State Power for Low-Carbon Development:
A Comparative Investigation into the Effectiveness of
Carbon Finance Projects in Tanzania, Uganda and Moldova

by

Mark Purdon

A thesis submitted in conformity with the requirements
for the degree of Doctor of Philosophy

Department of Political Science
University of Toronto

© Copyright by Mark Purdon 2013
Empirical investigation into afforestation and bioenergy carbon finance projects in Tanzania, Uganda and Moldova demonstrates that effective projects—both in terms of sustainable development and the generation of genuine carbon credits—are more likely to result when the state is able to bring carbon finance initiatives into alignment with national development objectives. Amongst the countries investigated, the most important factor in such alignment was, paradoxically, commitment liberal economic reforms. Contrary to the expectation that the performance of projects under the Kyoto Protocol’s Clean Development Mechanism (CDM) would be the same in states with similar administrative capacities, carbon finance projects were more effective in Uganda and Moldova than Tanzania. Commitment to liberal economic reforms in Uganda functions as an animating set of ideas that allows the state apparatus to work in a more purposeful manner and establish institutions and organizations which allow it to generate state power for low-carbon development.

For CDM forest and bioenergy projects, the risk of unsustainability is mitigated by a land tenure system and investment regime that (i) offer opportunities for individual smallholders to engage directly with the carbon market and create incentives for domestic investors while (ii) also accommodating historical land governance practices. Genuine carbon credits were associated with project developers who possessed a latent organizational capacity for implementation and were motivated to pursue market opportunities—state forest agencies in Uganda and Moldova. However, the ability of the state to retain latent organizational capacity
was restricted to sectors such as forestry that are less sophisticated technically; in the energy sector, such capacity was ceded to the private sector in Uganda and Moldova during structural adjustment. More skeptical of liberal economic policy, Tanzania has retained capacity in the energy sector; however, for the same reasons, it has not treated the CDM as a genuine opportunity.

At current carbon prices, CDM projects investigated were effective when the state was able to play a developmental role in the economy. Whether commitment to liberal economic reforms can have similar developmental effects in other parts of the developing world is questionable—a different animating set of ideas may be important.
Acknowledgements

This PhD project would not have succeeded without the support of many people: family, friends and colleagues. I first must thank Steven Bernstein for taking me on as a PhD student. As I didn’t have a background in political science prior to the PhD, I am grateful that he was open-minded enough to see in me the potential for tackling environment and development issues from a political angle. He also deserves special recognition for sending me to a number of UNFCCC events. Thanks also must be extended to my other committee members, Antoinette Handley and Grace Skogstad, for their willingness to read all the various different versions of the dissertation. I thank Antoinette in particular for pushing me to think and rethink the aspects of my dissertation relating to international development theory. Grace helped me keep the project on track. Thanks also should be extended to Will Prichard and Jennifer Clapp for their helpful insights.

Part of the fun about doing field-intensive research is the opportunity to meet and work with many great people. At the Environment for Development-Tanzania I would like to thank Razack Lokina, Salvatory Macha, Elizabeth Robinson as well as PhD students and rest of the faculty at the Department of Economics of the University of Dar es Salaam. Also in Tanzania, thanks must be extended to Mama Kaya, Michel Tchuenche, Secelela Balisidya, Peter Kazaura and Victoria Mushi. Victoria deserves special recognition for helping me find a great car and mechanic. At the Makerere University, thanks go first and foremost to Mohammed Bukenya at the Faculty of Forestry and Nature Conservation and other colleagues there. Outside of the university, I would like to thank Sara Namirembe, Melissa Eve and Phoebe Sullivan. Moldova would not have been possible without the kind assistance of Iordanca-Rodica Iordanov at Moldova State University and Ecaterina Melnicenco at Milieukontakt International. The Sensi Café also became a choice place for a PhD student working the night away. But during my nearly nine months in the field, I probably spent the most time with my research assistants who quickly became close friends. In Tanzania, fieldwork was assisted by Samwel Moses Ntapanta and Hamadiel Mgala. In Uganda, field assistance was provided by Maria Sarah Nadunga and Arinaitwe Euzobio. Finally, assistance in Moldova was provided by Dorin Toma.

Behind the scenes have been countless friends and colleagues. The Department of Political Science at the University of Toronto proved to be full of terribly intelligent people and interdisciplinary in the truest sense of the word. Through friends I have learned about the politics of ancient Greece, China and US space policy, women’s rights, microfinance as well as the ins-and-outs of Canadian and US environmental policy. In Toronto, close friends include Seth Jaffe, Olivier Ruchet, Kara Santokie, Kim Carter, Gabe Eidelman, David Houle, Erick Lachapelle, Sarah Eaton, Ethel Tungohan, Wayne Chu, Wendy Hicks, Caroline Shenaz Hossein-Sen, Elinor Bray-Collins, Deb Thompson, Stephen Trott, James McKee, Suzanne Hindmarch, Charmaine Stanley, Izabela Stefija, Karlo Basta, Luc Turgeon, Zack Taylor, Bill Flanik and Josh Gordon as well as Carolyn Branton and Mary-Alice Bailey. Outside the department, thanks are due to Jeff Biggs, Leah Adema and Hilary Martin. Montreal has been my second home. Special thanks to Simon-Philippe Breton, Marc Sauriol-Francovic, Joel Bedard, Daniel Summers-Lépine, Patrick Lozeau and Etienne De Sève as well as Thuy Nguyen, Jacob Thorpe, Elise Deacon, Céline Ruault, Claudiane Poisson, Catherine Boudreault, Roger Samson, Sarah Heiberg as well as the crew at Crossfit Capop. At McGill I would also like to thank Ora Szekeley, Sarah Mason-Case, Theo McLachlin, Isabel Galiana, James Devine, Erin White, Andrea Lawlor and Melanie
Thomas. Special thanks are due to Chris Bryniak, Åsa Kestrup, Brent Ean Frank Grube, and Boris Romaguer for believing in me during the course of the PhD. Faye Fredrikson, I am sure you are celebrating the completion of the dissertation in your own way.

I also benefitted from a number of professional opportunities during the course of my PhD. I would like to thank colleagues I have met through the UNDP including Matt Spannagle, Robert Kelly, Marcel Alers, Yannick Glemarec, Maryam Niamer-Fuller, Janka Geckova and Henrieta Martonakova. The opportunity to step into the world of international development policy has been invaluable. Many have remained close friends. At the Gold Standard Foundation it was a real opportunity to work with Meinrad Bürer, Adrian Rimmer and Tanya Petersen amongst others. Bill Graham and Wayne Kenefick offered me an opportunity to work on US and Canadian climate policy from a private sector perspective. Finally, thanks must be given to Marilyn Scott at the McGill School of Environment for offering me a lectureship opportunity there. It was a pleasure working with Iwao Hirose, Jaye Ellis, Renée Sieber, Elena Bennett, Nicolas Kosoy and David Goodin amongst others.

A very special thanks are due to my family. My parents, David and Marie Purdon, have been stalwart in their support and helping me see this PhD through. It was amongst the greatest pleasures to have been able to have my parents visit me in Tanzania, for a very memorable trip from the Serengeti down to Zanzibar. My sister, Catherine Purdon, and brother-in-law, Alain Kuyumjian, have also been incredibly supportive. It has been wonderful to see them welcome two amazing kids into the world during the course of my PhD—Daniel and Ani. When doing work on international development and climate policy, having close family in NYC helps! Being in Montreal, I have also felt part of the extended Kuyumjian family and would like to thank Arpy, Stepan and Aram in particular for always being welcoming. My Czech family has always been supportive and interested in my work, particularly my uncle and aunt, Jan and Marie Zeman. I would especially like to thank them for welcoming me for Christmas in 2008 during some of my PhD travels as well as near boundless hospitality long before and since. I would also thank my cousin Kateřina and her husband Aleš Machal for all their support—especially while visiting me in Berlin! It must be said that my interest in Moldova has been influenced by the experience of my mom and her family under the communist regime in Czechoslovakia and the transition since. I would also like to thank the Toronto side of my family, especially Jane and Tom McLellan, for many family dinners at their home. I would especially like to recognize my grandfather, Dr. Arnold Purdon. It must be unique that three generations of Purdons can claim the title of “Doctor” from the University of Toronto. My grandfather graduated from the Faculty of Medicine in 1940, my father with a PhD in biochemistry in 1975.

This research was supported with the generous support of an International Development Research Centre (IDRC) Doctoral Research Award; Social Sciences and Humanities Research Council (SSHRC) CGS Doctoral Scholarship; University of Toronto Department of Political Science Student Award as well as support from Environment for Development-Tanzania.

In a long project, I have undoubtedly missed some people. Apologies! This was really a collective effort and I could not have done it without the help of many! Thank you!! Asante sana!! Muștumesc!! Any errors in the dissertation are of course my own.
# Table of Contents

Abstract ........................................................................................................................................................................... ii
Acknowledgements ................................................................................................................................................................. iv
List of Tables ........................................................................................................................................................................ viii
List of Figures ........................................................................................................................................................................ x
List of Boxes ......................................................................................................................................................................... xii
Acronyms ................................................................................................................................................................................. xiii

1. **Introduction** ........................................................................................................................................................................ 1
   1.1. Summary of Research Findings and Explanation ........................................................................................................ 9
   1.2. Organization of the Dissertation .................................................................................................................................. 13

2. **Theory** ............................................................................................................................................................................... 14
   2.1. Introduction: Liberal Environmentalism and the CDM ................................................................................................. 14
   2.2. The Independent Variable: State Power for Development ......................................................................................... 18
   2.3. The Dependent Variable: CDM Effectiveness .............................................................................................................. 39
   2.4. Conclusion .................................................................................................................................................................. 47

3. **Research Design and Methods** ................................................................................................................................. 48
   3.1. Case Selection ............................................................................................................................................................... 48
   3.2. Measuring Sustainable Development and Additionality .......................................................................................... 58
   3.4. Deficiencies of Current Research into the CDM ........................................................................................................ 73
   3.5. Conclusion .................................................................................................................................................................. 77

4. **Project Development Context** ...................................................................................................................................... 79
   4.1. Tanzania ...................................................................................................................................................................... 79
   4.2. Uganda ....................................................................................................................................................................... 96
   4.3. Moldova .................................................................................................................................................................. 121
   4.4. Conclusion .................................................................................................................................................................. 143

5. **Results: Sustainable Development** .......................................................................................................................... 144
   5.1. Strong Sustainability .................................................................................................................................................. 151
   5.2. Weak Sustainability ................................................................................................................................................ 180
   5.3. Alternative Factors in Sustainability and Food Security .......................................................................................... 208
   5.4. Effectiveness of the DNA in Regulating Sustainable Development .................................................................. 217
   5.5. Conclusion .................................................................................................................................................................. 219
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Results: Additionality</td>
<td>220</td>
</tr>
<tr>
<td>6.1. Scenario 1: Governmental Organization as Project Developer</td>
<td>224</td>
</tr>
<tr>
<td>6.2. Scenario 2: Private Sector as Project Developer</td>
<td>240</td>
</tr>
<tr>
<td>6.3. Scenario 3: NGO as Project Developer</td>
<td>258</td>
</tr>
<tr>
<td>6.4. Conclusion</td>
<td>267</td>
</tr>
<tr>
<td>7. Explaining the Effectiveness of Carbon Finance Projects</td>
<td>268</td>
</tr>
<tr>
<td>7.1. Explaining Sustainable Development Impact</td>
<td>271</td>
</tr>
<tr>
<td>7.2. Explaining Additionality</td>
<td>301</td>
</tr>
<tr>
<td>7.3. Coherency between the CDM and the Rest of the State Bureaucracy</td>
<td>321</td>
</tr>
<tr>
<td>7.4. Conclusion</td>
<td>335</td>
</tr>
<tr>
<td>8. Conclusions and Implications</td>
<td>338</td>
</tr>
<tr>
<td>8.1. Summary of the Main Argument</td>
<td>338</td>
</tr>
<tr>
<td>8.2. Implications for International Development Theory</td>
<td>341</td>
</tr>
<tr>
<td>8.3. Implications for the Climate Change Regime</td>
<td>343</td>
</tr>
<tr>
<td>8.4. Remedies for Monitoring Additionality under Current Carbon Prices</td>
<td>346</td>
</tr>
<tr>
<td>8.5. Final Word</td>
<td>349</td>
</tr>
<tr>
<td>9. Appendices</td>
<td>351</td>
</tr>
<tr>
<td>Appendix 1: Project Evaluation Criteria used by DNA, Environmental Impact Assessment and Foreign Investment Screening</td>
<td>351</td>
</tr>
<tr>
<td>Appendix 2: CDM Project Cycle</td>
<td>361</td>
</tr>
<tr>
<td>Appendix 3: Economic, social and development indicators</td>
<td>363</td>
</tr>
<tr>
<td>Appendix 4: Household and Village Surveys</td>
<td>365</td>
</tr>
<tr>
<td>Appendix 5: Field Effort</td>
<td>383</td>
</tr>
<tr>
<td>Appendix 6: Supplementary Socioeconomic Research Findings</td>
<td>385</td>
</tr>
<tr>
<td>Appendix 7: 2008 Contract Between Green Resources and Idete village in Tanzania CDM Afforestation Project</td>
<td>391</td>
</tr>
<tr>
<td>Appendix 8: Supplementary Data for Uganda CDM Cogeneration Project</td>
<td>393</td>
</tr>
<tr>
<td>Appendix 9: Kakira Sugar Works – Outgrowers’ Cane Supply Agreement (Aided Farmers)</td>
<td>396</td>
</tr>
<tr>
<td>10. References</td>
<td>408</td>
</tr>
</tbody>
</table>
List of Tables

Table 1: Nine projects investigated across Tanzania, Uganda and Moldova ................................................................. 52
Table 2: Distribution of villages investigated .................................................................................................................. 57
Table 3: Basic comparative village statistics: population and households ................................................................. 57
Table 4: Cases for sustainable development ranking exercise ...................................................................................... 59
Table 5: Statistical overview of Tanzania CDM A/R projects .................................................................................... 80
Table 6: Approximate distribution of forested area (million hectares) across Tanzania’s primary land tenure categories, 1990 and 2006 .............................................................................................................. 84
Table 7: Village lands involved in Sun Biofuel project investigated in Tanzania ........................................................ 87
Table 8: Statistical overview of Karatu Energy Efficient Stove Project ........................................................................ 90
Table 9: CDM afforestation effort at Rwoho Central Forest Reserve ............................................................................ 98
Table 10: Approximate distribution of forested area (million hectares) across Uganda’s primary land tenure categories, 1990 and 2005 .................................................................................................................. 103
Table 11: List of villages in Bitereko subcounty surveyed ............................................................................................ 110
Table 12: Statistical overview of Moldovan afforestation projects supported by carbon finance ............................... 124
Table 13: Overview of Moldovan CDM rural energy modernization projects ............................................................ 130
Table 14: Frequency of fuel use across four households in Moldova ........................................................................ 132
Table 15: Incremental costs of GEF bioenergy project ................................................................................................. 138
Table 16: Local-level field effort by data collection type, project type and district ......................................................... 141
Table 17: Evaluation of CDM impact in terms of strong sustainability ....................................................................... 147
Table 18: Evaluation of CDM impact in terms of weak sustainability .......................................................................... 148
Table 19: Identification of Local CNC losses and benefits .......................................................................................... 152
Table 20: Identification of National CNC benefits ..................................................................................................... 152
Table 21: Frequency of fuel use across four households in Moldova ........................................................................ 154
Table 22: Fuel consumption and associated costs in Endabash and Bassodawish ....................................................... 160
Table 23: Comparative economic value of 1 hectare of pine plantation and maize after 6, 10 or 15 Years in Luhunga and Mapanda .................................................................................................................. 165
Table 24: Identification of local MMC benefits and opportunity costs ....................................................................... 181
Table 25: Identification of National MMC benefits and opportunity costs ............................................................... 182
Table 26: Compensation payments associated with land transfers for the Tanzania CDM afforestation project 193
Table 27: Carbon sequestration, carbon credit generation and payment schedule, per hectare, for Plan Vivo participants .......................................................................................................................... 196
Table 28: Expected harvesting schedule for Plan Vivo Mixed Native Woodlot ............................................................ 196
Table 29: Compensation payments associated with village land transfers to Sun Biofuels................................. 206
Table 30: Food security status across villages in Tanzania and Uganda.............................................................. 212
Table 31: Relationship between food insecurity and projects .................................................................................. 213
Table 32: Future Land Needs of Villages Based on Population Growth Rates............................................................... 216
Table 33: CDM Sustainable Development Evaluation and Regulation ......................................................................... 218
Table 34: Additionality performance of seven carbon finance projects ........................................................................ 222
Table 35: IRR, NPV and carbon prices of CDM projects investigated ........................................................................ 223
Table 36: Projects implemented under the SIF2 project............................................................................................. 237
Table 37: Financial analysis of three different project activities: coal-gas fuel switching, coal-biomass fuel-switching and energy retrofitting (coal-coal) as presented in Moldova CDM project documents.................. 239
Table 38: Change in royalty rates for forest products felled on government owned forests in Tanzania between 2002 and 2007 ........................................................................................................................................ 257
Table 39: Household tree planting effort and associated carbon sequestration amongst participants in the Plan Vivo project and control group .................................................................................................................. 260
Table 40: CDM projects reaching validation and registration stages, March 2013 ....................................................... 271
Table 41: Comparative economic value of 1 hectare of pine plantation and maize after 6, 10 or 15 Years in Luhunga and Mapanda............................................................................................................................................... 282
Table 42: Tree-planting effort of various organizations in Uganda, 2004-2011.......................................................... 311
Table 43: DNA summary evaluation across Tanzania, Uganda and Moldova.................................................................. 322
Table 44: Summary of Climate Change Regulation across Tanzania, Uganda and Moldova ........................................ 323
Table 45: Economic, social and development indicators in Tanzania, Uganda and Moldova ........................................ 363
Table 46: Summary table of local level field effort ..................................................................................................... 383
Table 47: Summary table of district and national level key informant interviews .................................................. 384
Table 48: Key Informant Interview Questions ........................................................................................................... 384
Table 49: Average household land holding and land use across villages investigated in Tanzania, Uganda and Moldova ....................................................................................................................................... 385
Table 50: Agricultural productivity and input use across across villages investigated in Tanzania, Uganda and Moldova........................................................................................................................................ 386
Table 51: Household economic characteristics across villages in Tanzania, Uganda and Moldova........................ 387
Table 52: Village land use designation across four villages in Moldova .................................................................... 388
Table 53: Calculation of genuine carbon credits after financial additionality assessment ...................................... 393
Table 54: Calculation of genuine carbon credits after combined financial and emissions additionality assessment ........................................................................................................................................ 394
Table 55: Power generation in Uganda: installed (2001-20010) and planned (2011-2014) ...................................... 395
List of Figures

Figure 1: Prices for CDM credits on secondary and primary markets, 2007-2012 ......................................................... 3
Figure 2: Matrix mapping state power for development ................................................................. 20

Figure 3: Correspondence analysis of basic economic, social and development indicators of Tanzania, Uganda and Moldova ................................................................................................................ 22

Figure 4: Correspondence analysis of subset of development indicators ................................................ 22

Figure 5: Trends in (A) Tax Revenue Extraction and (B) GDP per Capita across Tanzania, Uganda and Moldova, 1991-2010 ................................................................................................................ 30

Figure 6: Map showing location of projects investigated in Tanzania .............................................. 53

Figure 7: Map showing projects investigated in Uganda ................................................................. 53

Figure 8: Map showing location of two districts where CDM project activities were investigated in Moldova ................................................................. 54

Figure 9: Vehicles used during fieldwork ...................................................................................... 56

Figure 10: Critical Natural Capital ranking matrix .......................................................................... 64

Figure 11: Man-Made Capital Matrix ............................................................................................. 67

Figure 12: Examples of additional and non-additional carbon finance projects as a result of a changing baseline, for energy and afforestation/reforestation type projects, respectively ................................................................. 72

Figure 13: Map of project lands and villages of CDM afforestation projects and control villages in Mufindi District amidst four forest reserves ........................................................................ 82

Figure 14: Map of Mtamba village in Kisarawe district and control village of Maguruwe ....................... 88

Figure 15: Map of Endabash village involved with CDM cookstove project and control village of Bassodawish in Karatu district ........................................................................................................................... 93

Figure 16: Map of Rwoho and Bugamba CFRs in relation to Kirungu and Rwerazi villages (Ntungamo District) 101

Figure 17: Distribution of land tenure status amongst five villages in Uganda ................................. 108

Figure 18: Map indicating location of Bitereko sub-county and its proximity to Kigezi Wildlife Reserve and the district capital of Bushenyi .............................................................................................................................. 110

Figure 19: Change in Power Generation and Consumption in Uganda, 2005-2010 ........................................ 112

Figure 20: Population density amongst three districts investigated in Uganda ................................ 119

Figure 21: 2011 Satellite image showing location of KSW estate amidst agricultural lands ................ 119

Figure 22: Map indicating location of Kagogwa village and its distance from KSW Estate and Sugar Works in Jinja district as well as Central Forest Reserves in the region ................................................................. 120

Figure 23: Degraded hillside in Bursuceni which had been deforested during a period of intense fuel scarcity in the winter of 1995-96 ...................................................................................................................... 126

Figure 24: Historical trends in Moldova’s forest cover ........................................................................ 128
List of Boxes

Box 1: Galileo and Additionality .................................................................................................................. 46
Box 2: Importance of Scope of Comparison in Assessment of CDM Additionality ........................................ 76
Box 3: Primary barriers identified to the uptake of biomass energy by GEF bioenergy pilot project .............. 136
Box 4: Anticipated benefits of GEF biomass energy project ............................................................................ 137
Box 5: History of KSW Donor Financing 1982-2012 ...................................................................................... 245
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADP</td>
<td>Agrarian Democratic Party (Moldova)</td>
</tr>
<tr>
<td>AfDB</td>
<td>African Development Bank</td>
</tr>
<tr>
<td>AFOLU</td>
<td>Agriculture, Forestry and Other Land-Use</td>
</tr>
<tr>
<td>ALC</td>
<td>Area Land Committee (Uganda)</td>
</tr>
<tr>
<td>ALRC</td>
<td>Agency for Land Relations and Cadastre (Moldova)</td>
</tr>
<tr>
<td>ANR</td>
<td>Assisted Natural Regeneration</td>
</tr>
<tr>
<td>ANRE</td>
<td>National Energy Regulatory Agency (Moldova)</td>
</tr>
<tr>
<td>A/R</td>
<td>Afforestation/Reforestation</td>
</tr>
<tr>
<td>BSGA</td>
<td>Busoga Sugarcane Growers Association</td>
</tr>
<tr>
<td>CBOs</td>
<td>Community-based organizations</td>
</tr>
<tr>
<td>CCO</td>
<td>Certificate of Customary Ownership (Uganda)</td>
</tr>
<tr>
<td>CCRO</td>
<td>Certificate of customary right of occupancy (Tanzania)</td>
</tr>
<tr>
<td>CDCF</td>
<td>Community Development Carbon Fund (World Bank)</td>
</tr>
<tr>
<td>CDM</td>
<td>Clean Development Mechanism</td>
</tr>
<tr>
<td>CDM EB</td>
<td>CDM Executive Board</td>
</tr>
<tr>
<td>CER</td>
<td>Certified Emission Reduction</td>
</tr>
<tr>
<td>CFM</td>
<td>Collaborative Forest Management (Uganda)</td>
</tr>
<tr>
<td>CFR</td>
<td>Community Forest Reserve (Tanzania)</td>
</tr>
<tr>
<td>CFR</td>
<td>Central Forest Reserve (Uganda)</td>
</tr>
<tr>
<td>CFU</td>
<td>Carbon Finance Unit (World Bank)</td>
</tr>
<tr>
<td>CLA</td>
<td>Community Land Association (Uganda)</td>
</tr>
<tr>
<td>CO₂e</td>
<td>Carbon Dioxide Equivalent</td>
</tr>
<tr>
<td>COP</td>
<td>Conference of Parties</td>
</tr>
<tr>
<td>DED</td>
<td>District Executive Director (Tanzania)</td>
</tr>
<tr>
<td>DFO</td>
<td>District Forest Officer (Tanzania)</td>
</tr>
<tr>
<td>DFS</td>
<td>District Forest Service (Uganda)</td>
</tr>
<tr>
<td>DLB</td>
<td>District Land Board (Uganda)</td>
</tr>
<tr>
<td>DNA</td>
<td>Designated National Authority</td>
</tr>
<tr>
<td>DNRO</td>
<td>District Natural Resources, Lands and Environment Officer (Tanzania)</td>
</tr>
<tr>
<td>EcoTrust</td>
<td>Environmental Conservation Trust of Uganda</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>EPRC</td>
<td>Economic Policy Research Centre (Uganda)</td>
</tr>
<tr>
<td>ERA</td>
<td>Electricity Regulatory Agency (Uganda)</td>
</tr>
<tr>
<td>ERPA</td>
<td>Emission Reduction Purchase Agreement</td>
</tr>
<tr>
<td>ERT</td>
<td>Energy for Rural Transformation (Uganda)</td>
</tr>
<tr>
<td>ERTRF</td>
<td>Energy for Rural Transformation Refinance Fund (Uganda)</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agricultural Organization</td>
</tr>
<tr>
<td>FBD</td>
<td>Forest and Beekeeping Division (Tanzania)</td>
</tr>
<tr>
<td>FID</td>
<td>Forest Inspection Division (Uganda)</td>
</tr>
<tr>
<td>FIEFOC</td>
<td>Farm Income Enhancement and Forest Conservation (Uganda)</td>
</tr>
<tr>
<td>FLEG</td>
<td>Forest Law and Governance Program</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
</tr>
<tr>
<td>---------</td>
<td>-----------</td>
</tr>
<tr>
<td>FMP</td>
<td>Forest Management Plan</td>
</tr>
<tr>
<td>FSC</td>
<td>Forest Stewardship Council</td>
</tr>
<tr>
<td>FSSD</td>
<td>Forest Sector Support Department (Uganda)</td>
</tr>
<tr>
<td>GACC</td>
<td>Global Alliance for Clean Cookstoves</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GEF</td>
<td>Global Environment Fund</td>
</tr>
<tr>
<td>GHGs</td>
<td>Greenhouse gases</td>
</tr>
<tr>
<td>GNI</td>
<td>Gross National Income</td>
</tr>
<tr>
<td>GRL</td>
<td>Green Resources Limited</td>
</tr>
<tr>
<td>GWh</td>
<td>Gigawatt Hour</td>
</tr>
<tr>
<td>HFCs</td>
<td>Hydrofluorocarbons</td>
</tr>
<tr>
<td>ICAS</td>
<td>Forest Research and Management Institute (Moldova)</td>
</tr>
<tr>
<td>IREMP</td>
<td>Indicative Rural Electrification Master Plan</td>
</tr>
<tr>
<td>IRR</td>
<td>Internal Rate of Return</td>
</tr>
<tr>
<td>JFM</td>
<td>Joint Forest Implementation</td>
</tr>
<tr>
<td>Ji</td>
<td>Joint Implementation</td>
</tr>
<tr>
<td>KDA</td>
<td>Karatu Development Association (Tanzania)</td>
</tr>
<tr>
<td>KORD</td>
<td>Kakira Outgrowers for Rural Development</td>
</tr>
<tr>
<td>KSW</td>
<td>Kakira Sugar Works (Uganda)</td>
</tr>
<tr>
<td>KT</td>
<td>Kilotonne</td>
</tr>
<tr>
<td>kWh</td>
<td>Kilowatt Hour</td>
</tr>
<tr>
<td>LAFR</td>
<td>Local Authority Forest Reserve (Tanzania)</td>
</tr>
<tr>
<td>LDC</td>
<td>Least Developed Country</td>
</tr>
<tr>
<td>LEAT</td>
<td>Lawyers' Environmental Action Team (Tanzania)</td>
</tr>
<tr>
<td>LFR</td>
<td>Local Forest Reserve (Uganda)</td>
</tr>
<tr>
<td>LGA</td>
<td>Local Government Authority (Tanzania)</td>
</tr>
<tr>
<td>LULUCF</td>
<td>Land Use, Land-Use Change and Forestry</td>
</tr>
<tr>
<td>MAH</td>
<td>Ministry of Agriculture, Animal Industry and Fisheries (Uganda)</td>
</tr>
<tr>
<td>MAIA</td>
<td>Ministry of Agriculture and Food Industry (Moldova)</td>
</tr>
<tr>
<td>MCFU</td>
<td>Moldovan Carbon Finance Unit</td>
</tr>
<tr>
<td>MDL</td>
<td>Moldovan Lei (currency)</td>
</tr>
<tr>
<td>MEM</td>
<td>Ministry of Energy and Minerals (Tanzania)</td>
</tr>
<tr>
<td>MEMD</td>
<td>Ministry of Energy and Mineral Development (Uganda)</td>
</tr>
<tr>
<td>MENR</td>
<td>Ministry of Environment and Natural Resources (Moldova)</td>
</tr>
<tr>
<td>MFPED</td>
<td>Ministry of Finance, Planning and Economic Development (Uganda)</td>
</tr>
<tr>
<td>MIA</td>
<td>Ministry of Internal Affairs (Uganda)</td>
</tr>
<tr>
<td>MKUKUTA</td>
<td>National Strategy for Growth and Reduction of Poverty (Tanzania)</td>
</tr>
<tr>
<td>MKURABITA</td>
<td>Property and Business Formalization Programme (Tanzania)</td>
</tr>
<tr>
<td>MLHHS</td>
<td>Ministry of Lands, Housing &amp; Human Settlements Development (Tanzania)</td>
</tr>
<tr>
<td>MLHUD</td>
<td>Ministry of Lands, Housing and Urban Development (Uganda)</td>
</tr>
<tr>
<td>MNRT</td>
<td>Ministry of Natural Resources &amp; Tourism (Tanzania)</td>
</tr>
<tr>
<td>MoFPED</td>
<td>Ministry of Finance, Planning and Economic Development (Uganda)</td>
</tr>
<tr>
<td>MOLG</td>
<td>Ministry of Local Government (Uganda)</td>
</tr>
<tr>
<td>MTOE</td>
<td>Million Tonnes Oil Equivalent</td>
</tr>
<tr>
<td>MTTI</td>
<td>Ministry of Tourism, Trade and Industry (Uganda)</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
</tr>
<tr>
<td>------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>MW</td>
<td>Megawatt</td>
</tr>
<tr>
<td>MWLE</td>
<td>Ministry of Water, Lands and Environment (Uganda)</td>
</tr>
<tr>
<td>NAADS</td>
<td>National Agricultural Advisory Services (Uganda)</td>
</tr>
<tr>
<td>NAAEE</td>
<td>National Agency for Energy Efficiency</td>
</tr>
<tr>
<td>NAMA</td>
<td>Nationally Appropriate Mitigation Actions</td>
</tr>
<tr>
<td>NARD</td>
<td>National Agency for Rural Development (Moldova)</td>
</tr>
<tr>
<td>NBS</td>
<td>National Biomass Study (Uganda)</td>
</tr>
<tr>
<td>NBTF</td>
<td>National Biofuels Task Force (Tanzania)</td>
</tr>
<tr>
<td>NDP</td>
<td>National Development Plan (Uganda)</td>
</tr>
<tr>
<td>NEMA</td>
<td>National Environment Management Authority (Uganda)</td>
</tr>
<tr>
<td>NEMC</td>
<td>National Environment Management Council (Tanzania)</td>
</tr>
<tr>
<td>NFA</td>
<td>National Forestry Authority (NFA)</td>
</tr>
<tr>
<td>NFR</td>
<td>National Forest Reserve (Tanzania)</td>
</tr>
<tr>
<td>NGOs</td>
<td>Non-governmental Organizations</td>
</tr>
<tr>
<td>NLP</td>
<td>National Land Programme (Moldova)</td>
</tr>
<tr>
<td>NPV</td>
<td>Net Present Value</td>
</tr>
<tr>
<td>ODA</td>
<td>Official Development Assistance</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>OECD-DAC</td>
<td>OECD Development Assistance Committee</td>
</tr>
<tr>
<td>PCF</td>
<td>Prototype Carbon Fund (World Bank)</td>
</tr>
<tr>
<td>PDD</td>
<td>Project Design Document</td>
</tr>
<tr>
<td>PIN</td>
<td>Project Idea Note</td>
</tr>
<tr>
<td>PMA</td>
<td>Plan for the Modernization of Agriculture (Uganda)</td>
</tr>
<tr>
<td>PMO-RALG</td>
<td>Prime Minister’s Office – Regional Administration and Local Government</td>
</tr>
<tr>
<td>PPA</td>
<td>Power Purchase Agreement</td>
</tr>
<tr>
<td>ProBEC</td>
<td>Programme for Basic Energy Conservation in Southern Africa</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
</tr>
<tr>
<td>REA</td>
<td>Rural Energy Agency (Tanzania)</td>
</tr>
<tr>
<td>REA</td>
<td>Rural Electrification Agency (Uganda)</td>
</tr>
<tr>
<td>RECPA</td>
<td>Rwaho Environmental Conservation and Protection Association (Uganda)</td>
</tr>
<tr>
<td>REDD</td>
<td>Reducing Emissions from Deforestation and Forest Degradation in Developing Countries</td>
</tr>
<tr>
<td>REF</td>
<td>Rural Electrification Fund (Uganda)</td>
</tr>
<tr>
<td>REFIT</td>
<td>Renewable Energy Feed-in-Tariff</td>
</tr>
<tr>
<td>ROR</td>
<td>Rate of Return</td>
</tr>
<tr>
<td>SACCO</td>
<td>Savings and credit co-operative society (Uganda)</td>
</tr>
<tr>
<td>SEE</td>
<td>State Ecological Expertise</td>
</tr>
<tr>
<td>SEI</td>
<td>State Ecological Inspectorate</td>
</tr>
<tr>
<td>SIF2</td>
<td>Social Investment Fund 2 (Moldova)</td>
</tr>
<tr>
<td>SPGS</td>
<td>Sawlog Production Grant Scheme (Uganda)</td>
</tr>
<tr>
<td>SPILL</td>
<td>Strategic Plan to Implement Land Laws (Tanzania)</td>
</tr>
<tr>
<td>SSR</td>
<td>Soviet Socialist Republic</td>
</tr>
<tr>
<td>TANAPA</td>
<td>Tanzania National Parks</td>
</tr>
<tr>
<td>TaTEDO</td>
<td>Centre for Sustainable Modern Energy Expertise (Tanzania)</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
</tr>
<tr>
<td>---------</td>
<td>-----------</td>
</tr>
<tr>
<td>TFS</td>
<td>Tanzania Forest Service</td>
</tr>
<tr>
<td>TIC</td>
<td>Tanzania Investment Center</td>
</tr>
<tr>
<td>TIST</td>
<td>The International Small Group &amp; Tree Planting Programme</td>
</tr>
<tr>
<td>TPAWO</td>
<td>Tanzania Plantation and Agricultural Workers Association</td>
</tr>
<tr>
<td>TWICO</td>
<td>Tanzania Wood Industries Corporation</td>
</tr>
<tr>
<td>UEB</td>
<td>Uganda Electricity Board</td>
</tr>
<tr>
<td>UEDCL</td>
<td>Uganda Electricity Distribution Company Ltd</td>
</tr>
<tr>
<td>UEGCL</td>
<td>Uganda Electricity Generation Company Ltd</td>
</tr>
<tr>
<td>UETCL</td>
<td>Uganda Electricity Transmission Company Ltd</td>
</tr>
<tr>
<td>UFD</td>
<td>Uganda Forest Department</td>
</tr>
<tr>
<td>UIA</td>
<td>Uganda Investment Authority</td>
</tr>
<tr>
<td>ULA</td>
<td>Uganda Land Alliance</td>
</tr>
<tr>
<td>UNCED</td>
<td>United Nations Conference on Environment and Development</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>UN Framework Convention on Climate Change</td>
</tr>
<tr>
<td>UNFFE</td>
<td>Uganda National Farmers Federation</td>
</tr>
<tr>
<td>USCTA</td>
<td>Uganda Sugar Cane Technologists' Association</td>
</tr>
<tr>
<td>USSR</td>
<td>Union of Soviet Socialist Republics</td>
</tr>
<tr>
<td>VCS</td>
<td>Voluntary Carbon Standard</td>
</tr>
<tr>
<td>VLFR</td>
<td>Village Land Forest Reserve</td>
</tr>
<tr>
<td>VPO</td>
<td>Vice President's Office (Tanzania)</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
<tr>
<td>WCED</td>
<td>World Commission on Environment and Development</td>
</tr>
<tr>
<td>WFP</td>
<td>World Food Programme</td>
</tr>
</tbody>
</table>
State intervention in the economy, then, does not succeed or fail primarily because some states have more clever policy makers, capable of pursuing technically correct policies. Such sophistication matters, but the deeper reasons for why state intervention succeeds or fails have to do with the politics of the states. Some states are better at organizing power for use in a focused manner, while others are not. – Kohli (2004: 420)

1. Introduction

The growing threat of climate change has generated considerable interest in the possibility of shunting global development trajectories onto a sustainable, low-carbon pathway. Major multilateral development agencies such as the World Bank and UNDP have begun to mainstream climate change into their programming, as “climate-smart development” or “low-carbon climate-resilient development” (UNDP, 2011; World Bank, 2010e). While there is considerable agreement on this objective amongst the international community, there is little consensus on the means of reaching it.

While a previous era of development cooperation disbursed aid without much concern about its effectiveness, at least since the 1990s, donor agencies and governments have come to place a greater emphasis on results-based management (Binnendijk, 2001; Earl et al., 2001; Vähämäki et al., 2011). Under this, development financing is justified by its measurement and the evaluation of its effectiveness. Significantly, this change in the culture of international development financing has coincided with the rise of climate change on the international agenda. With hundreds of billions of dollars expected to flow to low-carbon development (or at least identified as necessary), the effectiveness of development financing now receives the scrutiny once reserved only for other areas of international cooperation such as international trade (Brewster, 2011; Moran, 2005; Rosendorff and Milner, 2001) and international security (Lysobey, 2000). Indeed, the international community’s ambition of redirecting development towards low-carbon development marks a new era in international development cooperation to the extent that it relies on results-based management.

In few areas have issues of climate change, international development cooperation and results-based management coalesced more than under the carbon market ushered in by the Kyoto Protocol. The rationale behind the international carbon market is that reducing emissions of
carbon dioxide (CO\textsubscript{2}) and other greenhouse gases in the developing world is cheaper than comparable efforts in the industrialized world—ideally translating into greater global emissions abatement. There is ample evidence that engaging emerging economies—particularly China—on climate change mitigation would drastically reduce it (Barrett, 1998: 25; Climate Group, 2009; Ellerman and Decaux, 1998: 17; Nordhaus, 2007: 33). This argument can be extended to least developed countries (LDCs), though mitigation potential here is largely in the area of forest, agriculture, bioenergy and land-use change (IPCC, 2007: 14; van der Werf et al., 2009).

In order to engage the developing world on climate change mitigation, the architects of the Kyoto Protocol devised a special carbon finance mechanism—the Clean Development Mechanism (CDM). Despite being introduced as something of an afterthought in negotiations (Werksman, 1998), the CDM quickly became a key instrument in a negotiated compromise between the industrialized and developing worlds on the costs and benefits of addressing climate change. With the goal of incentivizing projects that both reduce emissions and contribute to sustainable development, the CDM has been the standard-bearer for engagement with developing countries on climate change mitigation for the last decade. It is currently responsible for the vast majority of carbon credits sourced from the developing world.

However, the carbon market has been collapsing as a result of the global financial crisis and the failure of 2009 UN climate change talks in Copenhagen: both the market under the Kyoto Protocol as well as regional markets such as the EU Emission Trading System (ETS) and emerging markets in North America and New Zealand are struggling (Gronewold, 2011). As Figure 1 demonstrates, prices for CDM carbon credits have fallen precipitously in recent years, on both the CDM primary and secondary markets.\textsuperscript{1} Just the opposite trends would be necessary to see the carbon market succeed. Nordhaus, one of the world’s leading climate change economists, has contended that the price of carbon needs to rise to approximately $30 per tonne CO\textsubscript{2} in 2020 (€24 per tCO\textsubscript{2}) to prevent a 2°C change in temperature (Nordhaus, 2010: 11724).

\textsuperscript{1} Secondary market CDM credit prices reflect the price paid by final buyer while primary market CDM credit prices reflect prices paid to CDM project developers. Primary market CDM credit prices represent spot market low and high prices for pre-registered projects; given that it has taken considerable time for CDM projects to make their way to registration, this price was deemed most appropriate.
Yet prices on the CDM primary market, the signals for project developers in the developing world, have hovered around $9 (€7) for most of the mechanism’s history.

**Figure 1: Prices for CDM credits on secondary and primary markets, 2007-2012**

Collapsing prices for CDM credits are in part due to a lack of confidence in the mechanism’s effectiveness. The primary concern is that carbon credits are not truly fungible with emissions in developed countries against which they are traded. In other words, the carbon credits are bogus, a fraud. There is also a concern that the CDM only encourages a “race to the bottom” as the private sector exploits unsustainable, low-cost mitigation opportunities in the developing world. Doubts and frustrations with the CDM on both fronts have led many observers to argue that the mechanism needs to be abandoned or radically rethought (Bumpus and Liverman, 2008; Haya, 2010; Lohmann, 2006; Olsen and Fenhann, 2008; Paulsson, 2009; Prins and Rayner, 2007a; b; Skopek, 2010; Sutter and Parreño, 2007; Victor, 2001; Wara, 2008; Wara and Victor, 2008). As one leading international NGO has put it, the “problem [with the CDM] is that the whole mechanism is conceptually fundamentally flawed” (Brett, 2010).

This dissertation challenges the argument that the carbon market is fundamentally flawed. Through a comparative investigation of afforestation/reforestation (A/R) and bioenergy carbon finance project across Tanzania, Uganda and Moldova, it offers empirical evidence that, under certain conditions, the CDM and similar carbon offset projects do generate genuine carbon
credits and contribute to sustainable development. In contrast to most research in the CDM, I identify features of the domestic political economy of states hosting CDM projects that are important for it to work. The major argument advanced in this dissertation is that how a state organizes itself for development, which I describe by the term state power for development, is an important determinant of the effectiveness of carbon finance projects: under current carbon prices, the effectiveness of any carbon finance project is due to state’s power to bring it into alignment with its development objectives. Despite possessing less administrative capacity than Moldova, Uganda’s stronger preference for liberal economic reforms has led it to establish relatively strong market-supporting institutions and organizations, which while not their primary objective, also promote the effectiveness of carbon finance projects. An explanation for CDM effectiveness focusing on domestic factors contrasts with much of the climate policy literature which attributes the (assumed) failure of CDM projects largely to international or external factors—particularly the mechanism’s market-based design and information asymmetries in the CDM’s administration.

If this explanation appears novel, it is due as much to the attention I have given to the state as an explanatory factor as it is to the research methods I have used to measure the CDM’s performance: field-based comparative research across a number of projects and countries in the spirit of classic comparative studies in the development literature (Boone, 2003; Grindle, 1996; Hirschman, 1967). Most existing research into the CDM has been produced quickly, under a consultancy culture geared towards informing climate change negotiations. This method privileges those with expertise in the minutiae of UN climate change policy, but whose knowledge of the developing world rarely extends beyond capital city hotels. At the same time, because of a commitment to liberal environmentalism, which I describe below, the international community has treated the state as only a junior partner, effectively side-lining any real consideration of how best to engage with the state on low-carbon development. As one of the leading observers of climate policy has recently put it: “Oddly, most studies of international coordination on global warming ignore national policy and treat governments as ‘black boxes.’ Few analysts of international policy peer inside the box to discover how it works” (Victor, 2011: 8). Because there has been little systematic study of the CDM—both within and across
countries—domestic factors affecting the CDM’s effectiveness have remained unexplored. The current dissertation is one of very few to probe inside the black box.

Given the state of research into the CDM and the limited number of countries where projects have been implemented, particularly true at the time of fieldwork in 2009, the current study was largely exploratory in nature and sought to build understanding about how the performance carbon finance projects, particularly those in LDCs, vary according to a country’s level of development. I chose to study CDM projects in sub-Saharan Africa and the Former Soviet Union because this allows variation in what I call state power for development to be captured in a manner that was also logistically feasible. Policy in Tanzania and Uganda has often been compared because these two countries share numerous socioeconomic conditions that allow differences to stand out (Croke, 2012; Fjeldstad et al., 2003; Harrison, 2001; Kjaer, 2004; Kyarimpa, 2009; Steffensen et al., 2004; Therkildsen, 2010). Moldova, while still the poorest country in Europe, was selected as a comparator in order to control for administrative capacity. A comparison of only LDCs would not have been able to determine if the effectiveness of CDM projects was due to a lack of administrative capacity or the political economy preferences of the state. Beissinger and Young have argued for the utility of comparing states in previously disparate regions of Sub-Saharan Africa and the Former Soviet Union: “many of the ways in which state authority has disintegrated in the countries of both regions and the consequences of these cataclysms share enough similarities that meaningful insights into political processes can be generated when these situations are juxtaposed” (Beissinger and Young, 2002: 4).

I derive the term state power for development from Kohli (2004) who has used this term to great effect to differentiate state involvement in industrialization across two dimensions, one in terms of capacity and the other in terms of political economy:

Key determinants of... variation in state power for development are technical characteristics of state institutions, on the one hand, and the manner in which states craft their relations with social classes, especially producer classes, on the other. Some states are simply more purposive and better organized than others. Some states also choose to work with their dominant classes, whereas others, facing a variety of pressures, maintain some distance. Maximum power to propel industrialization is generated when purposive, well-organized states work closely with producing classes (Kohli, 2004: 21, underline is my emphasis).

Putting these two dimensions together, my argument is that, at least in the forest sector, a commitment to liberal economic reforms can function as an animating set of ideas that promotes
intragovernmental coherence and the establishment of *developmental* state institutions and organizations that generate power for effective carbon finance project execution—power for low-carbon development—in a manner analogous to the developmental state. The mechanisms by which the state achieves this vary between the two different outcomes that the CDM is charged to deliver.

For sustainable development, where a large number of actors and variables are at play, institutions such as land tenure and investment regime are most important. Variation in this institutional framework is ultimately a result of each state’s political economy orientation. My results indicate that MMC benefits for A/R and bioenergy projects are best promoted by a coherent set of rules for land tenure and investment that offers opportunities for smallholders to engage directly with the carbon markets at minimal risk and creates incentives for domestic investors. Land tenure also plays an important role in shaping CNC risks of land scarcity. The risk that land comes to represent CNC is affected by the way that a land tenure regime accommodates historical land governance practices.

For additionality, it is the presence of an organization with *latent organizational capacity for project implementation* in combination with state political economy orientation favourable to liberal economic reform. Latent organizational capacity for project implementation is a term I use to describe the capacity of organizations to implement a project or policy but not fulfill because of a lack of sufficient resources. Amongst projects implemented, such latent organizational capacity was found amongst state agencies in the forestry sector, adopted as a part of structural adjustment reform and tasked with implementing government policy even if such policies are unprofitable and insufficiently funded. The imprint of structural adjustment is found in the posture such state agencies have towards market opportunities—which inclines them towards opportunities such that offered through the CDM. However, in LDCs, such a developmental role for the state is limited low-tech sectors such as forestry, where the state has been able to maintain sufficient capacity to implement projects; a lack such capacity renders it infeasible for the state to play such a role in the energy sector. In sectors where the state cannot be expected to possess latent organization capacity for project implementation, the private sector will need to play a leading role. Under such conditions, my research suggests that improved
monitoring methods for carbon finance projects will be necessary to parse out emissions due to carbon finance, business practices as well as donor support.

But this dissertation’s novelty lies not just in identifying a novel explanatory variable—state power for development—but also clarifying the measurement of the dependent variable: the effectiveness of individual CDM projects. To the best of my knowledge, there has been no systematic field-based assessment of the effectiveness of CDM projects across different countries. Indeed, aside from research presented here, there is only a handful of studies that assess CDM projects using appropriate, comparative methods of policy evaluation (see Langbein and Felbinger, 2006; Mohr, 1995). Information reaching the climate change policy community has been limited to research based on scattered case-studies, questionable CDM project documents or dry legal institutional analyses—albeit printed with colourful layouts and launched at side-events to the annual UNFCCC meetings. With the dependent variable itself murky, it has not been possible to develop an analytical model to tease out causal factors that determine the effectiveness of the CDM. Coupled with sloppy analytical distinctions among key concepts for measuring the CDM’s effectiveness, the CDM has become a punching bag for pundits debating the relative virtues and vices of market-based approaches to climate change. To put it in political science terms, variation across the dependent variable (the effectiveness of individual CDM projects) has been obscured by the lack of comparative field methods to control for state power for development.

This dissertation fills this gap by using comparative methods to investigate the effectiveness of nine afforestation/reforestation (A/R) and bioenergy projects—some national in scope—in Tanzania, Uganda and Moldova. I used comparative policy evaluation methods for both dimensions of CDM effectiveness. For sustainable development, I compared the socioeconomic impact of carbon finance projects on villages involved with an appropriate control in order to evaluate the impact of projects on critical natural capital (CNC) and man-made capital (MMC)—terms I describe in more detail later. Notably I evaluate my findings in light of two contrasting paradigms of sustainability—strong and weak sustainability (Neumayer, 2003)—in what may be the first empirical investigation to use both in its evaluation. Most of the literature on sustainable development remains at the level of assessment—an ex-ante effort to identify consequences of
an intervention before it is implemented (Raggamby et al., 2012: 214-215). For additionality, I used what I call a “comparative baseline approach” to evaluate project emission reduction claims. There are two dimensions to this comparative baseline approach. First, I evaluated projects in terms of “financial additionality” by comparing CDM financing with other financing sources and, second, I evaluated “background additionality” by comparing CDM projects with similar activities in a region but not claiming carbon credits. I elaborate on these two dimensions of additionality later.

Projects investigated in Tanzania include two CDM afforestation projects and one CDM improved cookstove project, but also a biofuel project operating independent of the CDM. Though projects producing biofuels for export are ineligible under the CDM project (CDM EB, 2006), one such project was investigated because of concerns that it raised similar sustainability issues. As large-scale land acquisitions, both the afforestation and biofuel projects in Tanzania investigated here have been the subject of intense international scrutiny (Carrington et al., 2011; Carrington and Valentino, 2011; Karumbidza and Menne, 2011; Oxfam, 2008). In Uganda, another three projects were investigated. These include a CDM afforestation project in Rwoho Central Forest Reserve in southwestern Uganda (CDM-PDD, 2006a; b; c; d; 2009) and a carbon offset reforestation project operating in the voluntary carbon market operating according to the Plan Vivo standard (EcoTrust, 2011). Third, I investigated a CDM bioenergy cogeneration project at Kakira Sugar Works which used sugarcane residue to generate electricity to offset domestic emissions (CDM-PDD, 2007b). Finally, in Moldova I investigated two CDM afforestation projects (CDM-PDD, 2008d; 2010) and two CDM rural energy modernization CDM projects (CDM-PDD, 2005a; b). Because of a lack of uptake of the bioenergy component of the CDM rural energy modernization project, which I only learned about during the course of fieldwork, I also investigated a bioenergy pilot project sponsored by the Global Environment Facility (GEF, 2005b). In contrast to CDM projects in Africa, both the CDM afforestation and energy projects in Moldova were larger in scope—each involved hundreds of individual project activities stretching across nearly the entire country. In this sense, the projects in Moldova

---

2 The CDM Executive Board considers this to be double-counting: the country reducing its emissions from the consumption of biofuels could also be claiming the carbon credits (CDM EB, 2006).
anticipate movement towards so-called “sectoral CDM” (CDM EB, 2011a; UNFCCC, 2010b). The sophistication of Moldova’s CDM projects was expected given that Moldova was formerly a part of the Soviet Union. Nonetheless, as my results show, stronger state administrative capacity does not automatically mean that CDM projects meet their objectives.

I have focused on A/R and bioenergy carbon finance projects for two reasons. First, most mitigation potential in LDCs lies in these sectors (IPCC, 2007: 14; van der Werf et al., 2009). As relatively low consumers of fossil fuels, LDCs possess less mitigation potential in sectors such as energy and transport relative to emerging economies such as China, India and Brazil. However, the crediting of mitigation actions in the land-use sector has been limited under the CDM to A/R and bioenergy (Bernoux et al., 2002; Boyd et al., 2008; Purdon, 2010; Ringius, 2002). The international community continues to debate how to expand carbon finance into other areas of land-use change, such as reducing deforestation (REDD).

Second, forest and bioenergy projects hold some of the most potential for promoting sustainable development in rural areas which remain home to the majority of the world’s poor and marginalized and are linked to the urbanization of poverty through rural out-migration (Millennium Project, 2005: 16-17; Mwabu and Thorbecke, 2004; Ravallion et al., 2007). A robust rural development strategy also lays the foundation for industrialization and human development (Kay, 2002; 2009). While the history of the transformation of peasant to market economies is littered with conflict (Allina-Pisano, 2008; Hydén, 1980; Moore, 1993 [1966]; Polanyi, 2001 [1944]; Sah and Stiglitz, 2002), such a transformation can be a legitimate and sustainable development strategy under certain conditions. Part of the challenge in development lies in solving the political dilemma of how “the burden of the cost of development”—to borrow a phrase from Sah and Stiglitz (2002: 3)—is to be shared.

1.1. Summary of Research Findings and Explanation

My results demonstrate that carbon finance projects were largely effective in terms of sustainable development across the three countries, meeting conditions of weak and strong sustainability in seven of eleven cases, with one case where I believe weak sustainability has been achieved though not strong sustainability, but only three projects were truly additional. The reason that
projects led to violations of the conditions of sustainable development varied across countries: losses in terms of MMC and CNC were observed in one project in Tanzania though only CNC losses in two projects in Uganda and another in Moldova. In terms of additionality, I have most confidence in the carbon credits generated from CDM afforestation projects in Moldova and Uganda that were implemented by their respective state forest agencies. Another NGO-led project in Uganda was found to be additional, though there was considerable uncertainty about the amount of carbon credits generated because of the lack of an appropriate baseline.

In explaining these outcomes, I argue that sustainable development and emissions reductions rely on different facets of state administrative capacity: institutional capacity for sustainable development and organizational capacity to reduce emissions—terms I define in further detail below. First, as a broad process involving many factors, unsustainability cannot be entirely eliminated but its risk mitigated through appropriate institutional design. For CDM A/R and bioenergy projects, the risk of unsustainability is mitigated by a system of rules whose foundation is a land tenure system and investment regime that (i) offers opportunities for individual smallholders to engage directly with the carbon market, creates incentives for domestic investors and avoids the risks of large-scale land transactions while (ii) also accommodates historical practices of land-use and governance. The first set of institutions promotes MMC benefits while the second reduces potential critical natural capital CNC losses.

Of the three countries I investigated, the first set of institutions were most closely realized in Uganda where the state has actually managed to establish developmental institutions and organizations in the forest sector through liberal economic reforms which enhanced state capacity. The individual land rights enshrined in Uganda’s land tenure system and the selectivity of the Uganda Investment Agency and Uganda’s foreign investment regime in general—both the fruit of liberal economic reform—suggests a more developmental industrial policy than in Tanzania and Moldova. Sustainability was compromised in Moldova by a land tenure system that places greater restrictions on land-use in conjunction with a less transparent political culture that saw important local land-use decisions made in a non-participatory manner. Sustainable development in Tanzania is frustrated in the case of A/R and bioenergy projects by a land tenure system that prevents the direct engagement of rural smallholders with carbon finance unless their
land rights are first transferred to the state which then leases land to foreign investors. Such findings contrast with expectations about the important role of common property institutions in Tanzania, which has been critically acclaimed particularly in the forest sector (Blomley and Iddi, 2009; Blomley and Ramadhani, 2006; Sundet, 2005; Wily, 1999; Wily and Mbaya, 2001). However, in Uganda and Moldova, losses of critical natural capital were associated with land governance dilemmas resulting from the failure of their respective land tenure systems to recognize and accommodate the historical legacies of state collapse. By accommodating the country’s socialist past into its land tenure system, Tanzania appeared to mitigate such CNC losses. This is not to say that state power for development alone determines the sustainability of CDM projects. The sustainable development impact of A/R and bioenergy projects is also affected by drought, population pressure as well as the history of land governance in each country.

Second, in order for the CDM to effectively reduce emissions, the “additionality” criterion, the interests of the CDM project developer and the state need to be aligned such that the latent organizational capacity of the state can be tapped. When state agencies in Moldova and Uganda were involved in the implementation of CDM projects, as was the case in two afforestation projects, projects were highly additional. Because the mandate of state agencies is motivated by development objectives as well as financial incentives they are able to maintain a latent organizational capacity that can be effectively leveraged by the limited carbon finance available to produce genuine carbon credits. Though noting the greater administrative capacity in Moldova relative to Uganda, reflected in the size and sophistication of Moldovan projects, these are differences in degree not kind. The private sector has more difficulty in maintaining such a latent organizational capacity. With the price of carbon low and uncertain, the private sector’s need to secure funds from other, non-carbon sources leads it to violate the conditions of additionality. NGOs involved with carbon projects also struggle to maintain a latent organizational capacity. Instead, their capacity is highly dependent on carbon finance, which leaves them vulnerable to the vagaries of the carbon market. Thus, the latent organizational capacity of state agencies provides a buffer against the low price of carbon and the vicissitudes of the market that the private sector and NGOs cannot or will not provide.
In demonstrating the importance of state power for development, these findings challenge assumptions of liberal environmentalism (see Bernstein, 2001) upon which the CDM has been built. Such assumptions have made it difficult to conceive of an active role for the state in the carbon market as the architects of the CDM assumed that the heavy lifting for the CDM’s implementation would be done by the private sector and civil society as a global price for carbon emerged. Though such a price has emerged, it has not (yet) been high enough to trigger transformative changes in development. The low price of carbon is the elephant in the room. This has significant implications for the regulation of carbon finance projects: namely, the tools to measure the CDM’s effectiveness—notably the CDM’s counterfactual baseline measurement system—are not fine enough to separate the wheat from the chaff.

These findings have important implications for how the international community engages with LDCs on low-carbon development until carbon prices rise significantly. I identify two options for improving the emission reduction claims of carbon finance. The first is to encourage carbon finance initiatives that closely align with state development priorities and to which the state is already committing resources. This may be accomplished via one of the latest innovations in international climate finance—nation ally appropriate mitigation actions or NAMAs (Mason-Case, 2011: 2; Okubo et al., 2011; South Pole Carbon, 2011). The gist of NAMAs is that they are actions identified by governments in developing countries, thus ostensibly ensuring that mitigation activities align with a state’s development priorities. Second, more robust measurement, reporting and verification (MRV) systems relying on comparisons rather than counterfactuals could be put in place to more clearly monitor projects operating under a low carbon price signal.

For sustainable development, the focus should be on institutions. However, shaping appropriate institutions for sustainable development requires considerable knowledge of administrative capacity and political economy of individual states—something that many in climate policy circles do not sufficiently possess. This explains measures such trying to regulate sustainable development through project screening. The climate change regime has erred in promoting the organizational capacity of a special government body to regulate CDM project in terms of sustainable development known as the Designated National Authority (DNA). My results
demonstrate that the DNA is at best redundant to existing state bodies for environmental impact assessment and foreign investments—if not opening up opportunities for rent-seeking.

In truth, the CDM has already become passé in climate change policy circles and will likely transition into an alternative mechanisms, such NAMAs, reducing emissions from deforestation and forest degradation (REDD), or a “new market mechanism” under the UNFCCC. But none of these alternative mechanisms has actually been implemented; they remain largely on the drawing board or pilot project stage. Without understanding how the CDM works, there is a risk that the international climate change regime will simply pour old wine into new bottles.

1.2. Organization of the Dissertation

Following this introduction, Chapter 2 presents the theoretical background that motivates this dissertation. It includes a more detailed presentation of the argument about causal linkages between state power for development and CDM effectiveness. Chapter 3 presents the research design and methods used for this study. The chapter also presents a critical review of methods previously used to study carbon finance and shows why the approach used here is superior. Put briefly, existing studies largely fail to appreciate the importance of comparative methods and knowledge about development context necessary to generate causal inferences about the sustainable development and emission reduction claims of any specific carbon finance project. In Chapter 4, I detail the development context of the nine carbon finance projects investigated. Care here is given to local and national factors influencing sustainable development and emission reductions. The detail offered in this chapter may be dry, but provides important context for interpreting results.

Chapters 5 and 6 present the main findings of my research, where I assess the effectiveness of each of the nine projects investigated. The reader should be prepared here for some technical discussion—while I have sought to keep the language simple, technical analysis is necessary for credible policy analysis. In Chapter 7, I move to explain the variation in CDM effectiveness observed, both in terms of sustainable development and additionality. In the concluding Chapter 8, I discuss implications for international development theory and the future of the climate change regime, particularly new mechanisms for carbon finance.
2. Theory

2.1. Introduction: Liberal Environmentalism and the CDM

To properly diagnose the challenges confronting the CDM and other efforts to promote low-carbon development, it is first important to understand the political conditions under which the mechanism was established. The CDM was informed by international norms of liberal environmentalism, which made international trade in carbon credits conceivable but also shaped the way the carbon market was to be organized. Indeed, a global carbon market is consonant with classical liberal (or neoliberal) ideas such as private property, free-trade and self-regulating markets (Bernstein, 2001: 118-119; Thorsen and Lie, 2006). A key part of this dissertation’s argument is that international norms surrounding liberal environmentalism have spilled over into the domestic sphere for carbon finance, informing how the international community saw the role of the state in low-carbon development.

The origins of neoliberalism are found in a view of political economy that sees economic development as the outcome of the spontaneous emergence of markets and capital accumulation, processes which states can only make more efficient through limited interventions such as securing property rights and establishing the rule of law (De Soto, 2000; Hejeebu and McCloskey, 1999; Thorsen and Lie, 2006). Neoliberalism also advocates for a reduced role of government in economic affairs in order to reduce the incidence of corruption and market distortions (Bhagwati, 1982; Krueger, 1974). In terms of decision-making and the exercise of political authority, neoliberalism has emphasized “governance” by multiple stakeholders instead of “government” by the state (Cerny, 1995; Hewitt de Alcántara, 1998; Rosenau and Czempiel, 1992).

Liberal environmentalism entails a reformulation of environmentalism in the context of the neoliberal international economic order (Bernstein, 2000; 2001). Liberal environmentalism marked a decisive movement away from more command-and-control regulatory approaches to environmental issues that characterized previous eras towards environmental policies compatible with neoliberal, market-based approaches. While often considered consonant with the term
“sustainable development”, liberal environmentalism is actually only one particular interpretation of sustainable development—a term which is notoriously difficult to define (Bernstein, 2001; Lélé, 1991; Mebratu, 1998; Pezzoli, 1997).

The term became institutionalized as liberal environmentalism between its conceptual elaboration in the 1987 Bruntland Report and the 1992 Earth Summit. Liberal environmentalism prevailed over other, competing interpretations of sustainable development because of its “fit” with the neoliberal economic order. As a result, the term “sustainable development” now masks a compromise between norms of environmental protection with liberal economic norms that characterize international environmental governance (Bernstein, 2001: 7). The tacit reliance on neoliberal economic theory endures under recent attempts to reframe the debate on environment and development, such as through UNEP’s (2011b) “green economy” or the OECD’s (2011) “green growth” initiatives.

The above discussion highlighting the association between neoliberalism and environmentalism should not be read as a critique in itself of the carbon market. The jury is still out on whether the carbon market and liberal environmentalism have been beneficial or not for tackling climate change. It is beyond the scope of this dissertation to resolve that debate here. However, elsewhere I have made the case that, in relation to other forms of international climate finance, the carbon market has distinct political advantages (Purdon, 2013).

The important point here is that neoliberalism has informed the design of the carbon market by discounting the role states hosting CDM projects might play. States have been allocated only limited authority over CDM projects through the establishment of a domestic body known as the Designated National Authority (DNA). The primary function of the DNA is the approval of individual CDM projects on the grounds of their contribution to sustainable development (see Olhoff et al., 2004). Sensing difficulty in reaching international agreement on what constitutes

---

3 As originally conceptualized in the 1987 Bruntland Report, the well-known definition of sustainable development suggests limits to economic growth and human ingenuity: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: (i) The concept of ‘need’, in particular the essential needs of the world’s poor, to which overriding priority should be given; and (ii) the idea of limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future goals” (WCED, 1987: 43).
sustainable development, the UNFCCC decided that it was a matter of national determination (Curnow and Hodes, 2009: 19-38). Many countries have produced a list of criteria for assessing sustainable development in the initial CDM approval process, including Tanzania and Uganda though notably not Moldova (see Appendix 1). The DNA is also responsible for setting a definition of “forests” for afforestation and reforestation projects without which they cannot proceed.\textsuperscript{5}

However, the UNFCCC gave little guidance about where the DNA should be situated within states. The DNA may take a variety of technical forms: housed within an existing government department or ministry, formed as an inter-ministerial committee or established as a new and independent office (Curnow and Hodes, 2009: 19-38; Ganapati and Liu, 2009). But there has been little consideration of which arrangement is best for different countries. As this dissertation will show, at least in LDCs, the DNA has often been relegated to rather insignificant parts of the government bureaucracy and plays little actual role in the regulation of CDM projects. Rather, jurisdiction over the CDM is shared by a large number of government bodies, themselves already existing independently of the climate change regime. Many of these bodies have been underappreciated if not unknown to the architects of the international climate change regime.

DNA aside, most elements of the CDM’s governance have been outsourced (Green, 2008; Doelle, 2002). Private auditors were given the important task of determining whether the carbon credits claimed by individual CDM projects are genuine or not—the “additionality” criterion. The process as a whole is subject to the ultimate authority of the CDM Executive Board based in Germany (Green, 2008). Yet private auditors have only a limited scope of review that requires them to confirm that information in CDM project documents conforms to its specific CDM

\textsuperscript{4} The CDM authority in each developing country is simply required to produce a permit (Letter of Approval) stating that the CDM project is assisting the country to achieve sustainable development (Lee, 2004: 40-42).

\textsuperscript{5} The DNA is responsible for specifically defining “forest” within three parameters: (i) a single minimum tree crown cover value between 10 and 30 per cent; (ii) a single minimum land area value between 0.05 and 1 hectare; and (iii) a single minimum tree height value between 2 and 5 metres. The Marrakech Accords also emphasize that young natural stands and all plantations which have yet to reach a crown density of 10-30 per cent or tree height of 2-5 metres are considered “forests”—as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention (Purdon, 2009: 59). As the climate change regime moves towards REDD there have been calls to revise this definition (see Sasaki and Putz, 2009). But as of the time of writing, the CDM’s definition remains the official one.
project methodology (UNFCCC, 2005a:para.37). But these methodologies are focused on technical methods of measuring emissions associated with the CDM project in question and a hypothetical counterfactual scenario if the project did not exist. They provide little information about the development context in which a project is situated which, I argue, is key to evaluating additionality. Perversely, the reliance on CDM project documents prevents auditors from considering a project in its development context. See Appendix 2 for a fuller presentation of the CDM project cycle.

The international community has paid much less attention to the types of institutions and organizations within countries necessary for seeing effective CDM projects implemented. While it is nowhere clearly articulated, the international community assumed that entrepreneurs would arise spontaneously to undertake projects as a global price for carbon emerged. For example, CDM capacity-building efforts have largely focused on DNA structure and capacity (Baker & McKenzie Law, 2004; Curnow and Hodes, 2009) and the production of guidelines for undertaking CDM projects or programmes (Climate Focus, 2011; Hinostroza, 2011; UNEP Risoe Centre, 2008). To borrow a phrase from the Hollywood movie “Field of Dreams”, the approach of the international community was “If you build it, they will come.”

The failure to conceive of a more substantial role for the state in low-carbon development is stark in light of current awareness of the important relationship between the state and economic development. Historians of political economy have long observed the important role of the state in the origins of the market economy (see Gerschenkron, 1962; Moore, 1993 [1966]; Polanyi, 2001 [1944]). Speaking for many, Polanyi famously asserted: “Laissez-faire was planned; planning was not” (Polanyi, 2001 [1944]: 147). It would be an error here to fall into a debate on Polanyi and the origins of a market society, which has been discussed elsewhere (Blythe, 2004; Hejeebu and McCloskey, 1999). It is of little help because the distinction between spontaneous

---

6 The key sections of paragraph 37 of UNFCCC (2005a) read: “The [third-party auditor] selected by project participants to validate a project activity, being under a contractual arrangement with them, shall review the project design document and any supporting documentation to confirm that the following requirements have been met...(d) The project activity is expected to result in a reduction in anthropogenic emissions by sources of greenhouse gases that are additional to any that would occur in the absence of the proposed project activity...(e) The baseline and monitoring methodologies comply with requirements pertaining to: (i) Methodologies previously approved by the Executive Board; or (ii) Modalities and procedures for establishing a new methodology...”
markets and government intervention in market creation is a false dichotomy. What might appear to be the creation of a market might only be an intervention into an existing market to improve its efficiency. Many spontaneous markets are small and inefficient (Fafchamps, 2004: 3). At a certain point, Fafchamps continues, “[c]ollective action, in the form of government intervention or otherwise, is often welcome and sometime necessary to help make markets achieve their full potential” (p. 3). The debate about spontaneous and planned markets districts from Polanyi’s real message which is not an indictment of movement towards a more economically efficient market society, but the pace of this change: “The rate of change is often of no less importance than the direction of the change itself…[The role of government in economic life] consists in altering the rate of change, speeding it up or slowing it down” (Polanyi, 2001 [1944]: 39).

Since neoliberalism’s heyday, where Polanyi and other economic historians lost ground, this conclusion was resuscitated by North (1990) and substantiated by subsequent research (Acemoglu and Johnson, 2005; Evans, 2010; Evans and Rauch, 1999; Grindle, 1996; Kohli, 2004; Rodrik, 2000). There is an emerging consensus that the state is an important factor in economic development. I will draw on Polanyi’s insight later as it helps explain the paradoxical finding of this dissertation that some consequences of the neoliberal structural adjustment and privatization efforts in the developing world have had developmental results.

2.2. The Independent Variable: State Power for Development

In this dissertation, I explain variation in CDM effectiveness through variation in state power for development. As indicated earlier, I adopt the term state power for development from Kohli’s (2004) extensive review of the process of industrialization in the developing world. Kohli argues there are two elements of state power for development: one related to a state’s administrative capacity and the other to its political economy orientation—that is, its guiding ideology about political economy and the appropriate relationship between the state, private sector and civil society (Kohli, 2004: 21).

Three “state types” emerge from variation in these two elements of state power for development (Kohli, 2004: 12-16). On one end of the spectrum, is the developmental state. The developmental state was effective in East Asia largely because the state’s prioritization of economic growth
coincided with the interests of the dominant, business classes. In the East Asian experience, the developmental state was highly interventionist but demonstrated market-reinforcing behaviour that supported export-oriented capitalist economic development (Evans, 1995; Johnson, 1982; Wade, 1990). In other words, an animating set of ideas based around economic growth permeated the state apparatus, which saw the state nurture firms of national strategic importance and seek to enhance their competitiveness on international markets. The developmental state is often seen as a half-way house between more neoliberal economic policies promoted by the US and the socialist regime of the Soviet block. The implication of the developmental state model is that the way the state organizes its administrative capacities and the ends to which it directs them can allow a country to achieve developmental objectives it may not otherwise achieve.

On the other side of Kohli’s spectrum are neopatrimonial states where the state is weak and unorganized but also where its political orientations are more personalized or ethnically oriented. While often associated with states in Africa (Bratton and van de Walle, 1994; van de Walle, 2001), neopatrimonialism exists elsewhere, including Eastern Europe and the former Soviet Union (Guliyev, 2011; Tsygankov, 2007). It is ostensibly an asymmetrical relation between someone with power and another in need of the protection or favour that such power affords. In an early article, Gellner (1977) defined it thus:

Patronage is unsymmetrical, involving inequality of power; it tends to form an extended system; to be long-term, or at least not restricted to a single isolated transaction; to possess a distinctive ethos; and, whilst not always illegal or immoral, to stand outside the officially proclaimed formal morality of the society in question (p. 4).

Where political allegiances are based on fixed characteristics (such as class, religion or ethnicity), political support is guaranteed regardless of performance. This increases the ability of politicians to gain support in exchange for rewarding targeted groups with jobs and other private goods (Srivastava and Larizza, 2012: 11; also see Acemoglu & Robinson, 2008).

In between the developmental and neopatrimonial states are fragmented multi-class states. Though the state here is relatively effective, the interests between the government and private sector do not easily converge. Higher administrative capacity does not in itself result in conditions propitious to economic development. Kohli notes that the bureaucracy of a fragmented multi-class state such as India is no less competent or professional than its
counterpart in a more developmental state such as South Korea—“[t]he key issue, rather, is how elites structure and use state power for development” (Kohli, 2004: 385-386).

I draw on Kohli’s model in my study of the CDM’s effectiveness by distinguishing between state administrative capacity and state preferences for liberal economic reforms. See Figure 2 for a matrix where I place each of the three states investigated according to the two dimensions of state power for development. I argue that Moldova possesses administrative capacity that is high relative to countries in sub-Saharan Africa. Tanzania scores low marks on both dimensions of state power for development. While stable politically, its economy is stagnating as it lacks political will to follow through with liberal economic reforms. Finally, though possessing a relatively low state administrative capacity, Uganda demonstrates a high preference for liberal economic reforms. While there are signs of increasing neopatrimonial tendencies in Uganda, at least during the period when carbon projects were implemented, the state’s power for development was conducive to economic development.

![Figure 2: Matrix mapping state power for development](image)

The description above is supported by correspondence analysis of economic, social and governance indicators presented in Appendix 3. Tanzania and Uganda are distinguished from

---

7 The latter variable is a simplification of Kohli’s second variable and its focus on state-society relations. Such a simplification is justified because the essence of Kohli’s research into state-society relations is the extent to which the state is supportive of business classes as opposed to other groups, which is reflected in the state preferences for liberal economic reforms. A detailed study of the relationship between state and society, on which Kohli bases the second variable of state power for development, is beyond the scope of his study.

8 Correspondence analysis is a type of factor analysis to reduce variability in a dataset into its most statistically important components (Legendre and Legendre, 1998; Rakotomalala, 2005; 2006).
Moldova along an economic gradient (Figure 3). But the sheer differences between Moldova and the two East African states in terms of economic development obscure other factors conducive to CDM performance. The secondary axis of Figure 3 represents a political economy gradient. Along the second axis, Tanzania ranks highest in terms of political stability and control of corruption while Uganda is associated with higher FDI and population density. Notably Moldova is not significantly differentiated along this second axis. We can more clearly evaluate political economy factors by focusing on only the subset of development, capacity and governance indicators (Figure 4). While Tanzania is again associated with political stability and control of corruption, Moldova and particularly Uganda are associated with stronger regulatory quality as well as political, economic and management indexes.

---

9 FDI has been comparable in per capita terms across the three countries until an important spike in Moldova during 2004-2008 (see Appendix 3). Analysts have argued that this rise was linked to the 2007 accession of Romania to the EU, followed by the relocation of certain European businesses from Romania to Moldova, where tax conditions and labour costs were more attractive (Prohniţchi et al., 2010: 12-14). But with the 2008 financial crisis, FDI inflows into Moldova dropped considerably, back to levels comparable to East Africa.
Figure 3: Correspondence analysis of basic economic, social and development indicators of Tanzania, Uganda and Moldova

Axis 1 $\lambda = 0.155$ and Axis 2 $\lambda = 0.019$, representing 89% and 11% of total variation, respectively; unconstrained $\lambda = 0.174$.

Figure 4: Correspondence analysis of subset of development indicators of Tanzania, Uganda and Moldova

Axis 1 $\lambda = 0.026$ and Axis 2 $\lambda = 0.001$, representing 96% and 4% of total variation, respectively; unconstrained $\lambda = 0.027$. 
With greater administrative capacity, my initial hypothesis was that CDM projects in Moldova would be more effective than in Tanzania and Uganda. However, the most important finding of this study has been the contrasting effectiveness of CDM projects in Moldova and Uganda relative to Tanzania. This can be explained by Uganda’s stronger preference for liberal economic reforms. In Uganda and to a lesser extent Moldova, commitment to liberal economic reforms functions as an animating set of ideas that promotes coherency and purpose across the bureaucracy and, paradoxically, the establishment of developmental institutions and organizations which allow the state to bring carbon finance projects into alignment with national development objectives—in a manner analogous to the developmental state. Elements of state administrative capacity need to be brought together in a coherent and effective manner, something that is achieved through a shared ideology. Tanzania is less committed to liberal economic reform, resulting in an incoherent approach to economic development that has been unable to see the CDM as a viable opportunity. In Uganda, the state apparatus has actively reached out to “grab” hold of the CDM because, as a mechanism aligned with liberal economic policy, it is something which the state can mobilize around—which is evidenced by the close cooperation between the Ugandan authorities responsible for the CDM and the Uganda investment agency. In so doing, Uganda has made use of state agencies to further developmental ends while also establishing a land tenure/investment regime to create opportunities for smallholders to engage with international markets.

Such an argument may appear paradoxical as neoliberalism and developmentalism are often conceived as being contradictory. Nonetheless, a close read of empirical research on economic reform indicates that the two are not necessarily mutually exclusive. For instance, Fjeldstad and Moore (2009) have presented evidence that revenue agencies implemented in sub-Saharan Africa, largely as part of neoliberal structural adjustment policies, have actually enlarged state authority rather than reduced it. My research extends these findings into other areas of the bureaucracy in order to argue that the adoption of neoliberal institutions and organizations can enhance performance but also be undertaken in a manner that allows the executive considerably more power over the direction of development than commonly assumed.
There are, however, important limitations to my argument because the analogy to the developmental state can only be taken so far and there is certainly a tension between it and neoliberalism. It is unlikely that the development state model can be easily transferred to sub-Saharan Africa and the former Soviet Union—for a combination of both domestic and international reasons. Domestically, the glue which makes an embedded autonomy feasible is a strong sense of national identity and purpose (Woo-Cumings, 1999). National sentiment does not exist at sufficiently high levels in any of three case-study countries to make a developmental state feasible. In sub-Saharan Africa, only Botswana might be considered to possess sufficient national sentiment to meet this definition (see Taylor, 2002). Nor is Moldova a good example of national unity, having suffered a near civil war in 1992 and continued strained relations with the semi-autonomous region of Transnistria (Devyatkov, 2012; King, 2000; Urse, 2009). Lacking a strong national identity, neopatrimonial politics are relatively more pronounced in sub-Saharan Africa (Bratton and van de Walle, 1994; van de Walle, 2001) and the former Soviet Union (Guliyev, 2011; Tsygankov, 2007). The international conditions for a developmental state also do not present themselves. As discussed by Pempel (1999), the East Asian economies emblematic of the developmental state had exceptionally close links to the United States, which saw the economic development of the region vital to its broader security interests after WWII (see also Wade 2009: 353).

Furthermore, as my results will demonstrate, an aspiring developmental state may not have the capacity to achieve its goals in all sectors of the economy. The developmental effects of liberal economic reforms have limits. Indeed, amongst LDCs, the developmental outcomes may only be feasible in relatively low-tech sectors such as forestry. In contrast to managing, for example, an electricity grid, forestry is simpler and less costly. Implementing a high-tech energy project is simply beyond the state means in most LDCs. While a state can organize itself to achieve certain development objectives, there are limits to what even the most well-organized state can achieve. However, for emerging economies such as China and India, the state may very well have the capacity to pursue more technically sophisticated carbon finance projects—an issues I return to in the conclusion of this dissertation.
Nonetheless, the idea of a developmental state has proven attractive, if imperfect, in sub-Saharan Africa and the former Soviet Union (ECA, 2011; Edigheji, 2010; Fritz, 2007; Stoner-Weiss, 2006). Especially since the 2008 global financial crisis, there has been a growing interest in whether the successes of the East Asian style developmental state are transferable to LDCs (Altenburg, 2011; Chang, 2012; Edigheji, 2010; Leftwich, 2008; Lin and Chang, 2009; Rodrik, 2008; Wade, 2009). While all the conditions that made the developmental state possible in East Asia are not found in the three countries investigated, one key element is: an animating set of ideas that can promote intergovernmental coherence and result in a certain level of state power for development. Paradoxically, however, the idea that has been found to play this role is commitment to liberal economic reforms.

2.2.1. State Administrative Capacity

Of the two dimensions of state power for development, I begin with state administrative capacity. Grindle has defined administrative capacity as “the ability of states to deliver goods and services such as public health and education, provide physical infrastructure, and carry out the normal administrative functions of government, such as revenue collection, necessary economic regulation, and information management” (Grindle, 1996: 10). Two elements of administrative capacity are discernible: institutional and organizational capacity. North has famously defined institutions as the “rules of the game in a society” or, more formally, humanly devised constraints that shape human action (North, 1990: 3). Organizations are defined as “groups of individuals bound by some common purpose to achieve objectives” (North, 1990: 5). Institutions affect the cost/benefit calculations of actors involved in economic development by defining the distribution of powers and resources among them (Knill and Lehmkuhl, 2002: 47). If institutions are the rules of the game, then organizations are the players (Scott, 2008: 30).

For instance, putting a price on carbon changes the institutional context that different actors—public, private and NGO—find themselves in. But the ability to engage successfully with this new institutional context is dependent on the organizational capacity of different actors to coordinate and manage complex tasks—for example, a successful CDM project. Unfortunately, the distinction between institutions and organizations is often not upheld in the literature. For
example, what is sometimes referred to as “institutional capacity” (for example, UNDP (2010b: 9-17)) is better understood as “organizational capacity”. Recent research has emphasized the need to understand the interaction between institutions and organizations: “Institutions are neither self-generating nor self-sustaining. As sets of ‘rules of the game’, they achieve little on their own…[Formal and informal organizations and individuals] may play the game according to the rules or they may seek to evade and avoid the rules, thereby undermining it; and they also seek to shape or influence the rules” (IPPG, 2010: 9).

A distinction between institutions and organizations is important in this dissertation because different elements of state administrative capacity are important for the sustainable development and additionality claims of the CDM. As my research will show, institutional capacity is more important for sustainable development and organizational capacity for additionality. Following Thompson (1993), institutions provide “before-the-fact” administrative controls that are more appropriate for shaping complex socioeconomic dynamics such as sustainable development. “After-the-fact” controls, such as the monitoring of CDM project additionality, is better suited to state organizations such as those for environmental impact assessment and investment regulation. Nonetheless, many efforts towards administrative reform for sustainable development have focused on building organizational capacity. In the case of the CDM, the international community called on the establishment of a special administrative body—the DNA—to screen projects for sustainability.

**Institutional Capacity**

Institutional capacity as used here reflects the ability of a country’s legal framework to set out a system of incentives and constraints—carrots and sticks—to direct a wide number of actors towards the achievement of the state’s development objectives. Certainly, some institutional frameworks will permit states to reach such objectives in a more efficient manner than others.

My research into the sustainability of CDM A/R and bioenergy projects across Tanzania, Uganda and Moldova indicates that sustainability is best assured through a land tenure and investment regime while also accommodating historical land governance practices. For countries such as Tanzania, Uganda and Moldova where much of the economy is still based on agriculture and
natural resource exploitation, land tenure and the foreign investment regime are actually mutually constitutive. A market-supporting regime (i) offers opportunities for smallholders to engage directly with the carbon markets, (ii) creates incentives for domestic investors to also engage in sustainable development and (iii) avoids the risks of large-scale land acquisitions. Below I review the literature land tenure and foreign investment regimes and their bearing on sustainability outcomes for A/R and bioenergy projects.

**Land Tenure**

Activities based on the individual ownership of land such as agriculture and tree-crop farming are best governed as private goods and prevention of free-riding because the costs of the enforcement of property rights is low relative to the benefits of private ownership (Otsuka and Place, 2001: 18). There are convincing arguments that increasing population triggers innovations such as more individualized land tenure in order to provide security for land improvements (Boserup, 1965; Kabubo-Mariara, 2007). Evidence of (albeit informal) individual land rights and land markets is ubiquitous in Africa (Besley, 1995; Chimhowu and Woodhouse, 2006; Daley, 2005; Platteau, 1996). Consequently, it can be expected that a state which adopts individual land rights would be expected to reduce the risks of unsustainability of carbon finance projects involving A/R and bioenergy.

The argument above may appear to run contrary to popular notions about the important of common property systems for forests and fisheries (Ostrom, 1990; Ostrom et al., 1999; Ostrom et al., 2002). The gist of the common property resource literature is that because common property resources cannot be restricted to individuals or effectively managed by the state, they are best managed under a group property or “community-based” management scheme. Common property regimes are likely more important for forest conservation efforts and REDD, and of more limited applicability for A/R and bioenergy projects. Unfortunately, the enthusiasm for common property resources too often lends itself to romantic notions of communal life in peasant societies (Chimhowu and Woodhouse, 2006; Popkin, 1979: 1-31). One pertinent example of such an experiment regarding land comes from the failure of Ujamaa villagization in Tanzania. As Hydén observes:
Ujamaa was a principle traditionally practiced only within each household...It did not address itself to the mutual responsibilities and rights of individual households in a given local community. For these, the rural Tanzanians use the concept of ujima. As Mushi notes in his article, ujima refers to the habitual practice of co-operation among villagers in certain peak seasons (cultivating, planting, harvesting, etc.) or in cases of emergency where someone needs to finish a certain job in a day or two with the help of his neighbours and relatives, instead of weeks or months of doing it alone (Mushi, 1971). This function was communal in the sense of implying mutual aid and reciprocity, but not in the sense of communal ownership. Those who assisted their neighbours did not expect a share in their harvest, only some entertainment at the completion of the task...What [President] Nyerere was asking of the peasants, however, was to go beyond ujima and adopt ujamaa as the guiding principle of life and work, not only within the household but also in the relations between households in their community (Hydén, 1980: 99).

It is necessary to reflect critically on the appropriate role of common property governance systems. As Ntambirweki, a leading Ugandan legal scholar, argues: “Despite attempts to couch ‘common property regimes’ in a cloak of traditional legitimacy, it can be identified for what it is: Yet another attempt to experiment with collectivism in Africa and other third world domains” (Ntambirweki, 1998: 41).

Another school of thought, while accepting the evolution towards individual property rights, cautions against the formalization of individual land rights through law. Instead, informal land markets, it is argued, should be left in the informal sector because their formal privatization only favours elites and facilitates land grabs (Lastarria-Cornhiel, 1997; Platteau, 1996; Toulmin et al., 2002). Unruh (2008) has extended this argument towards CDM afforestation projects, urging that “the poor often need to be protected from governments, and yet governments will be responsible for law-making, guaranteeing rights, and titling programs [necessary for afforestation and reforestation carbon offset projects]” (Unruh, 2008: 702). However, the land tenure system need not be formalized. A land tenure system that recognizes customary land tenure and protects the land rights of indigenous landholders can still be conducive to sustainable development and may reduce their exposure to risk, though this does reduce opportunities for engaging with foreign investors.

Finally, land tenure is important for sustainability to the degree that it accommodates the peculiarities of a country’s history of land-use and governance. This has important implications for sustainability because historical land governance shapes the contemporary risks of land scarcity in different ways. For example, Tanzania’s experiment with Ujamaa villagization is perhaps the most well known (Hydén, 1980; McHenry, 1979; Schneider, 2007a). What is less
appreciated is how this historical experience has been incorporated into—if not shaped—its current land tenure system. Ujamaa retained traditional village boundaries, though concentrating villagers in settlements where public services and administration could be better offered. Consequently, villages in Tanzania have effective control rights over large tracts of territory—territory that the state would like to see opened for investment. In contrast, the risk of land scarcity leading to sustainability violations is greater in Uganda and Moldova whose land tenure systems do not accommodate historical land governance issues adequately.

**Foreign Investment Regime**

Investment regimes vary in how they allocate risks between rural villagers, government and foreign investors. A foreign investment regime is more propitious to sustainable CDM A/R and bioenergy projects when it creates incentives for domestic investors and thus avoids the risks inherent in large-scale international land transactions. Such conditions are not met by an excessively liberalized investment regime, but a more developmental one that seeks to strategically promote foreign investments in specific sectors where domestic resources are lacking.

Strangely, there is very little published on the relationship between land tenure reform and foreign investment, apart from the more recent literature on “land grabs” (Anseeuw et al., 2011; Arrighi et al., 2010; Cotula and Vermeulen, 2011; Zoomers, 2011). The mainstream response to the surge in international investments in land has been to institutionalize a set of international rights and best-practice principles—both for forest carbon finance (Baker & McKenzie, 2009: 43-44; CCBA, 2008; Costenbader, 2011: 15-79; Schwarte, 2010; Streck, 2009) and large-scale land acquisitions (De Schutter, 2009; FAO, 2010; Heri et al., 2011). As my research will show, the effectiveness of such international screening is doubtful.

**Organizational capacity**

Organizational capacity reflects the ability of organizations, “either singly or in cooperation with other organizations, to perform appropriate tasks” (Grindle and Hilderbrand, 1995: 443). In the context of the three countries investigated in this study, the lower organizational capacity of Tanzania and Uganda relative to Moldova is demonstrated by their lesser success in extracting
tax revenue (Figure 5a). As Skocpol has written, “A state’s means of raising and deploying financial resources tell us more than could any other single factor about its existing (and immediately potential) capacities,” (Skocpol, 1985: 17). The capacity to extract taxes is considered to be broadly emblematic of state capacity—“the state’s ability to implement a range of policies” (Besley and Persson, 2009: 2)—and also has positive spillover effects into other sectors of state apparatus (Prichard and Leonard, 2010). However, another important factor is the amount of resources available, something which clearly distinguished Moldova from the two East African countries—though noting a stark similarity in GDP per capita around the year 2000 (Figure 5b).

**Figure 5: Trends in (A) Tax Revenue Extraction and (B) GDP per Capita across Tanzania, Uganda and Moldova, 1991-2010**

My research demonstrates that state organizational capacity is important for emission reductions. In the context of CDM A/R and bioenergy projects, I submit that state agencies are able to bring carbon finance projects—and the international objective of reducing emissions in a cost-effective manner—into alignment with state development objectives. So-called agencification has been a key part of the economic reform process in all three countries, with a number of agencies established in each (Bana and McCourt, 2006; Fjeldstad et al., 2003; Fjeldstad and Moore, 2009; Kyarimpa, 2009; Matei et al., 2011; Matei, 2013; Sulle, 2010). While the study of agencification has focused on revenue agencies, my research also includes regulatory agencies for foreign investments and environmental impact assessment as well as sector specific agencies responsible
for policy implementation. State agencies important in this dissertation include those for forestry, energy/electricity, foreign investment facilitation and environmental impact assessment.

Originating in the “new public management” techniques of the developed world of the 1980s (Hood, 1991), state agencies have been created as semi-autonomous organizations intended to adhere to more business-like, results-based management techniques (Verhoest et al., 2010: 17-28). Thus the degree and number of agencies will vary with a state’s preferences for liberal economic reforms. Yet my results also indicated that state agencies are not the bastions of neoliberal, market-conforming institutions that some economists intended them to be. This is supported by observations by Fjeldstad and Moore (2009), discussed earlier, that revenue agencies in sub-Saharan Africa have enlarged rather than diluted state authority. State agencies in the forestry sector, though not in the energy sector, have managed to retain an important latent organizational capacity for the implementation of development projects, including those for carbon finance. Such a nuanced read of state agencies demands a greater appreciation of the political economic orientation of my three case-study countries.

2.2.2. State Political Economy Orientations

The political economy orientation of the state is important because, as I shall demonstrate, this is significant in explaining the effectiveness of carbon finance projects. To be sure, Tanzania, Uganda and Moldova have all have seen important liberal economic reforms during the past twenty-five years. Reforms in Tanzania and Uganda were part of structural adjustment policies pushed through by the World Bank and IMF (Boone, 2007; Mensah, 2007b; Wily and Mbaya, 2001). Moldova undertook liberal economic reforms after the dissolution of the Soviet Union and the country’s movement towards privatization (Allina-Pisano, 2008; Gorton, 2001; Gorton and White, 2003; Lerman et al., 1998; Matei et al., 2011; Matei, 2013). In addition, the political situation in all three countries can be described similarly as that of competitive authoritarianism (Levitsky and Way, 2002: 52-54). Formal democratic institutions are widely viewed as the principal means of obtaining and exercising political authority; however, incumbents violate those rules so often that the regime fails to meet conventional minimum standards for democracy (Levitsky and Way, 2002: 52-54). For reasons explained below, recent trends in Uganda lead
Levitsky and Way to categorize it as a borderline case tending towards authoritarianism, but during the implementation phase of the CDM projects investigated here (the mid-2000s) these tendencies were less pronounced.

Nonetheless, particularly between the two African countries, there are important differences between all three cases in terms of their preference for liberal economic reforms. I describe the political economy of each country in greater detail below, upon which I have based the categorization of each country’s political economy orientation.

**Political Economy of Uganda**

At least until relatively recently, Uganda assiduously adhered to the neoliberal policy prescriptions of international development agencies to great success, becoming a “darling” of the donor community (Kuteesa et al., 2009; Whitworth, 2009)—even garnering enough international good will to be awarded a seat on the UN Security Council in 2009-2010 (BTI, 2012b: 42). I shall argue that Uganda’s strong preference for liberal economic reforms functions as an animating set of ideas that allows the state apparatus to work in a more purposeful manner and establish institutions and organizations which, paradoxically, allow the state to bring carbon finance projects into alignment with its development priorities.

Before discussing Uganda’s politics more deeply, it is worth noting that up until President Museveni’s assumption of power in 1986, Uganda’s recent history was one of state failure and civil conflict. Upon receiving independence from Britain in 1962, the initial regime under Prime Minister Obote proved incapable of resolving political differences which led to conditions that were exploited by the dictator Idi Amin. Seizing power in 1971, Amin was only overthrown by a Tanzanian military force (accompanied by Ugandan exiles) in 1979. Yet upon regaining power after Amin’s ousting, Obote proved again unable to gain widespread legitimacy and the country once more descended into political violence. The early 1980s were marked by insecurity and a number of armed insurgencies until Museveni’s forces prevailed in 1986. In contrast to his Tanzanian and Moldovan counterparts, Museveni had to build state institutions from scratch including a police force, legislature, judiciary as well as introduce and adopt the 1995 Constitution.
Uganda was amongst the first countries in sub-Saharan Africa to embrace structural adjustment reforms in the 1980s (Kiiza et al., 2007; Melo et al., 2012). Despite originally being disposed to a Marxist political philosophy, upon assuming power Museveni proved an adroit and pragmatic political leader. Williams (2009) describes four distinct phases in the development of Uganda’s economic policy since Museveni took power in 1986. The most of these was the period 1990-1995 when the government took decisive neoliberal reforms followed by a period stretching into 2002 when the the government began to turn its attention towards poverty reduction and the expansion of public services through decentralization and education reform. However the period from 2002 onwards—the period relevant to the CDM projects investigated—has been described as one where the state has taken “a somewhat more interventionist stance” in the economy in an effort to promote competitiveness in the export sector and promote private sector growth (Williamson, 2009: 29).

Some have argued that Museveni’s successful implementation of structural adjustment policies stemmed from his “authoritarian advantage” which allowed him to muscle through controversial economic reforms ahead of the wave of democratization in the region (Mensah, 2007a: 12). Yet others described Museveni’s turn towards liberal economic reform as more pragmatic than ideological (Melo et al., 2012). For example, while embracing reforms, Museveni also remained true to an early promise to establish universal private education despite pressure to do otherwise (Ibid.: 59-62).

Also notable, Museveni’s bush war experience during the insurgency predisposed him towards the establishment of decentralized institutions. Local Resistance Councils, previously used to mobilize peasants during the bush war, were retained as Local Government Councils and granted significant formal powers and responsibilities in 1997 (Melo et al., 2012: 53-54, 57-58). Arguably, Museveni saw decentralization as a counterweight to centralized state agencies which he distrusts (Ibid.: 59-62), though other research suggests that institutions of decentralization may mask more centralized and personal lines of authority (Lambright, 2011).

Despite Uganda’s clear progress, there are concerns that Museveni’s rule is increasingly neo-patrimonial. Indeed, observers speak of a progressive Museveni I and a neo-patrimonial
Museveni II (Melo et al., 2012: 23). For many, the turning point was in 2003, when Museveni changed the Constitution which previously barred him from running for a third term (Barkan et al., 2004: v; Melo et al., 2012: 42-43). The issue divided his party, the National Resistance Movement, and since then there have been many indications point to a loss of wide-based support for his rule. For example, neo-patrimonial trends have come to permeate Uganda’s decentralization efforts. The number of districts, the highest form of local government, has doubled over the past ten years. Green (2010) shows that Museveni’s government has created new districts as a means to compensate for other patronage resources lost through democratic reforms.

The trend towards increasing neo-patrimonialism in Uganda poses considerable future challenges for the international community, including cooperation on climate change (Barkan, 2011; Barkan et al., 2004; de Vibe, 2012). As President Museveni clings to power in Uganda, there is an emerging consensus that his earlier “authoritarian advantage” in the economic sphere may soon expire. Barkan (2011) warns of “inflationary patronage—“the need for ever-increasing amounts of money to maintain oneself in power and increasing levels of corruption to provide the required funds” (p.11). However, the prospect of recent oil discoveries coming online as early as 2016 may allow Museveni to continue to buy support. Nonetheless, these regressive trends are relatively recent. For the purposes of the carbon finance projects investigated, which were all implemented in the mid-2000s, the political economic conditions were still progressive.

**Political Economy of Tanzania**

Tanzania has a history of socialism which goes back to the moment of its independence, most famously embodied as Ujamaa which is often translated as “African socialism” (Hydén, 1980; McHenry, 1979; Schneider, 2007a). At the center of this strategy was “villagization”. Ujamaa villages were initially conceived as “rural economic and social communities where people live together and work together for the good of all” (Nyerere, 1968 [1967]: 348, emphasis in original). While Nyerere originally conceived that villagization would be self-evidently in the interests of villagers, it came to be characterized by the relocation of residents from scattered homesteads into villages including, in certain cases, forced migration (McHenry, 1979: 118). The
1994 Land Commission found Ujamaa to be marked by “total disregard of the existing customary land tenure systems as well as virtually no thought being given to the future land tenure in the newly established villages” (GoT, 1994: 43). The power to relocate the population was founded on the legal notion of “radical title” inherited from the legal framework of the colonial regime.

Tanzania was also reluctant to embark on structural adjustment. In the 1980s, Tanzania’s President Nyerere, while not opposed to economic reform, resisted conditionality and entered into a very public disagreement with the IMF (Amani et al., 2007: 211). Structural adjustment was not really undertaken in the country until President Nyerere stepped down from power in 1985. Skepticism about capitalism endures to the present day, where a sentiment of “economic nationalism” permeates the country’s political culture (Therkildsen and Bourgouin, 2012). In a recent assessment, international observers at *Bertelsmann Stiftung*, a German development think-tank, have concluded that:

*Despite an official government commitment to liberal market policies and foreign investment, within the state administration and the ruling party on different levels, as well as in wide sections of the society, there is obviously a growing hostility toward foreign business due to the perceived “sellout” of Tanzanian enterprises, in the form of privatization and foreign investment (BTI, 2012a).*

Therkildsen and Bourgouin (2012) observe three political phenomenon that frustrate meaningful alliances between the state and private sector in Tanzania. First, the reintroduction of competitive elections in 1994 have resulted in a shift towards populist policies as opposed to business-oriented, growth-enhancing policies. Second, competitive elections have also shifted power-relations within the party, strengthening the position of lower-level party-members who most directly interact with voters. Under such “competitive clientelism”, party elites find it harder to implement national policy on the ground and corruption has crept upwards. Finally, the government is disinclined to engage in meaningful partnership with Tanzania’s dominant business leaders, who are mostly of Asian ethnic origin.

Cooksey and Kelsall (2011) argue that neopatrimonial politics are resurgent in Tanzania as a result of populist policies, but in an uncoordinated fashion that suggests it is beyond the control of government. This is in marked contrast to the Ujamaa period when Nyerere tamed patronage and related corruption. That system broke down as economic collapse set in during the 1980s:
“the beginnings of corruption in Tanzania as well as other manifestations of informal practices date back to the ‘hard times’ in the early 1980s” (Hydén, 2005: 11). Today, as Cooksey and Kelsall (2011) conclude, “while government income and expenditure are broadly balanced thanks to a reasonable strong and centralized Ministry of Finance, at meso- and micro-levels rent-management suffers from a lack of control. Grand corruption and patronage spending, for example, are loosely centralized at best. Most decisions are made by ad hoc cliques that straddle the higher reaches of the state and the private sector” (p.42).

Observers argue that part of the reason for these trends is the relative weakness of President Kikwete who does not have Nyerere’s stature—likely because crucial early support for his candidacy came from some of the more corrupt elements of the CCM political party (Cooksey and Kelsall, 2011). Nonetheless, in contrast to the situation in Uganda, discussed below, President Kikwete’s popularity in Tanzania is less personal and more due to his party’s ties with the highly revered first President of independent Tanzania, Julius Nyerere (Babeiya, 2012: 90-91).

Finally, ethnic politics in Tanzania have been much less pronounced than in other parts of sub-Saharan Africa. While there are a number of explanations for its stability, among the most important are the strong moral leadership of Tanzania’s first President, Julius Nyerere. Amongst the important policies initiated under his rule were Tanzania’s Swahili language policy, the divestiture of traditional chiefs and the promotion of village government bodies as well as, later, Tanzania’s controversial villagization policy in the 1970s that uprooted rural society in an effort to realize Ujamaa, or “African socialism” (Erickson, 2012; Green, 2011; Ibhawoh and Dibua, 2003; Mniwasa and Shauri, 2001). Despite such stability, there is an emerging consensus that the country lacks political resolve to address its stagnating economic situation.

**Political Economy of Moldova**

A former Soviet Socialist Republic, Moldova is commonly known as the poorest country in Europe. More than half of Moldova’s population is considered rural and agriculture comprises approximately 17% of GDP (World Bank, 2010d). But the agricultural sector has declined considerably in the absence of subsidies and guaranteed access to the Soviet market (Gorton,
Economic decline in rural areas has resulted in significant emigration—one estimate is that 8% of Moldova’s population is living abroad (Pantiru et al., 2007: 8). Despite such challenges, the poverty rate in Moldova had been declining over the 2000s until the 2008 global financial crisis (World Bank, 2006). The World Bank expected the poverty rate to rise as remittances decline because of the global financial crisis (Tiongson et al., 2010: xvii-xviii). In 2007, the country suffered its worst drought in more than sixty years which led to losses in agricultural production of 50-70%, the unnecessary slaughter of livestock and significant rise in local food prices (FAO/WFP, 2007; UNDP, 2010c: 82). As a small country (its population is only 3.6 million) located between East and West, it is very much at the mercy of international events, even more so than the two sub-Saharan African countries. Furthermore, Moldova has been buffeted by an internal conflict regarding the Transnistria semi-autonomous region since the fall of the Soviet Union and divisive internal politics amongst the Moldova’s political elite (Crowther, 2011; Kaufman, 1996; King, 2000; Pantiru et al., 2007). Indeed, political paralysis gripped the country in 2009 when parliamentary elections failed to garner enough votes to elect a president (Barry, 2009; EurActive, 2010; NY Times, 2009). It was only recently resolved in 2012, and notably, without the support of the former ruling Communist Party (Rusnac, 2012).

Moldova’s political history also suggests a scepticism of liberal economic reform, though recent political developments indicate that such opposition is dissipating as Moldova increasingly orients itself towards the EU (Devyatkov, 2012; Shapovalova and Boonstra, 2012). As a former Soviet Republic, Moldova underwent privatization in the 1990s as part of the dismantling of the Soviet system (Allina-Pisano, 2008; Gorton, 2001; Gorton and White, 2003; Lerman et al., 1998). Since then, the political economy of Moldova has been at the centre of political debate and the country has vacillated between Western and ostensibly Communist government for much of its independent existence, with the Communist Party or its elements slowing economic reforms (Crowther, 2011; Quinlan, 2004: 499-501; Way, 2005: 240). Initial privatization efforts post-independence met resistance from state and collective farm managers who had mobilized political opposition in the form of the Agrarian Democratic Party (ADP), a party comprised largely of members of the then defunct Communist Party and emergent Moldovan nationalists.
The ADP had coalesced after the dissolution of the Soviet Union in 1991, particularly as a response to the stridently pro-Romanian Popular Front, and gained a formal majority in Moldova’s first parliamentary elections in 1994 (King, 2000: 154-159). The conflict in Transnistria of 1992, in part due to provocations of the Popular Front (Kaufman, 1996: 122-125), was one reason for a loss of public support for the Popular Front in 1994 elections. They were replaced by the ADP which worked to slow the pace of economic reform.

However, in 2001, following a resurgence in 1998 elections after being banned from 1991-1994, the Communist Party formed a government. From 2001 through 2009, the period of time most relevant to the CDM projects investigated, the Communist Party governed Moldova. However, there have been some surprises. Though some expected that the Communist Party would seek alliances with Russia, this did not generally occur, largely due to a dispute over Transnistria—the breakaway, semi-autonomous region of Moldova with a strong Russia ethnic population. The key turning point was disagreement between Moldova and Russia on the Transnistrian issue in 2003. Against the expectations of many observers, the Communist Party has since come to endorse EU integration. This in turn provoked a response from Russia, including strengthened support for Transnistria, largely as subsidized energy supplies, as well as the placement of trade restrictions on Moldova.

With increasing trade restrictions placed on it by Russia and a free-trade agreement with the EU incomplete, Moldova finds itself in an uncertain international position between these two regional powers. Since 2003 the EU has displaced Russia as Moldova’s largest trading partner but, while Moldova is set to enter into a free-trade agreement with the EU, it currently struggles to penetrate the EU’s wine market and is unable to meet its sanitary conditions for meat and dairy products (Luecke et al., 2011: 7). In 2005, Russia banned the import of agricultural products from Moldova, and followed up in 2006 with a ban on Moldovan wine—both key

---

10 While officially part of Moldova, since 1992 Transnistria has exercised de facto independence from the national capital, Chisinau. The issue is complicated by the fact that Russia had, and has maintained, troops in Transnistria (ARGPO 2009, Devyatkov 2012, Nygren 2008). In seeking office in 2001, President Voronin promised to resolve the conflict and bring Transnistria fully under control by entering into direct negotiations with Moscow (Urse 2009). The agreement reached, however, proved deeply unpopular in Moldova, leading Voronin to change position.
Moldovan exports (Pantiru et al., 2007; Sanchez, 2009; Urse, 2009). Such international uncertainty has, arguably, frustrated the formulation of a coherent economic development policy.

2.3. The Dependent Variable: CDM Effectiveness

The CDM has the twin goal of realizing low-cost emission mitigation potential in developing countries through projects that contribute to sustainable development. I consider these two different components of CDM effectiveness: sustainable development and “additionality”. My discussion of sustainable development hinges on two competing paradigms of sustainability—strong and weak sustainability—but also appropriate methods for assessing causation in the assessment of sustainable development impact. “Additionality” is a term used to describe the measurement of emission reductions resulting from a CDM intervention. If a CDM project is not additional, then carbon credits issued from it are not fungible with emissions in industrialized countries against which they are traded.

2.3.1. Sustainable Development

Approaches to Measuring Sustainable Development

Many criticisms of the sustainable development contribution of the CDM are really counter-arguments about what constitutes sustainable development. As indicated earlier, sustainable development is notoriously difficult to define. (Bernstein, 2001; Lélé, 1991; Mebratu, 1998; Pezzoli, 1997). While there are many discussions about what sustainable development is and how it should be measured, as touched on earlier in our discussion of liberal environmentalism, following Raggamby et al. (2012: 212), I emphasize two main schools of thought:

1) A three pillar approach which emphasizes social, economic and ecological dimensions of sustainable development
2) An approach that emphasizes the distinction between strong and weak sustainability

Of these two schools, I use the approach based on the evaluation of strong and weak sustainability because it lends itself better to the measurement of sustainability outcomes that are the distinguishing feature of evaluation and results-based management. Evaluation is important because it furthers results-based policy by considering causal mechanisms related to observed results. The three pillar approach is more proper a tool of environmental assessment, where
factors believed to affect sustainability are anticipated in advance. In words of leading experts, an environmental impact assessment:

*is usually an ex ante policy evaluation that is broad in scope. It seeks to comprehensively identify the potential intended and unintended consequences (social, economic, environmental, political) of policy proposals in their entirety before the policy is implemented...[Environmental impact assessments] are not usually utilized to measure policy effectiveness ex post, for which other more focused evaluation strategies may be appropriate (Raggamby et al., 2012: 214-215).*

The main problem with the three pillar approach is that it assumes a relationship between the three pillars and sustainability rather than seeks to demonstrate it. Such a demonstration is frustrated because what a sustainable outcome would be is not defined in the three pillar approach. Consequently, it is not capable of demonstrating which elements of the pillars are causally related to sustainability in specific circumstances. The empirical evaluation of sustainability then becomes a meta-analysis of social, economic and ecological elements that are *assumed to be* necessary for sustainability, rather than an evaluation of whether the outcome in question is causally related to these elements.

The strong and weak sustainability approach that I use is unique in that it defines to competing conceptions of sustainability which can be measured in the field. While any claim to defining sustainability is contentious, I believe that this two-pronged approach to sustainability handles the complexity inherent in the concept better than alternatives.

**Strong and Weak Sustainability**

I argue that evaluation of the sustainable development impact of CDM A/R and bioenergy projects depends on what definition of sustainability is used—strong or weak sustainability (see Neumayer, 2003; Norton, 2005). As framed by Neumayer, both definitions embrace the definition of sustainable development as *development that maintains the capacity to provide non-declining utility for infinity* (Neumayer, 2003: 7). The two paradigms of sustainability differ in their acceptance of the substitutability of critical natural capital (CNC) by man-made capital (MMC). Neumayer defines capital as “those items that form the capacity to provide utility” (*Ibid.*).

Both strong sustainability and weak sustainability rely on theoretical assumptions about the ability to substitute between natural and man-made capital that cannot be conclusively tested.
Because neither strong nor weak sustainability can be falsified (see Popper, 2002 [1959]), it is not possible to draw definitive conclusions in favour of one paradigm or the other (Neumayer, 2003: 88). Consequently, they are examined separately for each CDM project investigated. To the best of my knowledge, no existing empirical study of sustainable development has been undertaken with both paradigms in mind.

Strong sustainability requires that CNC be maintained or increased to ensure sustainability. The main difficulty with operationalizing strong sustainability is distinguishing CNC from other forms of natural capital. Natural capital is defined as the totality of nature exclusive of people and their products that is capable of providing humans with current and future utility (Neumayer, 2003: 8). This definition originated with Henry George’s distinction between land, labour and capital as the three primary and mutually exclusive factors of production (George, 1886 [1879]: 33). For George land was nature: “The term land necessarily includes…the whole material universe outside of man himself…all natural materials, forces, and opportunities” (George, 1886 [1879]: 33). This notion of natural capital was a significant departure from economic thinking at the time insofar as it recognized that nature provides utility independent of human labour.  

An expansive definition of natural capital, such as George’s above, is problematic because it does not address issues of substitutability within natural capital. For example, it is certainly incorrect to promote sustainability by increasing the number of cheetahs in the world to compensate for the depletion of the ozone layer (Neumayer, 2003: 24). The depletion of the ozone layer is more critical to life on Earth. CNC recognizes natural elements or ecosystems that provide significant functions to humans, the absence of which would lead to sharp declines in the capacity to maintain utility or would risk such declines (Ekins et al., 2003: 176). While there are arguments that nature has a unique value on its own (Callicott, 1986; Oksanen, 1997), I share Neumayer’s logic that nature has value if and only if humans value it—though recognizing that humans might value nature for whatever reason including cultural and religious ones (Neumayer, 2003: 8). The definition of utility used here recognizes that utility includes tangible and intrinsic

---

11 For example, in the *Principles of Political Economy*, John Stuart Mill wrote “In all but…unimportant cases, the objects supplied by nature are only instrumental to human wants, after having undergone some degree of transformation by human exertion” (Mill 1891 [1848]: 27).
values. Examples of CNC encountered amongst the CDM A/R and bioenergy projects investigated include productive agricultural land, pastureland, soil quality, fuelwood supply, timber supply, freshwater supply, sugar supply and bioenergy feedstock, but also culturally important sites such as burial grounds.

One area where the distinction between CNC and natural capital becomes questionable is with regard to biodiversity. While biodiversity is increasingly being considered in terms of the ecosystem services it provides and its contribution to ecological resilience (Hooper et al., 2005; Peterson et al., 1998; TEEB, 2009), it is unclear how critical a function biodiversity plays in specific circumstances (Thompson and Starzomski, 2007). Yet it is also clear that global reductions in biodiversity are undesirable. In this dissertation, I have sought to resolve this issue in the evaluation of CDM project sustainability impact by considering biodiversity separately but in addition to CNC.

Distinguishing CNC from natural capital is important for the evaluation of CDM A/R and bioenergy projects. For example, there is a popular assumption that, especially for the rural poor, all land represents CNC. The International Land Coalition writes “It is the same land that peasant producers across rural Africa require to support their livelihoods and smallholder production that is targeted for large-scale acquisitions” (Odhiambo, 2011: 6). The implication is that the loss of any land for foreign investment represents a decline in the rural poor’s capacity to provide for their own wants and needs. While true in certain circumstances, this is not always the case. The issue is whether the land in question is actually being used by the rural poor, or needed in the future for use in agriculture, grazing or other activities from which the rural poor derive utility—including intrinsic cultural and religious values.

Weak sustainability defines sustainability in terms of the total utility offered by CNC and MMC, with rising MMC capable of substituting for declines in CNC. To ensure sustainability, it is necessary to maintain intact the sum of CNC and MMC. For instance, Malaysia (or Canada) can use the income from over-logging its forests to fund a modern university system for a high-technology industrial sector (Homer-Dixon, 1999: 107). As Neumayer explains, weak sustainability’s acceptance of substitutability between CNC and MMC “means that natural
capital can be safely run down as long as enough man-made capital is built in exchange” (Neumayer, 2003: 22). The main difficulty in assessing weak sustainability is developing a common unit to allow comparison of the utility of CNC and MMC. There are real concerns that current monetary evaluations of CNC fail to capture its full value. While an important point, high-resolution cost-benefit analysis of CNC and MMC is not always necessary. Often it is sufficient to note general trends of whether CNC is being maintained or compromised, which is then compared to MMC costs and benefits. This is the strategy of this dissertation.

**The Pareto Efficiency of Sustainability at the Local Level**

An important aspect of sustainable development not captured in the discussion of strong and weak sustainability above is trade-offs between sustainable development at the local and national scales. The definition of sustainability—strong or weak—that I assert in this dissertation subscribes to an ethic of Pareto efficiency: development must be sustainable at both the local and national levels to be sustainable. MMC and CNC benefits realized for the national economy cannot come at the cost to local communities or individuals nor increase the risks they face. It is well understood that peasants tend to be risk adverse because their poverty reduces their capacity to deal with risk (Fafchamps, 2003; Scott, 1976). Yet the initial stages of economic development often result in a net transfer of benefits from rural areas to urban areas—the rural sector is “squeezed”—for industrialization (Byres, 1979; Sah and Stiglitz, 2002). It is necessary to identify conditions when such trade-offs are sustainable.

One school of thought, known as urban bias theory, is highly critical of such trade-offs. It is beyond the scope of this dissertation to review urban bias theory in detail (see Jones and Corbridge, 2010; Lipton, 1977). More important are the policy prescriptions which flow from it: the cultivation of small-holder agriculture rather than the promotion of policies, one consequence of which is the transfer of surplus capital from peasant agriculture to industrial sectors (Bernstein and Brass, 1997: 9; Singh, 1978: 92-93). Operating on the assumption that “since capital is scarce relatively to labour in underdeveloped countries”, urban bias theory has urged investment in agriculture and light industry that produce almost immediate economic benefits in the rural sector (Byres, 1979: 222).
But another school argues that trade-offs between rural and urban sectors—between the local and national—can be justified under certain conditions. Byres argues that investments should avoid economic policies with a “once-for-all effect”, such as those promoted by urban bias theory, and instead strive for those resulting in a “continuing effect” that enlarges the rate of growth of output at future dates (Byres, 1979: 222). Such a transformation can expand the rate of economic growth, first at the extra-village level (national or urban) but ultimately rural society as well. But this need not compromise development at the local level. Following Kay, I argue that what is necessary is “a development strategy that generates a dynamic interaction between the [local and the national, rural and urban sectors]” (Kay, 2009: 117). This dynamic has been best documented in the case of East Asia’s industrial transformation, which recalls our earlier discussion of the developmental state:

[The industrialisation-induced squeeze [in post-WWII Taiwan] only lasted for a few decades, as there was a shift from an urban to a rural bias during the 1970s. Thanks to the country's successful industrialisation the labour surplus gradually vanished and real industrial wages began to rise... Agriculture became increasingly inefficient relative to world agriculture and required increasing protection against imports. It also became a net recipient of subsidies from the state (Kay, 2002: 1084).]

Long-term sustainability may therefore hinge on the ability of the state to act as a legitimate broker of economic development. During the early stages of modernization the initial squeeze of peasant economies is difficult because of the justifiable concerns of local populations about their own welfare and the intentions of the state as well as the relative independence of peasants: “Economic history is largely the story of how to capture the peasants” (Hydén, 1980: 9). As I discuss in more detail in my research methods, I assessed trade-offs in the sustainable development impact of projects at local and national levels.

Before concluding this section, the reader should be aware that debate on weak and strong sustainability is on-going. Some philosophers have rejected weak sustainability on the grounds that it concedes a moral obligation to preserve the natural environment irrespective of economic costs (Norton, 2005: 304-355). Similarly, they question the emphasis on CNC and its distinction from natural capital, associating this distinction with neoclassical economics methods of individual, material valuation. The problem is, of course, identifying alternative methods of valuation. Environmental philosophers such as Norton have appealed to a Habermasian discourse ethic as an approach to sustainability (Norton, 2005: 277-290; Purdon, 2003). But a discourse
ethic is only feasible in a coherent political community, largely free from political competition.\textsuperscript{12} From the perspective of political science, the attempt to bracket off politics from ethics is unrealistic (Allen, 2009).

\textbf{2.3.2. Additionality}

“Additionality” is a term used to describe measurement of the effectiveness of a CDM project to reduce emissions. The CDM itself does not reduce emissions, but rather measures the emission reductions of discrete projects and programmes. Yet in contrast to cap-and-trade programmes, it does not measure reductions relative to agreed emissions reduction target. Developing countries have no cap on their emissions under the Kyoto Protocol. Instead, for each CDM project, the project developer establishes a counterfactual baseline scenario against which future emission reductions are demonstrated to be additional.

The use of this counterfactual approach has aroused much criticism because of the perverse incentives such a system engenders (Wara, 2008; Wara and Victor, 2008). Project developers have every incentive to inflate this counterfactual baseline, arguing that more emissions would have been produced than actually would have been the case, which allows them to claim greater emission reductions. Such a perverse incentive is amplified by the fact that CDM project proponents are responsible not only for implementing a project but also describing the counterfactual baseline against which it is measured and carbon credits generated. Given asymmetric information between project developers and those charged with monitoring the claims they make in CDM project documents, it is difficult to assess the validity of the counterfactual scenario against which carbon credits are claimed.

Resolving issues of additionality requires then building better baselines (Gillenwater, 2011; Meyers, 1999; Shrestha and Shrestha, 2004). I maintain that is best done if one first recognizes

\textsuperscript{12} In the preface to his book, Norton (2005) seeks to justify bracketing off politics from his philosophy of sustainability: “I have consciously steered clear of one aspect of policy formation and management: the role of political and economic power relationships, which often limit attempts to achieve a rational environmental policy… What I have tried to do is to discuss a rational process that is possible—but hardly guaranteed. If members of any community or government participate in bad faith, subverting the adaptive management process to their own selfish ends, this is a different problem from the problem of what we should do as a community, which is the challenge of this book.”
that *comparison is a surrogate for a counterfactual*, an issue I return to in Chapter 3 on research methods. Comparison is at the basis of much good scientific research, including that of classic comparative experiments like Galileo’s investigations into gravity (Box 1). Arguably, those who have designed the CDM have created a rather unnecessary methodological conundrum in a reliance on counterfactuals. The apparent reason that counterfactuals have been preferred is that data for comparative benchmarking has been unavailable in developing countries and its acquisition would significantly increase costs. The CDM Executive Board is striving to address such additionality concerns through the elaboration of sector specific standardized CDM baselines which will see baseline emission profiles established in a more objective manner at the jurisdictional level rather than on a case-by-case basis by project proponents (CDM EB, 2011a; Michaelowa, 2008; UNFCCC, 2010b).

However, even the standardized baselines described above are static and do not accommodate changes in baseline conditions over time. Though dynamic baselines have attracted significant attention in the past (IEA, 2009; Meyers, 1999: 78-84), their use has been discouraged because of concerns about the financial risk that dynamic baselines entail for investors. The only way to really ascertain if a project has truly been additional is to consider a comparative baseline *ex-post*, at the end of the project crediting period.

**Box 1: Galileo and Additionality**

The popular story of Galileo’s experiment with gravity can be used to demystify additionality (see Wikipedia, 2012).

According to a biography by Galileo’s pupil, in 1589 the Italian scientist Galileo had dropped two balls of different weight but the same size—one made from steel and the other wood—from the Leaning Tower of Pisa to demonstrate that their time of descent was independent of their mass. When the two balls hit the ground he was able to disprove Aristotle’s theory of motion which held that heavy objects fall faster in proportion to their weight.

The method that those trained in the dark art of additionality would use to investigate gravity might adhere to the following. Only the metal ball would be dropped and its time recorded. But there would be no experimentation with the wooden ball. Instead, it would be imagined what would have happened if it had been dropped. Clearly the comparative approach would be preferred!

*Photo: Anonymous (2012)*
2.4. Conclusion

This dissertation seeks to contribute to our understanding of the effectiveness of the carbon market in LDCs. It does so by systematically comparing the effectiveness of individual CDM projects (the dependent variable) across states which vary in their state power for development (the independent variable).

A focus on state power for development is warranted because such an independent variable has not been the subject of research into the effectiveness of carbon finance projects. Because of the dominance of norms of liberal environmentalism in climate policy circles, experts have lacked the conceptual tools for evaluating carbon finance from such a perspective. My argument also involves a more analytically precise, two-dimensional dependent variable than is typically used in evaluations of carbon finance. While additionality is difficult to measure, its definition is relatively straightforward. Competing definitions of sustainability add considerable conceptual complexity to its assessment. To transcend this, I distinguish between two paradigms of sustainability—strong and weak sustainability—in my assessment of CDM projects. In Chapter 3, I describe the field methods I have used to measure CDM effectiveness, while in Chapter 4, I describe variation in state power for development in more detail.
3. Research Design and Methods

In order to advance the argument that state power for development is key to the effectiveness of the CDM in least developed countries, this dissertation undertakes a comparative analysis involving detailed investigation of nine carbon finance projects across Tanzania, Uganda and Moldova—countries which differ markedly in the way state power for development is organized. The dissertation is unique in systematically evaluating CDM effectiveness (the dependent variable) in states with different preferences for liberal economic reform and administrative capacities (the independent variables). Significantly, the explanatory model developed in this dissertation is grounded in the empirical evaluation of individual CDM projects. The approach is inductive: I cast a wide empirical net, including hundreds of household surveys and interviews as well as field visits to all nine projects and twenty-one villages, in order to identify the presence or absence of factors causally related to sustainable development and additionality.

The emphasis that I place on empirical fieldwork sets this dissertation apart from most research into the CDM. Despite the enormous amount of interest accorded the CDM and carbon market, most research has not been designed appropriately to answer basic questions about the effectiveness of individual projects operating under the CDM and similar carbon offset standards. That comparative methods have not been used in the evaluation of the CDM should come as no surprise. Inappropriate methods have obscured the evaluation of development initiatives such as the Millennium Village Project (Clemens and Demombynes, 2010; The Economist, 2011). Because of the influence existing research into the CDM has had on climate policy, I outline its deficiencies in the closing section of this chapter. But first we turn to the methods used in this dissertation.

3.1. Case Selection

The CDM is a relatively new mechanism of international cooperation, which restricted fieldwork to areas where it has been established. Indeed, at the time of the selection of countries to investigate in 2008, the CDM in sub-Saharan Africa was restricted to East Africa—countries that have long been top recipients of international development assistance. Similar to trends in
international finance, the distribution of CDM projects demonstrates a marked absence of projects in sub-Saharan Africa. As such, the countries investigated were selected in order to explore the relationship between CDM effectiveness and state power for development to the extent possible, though clearly falling short of the full spectrum of countries involved in the CDM.

3.1.1. Country Selection to Control for State Power for Development

I justify the selection of Tanzania, Uganda and Moldova as a most-different-systems design (see Gayle, 1988; Meckstroth, 1975; Przeworski and Teune, 1970). In most-different-systems research design, the goal is not to determine how cases differ, but to learn if, regardless of their differences, there are similar conditions necessary for the establishment of sustainable and additional carbon finance projects (Lopez, 1992: 275). Tanzania and Uganda are officially recognized by the United Nations as least developed countries (LDCs). Moldova was selected as a comparator in order to control for administrative capacity. However, these differences are not so great so as to make comparability between sub-Saharan African and the former Soviet Union meaningless. As indicated earlier, the challenges facing state authority in both regions share important similarities (Beissinger and Young, 2002: 4).

3.1.2. Carbon Finance Project Selection

I investigated a total of nine afforestation/reforestation (A/R) and bioenergy projects across Tanzania, Uganda and Moldova (Table 1). See Figures 4-6 for the location of projects investigated. Note that CDM projects in Tanzania and Uganda were discrete, located in a specific geographical area. CDM projects in Moldova however were sectoral in scope and extended across the entire country. Consequently I investigated a subset of project activities across two districts, in the northern and southern regions of Moldova.

My general rule was to visit all A/R and bioenergy projects that had reached the validation stage in the CDM project cycle by December 2008 and were therefore listed on the CDM website. Validation means that a CDM project has proceeded to at least the point of implementation. Generally, projects reaching the validation stage have received a “Letter of Approval” from the
host country’s DNA, allowing the project to proceed through the CDM process. This method largely avoided bias in the selection of projects for study. The one instance where a validated CDM project was not investigated was in the case of the Bagasse Cogeneration Project Kinyara Sugar Limited (CDM-PDD, 2008b), in northwestern Uganda. For logistical reasons, only the more accessible project in the southern part of the country was investigated.

Information for four projects was not available on the CDM project website. The CDM cookstove project in Tanzania was identified through personal communication with UNDP during deliberation on country selection. As will be discussed, an uncooperative DNA in Tanzania had made obtaining a Letter of Approval difficult and the project could not proceed to the official validation stage and was not listed on the CDM website. As it was not a CDM project, I did not identify the Tanzania biofuel project until I arrived in-country. While there were a number of biofuel projects underway in Tanzania, I identified two biofuel projects relatively close to Dar es Salaam. As the Swedish backed SEKAB sugarcane ethanol project succumbed to the global financial crisis (Mande, 2009a), this left the Sun Biofuel jatropha biodiesel project in Kisarawe District. Information on the Plan Vivo reforestation project in Uganda, a project of the voluntary carbon market, and bioenergy pilot project in Moldova, a GEF-funded project, was not obtained until fieldwork was initiated. These two projects were investigated to complement the other projects visited in each country. When researching projects not operating under the CDM, one quickly becomes aware of the significance of information made accessible for individual CDM projects on the UNFCCC website.

While the dissertation only refers to nine projects, given the complicated nature of the CDM, they technically correspond to a total of seventeen independent projects (Table 1). Projects were aggregated when they involved the same basic techniques and actors. Some of the “small-scale” projects investigated are clearly elements of larger projects, including the Uganda CDM afforestation project and the Moldova rural energy modernization project. Implementing a “small-scale” project has the advantage that the rules for design and implementation are less

---

13 A cookstove project in Uganda operating on the voluntary markets was also considered (Gunther, 2008). It was not pursued as the project was largely urban focused though a pilot project in a rural area had recently been initiated.
onerous, yet it is possible to bundle a number together to generate a more financially viable project (Purdon, 2009b: 8-10; UNFCCC, 2010a). However, the rules for small-scale A/R projects also insist that they “are developed or implemented by low-income communities and individuals as determined by the host Party” (UNFCCC, 2005b: para 1(i)).
### Table 1: Nine projects investigated across Tanzania, Uganda and Moldova

<table>
<thead>
<tr>
<th>Country</th>
<th>Project Reference Name</th>
<th>Technical Name</th>
<th>Reference</th>
<th>Project Developer</th>
<th>Technical Support / Financial Brokerage</th>
<th>Project Implementation Period</th>
<th>Estimated Carbon Value</th>
<th>Expected Carbon Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanzania</td>
<td>Tanzania CDM Afforestation</td>
<td>Afforestation in grassland areas of Uchindile &amp; Mapanda; Reforestation at the Idete Forest Project</td>
<td>(CDM-PDD, 2007a; 2008f)</td>
<td>Private Sector</td>
<td>Private Sector</td>
<td>1997-2004/2006-2013</td>
<td>$8.4 million</td>
<td>8.5 million</td>
</tr>
<tr>
<td>Tanzania</td>
<td>Tanzania CDM Cookstove</td>
<td>Karatu Energy Efficient Stove Project</td>
<td>(KDA, 2008)</td>
<td>NGO</td>
<td>UNDP</td>
<td>2008-2010</td>
<td>$7.4 million</td>
<td>0.6 million</td>
</tr>
<tr>
<td>Tanzania</td>
<td>Tanzania Biofuel (Non-Carbon)</td>
<td>Sun Biofuels Kisarawe Project</td>
<td>(Cleaver et al., 2010: 38-42; John, 2010; Sulle and Nelson, 2009: 46-54)</td>
<td>Private Sector</td>
<td>Private Sector</td>
<td>2006-2011 (suspended)</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Uganda</td>
<td>Uganda CDM Afforestation</td>
<td>Uganda Nile Basin Reforestation Project - No. 1-5</td>
<td>(CDM-PDD, 2006a; b; c; d; 2009)</td>
<td>State Agency</td>
<td>World Bank</td>
<td>2006-2010</td>
<td>$1.1 million</td>
<td>0.6 million</td>
</tr>
<tr>
<td>Uganda</td>
<td>Uganda CDM Cogeneration</td>
<td>Kakira Sugar Works Ltd. (KSW) Cogeneration Project</td>
<td>(CDM-PDD, 2007b)</td>
<td>Private Sector</td>
<td>World Bank</td>
<td>2004-2008</td>
<td>$1.5 million</td>
<td>0.4 million</td>
</tr>
<tr>
<td>Moldova</td>
<td>Moldova CDM Rural Energy Modernization</td>
<td>Moldova Biomass Heating in Rural Communities - No. 1 &amp; 2</td>
<td>(CDM-PDD, 2005a; b)</td>
<td>Moldova Carbon Finance Unit, State Ministry of Environment Consolidated Agricultural Projects’ Management Unit (CAPMU)</td>
<td>World Bank</td>
<td>2005-2007</td>
<td>$1.4 million</td>
<td>0.4 million</td>
</tr>
</tbody>
</table>

**Total No.** 9 17
Figure 6: Map showing location of projects investigated in Tanzania

Figure 7: Map showing location of projects investigated in Uganda
Figure 8: Map showing location of two districts where CDM project activities were investigated in Moldova
3.1.3. **Village Case Selection**

A total of 21 villages were investigated during the course of fieldwork, 14 project villages and 7 control villages (Table 2). Villages were almost always coupled with control villages located nearby (under 30 km), in the same jurisdiction and, to the extent possible, of comparable size. See statistics on village population and household numbers in Table 3. A much more detailed presentation of villages and the development context of the projects with which they were associated, including maps, is given in the following chapter.

There were instances where logistical realities made simple village pairings difficult. First, for logistical reasons, there was some overlap between villages used as controls in Moldova, with villages involved in the CDM afforestation project servicing as controls also for the CDM rural energy modernization project and bioenergy pilot project. For the CDM rural energy modernization project, Sâiți was used as the control in the southern region and Bursuceni being the control in the northern region. Bursuceni was also the control for the bioenergy pilot project in Moldova, which was located in Chiscareni. Without allowing for this overlap, there are only seven control villages (see where overlapping villages are indicated in parentheses in Table 4.

Second, I included as a “village” the community-based organization known by its acronym of RECPA that was involved in the CDM afforestation project in Uganda. While most of the members of this organization were located in the village of Rwoho, adjacent to the forest reserve where the CDM project was undertaken, the RECPA membership actually extends beyond this village. As will be explored in more detail later, village government structures in Uganda are not conducive to the formation of legal “community” entities as typically understood in the international efforts to promote community-based forest management and require the creation of a formal community-based organization (CBO). Because it was a CBO, no household surveys were undertaken amongst RECPA members but a village focus group was conducted. If RECPA were not considered a village, there would only be thirteen project villages.

Third, households participating in the Plan Vivo reforestation project in Uganda were compared with a control group of households in the same sub-county not participating in the carbon project. Because the Plan Vivo project operates at the level of individual households, such a
modification to the methodology appeared justified. However, there are important limitations to this approach. Finally, in two cases, villages could not be paired with a control village. First, for the Uganda CDM bagasse cogeneration project, identifying a village within a reasonable distance to the project village that was not growing sugarcane proved logistically difficult because sugar mills have extensive outgrower catchment areas. Second, in the northern district of Moldova investigated, all villages were involved in the CDM afforestation project—no control village was possible.

Finally, it should be emphasized that fieldwork would have been impossible without the use of a vehicle. The villages in question were often relatively isolated and at significant distance from the capitals of each case-study country. In Tanzania I bought a small Suzuki 4x4 vehicle which I drove to all project sites, then drove around around the West Coast of Lake Victoria to do the same in Uganda (Figure 9). In Moldova, I rented a car for the duration of fieldwork which enabled me to visit nearly all four corners of the country.

**Figure 9: Vehicles used during fieldwork**

“Hamna Shida” – the vehicle I bought and drove to all project sites in Tanzania and Uganda

Car I rented and drove around Moldova
Table 2: Distribution of villages investigated

<table>
<thead>
<tr>
<th>Country</th>
<th>Project/Control</th>
<th>Village</th>
<th>Project</th>
<th>Control</th>
<th>TOTAL</th>
<th>Overlap</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Afforestation/Reforestation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>Mapanda** / Idete**</td>
<td>Luhunga / Ipilimo</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uganda</td>
<td>Kirungu** / RECPA** / Biteroko SC Plan Vivo</td>
<td>Rwerazi / Biteroko SC Non-Plan Vivo</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moldova</td>
<td>Sâiți** / Bursuceni** / (Chiscareni)**,β</td>
<td>Turcoz / na</td>
<td>3/4overlap</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bioenergy/Biofuel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>Mtambaα</td>
<td>Maguruwe</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uganda</td>
<td>Kagogwa**</td>
<td>na</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moldova</td>
<td>Chiscareniβ</td>
<td>(Bursuceni)β</td>
<td>1/2overlap</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Improved Cookstove</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>Endabash**</td>
<td>Bassodawish</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rural Energy Modernization</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moldova</td>
<td>Ursoaie** / Cotujeni Mici** / Prepelița**</td>
<td>(Bursuceni)β / (Sâiți)β</td>
<td>2/4overlap</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>14/15overlap</td>
<td>7/10overlap</td>
<td>21/25overlap</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Indicates CDM Project
α The Plan Vivo reforestation in Biteroko sub-county was not associated with communities but rather with individual households.
β Mtamba was not a carbon project, but involved the acquisition of land for a biofuel project.
Villages in parentheses indicate overlap with other project activities. Chiscareni was a demonstration bioenergy project made possible by the GEF; it was also involved with CDM afforestation. Bursuceni is used as a control for the impact of the bioenergy project in Moldova. Despite being involved in reforestation activities, it was not involved in the bioenergy project. This is justified because all villages in the Sengeri rayon appeared to be involved with the reforestation project.

Table 3: Basic comparative village statistics: population and households

<table>
<thead>
<tr>
<th>Country</th>
<th>Project/Control</th>
<th>Village</th>
<th>Population</th>
<th>Households</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CDM Afforestation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>Project</td>
<td>Mapanda</td>
<td>5,342</td>
<td>980</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>Luhunga</td>
<td>2,781</td>
<td>519</td>
</tr>
<tr>
<td>Uganda</td>
<td>Project</td>
<td>Idete</td>
<td>4,163</td>
<td>883</td>
</tr>
<tr>
<td>Moldova</td>
<td>Control</td>
<td>Ipilimo</td>
<td>2,675</td>
<td>604</td>
</tr>
<tr>
<td><strong>Biofuel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>Project</td>
<td>Mtamba</td>
<td>889</td>
<td>240</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>Maguruwe</td>
<td>548</td>
<td>154</td>
</tr>
<tr>
<td><strong>CDM Cookstove</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>Project</td>
<td>Endabash</td>
<td>9,400</td>
<td>-1,391</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>Bassodawish</td>
<td>5,036</td>
<td>920</td>
</tr>
<tr>
<td><strong>Uganda</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation</td>
<td>Project</td>
<td>Kirungu</td>
<td>1,400</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>Rwerazi</td>
<td>1,552</td>
<td>188</td>
</tr>
<tr>
<td><strong>Plan Vivo Reforestation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project</td>
<td>Control</td>
<td>Plan Vivo HHs</td>
<td>na*</td>
<td>na*</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>Control HHs</td>
<td>na*</td>
<td>na*</td>
</tr>
<tr>
<td><strong>CDM Bagasse Cogeneration</strong></td>
<td></td>
<td></td>
<td>-1,250</td>
<td>178</td>
</tr>
<tr>
<td><strong>Moldova</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation</td>
<td>Project</td>
<td>Sâiți</td>
<td>2,300</td>
<td>760</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>Tocuz</td>
<td>4,900</td>
<td>1,400</td>
</tr>
<tr>
<td></td>
<td>Project</td>
<td>Bursuceni</td>
<td>1,294</td>
<td>671</td>
</tr>
<tr>
<td><strong>CDM Afforestation &amp; Bioenergy Pilot</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project</td>
<td>Chiscareni</td>
<td></td>
<td>5,975</td>
<td>2,750</td>
</tr>
<tr>
<td><strong>Moldova CDM Rural Energy Modernization</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project</td>
<td>Ursoaie</td>
<td></td>
<td>3,000</td>
<td>980</td>
</tr>
<tr>
<td>Project</td>
<td>Cotujeni-Mici</td>
<td></td>
<td>1,270</td>
<td>380</td>
</tr>
<tr>
<td>Project</td>
<td>Prepelița</td>
<td></td>
<td>2,973</td>
<td>1,276</td>
</tr>
</tbody>
</table>

α Biteroko sub-county has a population of approximately 25,200 and 4,738 households.
3.2. Measuring Sustainable Development and Additionality

I used comparative methods of policy evaluation to investigate the effectiveness of individual CDM projects, in the tradition of policy evaluation (Langbein and Felbinger, 2006; Mohr, 1995). Through comparison of the effects of the CDM with an appropriate control group, comparative analysis avoids the counterfactual conundrum that undermines current evaluation of the CDM. The control group actually serves as a surrogate for the counterfactual scenario of interest: “All causal analysis also requires comparison. Without comparison, there can be no counterfactual: what would have happened to outcome (Y) if there were no intervention (X) or if the intervention (X) had been different?” (Langbein and Felbinger, 2006: 59).

As indicated earlier, the approach to measuring sustainable development and additionality was inductive: the presence or absence of causal factors was determined by measuring a large number of variables that the literature suggests are related to sustainable development and additionality—a process I described in more detail below. The difference between the evaluation of CDM impact on sustainable development and additionality was the dependent variable: for sustainable development it was villages in all but one case (a village involved with a project compared with an adjacent control village) and for additionality it was economic activities (the CDM project activities compared with other economic activities in the region).

Fieldwork was carried-out at three levels: local, district/regional and national. Sustainable development impact was the primary focus of research undertaken at the local level, though this research also informed additionality assessment. Additionality was primarily assessed through review of policies, project information and information on development context identified through key informant interviews. Plans for fieldwork were finalized in late 2008 and executed over eight months in 2009: Tanzania (Jan-May), Uganda (May-June) and Moldova (July-August). Fieldwork was always undertaken with a research assistant who also served as a translator when necessary. In Tanzania, fieldwork was assisted by Samwel Moses Ntapanta and Hamadiel Mgala. In Uganda, field assistance was provided by Maria Sarah Nadunga and Arinaitwe Euzobio. Finally, assistance in Moldova was provided by Dorin Toma.
3.2.1. Sustainable Development: Comparative Socioeconomic Evaluation

There were two steps to the evaluation of sustainable development impact of carbon finance projects. First, a post-test-only comparative group design was used to compare the socioeconomic conditions of villages involved in CDM projects with an appropriate “control” village (Langbein and Felbinger, 2006: 109-111). The approach was to gather socioeconomic data as well as villagers’ perceptions of sustainable development impact of carbon finance projects in a comparative manner in order to identify each carbon finance project’s impact on CNC and MMC. Local CNC and MMC variables were identified inductively, through detailed household and village surveys supported by interviews with local villagers and other key informants. In this way, the presence or absence of elements of CNC or MMC were able to be causally related to sustainability outcomes.

Second, in order to consider the variation of CDM project sustainable development impact across Tanzania, Uganda and Moldova, the effects of the 9 carbon projects on 14 project villages was condensed through a qualitative ranking exercise to compare sustainability impact across projects. The effort here was to bring together all research findings in a systematic and meaningful way in order to facilitate comparisons across countries and tease out causal factors. To this end, I assigned a score to projects based on a qualitative evaluation of their impact in terms of CNC and MMC. Here I discuss sustainable development impact in terms of eleven “cases”. Cases either grouped villages together when a project had similar impacts on them or distinguished between villages involved in the same project when the sustainability impact differed (Table 4).

<table>
<thead>
<tr>
<th>Country</th>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanzania</td>
<td>Tanzania CDM Afforestation – Mapanda &amp; Idele</td>
</tr>
<tr>
<td></td>
<td>Tanzania Biofuel – Mtamba</td>
</tr>
<tr>
<td></td>
<td>Tanzania CDM Cookstove – Endabash</td>
</tr>
<tr>
<td>Uganda</td>
<td>Uganda CDM Afforestation – Kirungu</td>
</tr>
<tr>
<td></td>
<td>Uganda CDM Afforestation – RECPA</td>
</tr>
<tr>
<td></td>
<td>Uganda Plan Vivo Reforestation – Bitereko</td>
</tr>
<tr>
<td></td>
<td>Uganda CDM Cogeneration – Kagogwa</td>
</tr>
<tr>
<td>Moldova</td>
<td>Moldova CDM Afforestation – Sălăț and Chiscareni</td>
</tr>
<tr>
<td></td>
<td>Moldova CDM Afforestation - Bursuceni</td>
</tr>
<tr>
<td></td>
<td>Moldova Rural Energy Modernization</td>
</tr>
<tr>
<td></td>
<td>Moldova Bioenergy Pilot – Chiacarieni</td>
</tr>
</tbody>
</table>
Fieldwork and Data Collection

Household Survey and Village Interviews

At the local level, field methods included key informant interviews as well as detailed household and village surveys to investigate sustainable development impact. Household surveys sought quantitative and qualitative household socioeconomic information as well as impressions of the CDM project (generally administered as a semi-structured interview). Household surveys included questions on:

1) Basic household demographic characteristics;
2) Employment and income;
3) Land use and ownership;
4) Agricultural activities and crop yields;
5) Household energy and water use;
6) Other sources of income, including non-agricultural income; (vii) local financial and lending opportunities; and
7) Social networking.

A copy of the the household surveyed is found in Appendix 4. Slight variations of this household survey were administered in Tanzania, Uganda and Moldova.

In each village, 30 households were targeted for household surveys, though logistical constraints prevented this number from being collected in certain cases. All households were selected randomly using a transect method, a technique borrowed from ecology. Essentially, households were randomly selected in one direction along a village road/path; upon reaching approximately five households, the process was repeated along another road/path selected in the village. Altogether, 454 household surveys were undertaken, 151 local-level interviews recorded and an additional 15 focus groups conducted. See Appendix 5, Table 46.

Information, both quantitative and qualitative, collected from the surveys was subsequently entered into a database designed specifically for this dissertation with data entry facilitated by a number of Canada-based research assistants; household interviews were transcribed with similar assistance.\(^{14}\) Note that household surveys were undertaken in all villages except Ursoaie and Cotujeni Mici investigated in the context of the CDM rural energy modernization project in Moldova as well as amongst members of RECPA, the community-based organization involved

---

\(^{14}\) The individuals assisting in the project were Marjorie Tramfield, Mya Sherman, Bianca Ponziani, Sarah Xu, Semyon Chaymann, Ardeshir Vafadari, Shona Jenkins and Ahdia Hassan.
in the CDM afforestation project in Uganda. During village surveys (described below) I learned that Ursoaie and Cotujeni Mici had not pursued the bioenergy components of the projects and instead opted for natural gas.

What I refer to as “village surveys” were carried out in each village, administered as focus groups or to key informants to obtain basic information about village socioeconomic conditions. Village surveys were divided into the following sections:

1) General socioeconomic and demographic characteristics;
2) Infrastructure;
3) Economy;
4) Governance; and
5) Information on CDM project.

A copy of the village survey can also be found in Appendix 4. A total of nineteen village surveys were conducted. In addition, key local informants were interviewed; they included local government officials, project developers, private sector representatives and other local leaders. Nearly thirty additional local level interviews were undertaken. Interviewees were identified through snowball methods, where one contact was asked about other relevant persons to interview. See Appendix 5, Table 46.

**District and National-Level Interviews**

District and national level interviews were undertaken with key informants. District interviews sought to understand district administrative procedures affecting CDM projects and evaluate CDM projects in relation to other district development efforts. National-level interviews focused on climate change and development policy as well as CDM additionality. An overview of district- and national-level field effort is presented in Appendix 5, Table 47, with interview questions detailed in Table 48. A total of seventy-one district and national level key informant interviews were undertaken: 39 in Tanzania, 34 in Uganda and 22 in Moldova. Canada-based research assistants, as reported above, facilitated the transcription of these interviews.

**Data Analysis: CNC and MMC Impact and Sustainability Evaluation**

Sustainability evaluation proceeded first by analysing the impact of a project on CNC and MMC before then using these results to qualitatively rank each project’s sustainability outcome and
determine whether the conditions of strong sustainability and weak sustainability were maintained or violated.

**Strong Sustainability Evaluation**

For the evaluation of strong sustainability, I first evaluated how a project affected local CNC. This was determined inductively, based on observation of the presence or absence of an element of CNC in both a village involved in a project and its control village. In effect, the control village served as a baseline against which conditions in the project village was assessed. Distinguishing between natural capital and *critical* natural capital was possible by combining quantitative information obtained through household surveys supported by qualitative data obtained through surveys and focus groups. For example, if crop productivity was found lower in a project village than a control village and this corroborated with interviews stressing food insecurity issues and insufficient access to land, this was deemed as evidence that land represented local CNC and that this had been reduced by the project. Based on fieldwork findings, projects were scored according to whether they either decreased (-2), left unaffected (0) or increased (+2) local CNC.

Second, I identified CNC at the national level through review of national development strategies, related government reports and legislation. Because CNC changes over time, I limited this document review to the time period when CDM projects were initiated (generally the mid-2000s). Accordingly, the identification of critical natural capital considered Tanzania’s *2005 Tanzania's National Strategy for Growth and Reduction of Poverty* (GoT, 2005), also known by its Swahili acronym MKUKUTA; Uganda’s *2005 Poverty Eradication Action Plan* (MoFPED, 2005), and Moldova’s *2004 Economic Growth and Poverty Reduction Strategy Paper* (GoM, 2004). Natural resources and other environmental factors that were prioritized in these government reports were identified as national CNC. Similar to the scoring of local CNC, national CNC was scored according to whether a project decreased (-1), left unaffected (0) or increased (+1) national CNC.

Finally, third, I used a CNC ranking matrix to score the strong sustainability impact of each project at the local and national level (Figure 10). Considering sustainability at both levels is important because, as discussed above, one concern about state efforts to promote rural
economic development is that the state unjustly “squeezes” the surplus of the rural sector to promote industrialization and/or urban development. In order to meet the definition of sustainability offered here, such squeezing must be Pareto efficient at the local level. Given the commitment to Pareto efficiency, only if projects led to the increase or maintenance of CNC at the local level was it considered strongly sustainable. Projects that result in decreased local CNC though increasing national CNC are given a score of -2.

As discussed earlier, I treated biodiversity separately from CNC because it was not possible to determine if biodiversity itself was critical in its provision of human utility. Given alarm about the global loss of biodiversity, I considered it wrong not to include some evaluation of biodiversity. I thus assigned a biodiversity score in addition to a project’s effect on local and national CNC. However, I only added a biodiversity score if CNC increased or remained unchanged. For example, activities that lead to the conservation of biodiversity (forest conservation) but deprive local people of CNC in the process (agricultural land) do not meet the definition of sustainability I have used.
Figure 10: Critical Natural Capital ranking matrix

<table>
<thead>
<tr>
<th>NATIONAL CRITICAL NATURAL CAPITAL BENEFITS</th>
<th>National Critical Natural Capital Increased or Need for Critical Natural Capital Substitution Reduced</th>
<th>National Critical Natural Capital Unchanged or No Net Effect on Need for Critical Natural Capital Substitution</th>
<th>National Critical Natural Capital Decreased or Need for Critical Natural Capital Substitution Increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Critical Natural Capital Increased or Need for Local Critical Natural Capital Substitution Reduced (2)</td>
<td>Score = 3</td>
<td>Score = 2</td>
<td>Score = 1</td>
</tr>
<tr>
<td>Local Critical Natural Capital Unchanged or No Net Effect on Need for Local Critical Natural Capital Substitution (0)</td>
<td>Score = 1</td>
<td>Score = 0</td>
<td>Score = -1</td>
</tr>
<tr>
<td>Local Critical Natural Capital Decreased or Need for Local Critical Natural Capital Substitution Increased (-2)</td>
<td>Score = -2</td>
<td>Score = -2</td>
<td>Score = -2</td>
</tr>
</tbody>
</table>
Weak Sustainability Evaluation

Evaluation of weak sustainability proceeded by adding an evaluation of MMC impact to that of CNC. First, local MMC benefits were determined inductively, based on observation of the presence or absence of an element of MMC in both a village involved in a project and its control village. Again, the control village served as a baseline against which conditions in the project village was assessed. Based on fieldwork findings, projects were scored according to whether they either decreased (-2), left unaffected (0) or increased (+2) local MMC. In addition, I distinguish whether a project benefits only those participating in a project or also non-participants, with the latter scoring higher.

Unique to my evaluation of local MMC, I used the concept of opportunity cost in the evaluation of the MMC impact of each project: the costs of a CDM project should be evaluated by comparison to alternative economic activities that could have been undertaken had the project not been implemented. If a CDM project prevents other economic activities that would generate MMC benefits for a village, there is a significant opportunity cost to the village involved in terms of MMC. For instance, if a village accepts to establish a protected wildlife area on village lands that are also rich in oil, the village absorbs a considerable opportunity cost (assuming they would benefit from a share of oil revenues).

Second, I considered the MMC benefits of a project at the national level. This analysis was more straightforward than that for national CNC and simply required an evaluation if the MMC benefits of a project would extend beyond the village level.

Third, I used a MMC ranking matrix to score the MMC impact of each project at the local and national level (Figure 11). As discussed above, given the commitment to local-level Pareto efficiency, only if projects led to the increase or maintenance of MMC at the local level was it given a positive score. Projects that result in decreased local MMC though increasing national MMC are given a -2 score.

Finally, it was necessary to combine CNC and MMC evaluations to determine if the conditions of weak sustainability had been maintained or violated. As discussed earlier, the main difficulty
in assessing weak sustainability is developing a common unit to allow comparison of the utility of CNC and MMC and determine whether a project delivers net MMC benefits. Often it was sufficient to note general trends of whether CNC was being maintained or compromised by a project, which was then considered in relation to MMC costs and benefits. Results were clear in all but one case, the village of Kagogwa involved with the Uganda CDM cogeneration project in Uganda. Here a more high-resolution cost-benefit analysis of CNC and MMC would be necessary to determine if MMC benefits would be sufficient to compensate for increasing land scarcity/rising food prices that appeared to result from the expansion of sugarcane production towards the CDM cogeneration project. Nonetheless, in the results section, I offer tentative evaluation of this project based not only on the quantitative field research but also qualitative information obtained during interviews.
Figure 11: Man-Made Capital Matrix

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Man-Made Capital Increased (2)</td>
<td>Participants &amp; Non-Participants Benefit (or) Broad Community Benefits (1)</td>
<td>Score = 4</td>
<td>Score = 3</td>
<td>Score = 2</td>
</tr>
<tr>
<td>Local Man-Made Capital Unchanged (0)</td>
<td>Participants Benefit Only (0)</td>
<td>Score = 3</td>
<td>Score = 2</td>
<td>Score = 1</td>
</tr>
<tr>
<td>Local Man-Made Capital Decreased (-2)</td>
<td></td>
<td>Score = 1</td>
<td>Score = 0</td>
<td>Score = -1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Score = -2</td>
<td>Score = -2</td>
<td>Score = -2</td>
</tr>
</tbody>
</table>
3.2.3. **Additionality: Comparative Baseline Approach**

Additionality was evaluated by comparing the counterfactual baseline presented in the CDM project documents with similar economic activities underway in the project’s vicinity but not claiming carbon credits. In effect, I sought to compare the counterfactual baseline described in the CDM project document with one I constructed from observation. I refer to this as a “comparative baseline approach”. Another innovation was to distinguish between two analytically distinct aspects of additionality: project finance and background additionality. Finally, I also call attention to the importance of identifying the appropriate scope of comparison. As indicated earlier, it is important to compare a CDM project with activities in the region producing a similar economic output.

**Ex-Post Comparative Baseline Emissions Modeling**

To the extent possible, CDM baselines were evaluated and modeled retrospectively, after the start of a project’s crediting period, in juxtaposition to the CDM frozen baseline established at the start of the project. All CDM project documents describe in a quantitative manner the counterfactual baseline emissions scenario as well as the anticipated CDM project emissions scenario. There is a certain limitation in this “ex-post” modeling approach as it was based on fieldwork undertaken in 2009 and subsequent analysis through 2011, which is before the close of the crediting period of all seven projects investigated. Nonetheless, there is some confidence in the representativeness of additionality analysis because the implementation phase of all projects was concluded prior to my 2009 field visits—except for the Tanzania CDM afforestation project which was slated to continue tree-planting through 2014.

**Project Finance Additionality and Background Additionality**

Importantly, this study differentiates between two types of additionality: project finance additionality and background emissions/sequestration additionality. Project finance additionality is concerned with the financial barriers that would have prevented a project from proceeding if not for the support provided by the CDM. Financing is not the only barrier to the implementation of a CDM project—the CDM Executive Board recognizes technological barriers and barriers due to prevailing practice (CDM EB, 2011b)—but it is by far the most important.
One important issue in the consideration of financial additionality is the usage of ODA. Intended to incentivize private sector financing, the CDM was initially designed to be clearly separate the CDM from ODA. The CDM’s initial rules emphasized “that public funding for clean development mechanism projects from [developed countries] is not to result in the diversion of ODA and is to be separate from and not counted towards the financial obligations of [developed countries towards ODA]” (UNFCCC, 2001: preamble). Developing countries sought such a provision because of their concern that ODA would be diverted to the generation of carbon offsets, which were already in the interests of developed countries as means of reducing their compliance costs with Kyoto. In practice distinguishing between public funding and ODA has proven difficult to administer. All CDM projects require that the project developer affirm that “any public funding does not result in a diversion of ODA is separate from and is not counted towards [ODA commitments of developed countries]” (UNFCCC, 2005a: Appendix B, para(f)). The language is unclear—particularly the purposes from which ODA is to be prevented from being diverted (Dutschke and Michaelowa, 2006). However, there are good reasons to permit some combination of ODA and CDM financing, particularly to promote projects in areas in least developed countries. This was the opinion of the OECD who, in an important 2004 pronouncement of its Development Assistance Committee, decided that ODA could be used for everything except the final purchase of CDM carbon credits (OECD, 2004). While it is not clear if the CDM Executive Board necessarily agrees with this decision, most practitioners in the area of carbon finance appear to do so.

In the current study, the approach I have used has been to construct the financial history of each project in order to generate an “ODA-baseline” (Asuka, 2000). This was undertaken as part of a detailed history of the financing of each of the projects investigated in order to determine if the ODA and other sources of financing were included in the financial baseline of projects investigated.

---

15 The CDM rules actually read: “Information on sources of public funding for the project activity from Parties included in Annex I which shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of those Parties,” (UNFCCC 2005a: Appendix B, para(f)).
The second type of additionality, background additionality, describes changes in baseline conditions that are driven by events outside the control of the organization implementing a CDM project such as domestic market conditions or land-use change outside the project area. For example, even if a CDM project is not implemented, emissions might still decline as a developing country adopts a renewable energy feed-in-tariff to reduce oil imports. However, the relationship between renewable energy subsidies, usually a domestic policy, and the CDM is itself problematic under current CDM rules. The CDM arguably acts as a disincentive for governments to adopt their own renewable energy subsidies, as this would effectively reduce their baseline emissions and hence carbon credits. To address this perverse disincentive, the CDM Executive Board decided in 2005 that renewable energy subsidies would not be counted as part of baseline emissions (CDM EB, 2005). But as some observers have noted, this means that the CDM Executive Board “disabled their own additionality criteria” (WFC, 2009: 4). This points to a tension between national emission reduction efforts that developing counties can undertake independently and that for which international support is needed.

In reality, both financial incentives and background emission profiles can change over the 7-10 year window during which a CDM project claims credits. The problem is even more serious for CDM afforestation projects which are administered over a 20-30 year crediting period. The CDM baseline approach is not capable of adjusting to such changes. Almost all CDM methodologies rely on a frozen baseline approach, whereby historical emissions at the point of the CDM project’s inception are expected to have remained the same for the duration of the crediting period in the absence of the CDM project (IEA, 2009: 69-93; Purdon, 2009a: 60-62). Figure 12 demonstrates how a change to a CDM project’s baseline emissions affects the amount of genuine carbon credits generated, for energy and A/R projects.

**Scope of Additionality**

The scope of the comparative baseline approach is extremely important. Economic activities to which the CDM is compared need to be of similar economic output (electricity, timber, carbon sequestration), but do not have to be identical in the way that this output is produced. For example, it is inappropriate to assess additionality through a comparison of CDM renewable
energy projects to only renewable energy projects not claiming carbon credits. Rather the comparison should include all generating capacity—renewable and fossil fuel-based—within an appropriate geographic scale. Both renewable and fossil fuel-based generating capacity have the same output (electricity), even though they are produced in quite different ways.

Similarly, a tree plantation comprised of exotic species claiming carbon credits should be compared with other efforts to incentivize tree-planting, including efforts with only indigenous species. The output in both is carbon sequestered in wood. For reforestation, lands are likely conducive to natural vegetative regrowth if left unattended. The assessment of additionality of reforestation projects should therefore consider not just tree-planting effort, but also whether non-project lands will remain relatively devoid of carbon (i.e., because of grazing or crop production) or see some natural forest reclamation.
Figure 12: Examples of additional and non-additional carbon finance projects as a result of a changing baseline, for energy and afforestation/reforestation type projects, respectively.

**ENERGY PROJECTS**

(a) Completely Additional Project

(b) Project with Non-Additional (“Bogus”) Carbon Credits as a result of a changing baseline.

**AFFORESTATION / REFORESTATION PROJECTS**

(a) Completely Additional Project

(b) Project with Non-Additional (“Bogus”) Carbon Credits as a result of a changing baseline.
3.4. Deficiencies of Current Research into the CDM

Existing research into the CDM pays insufficient attention to research design, which frustrates the evaluation of the effectiveness of individual CDM projects and hence prevents conclusions about the mechanism’s performance from being drawn. Careful review of the existing literature on the CDM reveals an over-reliance on simple “one-shot” case-studies, large-N reviews of CDM project documents or legal institutional analyses. Most “one-shot” case-studies have tended to focus on sustainable development, while evaluation of additionality has relied on analysis of CDM project documents developed by project developers themselves. A weakness of all three approaches is that individual CDM projects are assessed without consideration of the broader development context in which they are located. Because of a lack of comparative research design, most existing studies have not convincingly demonstrated that outcomes observed in relation to a specific CDM project are actually due to the project and not other factors. I detail these deficiencies in the measurement of sustainable development and additionality below.

A lack of basic information about the effectiveness of individual CDM projects is enjoined by another methodological difficulty—the lack of comparisons of CDM effectiveness across different countries in order to control for state power for development as an independent variable. Because there has been little systematic study of the CDM—both within and across countries—explanations based on domestic factors such as state power for development are altogether lacking in the climate policy literature. Recent research into the CDM has begun to consider the relationship between the state and CDM performance (Fay et al., 2011; Newell et al., 2011; Peskett et al., 2011). However, such studies possess a number of shortcomings in seeking to explain CDM effectiveness. Notably, such studies to date have been country specific. They therefore lack a broad, comparative approach to control for variation in state power for development and the distinction I make between state administrative capacity and political economy preferences. Indeed, of the extant literature on the CDM, comparative studies, for example, between China and India (Ganapati and Liu, 2008; 2009) and China and South Africa (Fay et al., 2011) yield at best tenuous conclusions because of their emphasis on formal institutions such as the DNA.
3.4.1. “One-Shot” Case-Studies

“One shot” case-studies entail the investigation of the effects of a CDM project as a single case, such as surveying a village involved with a project. While mindful of the benefits of case-studies for generating hypotheses and process-tracing (McKeown, 1999), “one-shot” case-studies lack control groups necessary for addressing the larger issues of causality of interest to policy-makers. For example, a “one-shot” case-study cannot determine if socioeconomic conditions observed in a village associated with an individual CDM bioenergy project, such as food insecurity, are due to land lost to the CDM project or the result of poor rains in the area that have affected both villages involved with the CDM and those not. Despite this limitation, “one-shot” case-studies abound in the academic and grey literature on the CDM (Boyd, 2008; Boyd et al., 2007; Brown et al., 2011; Gong et al., 2010; Lohmann, 2005; Parumphumeesup and Kerr, 2011; Serôa da Motta et al., 2002).

Investigation into alternatives to the CDM suffers from similar methodological problems. Research into REDD pilot projects (Peskett et al., 2011; Richards, 2010), development projects involving payment for ecosystem services (Kosoy and Corbera, 2010; Pagiola et al., 2005; Wunder et al., 2008) as well as biofuel projects (Cleaver et al., 2010; Habib-Mintz, 2010; Martin et al., 2009; Sulle and Nelson, 2009) has all been limited to “one-shot” case-studies. Nonetheless, such studies often aspire to making causal claims about the CDM’s contribution to outcomes observed.

3.4.2. CDM Project Document Reviews

Most investigations of additionality have relied on CDM project documents, which are largely technical justifications of the amount of carbon credits that will result from an individual CDM project. As discussed earlier, these project documents offer only limited information on the development context in which projects are situated. Despite the long-standing critiques of the use of counterfactuals in CDM project documents, many analyses have relied on these project documents in order to facilitate comparison of a large number of CDM projects (Alexeew et al., 2010; Disch, 2010; Ganapati and Liu, 2008; Green, 2008; He and Morse, 2008; Michaelowa and Purohit, 2007; Schneider, 2007b; Sutter, 2003; Sutter and Parreño, 2007; Wara, 2007; 2008).
example, Schneider focuses his analysis on the project documents and validation reports for 93 CDM projects (Schneider, 2007b: 18; 2009).

There are only a very limited number of studies that have evaluated empirically the performance of carbon market projects by reconstructing baselines in a comparative manner (Wara, 2008; Wara and Victor, 2008; Zhang and Wang, 2011). The study by Wara and Victor generated significant attention about the CDM, notably being picked up in *The Economist* (2008). These authors argued that information asymmetries were being exploited by Chinese project developers to generate bogus carbon credits. However, the use of comparative methods in this study appears flawed upon closer scrutiny because of an inappropriate scope of comparison (Box 2). As will be discussed in greater detail below, clearly delineating the scope of comparison is important for the assessment of additionality.

In a more recent important study, Zhang and Wang (2011) attempt to resolve information asymmetries for CDM projects in China by using *ex-post* data for SO₂ emissions that are publicly available at the prefecture level as proxy CO₂ emissions. Their findings also cast doubt on CDM additionality. However, in pointed contrast to Wara and Victor, they argue that baselines have not been manipulated and suggest that emissions baselines changed over the crediting period for reasons that were outside the control of CDM project developers: “This is not to say that project developers intentionally manipulate additionality requirements. Rather, it is the current CDM baseline methodology that fails to predict future emissions in a fast changing economy.” (Zhang and Wang, 2011: 149-151). Critics of the CDM are unlikely to be satisfied with this argument. As state-owned companies, CDM project developers would be expected to collude with government to misrepresent baselines by omitting planned government incentives for renewable energy and energy efficiency (Wara, 2008: 1802).

While the above two studies sought to use comparative methods to assess additionality, I know of no such work to assess sustainable development impact. In a much cited study of the CDM’s contribution to sustainable development, Sutter and Parreño (2007) evaluated 16 CDM projects based on their project documents. Yet the use of such documents to evaluate sustainable development is particularly problematic. In contrast to the evaluation of emission reductions,
project developers are required to provide very little description of background development context.

**Box 2: Importance of Scope of Comparison in Assessment of CDM Additionality**

In a series of publications, Wara and Victor have offered one of the most comprehensive critiques of the CDM (Wara, 2008; Wara and Victor, 2008). Significantly, it is also the only CDM study to make use of comparative methods. However a closer reading of their analysis points to significant flaws in research design, particularly justification of the scope of comparison upon which their conclusions hinge.

The authors argued against the claim made by CDM project developers that all new natural gas fired power plants being built in China were additional, pointing to alternative incentives for adopting them as opposed to coal fired power plants. As evidence Wara argues:

*By the end of 2007, twenty-four [advanced natural gas fired power plant] projects, representing essentially all power plants actually being built (as opposed to planned) in China between 2005 and 2010, had applied under the methodology to claim credit for the difference between their emissions and the baseline established by [the specific CDM methodology used]. All plants built or under construction since 2005 are arguing that they would not have been built but for the CDM. This argument, when presented on a project-by-project basis, sounds plausible. It is only when the comparison between total project applications and the entire natural-gas-fired power sector is made, and the two are found to be roughly equivalent, that it becomes problematic (Wara, 2008: 1794, my emphasis).*

But the above citation is misleading: not all new power plants being built in China over 2005-2010 were claiming CDM carbon credits, only those of advanced natural gas fired type.

The use of advanced natural gas generating technology actually represented only a small fraction of the total generating capacity being built during the 2005-2010 period, about 18 GW or less than four percent of new capacity built (Wara, 2008: 1792). The remaining new generating capacity being built during the same period was based on coal. Elsewhere, in a footnote, Wara notes that China built 114 GW of new fossil-fuel-fired generating capacity in 2006 and was on track to build 95 GW of new fossil-fuel-fired generating capacity in 2007—almost all coal-fired (Bradsher, 2007; Wara, 2008: 1791).

This points to problems with the scope of additionality assessment: while the authors claim that the CDM was being cited for all new power plants built in China, it was actually only associated with a small fraction of them. Hardly any advanced natural gas fired power plants were being built outside of the CDM. If they were, this would really be evidence that there were sufficient incentives to build natural gas projects in the absence of the CDM.

Rather than undermining the additionality claim, changing the scope of comparison for additionality assessment to consider projects with similar effect is key. From the example here, when advanced natural gas fired projects are compared to total generating capacity being built over the period 2005 to 2010 in China, results actually point in a direction indicating the additionality of these CDM projects.

### 3.4.3. Legal Institutional Analysis

A final type of analysis popular in the field of carbon finance is legal institutional analysis. Such studies can be easily executed by reviewing legislation and other official government documentation. Many such studies have been published about the CDM (Baker & McKenzie Law, 2004; Curnow and Hodes, 2009; Fay et al., 2011; Kasimbazi, 2009; Winkler et al., 2005)
and REDD (Baker & McKenzie, 2009; Costenbader, 2011; Norton Rose, 2012) but also EIAs (Marara et al., 2011) and land tenure reform (Akida and Blomley, 2006; Sundet, 2005; Wily, 1999). While useful, the problem with such studies is using them to extrapolate the CDM’s actual performance.

There are two main issues here. First, there is usually a large gap between the legislation on the books and its implementation. For the CDM, questions of legal capacity have focused almost entirely on a specific domestic body required under the UNFCCC, the Designated National Authority or DNA (Ellis and Kamel, 2007: 26-29; Ganapati and Liu, 2009). For example, Ganapati and Liu (2009) argue that different types of projects have been implemented in China and India because of the different foci and strengths of their respective DNAs. But a focus on the DNA alone leaves in the background other institutions and organizations present within countries hosting CDM projects which, as this dissertation shall demonstrate, are much more important in explaining the effectiveness of individual CDM projects. Another example where legal institutional analyses fall short has been in discerning the gap between participatory forest management policy and its practice. While a number of studies have lauded the reforms towards participatory forest management in countries such as Tanzania (Akida and Blomley, 2006; Wily, 1999), such remarks contrast with more ethnographic research documenting poor administration if not corruption on the ground (Brockington, 2007; Robinson and Lokina, 2012).

Second, most legal institutional analyses gauge effectiveness in terms of procedural outcomes not results in terms of sustainable development or additionality. For example, Annandale (2001: 191) argued that an EIA is viable when a law or written administrative direction is established and adequate administrative support allocated. There is little effort to ascertain whether the EIA process is effective in screening out unsustainable projects.

3.5. Conclusion

I have discussed the research methods used in this dissertation in considerable detail as the previous evaluation of CDM effectiveness has suffered from a lack of clarity about key terms such as sustainable development and additionality but also used largely inappropriate methods. Ultimately I have sought to investigate in the field a large number of A/R and bioenergy carbon
finance across countries that vary in their state power for development in order to generate variation on both the dependent and independent variables. The methods I have used privilege comparisons in order to tease out causal factors in a way that, to the best of my knowledge, has not yet been done in the study of low-carbon development.
4. Project Development Context

In this chapter I present a detailed account of the development context of each of the nine carbon finance projects investigated. It is intended to provide a basis for understanding project sustainable development and additionality claims by providing more detailed information about each project, the local and national conditions that each is operating under and how each is situated in each country’s policy context. I present the development context for each project as a single chapter, though the reader may also want to read the discussion of individual projects here in relation to analysis of sustainable impact (Chapters 6) and additionality (Chapter 7) for the projects.

In the sections below, I present a short description for each project followed by brief description of the project’s development context and, related to this, justification of the selection of villages for fieldwork. This is followed by discussion of the broader, national development context in which the project is situated. For the presentation of national development context, I review relevant policies that indicate government attitudes to each project.

4.1. Tanzania

4.1.1. Tanzania CDM Afforestation Project

The Tanzania CDM afforestation project is actually composed of two CDM afforestation projects in central Tanzania: (i) Afforestation in grassland areas of Uchindile & Mapanda and (ii) Reforestation at the Idete Forest Project (CDM-PDD, 2007a: 2008f). The first project was initiated in Mufindi district (Iringa region) and adjacent Kilombero district (Morogoro region), while the second in only Mufindi district. Over a twenty year crediting period, the two projects are expected to generate 8.4 million tonnes of carbon credits (Table 5). In 2009, no purchaser for the carbon credits had come forward and the financial risk for the projects remained with the project developer. The first project has subsequently withdrawn from the CDM process where it was initially rejected on a technicality.\(^{16}\) though it has succeed in gaining accreditation in the

\(^{16}\) The UNFCCC deemed the first CDM afforestation project ineligible because it was initiated in 1997 but had still not been registered by 2006, thus not meeting a deadline imposed by the UNFCCC (Business Manager, Dar es
voluntary markets (VCS, 2010). The second CDM afforestation project is still under evaluation. The projects are private sector driven, both being implemented by Green Resources Limited (GRL), a Tanzanian subsidiary of Green Resources AS, a Norwegian company (GRAS, 2009).

Table 5: Statistical overview of Tanzania CDM A/R projects

<table>
<thead>
<tr>
<th></th>
<th>Size (ha)</th>
<th>Plantation Size (ha)</th>
<th>First Crediting Period Credits Generate (tCO₂-e)</th>
<th>Duration (Years)</th>
<th>Planting Effort (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mapanda-Uchindile Project</strong></td>
<td>18,379</td>
<td>13,450</td>
<td>6.4 million</td>
<td>20 yrs</td>
<td>1997-2004</td>
</tr>
<tr>
<td>- Uchindile-Kitete Section</td>
<td>13,727</td>
<td>9,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Mapanda-Chogo Section</td>
<td>6,258</td>
<td>4,450</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Chogo Village</td>
<td>1,606</td>
<td>/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Mapanda Village</td>
<td>4,652</td>
<td>/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Idete Project</strong></td>
<td>11,663</td>
<td>6,496</td>
<td>2.0 million</td>
<td>20 yrs</td>
<td>2006-2013</td>
</tr>
<tr>
<td>*Idete Village</td>
<td>11,663</td>
<td>6,496</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>30,042</td>
<td>19,946</td>
<td>8.4 million</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: (CDM-PDD, 2007a; 2008f)

**Project Development Context**

The CDM afforestation projects in Tanzania are located along the Udzungwa escarpment which forms the southern tip of the Eastern Arc Montaine forest ecosystem (MNRT, 2006: 10). See Figure 13. With its relatively humid conditions, the area is an attractive location for forestry and tea. Unilever Tea Estates are located here, including a forest reserve for fuelling Unilever’s operations. But there are at least three other major forest reserves in the district, including the central government’s Sao Hill Plantations—the largest in Tanzania—as well as a GRL timber mill and Mufindi Paper Mill which is East Africa’s largest paper mill (Christiansson, 1985; Salaam, Interview TD20, 7 March 2009). CDM projects that had started before 2000 have been eligible for the CDM but only if submitted for registration before 31 December 2005 (UNFCCC, 2001: para.13).

As discussed further in Chapter 8, it cannot go forward until a definition of “forests” is adopted by the Tanzania CDM authority, the DNA.

GRAS is Africa’s leading forestation company and has more than 14,000 ha of forest and claims to have planted more new trees than any other private company in Africa during the past ten years—a record 4,200 ha of new forest was planted in 2008—and holds more than 200,000 ha of land for future planting and conservation (GRAS, 2009: 2).
Government parastatal mills built around the Sao Hill plantations in the 1980s were shut down during the 1990s (Murison, 2002; World Bank, 2003b). This situation began to change in 2003 when GRL acquired and reopened the Sao Hill sawmill (GRAS, 2011: 5). Similarly, the government privatized Mufindi Paper Mill, which was purchased by the Rai Group Ltd of Kenya and resumed operation in 2005 (Kulekana, 2008).

The central government has also tapped the Udzungwa escarpment for its hydroelectric potential. The Kihansi dam, actually located in nearby Kilombero District, was a major development project completed only in 2000 with funding from the World Bank. It is currently the source of 35% of Tanzania’s electricity (GoT, 2006; TANESCO, 2010). There have been major environmental concerns with the Kihansi dam, which is diverting water from a unique strip of moist tropical forest on the southern face of the Udzungwa escarpment (Lovett et al., 1997; World Bank, 2007b; 2010a).

**Village Selection**

Two villages involved in the Tanzania CDM afforestation projects were investigated in detail, Mapanda and Idete, and paired with two control villages (Figure 13). Luhunga village is located about 35 kilometers away from Mapanda village yet also on the Udzungwa escarpment at 1800 m. Ipilimo was selected as the control for Idete, as both shared the drier miombo forest conditions of the western, lower altitude part of the Mufindi district. The Mapanda project actually involves 18,000 ha distributed across four villages in Mufindi District, Iringa region (Mapanda, Chogo) and Kilombero District, Morogoro region (Uchindile and Kitete). For this study, only the Mapanda project was visited in the field, where 4,652 ha were transferred. The Idete project consists of 11,663 ha of village lands.

---

19 As of 2008, the mill was producing nearly 40,000 tonnes of paper annually and plans on reaching a maximum capacity of 130,000 tonnes. Ironically, the mill has recently submitted a CDM project, entitled 35.6 MW Biomass Power Plant project of Mufindi Paper Mills Limited – Tanzania (CDM-PDD, 2008b). The project intends on using wood residues that would normally be left on the forest floor to decay (and thereby releasing methane) with a guaranteed sourcing from Sao Hill Plantations as well as Tanganyika Wattle Limited (140 km away). Unfortunately I was unaware of the CDM project at Mufindi Paper Mill, which had only been posted on the UNFCCC website in late 2008/early 2009. I actually met with personnel at the Mill during the March 2009 field effort, though in discussions no mention was made of the CDM.
The village governments of all four villages investigated possessed a Certificate of Village Land which, under the *Village Land Act*, affirms the occupation and use of Village Land in accordance with the customary law of the area (s.7(7)(c)). However, none of the villages were in possession of detailed information on the extant extent of their village lands. All four villages had undertaken village land zoning, but this had not been written down and was only marked on the ground.  

**Figure 13: Map of project lands and villages of CDM afforestation projects and control villages in Mufindi District amidst four forest reserves**

![Map of project lands and villages](image)

Note that maps of plantation areas for Mapanda and Idete are taken from the carbon project documents CDM-PDD, 2007; CDM-PDD, 2008) and overlaid onto maps of Forest Reserves and Protected Areas derived from ProtectedPlanet.Net using Google Earth.

**Industrial Forestry Policy Context**

Despite the international attention Tanzania’s forests have received from the international community, the government is less interested in expanding industrial forestry than in either Uganda or Moldova. As demonstrated below, there are considerable forest plantations already

---

existing in Tanzania while the country has over the past ten years attracted significant private sector interest to expand and revamp timber processing capacity. The forest sector has not been one of the “lead” sectors identified for public investment under MKUKUTA, the National Strategy for Growth and Reduction of Poverty (GoT, 2005: Annex 1: 3).

It is estimated that in 1990, Tanzania had 34.7 million ha of forests, though reduced to 33.4 million ha by 2010—a reduction of 3.7% (FAO, 2011: 110; MNRT, 1998: 8). Nonetheless, forests and woodlands still represent approximately 38% of Tanzania’s national territory. But the vast majority of Tanzania’s forest area, more than 90%, is relatively unproductive miombo woodlands (Table 6). Much attention has been given to the Tanzania’s lush montane forests such as of the Eastern Arc Mountains (~0.35 million ha) and coastal forests (~0.07 million ha) which are rich in biodiversity, but rather insignificant in terms of their size (Burgess et al., 1998: 337; MNRT, 2006: ii). Unproductive, rather uncharismatic miombo forests are dominant in Tanzania.

In terms of forest tenure, slightly less than half of Tanzania’s forest area is gazetted (on Reserve or General land) while the rest is ungazetted on village land. Forests on gazetted lands are comprised largely of national forest reserves (NFRs). About 5% are deemed local forest reserves under district authorities while official village forest reserves comprise about six percent of Tanzania’s forest area. The latter are representative of Tanzania’s participatory forest management schemes, including village land forest reserves, community forest reserves as well as forests vested in the village council (Blomley and Iddi, 2009: 7).

Little of Tanzania’s 33.4 million ha of forest are used towards the industrial production of timber and paper, estimated at 165,000 ha today across government forest reserves and private plantations. Approximately 80,000 ha is government owned—the most significant being the 41,600 ha of Sao Hill plantations in Mufindi district (World Bank, 2003b: 3). Sao Hill plantations have existed since colonial times and were nationalized through the 1967 Arusha Declaration and targeted for expansion in the 1970s as a part of Tanzania’s industrial strategy in conjunction with the construction of what is now known as Mufindi Paper Mill (Christiansson, 1985: 123). As a result of these efforts, in 1982 Sao Hill stood at only 14,600 ha, about one-third
current size. The plantations have been under the Forest and Beekeeping Division (FBD) at the Ministry of Natural Resources (World Bank, 2003b: 73).

Privately held forest plantations, on General Land leased from government, are rather insignificant in Tanzania—representing less than 1% of the forest base. Considering growth at GRL operations, one of Tanzania’s leading private forestry outfits, current industrial plantations are estimated at nearly 85,000 ha. The vast extent of government plantations allows the national government a monopoly on (legitimate) forest products and the power to set prices. Royalty fees and other permits are set out in “Schedule 14” of the official regulations of the 2004 Forest Regulations, which can only be changed through an act of Parliament (Milledge et al., 2007: 244–245).

Table 6: Approximate distribution of forested area (million hectares) across Tanzania’s primary land tenure categories, 1990 and 2006

<table>
<thead>
<tr>
<th>Year</th>
<th>Type Forest</th>
<th>Reserved Land</th>
<th>Gazetted*</th>
<th>General Land</th>
<th>Total</th>
<th>Ungazetted*</th>
<th>TOTAL***</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NFR Mha</td>
<td>LFR Mha</td>
<td>PAs Mha</td>
<td>VFR Mha</td>
<td>Private* Mha</td>
<td>Mha</td>
</tr>
<tr>
<td>1990</td>
<td>Productive</td>
<td>4.7</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>Protected</td>
<td>7.7</td>
<td>/</td>
<td>2.0</td>
<td>/</td>
<td>/</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>TOTAL FOREST</td>
<td>12.5</td>
<td>2.0</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>14.5</td>
</tr>
<tr>
<td>2006</td>
<td>Productive</td>
<td>9.3</td>
<td>1.4</td>
<td>/</td>
<td>0.13</td>
<td>0.13</td>
<td>11.0</td>
</tr>
<tr>
<td></td>
<td>Protected</td>
<td>3.0</td>
<td>0.2</td>
<td>2.0</td>
<td>0.32</td>
<td>0.01</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>TOTAL FOREST</td>
<td>12.3</td>
<td>1.6</td>
<td>2.0</td>
<td>0.45</td>
<td>0.14</td>
<td>14.5</td>
</tr>
<tr>
<td>% Change</td>
<td>-1.6%</td>
<td>0%</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>-3.7%</td>
</tr>
</tbody>
</table>

Sources: * (Akida and Blomley, 2006: 2–3; MNRT, 1998: 1); ** Estimated from GRL afforestation (see text), *** (FAO, 2011)

Note: Figures above should be treated with caution due to potential errors in primary sources used. I use FAO statistics for total forest cover in 1990 and 2006, which show a reduction in Tanzania’s forest cover. However the extent of gazetted and unga zetted forest are unsatisfactory. Totals gazetted forests were the same in Akida & Blomley (2006) and MNRT (1998). Unreserved forests in Akida & Blomley (2006) were greater than in MNRT (1998).

---

21 As of 2008, GRL managed about 38,000 ha across the country, including approximately 24,000 ha amongst the two CDM projects investigated (GRAS, 2009: 13-14). In 2001, privately held forest land was reported at 18,000 ha (MNRT, 2001: 24). By 2003 it was estimated at 55,000 ha (World Bank, 2003b: 3) and 61,000 ha in 2006 (Akida and Blomley, 2006: 20).
Wood processing capacity in Tanzania had been falling from 900,000 m³/year of round wood in 1992 to 710,000 m³/year in 1998 and 454,482 m³/year in 2005 (Milledge et al., 2007: 142; MNRT, 2000: 6-7). However, given recent developments, particularly as a result of recent mills reopening in Mufindi district, wood processing capacity has been on the rise since the mid-2000s, though this is not well captured yet in official statistics. The World Bank has estimated that the Mufindi Paper Mill’s annual wood consumption could alone reach 300,000 m³/year once fully operational (Kulekana, 2008; World Bank, 2003b: 74). In 2008, Tanzania was a net importer of paper and wood panels, though an exporter of sawnwood (FAO, 2011: 137), though perhaps much more is exported illegally (Milledge et al., 2007).

4.1.2. Tanzania Biofuel Project

Tanzania has recently been host to a number of biofuel projects, largely for the production of ethanol and biodiesel for sale on European markets (Cleaver et al., 2010: 37; Martin et al., 2009; Sosovele, 2010; Sulle and Nelson, 2009). The British based Sun Biofuels acquired in 2009 approximately 8,211 ha of land from 8 villages to establish a jatropha biodiesel plantation in Kisarawe district, about 50 km outside Dar es Salaam (Cleaver et al., 2010: 38-42; John, 2010). This was only the first phase in a larger project which would see Sun Biofuels expand to 18,000 ha with lands from eleven villages. While not certain, it is likely that most of the biofuel was slated for the export market, though the domestic sale of biofuel cannot be excluded. Recall that biofuel production for export is ineligible as a CDM project (CDM EB, 2006), but given similarities of the sustainable development issues between such biofuel projects and CDM afforestation projects, investigation into one on-going biofuel project, the Sun Biofuels project, was undertaken.

---

22 In 2011, Sun Biofuels exported its first shipment of biofuel from plantations in Mozambique to Germany, where Lufthansa has committed itself to sourcing a considerable amount of its fuel from biofuels (Biofuels Digest, 2011a).

23 When seeking to investigate biofuel projects not operating under the CDM, one quickly becomes aware of the significance of information centralized and made accessible for individual CDM projects on the UNFCCC website. A transparent clearing house for information on biofuel projects is not readily available. While there have been a number of biofuel projects underway in Tanzania, two biofuel projects relatively close to Dar es Salaam led by foreign investors were identified in this manner. As the Swedish backed SEKAB sugarcane ethanol project succumbed to the global financial crisis (Mande, 2009), this left Sun Biofuel jatropha biodiesel project in Kisarawe District.
Apart from subsistence agriculture, the economy of Kisarawe district where the biofuel project was located had previously been based on the export of cashews (GoT, 2003b; Jaffee, 1994). But cashew production plummeted during Ujamaa villagization in the 1970s, and has not regained its previous stature (Mitchell, 2004). As cashew production has declined, cassava production for export has increased and Kisarawe district is now the leading cassava producer in Tanzania (GoT, 2007: 18; van Beukeringa et al., 2007).

Interviews with local government officials indicated that both Mtamba and Maguruwe were also characterized by an influx of migrants. In Mtamba immigration was principally to acquire land for agriculture but also charcoal and timber. In Mtamba, two groups of migrants were distinguished, both comprised of Tanzanians: individual families seeking household plots and groups of 10-12 persons coming from Dar es Salaam to acquire slightly larger tracts of land. One example of the latter was a small private Tanzanian firm that had acquired approximately 325 ha of land for making poles and scaffolding for the Dar es Salaam market.\(^{24}\) Research in other villages in the area has similarly found that the rate of immigration to the area is relatively high (Malugu, 2007: 162).

The district is also renowned for its coastal rainforests, home to high biodiversity and endemic flora and fauna and three forest reserves: Pugu, Kazimzumbwi and Ruvu South (Burgess et al., 1998; Malugu, 2007). There have been frequent efforts to conserve forests in the area, including an extensive international NGO effort in the 2000s to engage local villages in Joint Forest Management, JFM (Kaale and Mwakifwamba, 2006). But forests in the area are especially threatened by the charcoal trade. As if part of a tragic comedy, the control village Maguruwe lost the vast majority of the Kazimzumbwi Forest Reserve in the midst of implementing JFM (Kaale and Mwakifwamba, 2006: 19; van Beukeringa et al., 2007: 12). Similar problems have been reported for Ruvu South Forest Reserve, where the situation has verged on the edge of violence as armed charcoal traders threatened villagers and government forest guards alike (Kaale and

\(^{24}\) Villager, Mtamba Village, Interview T39, 1 May 2009.
Mwakifwamba, 2006: 19). Examination of satellite imagery available of Kazimzumbwi Forest Reserve shows two-thirds of Ruvu South Forest Reserve is degraded. It should be noted that the section of the forest reserve closest to Mtamba appears to be the most intact.

**Village Selection**

A number of villages were involved with the biofuel project in Tanzania, though only one was selected for detailed investigation (Figure 14). The actual number of villages involved varies amongst different reports on the project (Cleaver et al., 2010: 39; John, 2010; Simbeye, 2010). A reasonable estimate is that eight villages have been involved thus far in the project (Table 7). Of the eight villages involved in the land transfer towards the biofuel project, Mtamba was investigated because it was the most accessible. Its control village was Maguruwe, approximately 15 km away. Notably both Mtamba and the control village of Magaruwe are adjacent to central government forest reserves: Mtamba is adjacent to Ruvu South Forest Reserve and Magaruwe next to Kazimzumbwi Forest Reserve. It should be noted that the field effort in Mtamba was limited to village interviews and the collection of only 17 household surveys, only slightly more than half anticipated. Logistical constraints prevented the author from pursuing a second visit to the village, as had been intended. It is therefore prudent to treat the quantitative information from Mtamba with care.

### Table 7: Village lands involved in Sun Biofuel project investigated in Tanzania

<table>
<thead>
<tr>
<th>Project Phase</th>
<th>Village</th>
<th>Village Land (ha)</th>
<th>Land Acquired (ha)</th>
<th>Percent Land Transferred (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1 TOTAL</td>
<td>21,559</td>
<td>8,111</td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td>Vilabwa</td>
<td>3,637</td>
<td>379</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Chakenge</td>
<td>3,074</td>
<td>1,094</td>
<td>36%</td>
<td></td>
</tr>
<tr>
<td>Mtakayo</td>
<td>3,154</td>
<td>1,546</td>
<td>49%</td>
<td></td>
</tr>
<tr>
<td>Kidugalo</td>
<td>2,254</td>
<td>216</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Marumbo</td>
<td>7,316</td>
<td>3,268</td>
<td>45%</td>
<td></td>
</tr>
<tr>
<td>Muhaga</td>
<td>5,761</td>
<td>1,705</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Kuluvi</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>Mtamba</td>
<td>na</td>
<td>Likely less than 1,000</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>Phase 2 TOTAL</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>Mitengwe</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>Palaka</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>Mzenga</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td></td>
</tr>
</tbody>
</table>

Sources: CDM-PDD (2007, 2008); Cleaver et al. (2010).

25 See Google Earth. GPS coordinates for the Sun Biofuel project are: 7° 5'0.00"S; 38°50'0.00"E.
Charcoal Policy Context

Charcoal production and its regulation is important in the context of the land management issues surrounding the Sun Biofuel project. Charcoal is considered significantly more unsustainable, yet it is the preferred fuel in urban areas as a transition fuel on the energy ladder from fuelwood to kerosene (Kammen and Lew, 2005: 3). While firewood consumed for household use in rural areas consists of collecting branches or deadwood (Bajracharya, 1983), charcoal production consumes entire trees (Seboka, 2009; van Beukeringa et al., 2007). Furthermore, inefficiencies in the production process results in consumers of charcoal using 4-6 times more wood than consumers of firewood (Kammen and Lew, 2005: 4). Mwampamba estimates that 62,000–421,000 ha of forest may have been needed to meet the national household charcoal demand in 2002, approximately 30-60% of Tanzania’s total forest loss (Mwampamba, 2007: 4230). Related to efforts to control charcoal, particularly in the case of Mtamba village, is joint forest
management (JFM)—a form of participatory forest management—which I describe in more detail later in our discussion of Tanzania’s land tenure system.

### 4.1.3. Tanzania CDM Cookstove Project

Implemented by a local NGO known as the Karatu Development Association (KDA), the *Karatu Energy Efficient Stove Project* aimed to disseminate and maintain 22,000 improved cookstoves amongst 50 villages in Karatu and Mbulu districts of northern Tanzania (KDA, 2008). Over 10 years, the CDM project expected to generate nearly 600,000 tonnes of emission reductions from reduced fuelwood consumption (UNDP, 2008). KDA piloted the project in 2004 with a grant from a Danish NGO named Oko-Net. It led to the construction of 1,800 cookstoves in 11 villages and had attracted financial assistance from the UNDP’s Millennium Development Goals Carbon Facility since 2008 in order to expand the project under the CDM. Notably the project expected to receive a premium price for its carbon credits, at $12.5 per tCO₂e. The two villages investigated, Endabash and Bassodawish, are located on the plateau between Lakes Manyara and Eyasi, roughly equidistant from Ngorongoro Conservation Area to the north and Marang Forest Reserve to the south. The landscape where the projects are situated is largely comprised of *Acacia* spp. woodland interspersed in relatively unproductive *Hyparrhenia* grassland.

The project was unique in three other respects. First it relied on a stove design that could be constructed and maintained locally yet was still highly thermally efficient. Second, the simplicity of its design which allowed it to be implemented by local women’s groups, facilitated stove adoption by working through appropriate gender channels. Third, after the first three years of the CDM project, it anticipated distributing 70% of the surplus revenue generated from the sale of carbon credits (expected to be $0.6 million per year) amongst households involved; the remaining 30% would be invested in an energy fund under KDA. See Table 8 for a statistical overview of the cookstove project.

---

26 *NGO Officer, Karatu Town, Interview TD6, 3 April 2009.*

27 *NGO Officer, Karatu Town, Interview TD3, 4 April 2009.*

28 *NGO Officer, Karatu Town, Interview TD3, 4 April 2009.*
While the project had received considerable attention from UNDP, it was not yet fully operational when I visited in April 2009. KDA was still in the process of negotiating a permit (Letter of Approval) for the project from the Tanzanian CDM authorities, and it was not technically slated to begin generating credits until October 2009. The project developers had also not yet submitted project materials for third-party validation, an important step in the CDM process. One reason why the project had not formalized its engagement with the CDM was that an official CDM methodology for improved cookstove projects was only adopted in late 2007 (Purdon, 2010: 1036-1037). But there were also complications with the project’s approval by the CDM authorities in Tanzania, as discussed later. Altogether the project appeared relatively advanced despite having only recently having engaged with the CDM process.

The CDM project was scheduled to scale up efforts significantly, building 5,970 cookstoves by end of 2009, 13,330 by 2010, 19,260 by 2011 and all 22,000 by end of 2012 (KDA, 2008). But subsequent to 2009 fieldwork, however, the Danish technical advisor to KDA withdrew and, along with him, apparently financial support for the project. The project has been suspended. Reasons for the suspension are however not altogether clear. KDA is now in the position of seeking technical assistance from the Tanzania Rural Energy Agency (REA) to implement the project, despite the REA’s focus on rural electrification.  

| Carbon | No. | Total | Crediting | Estimated | Estimated | Estimated |
| Credits | Villages | Number | Period | Implementation | Carbon | Carbon |
| (tCO$_2$e) |  | of Stoves | (Years) | Costs | Value | Price | (USD/tCO$_2$e) |
| 0.59 million | 50 | 22,000 | 10 yrs | $0.95 million | $7.4 million | $12.5 |

NGO Officer, Karatu Town, Interview TD22, 21 October 2011.
**Project Development Context**

Tourism and agriculture are the mainstays of the Karatu district economy. Karatu is the gateway to the Ngorongoro Conservation Area and Serengeti National Park and also adjacent to Lake Manyara National Park—Tanzania’s elite tourist attractions (Figure 15). But there are also a number of forest reserves in the Lake Manyara watershed, including the Marang Forest Reserve, just to the south of Endabash (Figure 15). Lake Manyara National Park is administered under the Tanzania National Parks (TANAPA) while Ngorongoro conservation area is administered by the more independent Ngorongoro Conservation Area Authority (LEAT, no date). Marang Forest Reserve is nominally managed centrally by the Division of Forestry and Beekeeping, although it has long been acknowledged that such centralized management is not effective (MNRT, 2001: 23). The rest of the territory is Village Land. Outside the protected areas, the agricultural lands on the slopes running south from Ngorongoro Crater are amongst the richest in Tanzania and have been allocated to large-scale wheat and coffee plantations since the German colonial period (Fosbrooke, 1972; Rohde and Hilhorst, 2001; Schultz, 1979). But climatic conditions become less productive as one descends from the highlands. Endabash and Bassodawish, at a lower altitude, are associated with lower rainfall yet higher potential evapotranspiration (Schultz, 1979: 57).

The history of land use in Karatu district is important for understanding the cookstove project. Prior to German colonialism, the Karatu area had been the domain of the pastoralist Maasai whose cattle maintained a grassland ecosystem. However, a major cattle plague in the 1890s wiped out Maasai herds, initiating a political transformation which saw the agro-pastoral Iraqw (Mbulu) people to the south rise to prominence. The displacement of the Maasai and their cattle led to changes in the local vegetation, resulting in the re-establishment of miombo woodlands (Rohde and Hilhorst, 2001: 10; Snyder, 1996). But such miombo woodlands are also prime habitat for the tsetse fly which causes sleeping sickness (Brightwell et al., 1992; Nash, 1937; Van den Bossche and De Deken, 2002). Mindful of a major tsetse fly outbreak in Uganda, the British colonial authorities embarked on a tsetse control program in Tanzania during the 1940s-50s.

---

30 Evapotranspiration is the movement of water from the ground to the atmosphere through evaporation and plant transpiration (the movement of water within a plant and subsequent loss through stomata in its leaves).
which included massive relocations of local populations and the clearing of woodland habitat (Hocking et al., 1963; Hoppe, 2003). As a result, Karatu district again became largely devoid of woody vegetation.

Various reports from Karatu dating from the 1970s (Thomas, 1977), 1980s (Helmfrid and Persson, 1987) and 1990s (Axelsson and Hagborg, 1994) attested to the fact that the fuelwood situation in the area was only getting worse. Between 1953 and 1987, woody vegetation in the Lake Manyara basin declined by around 14% due to fuelwood consumption and timber harvesting while cropland increased by 118% (Mwalyosi (1991) and Mwalyosi & Mohamed (1992) cited in Yanda and Madulu, 2005). This included the Marang Forest Reserve adjacent to Endabash saw 15–20% of its area degraded into wooded grassland and bushland (Meindertsman and Kessler, 1997 cited in Yanda & Madulu, 2005: 723). In 1994, Axelsson and Hagborg found that fuelwood collection had become so time-consuming in Karatu district that some families had begun to resort to cow-dung (Axelsson and Hagborg, 1994: 5).

Key informants interviewed in Karatu indicated that fuelwood continues to be a major problem in the district.31 In 2009, a combined tree-planting programme was being discussed by the district government. It would require each village to establish village land forest reserves to secure fuelwood supply.32 But only two villages had been successful in establishing such reserves.33 One obstacle to the village afforestation programme was financing. Budget support for forestry lagged behind expenditures for health, schools, roads and water.34 As a drought prone district, the provision of safe drinking water was the priority in Karatu.35 Villagers could be accorded basic usage rights to the forest reserves upon review by the Ministry under Tanzania’s 2002 Forest Act (para.23-27), although there was no JFM between villages such as Endabash and the adjacent Marang Forest Reserve. It was however clear that many people were collecting firewood from unregulated village lands and the forest reserve.

---

31 Karatu District Government Officer, Karatu Town, Interview TD4, 16 April 2009.
32 Karatu District Government Officer, Karatu Town, Interview TD4, 16 April 2009.
33 Karatu District Government Officer, Karatu Town, Interview TD4, 16 April 2009.
34 Karatu District Government Officer, Karatu Town, Interview TD5, 16 April 2009.
35 NGO Officer, Karatu Town, Interview TD7, 16 April 2009.
**Figure 15:** Map of Endabash village involved with CDM cookstove project and control village of Bassodawish in Karatu district

**Village Selection**

The CDM cookstove project in Tanzania had been initiated in the village of Endabash in Karatu district. Performance of the stove project in Endabash was compared with Bassodawish, a village 15 km away, but not involved with the cookstove project. Because of logistical constraints, Endabash was surveyed in April 2009 but Bassodawish in August 2009. Bassodawish is larger than Endabash with populations of 9,400 (1,391 households) and 5,036 (920 households), though in terms of landholdings and household expenditures (a proxy for household income) only slightly greater. As of 2009, the cookstove workshop in Endabash was the only one established for the CDM project.\(^{36}\) The interpretation of results from Endabash should thus be treated with caution as the cookstoves here were not developed under the CDM. But since workshops had not yet been established in the other villages, where the CDM was expected to expand, Endabash was selected. The other 10 villages of the pilot project, located in Endabash, Endamarariek, Kansay and Bugger wards of Karatu district, were not visited during fieldwork.

\(^{36}\) *NGO Officer, Karatu Town, Interview TD6, 3 April 2009.*
Fuelwood and Improved Cookstove Policy Context

Fuel for cooking and other domestic energy needs in rural areas of Tanzania is met primarily through the use of biomass, typically fuelwood in rural areas and charcoal in urban settings. Women and children spend hours collecting firewood and cooking over inefficient three-stone hearths, while suffering prolonged exposure to smoke (Butcher and Sorenson, 1979; Manibog, 1984; Raiyani et al., 1993; Zhang and Smith, 1996). Such inefficient stoves are also a significant source of emissions from wood consumed and also of inefficiencies in the combustion process (BallardTremeer and Jawurek, 1996; Ezzati et al., 2000; McCracken and Smith, 1998; Smith et al., 2000; Zhang et al., 2000).

Village forestry was a significant government focus after independence. The Tanzania government initiated a village woodlots programme in 1968, shortly after independence (Dykstra, 1983; Leach and Mearns, 1988; Skutsch, 1985). During the 1970s, the potential exhaustion of fuelwood loomed as an impending crisis (Dewees, 1989; Hosier et al., 1990). In the early 1980s, a renewed effort in the form of a national tree-planting campaign was launched (Ahlbäck, 1988). These programmes led to increased village tree-planting efforts though, by most estimates, their success was only modest because of their highly centralized and inefficient implementation (Abdallah and Monela, 2007: 16; Ahlbäck, 1995: 306; Kulindwa and Schechambo, 1995: 115). Results were poor—by 1989 only about 8,000 ha of village forest plantations had been established nation-wide (Abdallah and Monela, 2007: 16). By 1990, economic conditions had declined to the extent that government support for afforestation had declined to less than 15% of 1973 funding allocations (Kulindwa and Schechambo, 1995: 116). Government involvement in afforestation (and improved cookstoves) were scaled back in the

---

37 It is estimated that biomass accounts for 92% of Tanzania’s total energy consumption: fuelwood (61%), charcoal (19%) and agricultural residues (12%) (GoT, 2003b: 6 & 73, GoT, 1992: 6, Mwandosya & Luhanga, 1993: 448).

38 Afforestation programmes were overly centralized, which saw seedlings raised in nurseries in district and regional headquarters and their subsequent delivery to villages late and with little or no monitoring. But the communal nature of the village afforestation programme was also found a disincentive to individual tree-planting efforts (Skutsch, 1985: 152). Another factor was insufficient forest extension services to build capacity in tree-planting in the villages. Village labour supply has also been a constraint. Brief periods of rain mean that villagers often had to choose between planting trees or planting crops, the latter necessarily winning. Lastly, villagers often prefer those tree species that can be used for timber or produce fruit; trees as a source of fuel are often a secondary priority (Kajomulo-Tibajjuka, 1985, Sambali, 1990).
1990s, in part because the fuelwood crisis predicted in the 1970s was never fully realized (Hosier et al., 1990; Johnsen, 1999; Mwampamba, 2007).³⁹

Improved cookstoves programmes and other efforts to curb fuelwood demand were only initiated in the mid-1980s. The first stove programme in Tanzania was initiated in Morogoro region in 1985 with support from Norway and was followed by a number of other pilot projects (O'Keefe et al., 1990; Otiti, 1992; Sawe, 2009). The effort was modest next to the vast scale of the problem. For example, the woodstove component of a major World Bank supported forest programme resulted in only a modest dissemination of 10,500 improved stoves (World Bank, 1999: ii). Government interest lapsed into the 1990s. For example, although the 1992 National Energy Policy set the goal of arresting “woodfuel depletion by involving more appropriate land management practices and more efficient woodfuel technologies” (GoT, 1992: 5), in terms of financial support for implementation, the government’s focus was on expanding electricity and fossil fuels (oil and gas). Together these two sectors absorbed 95% of expenditures for the implementation of the 1992 policy (Mwandosya and Luhanga, 1993: 450). The shift continued with the 2003 National Energy Policy (GoT, 2003a). While it also highlights biomass, its focus has been on new institutions for rural electricity generation (Lymio, 2007: 10). The only projects that the recently established Rural Energy Agency (REA) is currently supporting are for rural electrification (REA, 2010).

Current support for improved cookstoves comes mainly from donors and the NGO community. A Tanzanian renewable energy NGO, TaTEDO, claims that over the period 2000-2008, approximately 1.5 million improved cookstoves have been distributed in Tanzania, 92% of

³⁹ First, the information upon which predictions of the pending national fuelwood crisis was itself inadequate, masking more local variations (Hosier et al., 1990). Miombo woodlands and informal woodlots—all important sources of fuelwood—were not well accounted for (Lundgren & van Gelder, 1983 cited in Johnsen, 1999: 117, Girard, 2002). Second the fuelwood crisis had been exaggerated because rural firewood consumption was considered as unsustainable as urban charcoal consumption. Though charcoal production consumes entire trees (Seboka, 2009, van Beukeringa et al., 2007), firewood consumed for household cooking and heating in rural areas has a much smaller ecological footprint (Bajracharya, 1983). Lastly, the woodfuel crisis underestimated the capacity of rural people to cope with increased scarcity (Dewees, 1989). While certainly a maladaptation antithetical to sustainable development, people consume less fuel when it is more costly to obtain or people simply use “lower quality” fuels such as agricultural residues and dung, which becomes culturally normalized (Johnsen, 1999, Hyman, 1982).
which are improved charcoal stoves intended for the urban market (Sawe, 2009: 26). The Programme for Basic Energy Conservation in Southern Africa (ProBEC), supported by SADC and GTZ, was launched in Tanzania in 2005. It cites the government’s focus on rural electrification as a need for intervention (ProBEC, 2010). Even more recently an international CDM cookstove programme has been initiated by the Uganda Carbon Bureau with the objective of deploying cookstoves in Uganda, Kenya, Tanzania, Rwanda and Burundi as well as Sudan (CDM-SSC-PoA-DD, 2010). Finally the Global Alliance for Clean Cookstove (GACC) was launched by the UN Foundation in fall 2010 (GACC, 2011; World Bank, 2011a: v). The Tanzanian government has only very recently become partner in this $100 million public-private partnership (Naleid, 2011). The goal of the GACC is to see 100 million homes around the world adopt clean and efficient stoves and fuels by 2020.

4.2. Uganda

4.2.1. Uganda CDM Afforestation Project

The location of the Uganda CDM afforestation project in Uganda, Rwoho Central Forest Reserve (CFR), extends 9,073 ha across the low-lying mountains of Ntungamo, Isiringo and Mbarara districts in southwestern Uganda of which approximately 6,000 ha are available for afforestation (NFA, 2007a: 14-15). The first sections of the CDM project to be implemented were in Ntungamo district, which was the focus of the fieldwork. The forest reserve has been the subject of a CDM afforestation project known as the Uganda Nile Basin Reforestation Project implemented by National Forestry Authority (NFA) with financial and technical support from the World Bank. The project is actually comprised of five “small-scale” CDM afforestation projects that together cover 2,015 ha of Rwoho CFR and are expected to sequester 647,745 tCO₂e over twenty years (Table 9).

Note that though the CDM project is actually described as a “reforestation” project, it is better designated as “afforestation”. While Rwoho is an even mix of Albizia-Markhamia forest / Themeda-Chloris grass savannah (NFA, 2007a: 3-4), the CDM planting sites were originally grassland as recently as the 1960s (CDM-PDD, 2009: 10). Some areas were subject to a limited tree-planting effort over 1964-1978 totaling 800 ha though again deforested due to disturbance or harvesting since at least 1990 (planting effort in Rwoho discussed in more detail below). This planting effort and designation of Rwoho as a CFR has compelled the project developers to designate the projects as reforestation, though afforestation of grassland would be more apt.
All CDM project lands are under the authority of the NFA and not that of any village. In order to engage local communities, an agreement was reached between the NFA and a local NGO—the Rwoho Environmental Conservation and Protection Association (RECPA). Recall that “small-scale” CDM projects enjoy simplified accounting procedures though small-scale A/R projects are also required to demonstrate that projects “are developed or implemented by low-income communities and individuals as determined by the host Party” (UNFCCC, 2005b: para 1(i)). Thus, of the 2,015 ha CDM area, the vast majority is being managed by the NFA and about 10% designated as community planting areas under a collaborative forest management (CFM) agreement. CFM includes limited use rights in a 200 meter buffer strip around Rwoho CFR (RECPA & NFA, 2006: 16). In 2007, NFA entered into a tree farming license with RECPA to plant 60 ha within the CDM project area (NFA, 2007b). The World Bank, through its Biocarbon Fund, has agreed to buy the first 261,220 tonnes of carbon credits at a unit price of $4.15 per tCO₂e to be delivered on an annual basis during the first ten years of the project—an investment totalling $1,084,067 (NFA and Biocarbon Fund, 2006).
Table 9: CDM afforestation effort at Rwoho Central Forest Reserve

<table>
<thead>
<tr>
<th>Forest Compartment</th>
<th>District</th>
<th>Planting Start Date</th>
<th>Total Area (ha)</th>
<th>NFA (ha)</th>
<th>Community/RECPA (ha)</th>
<th>Sequestration (20 yr) tCO₂e</th>
<th>Crediting Period</th>
<th>World Bank Purchase Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>(ha)</td>
<td>(ha)</td>
<td>tCO₂e</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compartment 1</td>
<td>Isingiro</td>
<td>2009</td>
<td>468.0</td>
<td>402.4</td>
<td>65.6</td>
<td>149,951</td>
<td>20 yrs (2009-2028)</td>
<td>/</td>
</tr>
<tr>
<td>Compartment 2</td>
<td>Ntungamo</td>
<td>2010</td>
<td>370.0</td>
<td>334.1</td>
<td>35.9</td>
<td>118,551</td>
<td>20 yrs (2010-2029)</td>
<td>/</td>
</tr>
<tr>
<td>Compartment 3</td>
<td>Isingiro</td>
<td>2007</td>
<td>341.9</td>
<td>319.2</td>
<td>22.7</td>
<td>111,798</td>
<td>20 yrs (2007-2026)</td>
<td>/</td>
</tr>
<tr>
<td>Compartment 4</td>
<td>Isingiro</td>
<td>2008</td>
<td>347.1</td>
<td>324.9</td>
<td>22.2</td>
<td>111,214</td>
<td>20 yrs (2008-2027)</td>
<td>/</td>
</tr>
<tr>
<td>Compartment 5</td>
<td>Ntungamo</td>
<td>2006</td>
<td>487.6</td>
<td>413.0</td>
<td>47.6</td>
<td>156,231</td>
<td>20 yrs (2006-2025)</td>
<td>/</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td>2,014.6</td>
<td>1,793.6</td>
<td>194.0</td>
<td>647,745</td>
<td></td>
<td>$1,084,067</td>
</tr>
</tbody>
</table>

Uganda Nile Basin Reforestation Projects No. 1-5 (CDM-PDD 2006a, b, c, d; 2009)
**Project Development Context**

Rwoho CFR is managed by NFA in conjunction with the much smaller Bugamba CFR, located just to the north (Figure 16). The more accessible Bugamba CFR was initially planted in the 1950s, with Uganda’s then Forestry Department reaching Rwoho only in the 1960s. The CDM afforestation project was not the sole tree-planting effort being undertaken in Ntungamo district, but it was the only one active in Rwoho CFR. The FIEFOC project was being undertaken in three sub-counties of Rugarama, Ruhaama and Nyakyera, though not Rwoho sub-county. The wife of President Museveni—Janet Museveni, also a Member of Parliament—had also initiated a tree-planting campaign in Ntungamo, but also outside the CFR (Mugisha, 2008). The Sawlog Production Grant Scheme is also active in the district, including supporting the planting of 40 ha of land by RECPA outside of Rwoho CFR (Mwayafu and Kimbowa, 2011: 4).

**Village Selection**

The sustainable development impact of the Uganda CDM afforestation project in Rwoho CFR was investigated through comparison of Kirungu village, located adjacent to the forest reserve, with a control village of Rwerazi located approximately 10 kilometers away and quite apart from the CFR (Figure 16). The two villages are of comparable size with populations of 1400 (~350 households) and 1552 (188 households) in Kirungu and Rwerazi, respectively. However, as a “small-scale” CDM project, project developers are required to ensure that projects “are developed or implemented by low-income communities and individuals as determined by the host Party” (UNFCCC, 2005b:para1(i)).

In order to engage local communities in the CDM project, in 2006 the NFA entered into a Collaborative Forest Management (CFM) agreement with a registered community-based organization—the Rwoho Environmental Conservation and Protection Association (RECPA). RECPA is headquartered in Rwoho Village, only about 5 km by the only available road to Kirungu but enjoying considerably greater access to Uganda’s road network. Other studies have focused instead on RECPA (see Peskett et al. (2011), Mwayafu and Kimbowa (2011)). However, by focusing on the benefits to the members of such organizations, the impact of the project on

---

non-members resident in the area is overlooked. A 2009 survey of RECPA found it to have 52 members in Rwoho village and 12 in Kirungu who had planted a total of 160 and 11 ha over 1998-2009, respectively.\footnote{Based on survey undertaken by RECPA in 2009 for the author.} While also adjacent to the CFR, Rwoho is a larger village and more peripheral to the planting areas of the CFR.

RECPA had been formed independent of the CDM project in 1998 in order to plant trees around Rwoho village, gaining community-based organization (CBO) status in 2003 (U8). A CBO is distinguished from an NGO as an organization wholly controlled by Ugandans, operating at sub-county level and below, that is involved in NGO-type activities but working clearly for non-profit or commercial purposes (MIA, 2010: 13). Annual subscription to RECPA is 5,000 Ush with a one-time initial fee of about 10,000 Ush which is used to maintain plantations (Krishnan, 2010).\footnote{NGO Focus Group (U8), Rwoho, 19 May 2009.} RECPA’s membership by 2010 stood at 200, with members from the three districts bordering Rwoho CFR (Ntungamo, Isiringo and Mbarara) but also the more distant Kiruhura district (Mwayafu and Kimbowa, 2011: 4). Given this, it is not clear that RECPA necessarily represents local community members alone. Importantly, the CFM agreement permits RECPA members the commercial harvesting of timber, charcoal/firewood and bee-keeping from 200 m buffer strip of the CFR (RECPA & NFA, 2006: Schedules: Timber Harvesting through Bee-Keeping).

In addition to the membership fees for joining RECPA, to become part of the CDM project it is necessary to pay an additional 100,000 Ush—ten times the normal membership fee—for a share. While there is no limit to the number of shareholders, the maximum number of shares any shareholder can purchase is six—an effort to prevent elite capture (Mwayafu and Kimbowa, 2011: 5). If the project succeeds, RECPA shareholders would be entitled to carbon credits under the project which, along with forest harvesting, are expected to equal 150,000 Ush a year per ha (Krishnan, 2010). However as of 2009, no carbon funds had been released to RECPA.\footnote{Ibid.} Mwayafu and Kimbowa (2011) have expressed concern that such a benefit sharing system might
become diluted because the number of shareholders is not capped. However, while the amount of land allocated for carbon management has initially been limited to 60 ha, more land was expected to be made available upon demonstration of RECPA’s planting capability. If the amount of land afforested by RECPA is expanded, this might justify a larger number of shareholders.

It should be noted that the CDM project does not insist on partnership with RECPA alone (CDM-PDD, 2006d: 9). Other community-based organizations can and have sought to become partners. Since 2009, a number of other community associations have applied for tree-planting areas within Rwoho CFR as part of the CDM project including Bushwere Environmental Conservation Association (for 12 ha), Kanyamwizi Development Association (30 ha), Kagoto Foundation for Development (for 27 ha), while Support for Women in Agriculture and Environment (for 35 ha) (Mwayafu and Kimbowa, 2011: 3). However, RECPA has been amongst the first and so far the most advanced local partner.

Figure 16: Map of Rwoho and Bugamba CFRs in relation to Kirungu and Rwerazi villages (Ntungamo District)
**Industrial Forestry Policy Context**

Uganda’s forest industry is in a more difficult position compared to Tanzania, largely attributable to the period of conflict that the country endured in the 1970s through 1980s (Webster et al., 2003: 167). Uganda’s current timber demand is met by timber plantations planted in the 1960s and 1970s which have almost been exhausted (SPGS, 2007: 11). It has been estimated that at least 120,000 ha of plantation forest will be needed by 2020 (SPGS, 2011: 4), though NFA estimated that only 3,000 ha of plantations remained in 2005 (NFA, 2005b: 10). The timber industry is underdeveloped, with mobile sawmills being the most dominant forms. A recent study found only one major plywood manufacturer in the country (Kambugu et al., 2010: 196) though a electricity pole plant was started up in 2010 through Norwegian investment (GRAS, 2011: 5). Pulp and paper is also underdeveloped in Uganda. The Uganda Investment Agency states that “most of the paper products in Uganda are imported” (UIA, 2011a: 7). To the best of the author’s knowledge, there is only one company producing paper packaging (Kasozi, 2007)—and even the feedstock here may be derived from waste residues and not timber.

In contrast to Tanzania, forests and forestry have been accorded priority status by the government. The 2010 National Development Plan (NDP) commits Uganda to restoring Uganda’s forest cover to 1990 levels, 4.9 million ha or 24% of the national territory, by 2015 (MoFPED, 2010: 95-96). This builds on similar commitments to increasing forests in the country in the 2005 Poverty Eradication Action Plan, which prioritized private and community forestry and also linkages with carbon markets (MoFPED, 2005: 77-78).

Patterns of forest tenure are similar in Uganda. Most forest land lies outside government management on customary land. Uganda’s official Permanent Forest Estate is comprised of 2.0 million ha. It includes all forest reserves (local and central forest reserves) as well as all forested areas in the national parks and wildlife reserves (MWLE, 2001: 2). The Permanent Forest Estate is to be maintained in perpetuity and degazetting any part requires compensation through the establishment of a forest reserve elsewhere (MWLE, 2001: 2). Of this, NFA is responsible for

---

46 Sections 10-11 of the 2003 National Forestry and Tree Planting Act maintain that a number of public consultations be held, an EIA undertaken and an area at least equivalent in size to be declared a forest reserve to replaced that which has been degazetted (Mwebaza & Kaggwa, 2007: 10).
nearly 1.3 million ha across 506 central forest reserves (CFRs). Many of the CFRs are standing forest and only 300,000 ha have been identified for plantation development (NFA, 2005a). Of these, NFA has only planted about 10,000 ha since it was established in 2004, though an additional 50,000-77,000 ha have been allocated if it can source sufficient funding (Jakovelli, 2009: 120; NFA, 2005a; SPGS, 2011: 4). The number of CFRs was significantly increased in 1995 through passage of an amended 1995 Local Governments (Resistance Councils) Instrument which placed forest reserves of greater than 100 ha under the central government (Ribot et al., 2006: 1869).

Table 10: Approximate distribution of forested area (million hectares) across Uganda’s primary land tenure categories, 1990 and 2005

<table>
<thead>
<tr>
<th>Year</th>
<th>Type Forest</th>
<th>Permanent Forest Estate</th>
<th>Private &amp; Customary Land</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LFR (NFA)</td>
<td>CFRs (UWA)</td>
<td>PAs (UWA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mha</td>
<td>Mha</td>
<td>Mha</td>
</tr>
<tr>
<td>1990</td>
<td>Plantations</td>
<td>0.0006</td>
<td>0.02</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td>Tropical Forest</td>
<td>0.0005</td>
<td>0.35</td>
<td>0.23</td>
</tr>
<tr>
<td></td>
<td>Woodland</td>
<td>0.0005</td>
<td>0.43</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>TOTAL FOREST</td>
<td>0.0016</td>
<td>0.79</td>
<td>0.68</td>
</tr>
<tr>
<td>2005</td>
<td>Plantations</td>
<td>0.0006</td>
<td>0.02</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>Tropical Forest</td>
<td>0.0005</td>
<td>0.35</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>Woodland</td>
<td>0.0005</td>
<td>0.43</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>TOTAL FOREST*</td>
<td>0.0016</td>
<td>0.79</td>
<td>0.55</td>
</tr>
<tr>
<td>% Change</td>
<td>0%</td>
<td>0%</td>
<td>-19%</td>
<td>-8.9%</td>
</tr>
</tbody>
</table>

Sources: (Manyindo, 2005: 4; MWLE, 2001: 2; UFD, 2002: 44-46).

Note: Figures above should be treated with caution. Total forest area in Uganda declined from 4.9 million ha in 1990 to 3.6 million ha in 2005, largely due to the conversion of 1.2 million of woodland to bushland and croplands (allocated to private and customary land) as well as loss of approximately 1,000 ha of plantation (allocated to CFRs) and 130,000 ha of tropical forest (allocated to Pas) (see Nakakaawa et al. 2011: 35).

**Forest Reserve Encroachment**

NFA currently identifies encroachment as its main challenge in managing CFRs. A 2005 census counted 180,500 encroachers who had 57,589 ha under cultivation and 136,517 heads of livestock (NFA, 2005a). A more recent estimate puts the number of encroachers at 350,000 (Tebajjukira, 2009). However, the history of encroachment is complex, stemming from the British colonial administration’s first attempts at gazetting forest reserves and become a political
tool under Amin and Museveni (Mugyeni et al., 2005). The upshot of the historical treatment of CFRs is that those deemed encroaching have lived off the lands of central forest reserves for generations. This was situation of residents of Kirungu village, one of the villages adjacent to the forest reserve.

4.2.2. *Uganda Plan Vivo Reforestation Project*

The Plan Vivo reforestation project in Uganda seeks to encourage the planting of indigenous tree species on the lands of individual smallholder farmers. It is not a CDM project, but generates carbon credits for sale on the voluntary carbon markets under the Plan Vivo standard. The specific project investigated in Uganda is known as the *Trees for Global Benefits: A Cooperative Community Land-Use Carbon Offset Project, Uganda*, which is led by an Ugandan NGO known as the Environmental Conservation Trust of Uganda (EcoTrust).

The *Trees for Global Benefits* Plan Vivo project was initiated in 2003 in Bitereko sub-county of Bushenyi district of southwestern Uganda with a local group known as the Bitereko Women’s Group serving as local coordinator. The project has since expanded to Hoima and Masindi in 2007 (EcoTrust, 2007a) and, in 2010, to the Kasese district as well as Rwenzori and Mt Elgon areas (EcoTrust, 2011). Overall, EcoTrust claims to have a total of 1,210 ha under management involving 909 participants representing 250,000 trees. The project has seen significant recent growth since it was initiated in 2003, particularly in 2010 which saw nearly 400 participants added, raising the total number to more than 900 participants (EcoTrust, 2011: 20). Based on carbon sequestration estimates provided in Plan Vivo’s technical specifications, described below, the 1,210 ha planted is expected to sequester 0.5 MtCO₂e over a 20 year crediting period of which about half (277,208 tCO₂e) is issued as carbon credits from the project (Plan Vivo, 2011). Based on the amount of carbon credits issued and a $4 per tCO₂e price per credit, the estimated carbon value of the project to date is $1.1 million.

---

47 109,993 trees were monitored amongst the 395 new participants in 2010 (EcoTrust 2011: 31-51), which suggests 143,130 planted by the remaining 514 participants.
Plan Vivo itself is a carbon offset accreditation system that includes a set of standards, administrative tools and guidance—all of which is governed by the Plan Vivo Foundation based in the UK (Plan Vivo, 2008). However, projects are implemented by independent organizations in developing countries themselves. EcoTrust is one of the more successful Ugandan NGOs with a history of donor support from agencies such as USAID, IFAD, DFID, and the World Bank (EcoTrust, 2009; Plan Vivo-PDD, 2009). Exact figures are lacking, but from 2001-2004, USAID supported EcoTrust with nearly $2.7 million—over $0.35 million towards activities in Bushenyi district—and the World Bank provided $0.14 million for projects across Uganda (EcoTrust, No Date).

At the heart of the Plan Vivo system is a land management plan known as a “Plan Vivo,” developed by each individual smallholder who maps out areas for tree-planting and long-term land-use. This land management plan is evaluated by a local project coordinator, operating on behalf of the organization implementing the project, on the basis of its compatibility with the Plan Vivo Standards. The local project coordinator plays a key role in the Plan Vivo system by recruiting landholders, coordinating training, overseeing technical aspects, conducting monitoring, coordinating carbon sales with landholders, and reporting project activities annually to the implementing organization and subsequently to the Plan Vivo Foundation (Plan Vivo, 2008: 22). Typically independent of the organization implementing the Plan Vivo project, the local project coordinator is often a trusted elite of the rural community where the project is being undertaken.

**Project Development Context**

The Plan Vivo project was investigated in Bitereko sub-county, which has a population of approximately 25,200 (4,738 households), with additional people settling in the area.\(^{48}\) The local economy is largely comprised of agriculture and livestock keeping,\(^{49}\) though at least one quarter of the population was reported to be food insecure—an issue that was considered by local leaders

---

\(^{48}\) *Subcounty Government Officer, Bitereko Subcounty, Interview UD15, 27 May 2009.*

\(^{49}\) *Subcounty Government Officer, Bitereko Subcounty, Interview UD15, 27 May 2009.*
to be due to male delinquency.\textsuperscript{50} There is no electricity in the sub-county though a limited number of individuals have solar.\textsuperscript{51} The sub-county chairman explained that Bitereko was quite isolated and without amenities, which made it a struggle to attract good teachers. But Bitereko sub-county is also in proximity to Queen Elizabeth National Park and Kigezi Wildlife Reserve, the latter also comprised of North and South Maramagambo Central Forest Reserves (Figure 16).\textsuperscript{52}

The most important development effort in the sub-county was the NAADS agricultural extension programme, which had been initiated in 2006. As of 2009, NAADS had formed 218 farmer groups (each comprised of 20 individuals) in order to augment collective buying and selling power.\textsuperscript{53} NAADS is also encouraging the use of fertilizers, whose use is currently very limited.\textsuperscript{54} However, Plan Vivo participants used fertilizer to a larger degree than non-participants, where its use was absent (Table 50). Indeed, Plan Vivo participants used the most fertilizer amongst any group investigated in Uganda. There were also other tree-planting efforts underway in Bushenyi district, but none yet in Bitereko district. FIEFOC had been initiated in the district in 2004 and aimed to plant 8 million trees over 7,200 ha by 2010,\textsuperscript{55} but was only slated to start up in Bitereko sub-county in September 2009.\textsuperscript{56} Last, the voluntary carbon offset project known as TIST (The International Small Group & Tree Planting Programme) was also active in Bushenyi district. TIST claims to have planted 1,206,733 trees across 334 groups in the Bushenyi district (TIST, 2011). By way of comparison, the Plan Vivo project has only planted approximately 250,000

\textsuperscript{50} Subcounty Government Officer, Bitereko Subcounty, Interview UD15, 27 May 2009.

\textsuperscript{51} Subcounty Government Officer, Bitereko Subcounty, Interview UD15, 27 May 2009.

\textsuperscript{52} This involves considerable coordination between UWA and NFA, though recognizing that the CFRs are managed for ecological and biodiversity conservation (NFA, 2005b: 27-29).

\textsuperscript{53} Subcounty Government Officer, Bitereko Subcounty, Interview UD15, 27 May 2009.

\textsuperscript{54} Fertilizer cost about 120,000 Ush for a 50 kg bag, which was out of the reach of most individuals (Subcounty Government Officer, Bitereko Subcounty, Interview UD15, 27 May 2009). There was concern amongst some farmers that if they were unable to continue to use fertilizer, the soil would be worse off (Ibid.). Some farmers also refrained from using fertilizers because they thought it would cut off access to important organic produce markets in Europe (Ibid.).

\textsuperscript{55} District Government Officer, Bushenyi, Interview UD11, 25 May 2009.

trees. But the TIST group has not planted in Bitereko sub-county, with most TIST planting taking place north and east of Bushenyi.

One of the important social safe-guards built into the project was the drafting of a Plan Vivo land management plan. Through such planning, an appropriate number of trees could be assigned in a manner adjusted to ensure food security. Often low fertility lands were sought for tree-planting to reduce the risk of food insecurity and ensure permanence. One copy of the plan was retained with the local government and the other sent to EcoTrust in Kampala. Once tree planting had been initiated, the resident coordinator from the Bitereko Women’s Group would visit the site for an initial monitoring. This was followed by a second monitoring effort by EcoTrust auditors at each payment year.

According to EcoTrust, security of tenure of land holdings was of key importance as there should be a long-term commitment by the landowner to have land under a forestry system for a number of tree rotations (Plan Vivo-PDD, 2009). Like many areas of southwestern Uganda (see Carswell, 2002), the customary land ownership patterns in Bitereko sub-county were based on individual or private ownership of lands. Most residents have been able to demonstrate long-term land rights through informal local documentation such as a local purchase agreement, land title and approval of local political leaders (Plan Vivo-PDD, 2009). More than 90% of Plan Vivo participants surveyed claimed ownership of their lands in this manner, significantly more than amongst the control group (Figure 17). However, no formal land titles of any kind had been issued in Bitereko (freehold title, CCO or CLAs).

The lack of official land titles was generally not cause for concern, with a few respondents citing Constitutional restrictions on government acquisitions of private land, while trees and shrubs

---

57 109,993 trees were monitored amongst the 395 new participants in 2010 (EcoTrust 2011: 31-51), which suggests 143,130 planted by the remaining 514 participants.
58 NGO Officer, Bitereko Subcounty, Interview UD13, 26 May 2009.
59 NGO Officer, Bitereko Subcounty, Interview UD13, 26 May 2009.
were used to demarcate boundaries.\textsuperscript{61} There was also a number of land sales to people from outside the sub-county.\textsuperscript{62} Some acknowledged the additional security offered through formal land titling, but found the process too expensive.\textsuperscript{63} However, a number of participants had been hesitant to partake in the Plan Vivo project because of the concern that if they were selling their carbon, they might also be selling their trees and possibly land.\textsuperscript{64}

\textbf{Figure 17: Distribution of land tenure status amongst five villages in Uganda}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure17.png}
\caption{Distribution of land tenure status amongst five villages in Uganda}
\end{figure}

\textbf{Village Selection}

For the Uganda Plan Vivo reforestation project, fieldwork was restricted to Plan Vivo’s efforts in a number of villages located across the 7,000 ha Bitereko sub-county of Bushenyi district (Figure 18). Plan Vivo project was initiated in Bitereko due to the history of involvement between


\textsuperscript{62} Villager, Bitero Subcounty, Interview U15, 27 May 2009; Villager, Bitero Subcounty, Interview U20, 27 May 2009. Land prices varied between 0.08 - 6.0 million Ush per ha, though without significant difference between agricultural land (0.67 million Ush/ha), fallowland (0.51 million Ush/ha), uncultivated land (0.31 million Ush/ha) and forest land (0.74 million Ush/ha).

\textsuperscript{63} Villager, Bitero Subcounty, Interview U20, 27 May 2009.

EcoTrust and the Bitereko Women’s Group (Biryawaho cited in Katoomba Group, 2006: 64).\textsuperscript{65} Unfortunately, information on the number of farmers recruited in Bitereko sub-county is not available (such figures are only presented at the district level). Consequently, additionality analysis was conducted per hectare basis, as calculations at this level are applied generically to all households across the project. While Plan Vivo is now found in a number of sub-counties and districts, Bitereko sub-county was selected for investigation because it has consistently had the highest number of participants of any sub-county since the project’s inception (Biryawaho, 2005: 8). As of 2009, 73 households had undertaken tree-planting and received payments in Bitereko sub-county, with an additional 37 having been registered.\textsuperscript{66}

Analysis of sustainable development impact also required a modified approach. Households participating in the Plan Vivo project were compared with a control group of households in the same sub-county not participating in the carbon project. When assessing initial Plan Vivo participants, attention was given to obtaining a sample of households from villages across the subcounty. It was anticipated that the control group would also have served as a baseline for assessing additionality, though for reasons explained below, this proved inappropriate. For the first group, a list of over thirty Plan Vivo participants was solicited from the local field coordinator in Bitereko. The control group, comprised of households not participating in the project, was selected at random. However, given that the control group was largely sampled without vehicle access, the distribution of households was concentrated with Bitereko and Kanyabukushu villages (Table 11).

\textsuperscript{65} As EcoTrust has explained “At EcoTrust we’ve had a number of projects in this part of Uganda. First, in 1999 we provided a grant to the Bitereko Women’s Group to set up woodlots, obtain energy-saving stoves, and get involved in sustainable agriculture. Then, in 2002, we helped provide goats to the local women. In both these cases, the Bitereko Women’s Group performed admirably: they were great at writing reports for the grants. In fact, they have been so good at getting resources for their members that now men are beginning to try and join the group. So, when we began working with ECCM on a project to pay local farmers to sequester carbon, we knew this group would be a good one to start with” (Biryawaho cited in Katoomba Group, 2006: 64).

\textsuperscript{66} NGO Officer, Bitereko Subcounty, Interview UD13, 26 May 2009.
Table 11: List of villages in Bitereko subcounty surveyed

<table>
<thead>
<tr>
<th>Village</th>
<th>Plan Vivo Participants</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitereko</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>Cwera</td>
<td>2</td>
<td>/</td>
</tr>
<tr>
<td>Kanyabukushu</td>
<td>/</td>
<td>9</td>
</tr>
<tr>
<td>Karangera</td>
<td>2</td>
<td>/</td>
</tr>
<tr>
<td>Kshojwa</td>
<td>2</td>
<td>/</td>
</tr>
<tr>
<td>Katwer</td>
<td>2</td>
<td>/</td>
</tr>
<tr>
<td>Kigarama</td>
<td>3</td>
<td>/</td>
</tr>
<tr>
<td>Kitojo</td>
<td>5</td>
<td>/</td>
</tr>
<tr>
<td>Nyamiyoga</td>
<td>/</td>
<td>3</td>
</tr>
<tr>
<td>Nyarriko</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Omuburembo</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Omukibale</td>
<td>1</td>
<td>/</td>
</tr>
<tr>
<td>Ruhugye</td>
<td>1</td>
<td>/</td>
</tr>
<tr>
<td>Uncertain</td>
<td>5</td>
<td>/</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>30</strong></td>
<td><strong>30</strong></td>
</tr>
</tbody>
</table>

Figure 18: Map indicating location of Bitereko sub-county and its proximity to Kigezi Wildlife Reserve and the district capital of Bushenyi
4.2.3. **Uganda CDM Bagasse Cogeneration Project**

The *Kakira Sugar Works Ltd. (KSW) Cogeneration Project* (CDM-PDD, 2007b) claimed CDM financing was necessary for the expansion of bagasse cogeneration capacity, the surplus electricity from which has been exported to Uganda’s national grid where it claims to have displaced emissions from fossil fuel power generation (CDM-PDD, 2007b: 2-3, 15). Cogeneration is an economical means of managing bagasse, the biomass residue left after processing raw sugarcane, which would otherwise have been disposed of by field burning. Interest in cogeneration was precipitated by a drought between 2004-2007 that saw hydroelectric power generation plummet in Uganda and replaced through a short-term strategy to build emergency thermal power plants (UETCL, 2008: 39).\(^67\)

KSW completed the upgrading of cogeneration equipment in early 2008, when the company began exporting 12-14 MW of electricity to the national grid.\(^68\) The CDM project initially claimed 378,793 tonnes of carbon credits over a seven year crediting period from 2008-2014 (CDM-PDD, 2007b: 2-8). At a price of $4 per tCO\(_2\)e, the carbon value of the project is estimated at $1.5 million. However, KSW has since withdrawn the project from the CDM process, ostensibly because of changes in the CDM methodology that have reduced the amount of carbon credits the project could generate (Naus, 2010: 91). But the analysis undertaken here suggests the project’s additionality claims would also be questioned if the project would have proceeded finally through the CDM regulatory process.

**Project Development Context**

The Uganda CDM cogeneration project cannot be fully understood without discussion of the policy context surrounding sugar (and sugarcane), forests and electric power in Uganda. All saw important reforms during the late 1990s/early 2000s that come together in an important way in this project.

---

\(^{67}\) *Ugandan Government Officer, Kampala, Interview UN20, 12 May 2009.*

\(^{68}\) *Business Manager, Kakira District, Interview UD1, 8 June 2009.*
**Electricity Generation in Uganda**

Rural electrification has been a major priority in Uganda and target of significant economic reforms. Relevant to the Uganda CDM cogeneration project is the emphasis given to rural electrification in the 2005 *Poverty Eradication Action Plan* and *Rural Electrification Strategy and Plan 2001-2010*.

Uganda’s power generation capacity has increased significantly since 2001 from approximately 300 MW capacity to 578 MW capacity in 2010 (Engurait, 2005: 11; World Bank, 2011c: 59). However, Uganda’s reliance on hydroelectric power has proven vulnerable. Drought between 2004 and 2006 reduced water flow into Lake Victoria (Karekezi et al., 2009: 30). Hydroelectric power generation plummeted from 450,000 MWh to 200,000 MWh, though since recovering to 300,000 MWh (Figure 19). The short-term strategy to address the power shortage, developed in 2005, was to build emergency thermal power plants (UETCL, 2008: 39/UN20). As electricity demand has risen and hydroelectric generation plateaued, thermal generating capacity has risen substantially to nearly equal hydroelectric generating capacity in 2010 (Figure 19)

**Figure 19: Change in Power Generation and Consumption in Uganda, 2005-2010**

(a) Power generation, 2005-2010

(b) Power consumption, 2006-2010

*Sources: ERA (2010a: 24 & 26; 2010b)*

**Sugarcane and Forests in Southern Uganda**

Historically, sugar prices were set by the Sugar Industry Unit under the Ministry of Trade and Industry, but this was one of the first targets of economic reform (World Bank, 1996: 7). Uganda
posts a sugar deficit that requires the importation of sugar, a situation which is expected to extend until at least 2013 (USCTA, 2010). Consequently, the country has been buffeted by sugar shortages and price spikes (Busharizi, 2011; Mukasa, 2011). Lacking a coherent response, the government has recently developed a 2011 Sugar Policy. The policy, which has not yet been made public, is expected to empower farmers to negotiate fair prices while also requiring that 30% of any sugarcane catchment area be set aside for food crops (Anonymous, 2011a; Ssempija, 2010). It also seeks to curtail sugar smuggling, stipulates that new sugar factories need to be located outside a 25-kilometre radius from existing ones, and calls for the establishment of a national sugar board (Ibid.). Significantly, sugarcane outgrowers do not have access to government agricultural extension services because they are considered under the Ministry of Tourism, Trade and Industry (MTTI) and not the Ministry of Agriculture (Miti, 2009).

Government interest in reducing sugar imports and cultivating a domestic sugarcane industry has generated a significant amount of controversy in southern Uganda, where much of Uganda’s sugar industry is located (the other area being in Masindi district to the northwest). This is exemplified through controversies surrounding Butamira Central Forest Reserve and more recently around the potential allocation of Mabira Central Forest Reserve.

Butamira CFR was a Eucalyptus plantation fuelling KSW until 1998 when the company sought to convert the land to sugarcane when it began to use bagasse as fuel (Manyindo et al., 2001; Tumushabe and Bainomugisha, 2004). It was gazetted as a Local Forest Reserve in 1930 and in 1949 leased to the precursor company of KSW for 49 years by the Busoga Local Government. The license remained in effect even during the turbulent years after Uganda’s independence through to Museveni’s assent to power. When the lease expired in 1998, KSW sought and was granted, under “irregular circumstances”, another 49-year permit that illegally endorsed the change of land use in the Reserve to general purposes. Though Uganda is now committed to the maintenance of its Permanent Forest Estate (MWLE, 2001: 2), the land conversion in question was initiated in the midst of the forest sector reform process. As a result of a Parliamentary inquiry, the permit issued in 1998 was revoked, but only after KSW had already cleared over 700 ha to extend its sugar cane estate. In October 2000, however the Forestry Department issued
permits to about 200 groups and individuals to plant *Eucalyptus* trees as well as crops on the area cleared by KSW. By 2001 they had planted 500 ha with *Eucalyptus* and food crops, generating considerable economic benefits for local residents. However, in 2001, the government ultimately degazetted Butamira CFR to the benefit of KSW who cleared the land amidst considerable controversy (Kulubya and Mohammed, 2002; Mohammed, 2001).

The issue of Mabira CFR demonstrates the continued sensitivity surrounding forests and sugarcane production. The issue flared into protest and violence when Museveni proposed allocating in 2007 approximately one-quarter of the forest area (7,000 ha) to the SCoufl Sugar Works for sugarcane production. It should be noted that the National Biomass Study determined that 7,000 ha (24%) of the forest reserve was degraded or encroached upon (UFD, 2002: Appendix 11). In addition to pressure from donors (particularly the World Bank), this study led the government to recant (Child, 2009; Kasita, 2007). However, given a recent sugar shortage, Museveni has indicated a renewed determination to see the allocation through, though stating that he will abide by Parliament’s decision and seek only the degraded section of Mabira (Anonymous, 2011b; Bareebe, 2011).

**Expansion of KSW Sugarcane Supply**

KSW’s core estate measures approximately 7,800 ha, with the acquisition of Butamira CFR marking its last significant, contiguous expansion. To increase cane supply, it has instead come to rely on local smallholder farmers as sugarcane outgrowers to supply the additional cane. The contribution of outgrowers has increased from 3216 ha in 1995, 10436 ha in 2006 (KSW, 2006) and reaching approximately 15360 ha by 2009. KSW had also recently increased its harvest radius to 35 km. This indicates a certain degree of tenure security of household lands: KSW has had to contract with smallholder farmers in order to expand sugar production and has not been able to acquire additional lands directly.

---

69 *Business Manager, Kakira District, Interview UD4, 9 June 2009.*

70 *Local Government Focus Group (U25), Kagogwa Village, 11 June 2009.*
The expansion of the outgrowers has been favourably received. A 1996 report by the World Bank after KSW’s first expansion concluded:

*Outgrowers interviewed during the completion mission expressed satisfaction at the positive experience with the scheme. Farmers in this area of Uganda have a significant proportion of their farms underutilized since there are few market outlets for cash crops, and their farming systems tend to concentrate on food production for the household with limited marketable surpluses (World Bank, 1996: 4)*

One hectare can produce 124 tonnes sugarcane over an 18 month period which leads to net profits of 2.5 million Ush. By way of comparison, maize was reported to generate 0.45-1.0 million USh per hectare—not accounting for transport and labour costs. Furthermore, KSW was a ready and secure market which paid farmers within three days of receipt and accepted sugarcane nearly any time of year. The CDM project validator concluded that “the standards of living of the people living in the surrounding areas engaged in cane supply to the factor[y] is above the average [of the] rural population in the country (DNV, 2008).

KSW does not appear to have further ambitions for expanding in Jinja district, though it is considering expansion in the northern Amuru district (Moro, 2007). The company has actually sought government intervention to prevent a new entrant, the Alam Group, from establishing the Mayuge Sugar Works in the area (Mugabi, 2011). KSW argues that the situation of the Mayuge Sugar Works would be within 9 km of its operations, thus in contravention of the 2010 Sugar Policy and siphon off its outgrowers (New Vision, 2011; Ogwang, 2011). One respondent indicated that the Mayuge Sugar Works was formed in cooperation with former KSW outgrowers.

The primary determining factor of sugarcane’s contribution to farmers’ livelihoods was the price of cane. After the re-establishment of KSW in the late 1980s, the price was determined through a

---

71 A more fertile plot could produce 160 tonnes per hectare (Small Business Owner, Kakira District, Interview UD16, 8 June 2009).

72 NGO Officer, Kakira District, Interview UD3, 10 June 2009; Business Manager, Kakira District, Interview UD4, 9 June 2009.

73 Villager, Kakira District, Interview UD2, 10 June 2009.
formula developed by the World Bank, though it is was now negotiated on an annual basis between KSW and the Busoga Sugarcane Growers Association (BSGA). It was comprised of two prices: an interim price representing 90% of the payment plus arrears, calculated as 35% percent of KSW’s profits after the close of the financial year. The interim price has risen from 24,000 Ush per tonne sugarcane in 1995 to 38,000 Ush in 2008 and 40,000 per tonne in 2009 (KSW, 2009). BSGA also negotiates transport prices with KSW.

BSGA was established in 1993 “to unite all the farmers” in order to negotiate with KSW and is open to anyone registered with KSW. The number of KSW outgrowers has expanded from 1,165 in 1995 to 3,601 in 2006 (KSW, 2006) and 6,400 in 2009. The board of the BSGA meets every two months with KSW management and every three months with delegates from the sixteen sub-counties of Jinja district. During the annual general assembly, KSW and BSGA finalize sugarcane pricing. As of 2009, BSGA had approximately 6,000 members and is funded by a 50 Ush charge on each tonne of sugarcane. While BSGA was involved in sensitizing farmers in adjacent Mayuge district, where a rival sugar mill was slated to begin production in

---

74 Small Business Owner, Kakira District, Interview UD16, 8 June 2009. Also, a NGO Officer in Kakira district explained that the pricing formula was devised to accommodate changes in sugar pricing over the course of the year: “When you are being paid, [KSW] pays you the interim price. They don’t pay you the whole money. They retain a certain percentage. So at the end of the season when [KSW] has calculated his profit he used to give us 35%. And now he’s giving us 40%, after negotiation. The formula he uses to pay us, to arrive at the price, he’s using now 40% (NGO Officer, Kakira District, Interview UD3, 10 June 2009).”

75 It was reported that most farmers wanted a price of 45,000 per tonne, but KSW warned that too large a price rise would only trigger demand for higher prices from other labourers in the sugarcane supply chain (Small Business Owner, Kakira District, Interview UD16, 8 June 2009). With competition for sugarcane likely to increase in the region with arrival of Alam Group’s sugar mill in adjacent Mayuge district, there was an expectation amongst BSGA that sugarcane prices would continue to rise (NGO Officer, Kakira District, Interview UD3, 10 June 2009). The arrears price for 2008 was 3,681 Ush, making the final price for sugarcane 41,981 Ush per tonne minus contributions to KORD and BSGA (KSW, 2009). Significantly, BSGA had successfully negotiated to see the arrears price raised to 40% of KSW profits (NGO Officer, Kakira District, Interview UD3, 10 June 2009).

76 Transport prices range from 7,400 Ush per tonne for distances of 0-4 km up to 18,000 Ush per tonne for distances of 30-35 km (KSW, 2009).

77 Small Business Owner, Kakira District, Interview UD16, 8 June 2009.

78 Business Manager, Kakira District, Interview UD4, 9 June 2009; Small Business Owner, Kakira District, Interview UD16, 8 June 2009.

79 NGO Officer, Kakira District, Interview UD3, 10 June 2009.

80 Small Business Owner, Kakira District, Interview UD16, 8 June 2009.

81 NGO Officer, Kakira District, Interview UD3, 10 June 2009.
In addition to direct financial benefits, KSW and the BSGA have jointly established a local development assistance organization: Kakira Outgrowers for Rural Development (KORD). KORD promotes development projects in the area focusing on roads, schools and education. It is funded jointly by BSGA and KSW with 250 Ush and 125 Ush taken from each tonne of sugarcane supplied by outgrowers and Kakira’s estates, respectively. KORD received a contribution of 350-425 million Ush in 2009 for local rural development projects. Casual labourers such as cane cutters and drivers are, however, not part of the BSGA. KSW has also over the years attracted a significant number of migrant workers from outside the region, including from Tanzania, Kenya and DRC. They did not appear to have any labour association.

In order to secure sugarcane supply, KSW enters into a contract with individual outgrowers to supply cane to KSW, ensure their cane is not diverted to other buyers and, discussed in more detail below, to ensure food security. A copy of the KSW outgrower’s contract is provided in Appendix 9. These contracts provided an additional form of land tenure documentation. Despite a lack of formal government land title, all outgrowers are registered with KSW in a computer database. There are two types of contracts: (i) aided, where KSW also provides a loan for sugarcane inputs (seed cane, ploughing and transport), and (ii) un-aided, for growers already

---

82 NGO Officer, Kakira District, Interview UD3, 10 June 2009.
83 NGO Officer, Kakira District, Interview UD3, 10 June 2009; Business Manager, Kakira District, Interview UD4, 9 June 2009.
84 Small Business Owner, Kakira District, Interview UD16, 8 June 2009.
85 Villager, Kagogwa Village, Interview U24, 11 June 2009.
86 Business Manager, Kakira District, Interview UD4, 9 June 2009; Small Business Owner, Kakira District, Interview UD16, 8 June 2009.
87 Village Focus Group (U26), Kagogwa Village, 11 June 2009.
have sufficient cash available to pay for KSW’s inputs without need for a loan.\textsuperscript{88} Reportedly, a normal harvesting period would see the final loan paid at the third harvest, approximately 4.5 years later.\textsuperscript{89} The permits are issued in a manner to control the supply of sugarcane to the sugar mill.\textsuperscript{90} Significantly, these contracts appeared enforceable: KSW had reportedly already taken 30 farmers to court for breach of contract.\textsuperscript{91} At the same time, some outgrowers voiced displeasure with KSW, citing serious delays in payment, delivery of inputs and cutting permits and dependency on KSW for inputs, particularly seed cane.\textsuperscript{92} It was also reported that KSW’s factory workers went on strike in 2008 to protest pay delays and poor working conditions.\textsuperscript{93}

\textit{Demographic Trends in Jinja District}

The demographic trends in Jinja district are worth exploring, as the district has amongst the highest population densities of any of the three districts investigated (Figure 20). Also significant is the proximity of Kagogwa to the district capital of Jinja (11 km) in contrast to projects in Ntungamo and Bushenyi, which were both at least 25 km from their respective district capitals. Finally, it should be noted that the district capital of Jinja is the second largest city in Uganda. All these factors suggest that population pressure could be a factor in land use. Indeed, satellite imagery of KSW estate shows it surrounded on all sides by agricultural lands (Figure 21).

\textsuperscript{88} \textit{Small Business Owner, Kakira District, Interview UD16, 8 June 2009.}
\textsuperscript{89} \textit{Village Focus Group (U26), Kagogwa Village, 11 June 2009}
\textsuperscript{90} \textit{Village Focus Group (U26), Kagogwa Village, 11 June 2009}
\textsuperscript{91} \textit{Village Focus Group (U26), Kagogwa Village, 11 June 2009; NGO Officer, Kakira District, Interview UD3, 10 June 2009.}
\textsuperscript{92} \textit{Villager, Kakira District, Interview UD2, 10 June 2009.}
\textsuperscript{93} \textit{Villager, Kakira District, Interview UD2, 10 June 2009.}
Figure 20: Population density amongst three districts investigated in Uganda

![Population density graph](image1)

Figure 21: 2011 Satellite image showing location of KSW estate amidst agricultural lands

![Satellite image](image2)
Figure 22: Map indicating location of Kagogwa village and its distance from KSW Estate and Sugar Works in Jinja district as well as Central Forest Reserves in the region.

KSW estate
Former Butamira CFR
Mabira CFR
Bukaleba CFR

Also shown are Mabira, Bukaleba and the former Butamira CFR and competing sugar factories owned by SCOUL and the Alam Group (to open in 2012).

Village Selection

The sustainable development impact of Uganda CDM bagasse cogeneration project was investigated through field surveys and interviews in Kagogwa, a village of ~1,250 people and 178 households located on the edge of the Kakira Sugar Works (KSW) estate (Figure 22). Significantly, and in contrast to other projects investigated, it is only eleven kilometers from a major urban centre: Jinja, the district capital and the second largest city in Uganda. More importantly, no control village was compared to Kagogwa. Two comparisons were considered, but all were ultimately deemed unfeasible given logistical constraints. The first comparison would have been to compare Kagogwa to a village not involved in the production of sugarcane and only involved in agriculture. The problem with this comparison was that the catchment basin for KSW implicated all villages within a 30 km radius of the sugar factory. This suggested that locating such a village would be logistical challenge. Presumably it would entail travel to an adjacent district, which would undermine the ability to control for socioeconomic and political
conditions in the research design. The second comparison considered would have required locating a comparable village similarly within the orbit of a sugarcane mill but not being undertaken under the CDM. Such a village would have only been possible in a village within the orbit of another sugar mill. The Sugar Corporation of Uganda Limited sugar works (SCOUL) was 50 km away and in a different district. Fieldwork there proved infeasible given time and logistical constraints. The lack of a control village should be borne in mind when considering the assessment of sustainable development.

4.3. Moldova

In Moldova I investigated two CDM afforestation projects (CDM-PDD, 2008d; 2010) and two CDM rural energy modernization CDM projects (CDM-PDD, 2005a; b). Because the bioenergy component of the CDM rural energy modernization project failed, only learned during the course of fieldwork, a bioenergy pilot project sponsored by the Global Environment Facility (GEF) was also investigated (GEF, 2005b). Recall however that there was some overlap between villages used as controls in Moldova. Villages involved in the CDM afforestation projects served as controls for the CDM rural energy modernization and bioenergy pilot projects (Table 16).

4.3.1. Moldova CDM Afforestation Project

There are actually three CDM afforestation projects underway in Moldova, all implemented by Moldsilva, the state forest agency, though two are being implemented under the CDM. Because of similarities between the project developers and timing, I consider them together as a single project. The first CDM project is a 20,290 ha tree planting effort (CDM-PDD, 2008), entitled Moldova Soil Conservation Project, which became amongst the first afforestation project in the world to be approved by the CDM Executive Board (World Bank, 2009c). The second CDM project, entitled Moldova Community Forestry Development Project, has aimed to afforest 10,589 ha (CDM-PDD, 2010). Together, the two CDM projects in Moldova are comprised of 3,431 discrete parcels (with an average parcel size of 15 ha) involving three-quarters of all villages in Moldova (Table 12). The third non-CDM afforestation effort is financed through a forward contract for the purchase of voluntary carbon credits between Moldsilva and the World Bank to plant 8,170 ha (Moldsilva, 2009: 18).
The majority of lands targeted for afforestation in the CDM projects are owned by villages, the rest owned by Moldsilva as part of Moldova’s Forest Estate. Nearly 60% of the lands involved in the first CDM project are the property of village councils (CDM-PDD, 2008: 3); in the second CDM project, villages own 95% of project lands (CDM-PDD, 2010: 4). By way of a contract signed between village governments and Moldsilva, management rights to villages lands were transferred to Moldsilva for a 10 year period as trees mature (CDM-PDD, 2008d: 26-27). Subsequent to this, management of afforested areas is to be reinstated with village councils. The vast majority of trees planted in the CDM project (nearly 90%) are Black Locust (*Robinia pseudoacacia*) (CDM-PDD, 2008d: 28), a foreign species originally from the United States. Significantly, despite the objective of afforesting degraded lands, the majority of lands anticipated for the CDM projects were actually not designated as degraded land but as pasture—nearly 70% (CDM-PDD, 2008d: 37-38; 2010: 35). Yet with land for grazing often insufficient and the distinction between pasture and degraded land blurry, the allocation of lands for afforestation to Moldsilva was extremely sensitive.

While there is an EIA system in Moldova, as discussed in Chapter 4, an EIA was not formally required for the either the CDM afforestation or rural energy modernization projects in Moldova (CDM-PDD, 2008d: 97; World Bank, 2003a: 9). Nonetheless, an EIA for the CDM afforestation project was required by the World Bank in order for it to receive funding (World Bank, 2003a: 54-56). The World Bank also required an Environmental Management Plan which summarizes the mitigation, monitoring, and institutional measures to be taken by Moldsilva during implementation (World Bank, 2003a: 46-58). Importantly, it identified a formal “Process Framework” for mitigating the adverse livelihood impact of involuntary loss of degraded pastures resulting from the afforestation project (World Bank, 2003a: 54-56). Supported by a nearly $1 million grant in 2003 from Japan’s Policy and Human Resources Development Fund (World Bank, 2004a: 4), the Process Framework would direct support through a “Special Project Compensation Program” including:

---

94 A list of thirty two activities to be considered is listed in an annex to the 1996 Law on SEE and EIA (World Bank, 2003a: 8-9).
(a) provision of alternative grazing grounds;
(b) provision of livestock fodder during duration of the project;
(c) priority status for receiving benefits from the forests (temporary employment and fuelwood);
(d) allowance for local communities to grow vegetables between the seedling rows until the trees grow and shade these areas; and
(e) direct financial support to affected individuals and communities (World Bank, 2003a: 54-56).

Notably the “Process Framework” benefits only a very small number of villages involved. Its activities were implemented in 50 villages (World Bank, 2009b: 83), though also claiming substantial “sharing of information, experience and best practice with non-participating interested communities.” However, the CDM projects altogether implicated nearly 600 villages.
Table 12: Statistical overview of Moldovan afforestation projects supported by carbon finance

<table>
<thead>
<tr>
<th>Project</th>
<th>Size (ha)</th>
<th>Parcels (n)</th>
<th>Villages (n)</th>
<th>First Crediting Period (Years)</th>
<th>First Crediting Period Duration</th>
<th>Planting Effort Duration (Years)</th>
<th>Estimated Implementation Cost ($ million)</th>
<th>World Bank Carbon Financing ($ million)</th>
<th>World Bank Carbon Purchased (million tCO$_2$e)</th>
<th>Estimated Carbon Price ($/tCO$_2$e)</th>
<th>Date of Purchase Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDM 1</td>
<td>20,290</td>
<td>2,472</td>
<td>594</td>
<td>3.6</td>
<td>20 yrs (2002-22)</td>
<td>2002-2006</td>
<td>$18.7</td>
<td>$7.0*</td>
<td>1.9</td>
<td>$3.70</td>
<td>2004, 2006</td>
</tr>
<tr>
<td>CDM 2</td>
<td>10,589</td>
<td>961</td>
<td>same</td>
<td>3.8</td>
<td>30 yrs (2006-35)</td>
<td>2006-2008</td>
<td>$28.2</td>
<td>$2.0**</td>
<td>0.55</td>
<td>na</td>
<td>2009</td>
</tr>
<tr>
<td>Voluntary</td>
<td>8,170</td>
<td>na</td>
<td>na</td>
<td>0.175</td>
<td>5 yrs (2003-07)</td>
<td>2003-2007</td>
<td>na</td>
<td>$0.44***</td>
<td>0.175</td>
<td>$2.50</td>
<td>na</td>
</tr>
</tbody>
</table>

* $5.2 million for 1.3 million tCO$_2$e – Prototype Carbon Fund, $2.5 million for 0.6 million tCO$_2$e – Biocarbon Fund
** Estimated from $3.7 per tCO$_2$e price
*** $0.44 million for 0.175 million tCO$_2$e – Biocarbon Fund
Sources: (CDM-PDD, 2008d; 2010; Moldsilva, 2009; World Bank, 2010b; No Date)
Land Degradation in Moldova

Traditionally known for its rich agricultural lands, especially its chernozem “black earth” soils, Moldova has amongst the highest levels of land degradation of any country in Eastern Europe (Istrate and Hens, 1996: 55; Krupenikov, 2008; Krupenikov and Boinchanch, 2004; van Lynden, 2000: Figure 2c). Land degradation is largely attributed to the Soviet practice of tilling fallow fields between crop rotations—sometimes fallow fields were tilled as many as 4-5 times during a single season (Karbozova-Saljnikov et al., 2004). Such intensive mechanical disturbance leads to enhanced mineralization of soil organic matter but also prevents the reestablishment of vegetation to replenish soil organic matter and, as a result, soil nutrients leach out. Land degradation was effectively masked by the Soviet practice of intensive application of fertilizers and pesticides (Boincean, 2009). Physical erosion caused by wind and water (particularly heavy summer rains) is another important factor in land degradation. Cultivation on sloped areas increased after World War II, though offset by the planting of forested strips to guard against erosion (Summer and Diernhofer, 2003: 25-26). These forested strips were however cleared in the 1970s (ibid.).

Tree planting has been advocated for addressing land degradation in other Eastern European countries because it is one of the most economically efficient ways of addressing the problem (Balana et al., 2012; Khamzina et al., 2006; Reubens et al., 2011; Singh, 2012; Zdruli et al., 1997). Other strategies to address land degradation include constructing irrigation ditches to channel rainwater and prevent gulley formation, while soil fertility can also be enhanced through application of irrigation and fertilizers. Indeed, a Programme for Land Development and the Improvement of Soil Fertility exists in Moldova, though whose focus is on the application of chemical fertilizers (Ministry of Agriculture, 2004). Given the extent of degraded lands in

---

95 The eminent Russian-Moldovan soil scientist Krupenikov mourned “I have to admit with pity that chernozems have lost a lot of their magnificent power and beauty over those years…It will make me cry if people destroy this inimitable wonder of nature—chernozems (the eternal breadwinners)—by the end of our century (Krupenikov, 2008 cited in Lisetskii, 2009: 1190).

96 61% of Moldova’s arable lands are on slopes of 1-5° inclination, 15% of 5-8° inclination and 4% on slopes of 8-15°—only 20% of the country’s arable lands are on flat ground (Istrate and Hens, 1996: 55).

97 District Government Officer, Căușeni, Interview MD1, 7 August 2009.
Moldova, low-cost means of arresting soil erosion and fertility loss through afforestation have a significant appeal. Between 85,000 and 95,118 ha of degraded land across the country have been targeted for restoration through afforestation/reforestation by the government’s 2003 State Program for Afforestation and Regeneration of the Lands from the Forest Estate for the Period of 2003-2020 (CDM-PDD, 2008: 57-60; CDM-PDD, 2010: 54-57; FAO, 2007: 4).

**Figure 23: Degraded hillside in Bursuceni which had been deforested during a period of intense fuel scarcity in the winter of 1995-96**

![Degraded hillside in Bursuceni](image)

*Photo credit: the author (2009)*

**Forests and Forestry Policy in Moldova**

There is some debate as to the extent of forests in Moldova. The FAO has estimated Moldova’s forests to stand at 386,000 ha and represent 12% of its total land area (FAO, 2011: 115). FAO numbers are however disputable because they include forest buffer strips, orchards and other
The government of Moldova has focused on expanding Moldova’s forest cover as means of addressing land degradation. In addition to the *2003 State Programme for Afforestation and Regeneration*, discussed above, this is reflected in Moldova’s *2004 Economic Growth and Poverty Reduction Strategy Paper* as well as a number of other government policies. The report to the World Bank targeted an increase in the relative weight of areas covered with forests from 10.3% in 2002 to 11.0% in 2006, 12.1% in 2010 and 13.2% in 2015 (GoM, 2004: 37). More importantly perhaps, the government’s *2003 Strategy for the Sustainable Development of the Forestry Sector (2003-2020)* set a goal of expanding forest cover from 9.6% to 15%—or at least by 130,000 ha—by 2020 (Gulca, 2006: 126; 2010: 87; ICAS, 2007). See trends in Moldova’s forest cover in Figure 24.

Of the goal to increase forest cover by 130,000 ha, nearly three-quarters (95,118 ha) was to be achieved through the *2003 State Program for Afforestation and Regeneration of the Lands of the Forest Estate for the Period of 2003-2020* (FAO, 2007: 4). Of the total area targeted in the program, 26% was to be afforested while the remaining 74% was to be reforested—all for a total cost of $44.6 million USD (*Ibid.*). Such a goal represents a considerable challenge. Notably, the 15% target was also fixed by the Soviet Union and not attained (Gulca, 2010: 87).

---

98 FAO’s figure includes 30,800 ha of forest buffer strips, 18,500 thousand ha of other forest-type vegetation such as orchards and finally 37,900 ha of land devoid of forest (ICAS, 2005; Gavrilita & Druta, 2010: 109).
### 4.3.2. Moldova CDM Rural Energy Modernization Project

Two CDM projects have sought to use carbon finance to promote fuel-switching towards bioenergy and natural gas as well as energy efficiency improvements amongst village public buildings relying on coal—which can be referred to collectively as rural energy modernization. They were developed as part of the World Bank’s Community Development Carbon Facility (CDCF), which has signed a contract to purchase the carbon credits (CDCF, 2007). Entitled *Moldova Biomass Heating in Rural Communities - No. 1 and 2*, the two projects were expected to lead to between thirty and forty-five percent of buildings targeted to switch to biomass residue for fuel (CDM-PDD, 2005a: 10; 2005b: 10). The two rural energy modernization CDM projects aimed to generate 357,768 tCO₂e of carbon credits over a ten-year period from 2006-2015 (Table 13). They are virtually identical and it is appropriate to think of the two as a single project that is seeking to benefit from a simplified administrative process under CDM rules for small-scale projects.

The Moldovan CDM project actually seeks to promote three different types of mitigation activities: bioenergy, energy efficiency and fossil fuel-switching from coal to natural gas—each of which needs to conform to an official CDM methodology (Table 13). For reasons provided below, the bioenergy component of the CDM project failed. A bioenergy pilot project
implemented under Global Environment Facility (GEF, 2005b: 47) was investigated to understand what the sustainable development impact of the bioenergy component would have been had it been successfully implemented as part of the CDM project. The Moldova bioenergy pilot project is discussed separately.
Table 13: Overview of Moldovan CDM rural energy modernization projects

<table>
<thead>
<tr>
<th>CDM Project</th>
<th>Small-Scale Type</th>
<th>Small-Scale Methodology</th>
<th>Expected Project Contribution</th>
<th>Expected No. Project Activities</th>
<th>Actual No. Project Activities&lt;sup&gt;β&lt;/sup&gt;</th>
<th>Expected Emission Reductions (10 yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDM 1</td>
<td>Type I: Renewable Energy</td>
<td>I.C Thermal energy for the user&lt;br&gt;For all PAs of this category, their aggregate generation capacity specified by the manufacturer shall be less than 15 MW</td>
<td>13.5 MW</td>
<td>53</td>
<td>0</td>
<td>178,884</td>
</tr>
<tr>
<td></td>
<td>Type II: Energy Efficiency</td>
<td>II.E Energy efficiency and fuel switching measures for buildings&lt;br&gt;For this category the aggregate energy savings may not exceed the equivalent of 60 GWh per year.*</td>
<td>9.3 GWh</td>
<td>38</td>
<td>66</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type III: Other projects that reduce anthropogenic emissions by sources</td>
<td>III.B Switching fossil fuels&lt;br&gt;For all PAs of this category the project measures shall both reduce anthropogenic emissions by sources and directly emit less than 60 kilotonnes of carbon dioxide equivalent annually.**</td>
<td>4.6 kt/year</td>
<td>29</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>CDM 2</td>
<td>Type I: Renewable Energy</td>
<td>I.C Thermal energy for the user&lt;br&gt;For all PAs of this category, their aggregate generation capacity specified by the manufacturer shall be less than 15 MW</td>
<td>13.5 MW</td>
<td>53</td>
<td>na</td>
<td>178,884</td>
</tr>
<tr>
<td></td>
<td>Type II: Energy Efficiency</td>
<td>II.E Energy efficiency and fuel switching measures for buildings&lt;br&gt;For this category the aggregate energy savings may not exceed the equivalent of 60 GWh per year.*</td>
<td>9.3 GWh</td>
<td>38</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type III: Other projects that reduce anthropogenic emissions by sources</td>
<td>III.B Switching fossil fuels&lt;br&gt;For all PAs of this category the project measures shall both reduce anthropogenic emissions by sources and directly emit less than 60 kilotonnes of carbon dioxide equivalent annually.**</td>
<td>4.6 kt/year</td>
<td>29</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td>240</td>
<td>357,768</td>
<td></td>
</tr>
</tbody>
</table>

<sup>*</sup>At the time the CDM project was developed, the threshold was 15 GWh; <sup>**</sup>At the time the CDM project was developed, the threshold was 15 kt/year; <sup>β</sup>Actual number of project activities derived from 2007 monitoring effort (MCFU, 2007).
Energy Situation in Moldova

The CDM rural energy modernization project was intended to address critical energy inefficiencies in public buildings in Moldova’s rural villages. Moldova is almost entirely dependent on external sources for its energy: 97% of its energy is imported (Government of Moldova, 2007: 8). With the collapse of the Soviet Union, energy consumption in Moldova plummeted by more than 80% though it has steadily increased since 2000. Natural gas, petroleum, hydroelectric power and coal are the most important components of Moldova’s energy mix (Government of Moldova, 2007: 9). Natural gas dominates the energy sector, constituting nearly half of Moldova’s energy supply (Ibid.). The electricity system of the Republic of Moldova relies on the Cuciurgan thermal power plant located in Transnistria, which represents 50-70% of Moldova’s electricity (enerCEE, 2011/MN5). The energy sector itself is governed by the Minister of Economy, within its Division for Energy Security and Efficiency. Tariffs for natural gas, petrol and electricity are however regulated by the more independent National Energy Regulatory Agency (ANRE, 2008: 78-79).

The energy situation in Moldova’s rural regions is certainly more distressed than in cities and towns because of a lack of access to natural gas. Approximately 360-380 thousand m$^3$ of wood is extracted annually from Moldova’s forests, of which nearly 80% is used as firewood for domestic heating (ICAS cited in UNDP, 2010c: 71). At the same time, as demonstrated by fieldwork, many households in villages not connected directly to the natural gas network use natural gas for cooking by purchasing propane tanks (Table 14).

---

99 In 2005, Moldova consumed 2.5 million tonnes oil equivalent (MTOE), up from 1.7 MTOE in 2001 (Government of Moldova, 2007: 8.). In 1990, however, energy consumption stood at 10 MTOE (Ibid.). But it is expected that Moldova’s energy consumption will double by 2020 (UNDP, 2009: 109).

100 In 2005, energy generation in Moldova (including Transnistria) stood at 2600 GWh (Government of Moldova, 2007: 11), though because of deterioration and lack of maintenance the actual power generated might be only half that (UNDP, 2009: 109). An additional 1000 GWh has been imported from Ukraine (Government of Moldova, 2007: 11).
Table 14: Frequency of fuel use across four households in Moldova

<table>
<thead>
<tr>
<th>Region</th>
<th>Village</th>
<th>Control Village</th>
<th>Fuelwood</th>
<th>Charcoal</th>
<th>Dung</th>
<th>Crop Residues</th>
<th>Gas Tanks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern</td>
<td>Săiţi</td>
<td>no</td>
<td>77%</td>
<td>10%</td>
<td>50%</td>
<td>30%</td>
<td>80%</td>
</tr>
<tr>
<td></td>
<td>Tocuz</td>
<td>control</td>
<td>69%</td>
<td>3%</td>
<td>41%</td>
<td>55%</td>
<td>76%</td>
</tr>
<tr>
<td>Northern</td>
<td>Bursuceni</td>
<td>no</td>
<td>70%</td>
<td>13%</td>
<td>57%</td>
<td>37%</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>Chiscareni</td>
<td>no</td>
<td>93%</td>
<td>40%</td>
<td>3%</td>
<td>10%</td>
<td>60%</td>
</tr>
</tbody>
</table>

Natural gas is crucial to Moldova’s energy supply. In 2005, natural gas accounted for half of Moldova’s primary energy supply, all of which is imported from Russia via Ukraine (Government of Moldova, 2007: 8). While regulated by National Energy Regulatory Agency (ANRE), natural gas prices have been rising (Figure 25). Russia has long subsidized energy to Moldova and former Soviet Republics (Brada, 1988; Gelb, 2007; Woehrel, 2009), but it is well understood in Moldova that natural gas prices will eventually rise to EU market levels, though the actual date of this transition is uncertain. As one bureaucrat at ANRE explained: “It depends on how Moldovan and Russian governments are getting along.” Yet even at the current subsidized prices, poorer Moldovans are struggling to afford natural gas (UNDP, 2010c: 109-110).

The security of Moldova’s natural gas supply is a top energy concern. Moldova was directly affected by the natural gas dispute between Ukraine and Russia in early 2009, which saw natural gas flows into Moldova suspended (Unimedia, 2009; Woehrel, 2009: 11). The security of natural gas supplies to Moldova is further complicated by the fact that the main Russian pipeline passes through Transnistria, which was the industrial heart of the former Moldova SSR. There are

---

101 Gross prices for natural gas are higher than those reported in Figure 25 because Moldova collects transit fees for the Russian gas transported over Moldova to third countries, which reduces the net price of gas consumed in Moldova (World Bank, 2003b).


103 Moldova Government Officer, Chisinau, Interview MN5, 26 August 2009.

104 There have been claims that Transnistrian authorities have participated in shutting down gas flows to Moldova (Business Owner, Chisinau, Interview MN15, 20 July 2009). Transnistria has also been unable or unwilling to pay for the natural gas which it does consume, insisting that these costs be borne by Moldovagaz, the national gas company, with whom contracts with Russia’s Gazprom have been signed. Russia’s International Commercial Arbitration Court has ruled consistently in such incidents that Moldovagaz is the responsible party for such debts.
thus reasons to seek alternatives to Russian natural gas flowing through Transnistria. Connection to a gas pipeline being built through Romania, part of a larger pipeline connecting Azerbaijan via Georgia and Turkey to Austria, is currently being explored (Molnar, 2012; Urse, 2009).

Figure 25: Evolution of natural gas prices in Moldova

The use of renewable energy is quite low in Moldova, representing just 3.6% of Moldova’s energy supply in 2005 (Government of Moldova, 2007: 15). Yet, in light of the above, much of this consists of wood and dung used for household heating in rural areas. It has been estimated that there is potential to generate 2.7 MTOE in modern renewable energy—approximately Moldova’s total current energy consumption (Government of Moldova, 2007: 15). This might be derived from solar (41%), wind (26%), hydro (11%) bioenergy (19%) (Ibid.). Biomass is the most feasible renewable energy in the near-term. A 2002 World Bank study identified unprocessed agricultural wastes, especially wheat straw, as the most available biomass fuel (GEF, 2005b: 3). Though there is some experience with small scale rural biomass projects, there is very little experience in Moldova with modern bioenergy (EBRD Renewables, 2010).

The Moldovan government has incurred a nearly $300 million debt from Transnistria’s gas consumption (Preasca, 2010).
**CDM Project Development Context**

The CDM rural energy modernization project in Moldova is just one of number of energy projects being promoted in Moldova by the international community. During the CDM project’s implementation, the most important concurrent project has been the Social Investment Fund 2 project (SIF2), onto which the CDM projects themselves were grafted (CDM-PDD, 2005a: 5). The CDM project was however quite small relative to SIF2. The entire funding to the CDM project was likely in the range of $1.4-2.5 million\(^{105}\) while SIF2 originally received $30 million, which was recently replenished with $6 million.

The SIF2 projects and its precursor SIF1 aimed to support social and economic development projects identified by Moldovan villages and vulnerable groups (World Bank, 2004c: 2). While the selection of projects was at the discretion of villages involved, SIF financing could be directed to biomass heating. SIF1 was initiated in 1999-2004 and extended into SIF2 which is ongoing, with a combined budget of nearly $30 million which was recently replenished with $6 million (World Bank, 2004c; 2008: 15; 2010c). The programme is under the authority of the Moldova Social Investment Fund, an autonomous non-profit organization administered by a committee headed by the Prime Minister (MSIF, No Date).

SIF2 was expected to finance 400 projects in rural Moldova, with an estimated 250-300 being related to energy infrastructure for public buildings such as schools, community halls and health centres (CDM-PDD, 2005a: 5). The CDM project was grafted onto the SIF2 project and sought to steer it towards bioenergy, natural gas and energy retrofits.

**4.3.3. Moldova Bioenergy Pilot Project**

During initial consultations in Chisinau, it was clear that the bioenergy component of the CDM rural energy modernization project had not succeeded: no villages had adopted a bioenergy boiler as part of the CDM scheme. An initial monitoring effort found that only the activities to improve energy efficiency and switching from coal to natural gas had been undertaken (MCFU, 2007). The fact that the biomass component of the CDM project had failed was problematic in

---

\(^{105}\) Assuming that the World Bank’s Community Development Carbon Fund paid between $4-7 per tonne CO2e.
terms of this dissertation’s focus on land governance. It was learned however that a bioenergy pilot project had been implemented amongst five villages with financial support from the GEF (2005b: 47). In order to make meaningful comparisons with the sustainability of bioenergy projects in Africa, the bioenergy pilot project in Chiscareni was investigated.

The biomass energy pilot project in Chiscareni was investigated to understand what the local sustainable development impact of the bioenergy component would have been had it been successfully implemented as part of the CDM project and why it was not selected in the first place. The project consisted of a modern biomass energy boiler installed at the school, replacing the previous heating system which had relied on coal. See a photo of the boiler below (Figure 26). The GEF pilot project concluded that confidence and awareness about the technology were the primary barriers to village uptake of biomass energy (Box 3). Incremental cost assessment demonstrates that the bioenergy pilot project would cost almost $1 million more than typical heating equipment (Table 15). But benefits accruing from the installation of biomass boilers were anticipated to include fuel switch cost savings, security of supply as well as reduced energy demand (Box 4).

**Figure 26: Biomass boiler installed in Chiscareni as part of GEF project**

![Biomass boiler](image_url)

*Photo credit: the author (2009)*
Box 3: Primary barriers identified to the uptake of biomass energy by GEF bioenergy pilot project

The main barrier to the use of renewable energy (agricultural wastes) is that there is no current possibility for an independent and rational decision maker, in Moldova, to be aware of, to investigate or to source a renewable energy / biomass option as a fuel for an energy requirement. The current availability and information is totally geared toward gas, oil, coal and electricity. Preliminary energy audits have highlighted that the higher capital cost of biomass technology can be offset by the significantly lower annual fuel cost of biomass, obtained from local sources – agricultural lands surrounding rural villages. However, the technology and fuel cycle and the economic package have to be proven so that biomass fuelled thermal energy systems will become a rational economic decision (GEF, 2005b: 3).

There exists a common perception in Moldova that agricultural wastes cannot be effectively utilized to produce heat. This energy source is therefore not considered as a serious option. Preliminary energy audits have highlighted the higher capital cost of biomass technology in comparison to gas, the usually preferred option, where available. To mitigate this variance it will be necessary to procure locally produced systems made under license based upon proven (Western European) technology, which reduces capital costs by some 50% (GEF, 2005b: 6, emphasis in original).

The straw market is presently undeveloped in Moldova, having mainly a virtual meaning. During the Soviet time, there was no perception of market for straw. The straw was baled and used mainly for internal consumption of the collective agricultural farms (as bedding for livestock and in rare cases for feeding animals). According to statistical data about 30% of the straw (in rare cases 50%) from the field is taken by rural population from villages and used for livestock bedding. The remaining quantities are usually burned on the field. Leaving straw on the field and burning it, despite the existing ecological penalties, which are hardly applied because of inefficient legal mechanism, is dictated by economical reason. Processing the straw after harvesting can increase the direct cost for final product up to 20%. Taking also into consideration that there is no appropriate equipment to process the straw which appears as an agricultural waste, in most of the cases it is burned on the field. The goal of the project is to transfigure the straw from an agricultural waste into a market based product that could generate additional income stream for agroenterprise. Overcoming of this barrier will clearly open a new direction for agricultural investments in new type of product (GEF, 2005b: 7, emphasis in original).

There are no presently suppliers of baling equipment on the market. This is conditioned by the fact that this is very specific equipment, quite difficult to operate and is rarely used at present because of the absence of market for straw. In order to diminish the created situation the project will provide conditioned investment grants to the beneficiaries, which will cover approximately 40% of the imported price of the bailing equipment and one year straw supply costs for the demonstration sites. Along the provided grants, the project will establish financial arrangements that will allow using the leasing scheme to delay the debtor payments of 60%, giving an economic shove for a perspective biomass market development in Moldova (GEF, 2005b: 18).

Source: GEF (2005b: 18)
**Box 4: Anticipated benefits of GEF biomass energy project**

Benefits arise from: supply side efficiency through the replacement of old and inefficient coal boilers (less than 50% efficiency) with batch fired straw boilers (80% efficiency); fuel switch cost savings and security of fuel supply, and; demand side benefits from improvements to buildings and heat distribution systems reducing heat losses and energy demand. Estimates of the prime energy costs are US$2.6/GJ for straw (US$ 30 per ton with energy content of 11.74 GJ/t) and US$4.4/GJ for black coal (US$ 100/t with energy content of 22.56 GJ/t). The significantly lower biomass fuel costs offset the higher capital costs of a biomass system, in simple year-payback terms, over 4-5 seasons.

The average size of straw fired boilers within the selected social buildings is about 300 kWh, with an annual consumption of about 3,240 GJ (276 tons of straw bales at US$30 per ton) over a 2,250 hour heating season with a firing efficiency of 75%. In equivalent terms 4,400 GJ of hard black coal at an efficiency of 55% would be necessary to produce the same output. This would cost about US$18,080 (226 tons at US$80 per ton); while the straw bales fuel cost would be US$8,280 per year, an annual difference of US$9,800.

Fuels are supplied to heat public buildings funded by budgetary provisions of local public authorities. The improved technical and financial performance of heating in public buildings will release financial resources used to purchase imported fuel. These savings will provide budget for improving heat service levels (which can be as little as 50% under a coal regime) and for use in other local services funded through local budget resources. The average savings per community (based on a full heat service from a 300 kWh system over 2,250 hours) will accrue from increased boiler efficiency and from fuel switching savings from coal to biomass fuels resulting in estimated overall annual savings of an average of $9,800 per community. In total annual projected savings amount to $ 98,000 in the communities with pilot installations.

*Source: GEF (2005b: 13)*
**Table 15: Incremental costs of GEF bioenergy project**

<table>
<thead>
<tr>
<th>Activities Baseline</th>
<th>Costs</th>
<th>Alternative Costs</th>
<th>Incremental Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of Feasibility Studies</td>
<td>0</td>
<td>$25,000</td>
<td>$25,000</td>
</tr>
<tr>
<td>A. Biomass thermal energy heating units</td>
<td>$745,000</td>
<td>$1,147,500</td>
<td>$402,500</td>
</tr>
<tr>
<td>*Technical documentation and preparatory work</td>
<td>$0</td>
<td>$19,500</td>
<td>$19,500</td>
</tr>
<tr>
<td>*Training/Consultation</td>
<td>$0</td>
<td>$26,000</td>
<td>$26,000</td>
</tr>
<tr>
<td>*Demand-side efficiency support</td>
<td>$700,000</td>
<td>$712,000</td>
<td>$12,000</td>
</tr>
<tr>
<td>*Incremental costs of biomass boiler</td>
<td>$0</td>
<td>$345,000</td>
<td>$345,000</td>
</tr>
<tr>
<td>*O&amp;M of Coal/Biomass Boiler</td>
<td>$45,000</td>
<td>$45,000</td>
<td>$0</td>
</tr>
<tr>
<td>B. Biomass production and fuel cycle support</td>
<td>$909,330</td>
<td>$1,118,686</td>
<td>$209,348</td>
</tr>
<tr>
<td>*Technical documentation and preparatory work</td>
<td>$0</td>
<td>$18,000</td>
<td>$18,000</td>
</tr>
<tr>
<td>*Fuel supply/Storage, handling and distribution of straw</td>
<td>$909,338**</td>
<td>$956,186†</td>
<td>$46,848</td>
</tr>
<tr>
<td>*Establishment of straw biomass fuel supply system (TA and Training)</td>
<td>$0</td>
<td>$144,500</td>
<td>$144,500</td>
</tr>
<tr>
<td>C. Public awareness, outreach and dissemination, information barriers removal</td>
<td>$0</td>
<td>$164,675</td>
<td>$164,675</td>
</tr>
<tr>
<td>D. Project Management, audit, monitoring and evaluation activities</td>
<td>$0</td>
<td>$196,397</td>
<td>$196,397</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>$1,654,338</td>
<td>$2,652,258</td>
<td>$997,920</td>
</tr>
</tbody>
</table>

* The amount of US $909,338 included in the Incremental Cost Matrix shows the expected costs of traditional fuel supply under the Baseline. Up to this amount will be required from beneficiaries to be provided as co-financing in the Project Scenario in the framework of establishment of straw market, towards equipment of collection, storage, and transportation of the biomass. The amount for fuel supply that exceeds what would have been the cost of traditional fuel supply would be provided by the Grant.

** The amount that would have been spent on traditional fuel supply over 10 year period; conservative estimate as Russian energy imports are expected to move towards European Prices (currently considerably less)

† ($689,000 – estimated cost of 10 year straw supply; $219,388 - co-financing for straw storage and transportation facilities; and $46,848 - GEF contribution to storage and transportation. It should also be noted that main project beneficiaries will incur about 30% less costs on straw supply compared to traditional fuels. This is the essential economics of the project’s replication potential. Co-financiers (2KR Program) will provide co-financing for straw storage and transportation for the demonstration purposes, to bring the total co-financing for fuel supply systems component to the amount of the baseline costs.
4.3.4. Village Selection in Moldova

Fieldwork undertaken in Moldova required modification of the original research design. First, time and logistical constraints required that field efforts to investigate the CDM afforestation and rural energy modernization projects overlap. Căușeni and Sîngerei district were selected *a priori* because the CDM afforestation and rural energy modernization projects were active in both. While a total seven villages were involved in the field investigation of performance of the CDM afforestation and rural energy modernization projects, only four were subject to detailed household surveys (Table 16). The villages ranged in size from populations of 1,270 in Cotiujenii-Mici and 5,975 in Chiscareni.

Surveys were undertaken in Săiți and Tocuz in Căușeni district in the south and Chiscareni and Bursuceni of Sîngerei district in the north. Of these, three were involved with the CDM afforestation project (Săiți, Bursuceni and Chiscareni) while Tocuz was a control village. None of the villages where household surveys were undertaken was involved with the CDM rural energy modernization project, though Chiscareni was involved with the GEF biomass pilot project. Three villages were investigated in the context of the CDM rural energy modernization project without formal household surveys but involving village focus groups and discussions with key local stakeholders. In Căușeni district, only one village was involved with the rural energy modernization CDM project (Ursoaie). In the northern Sîngerei district only two rural villages had been involved with the project (Cotiujenii-Mici and Prepelița). They had all adopted natural gas or hybrid coal-gas boilers.

The second issue complicating the original research design was that achieving a balanced quasi-experimental design of villages involved with the CDM projects and control villages proved problematic. Because the afforestation project involved the majority of villages in the country, the identification of control villages was difficult. While a control village was identified in Căușeni district in the south, in the northern Sîngerei district, no village was *not* involved with the CDM afforestation project. As was learned, regular meetings of all mayors in Sîngerei district provided an opportunity to discuss the afforestation project though the decision to adopt
the project was taken by each village government independently. Because only three villages were involved amongst the two districts investigated in the CDM energy project, control villages were generally available.

The third issue complicating research design, was the failure of the bioenergy component of the CDM rural energy modernization project. As indicated above, a GEF bioenergy project was investigated in Chiscareni of Singerei district (GEF, 2005b). For the purpose of this dissertation, the village adjacent (Bursuceni) is used as its control. This is not ideal given that Chiscareni was the most advanced in terms of its economic development, including a small factory maintained by Italian investors. In fact, Chiscareni used to be the district capital until 1956 (M34) which tends to explain the higher level of social services and economic development, but given the logistical constraints it represents a best effort.

106 District Government Officer, Singerei Interview MD2, 12 August 2009.
Table 16: Local-level field effort by data collection type, project type and district

<table>
<thead>
<tr>
<th></th>
<th>Project Village</th>
<th>Control Village</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Căuşeni District (South)</td>
<td>Singerei District (North)</td>
<td>Căuşeni District (South)</td>
</tr>
<tr>
<td><strong>Household Surveys</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• CDM Afforestation</td>
<td>Săiţi</td>
<td>Bursuceni, (Chiscareni(^{\text{II}}))</td>
<td>Tocuz</td>
</tr>
<tr>
<td>• CDM Rural Energy Modernization</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>• Bioenergy Pilot Project</td>
<td>na</td>
<td>Chiscareni(^{\text{II}})</td>
<td>na</td>
</tr>
<tr>
<td><strong>Total for Household Surveys</strong></td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Project Village</th>
<th>Control Village</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Căuşeni District (South)</td>
<td>Singerei District (North)</td>
<td>Căuşeni District (South)</td>
</tr>
<tr>
<td><strong>Key Informant Interviews</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• CDM Afforestation</td>
<td>Săiţi</td>
<td>Bursuceni, (Chiscareni(^{\text{II}}))</td>
<td>Tocuz</td>
</tr>
<tr>
<td>• CDM Rural Energy Modernization</td>
<td>Ursoaie</td>
<td>Cotiujenii-Mici, Prepeliţa</td>
<td>(Bursuceni)(^{\text{II}})</td>
</tr>
<tr>
<td>• Bioenergy Pilot Project</td>
<td>/</td>
<td>Chiscareni(^{\text{II}})</td>
<td>(Bursuceni)(^{\text{II}})</td>
</tr>
<tr>
<td><strong>Total for Interviews</strong></td>
<td>2</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

\(^{\text{II}}\) Chiscareni was a demonstration bioenergy project made possible by the GEF; it was also involved with CDM afforestation

\(^{\text{II}}\) Bursuceni is used as a control for the impact of the rural energy modernization project in Moldova. Despite being involved in reforestation activities, was not involved in the bioenergy project. This is justified because all villages in the Singerei rayon appeared to be involved with the reforestation project.
Figure 27: Map of villages in Singerei district, northern Moldova

Green indicates CDM projects, with Chiscareni hosting bioenergy pilot project as well.

Figure 28: Map of villages in Căuşeni district, southern Moldova

Green indicates CDM projects and red indicates control.
4.4. Conclusion

This chapter has presented a detailed description of the development context of each of the nine carbon finance projects investigated. While likely a dry read, it presents a wealth of information upon which to base the analysis of the sustainable development and additionality assessment undertaken in the following two chapters. It cannot be emphasized enough how the information about the development context presented here contrasts with that available in the official CDM project documents available to regulators. While certainly the description of project development context offered here is not without error, it goes far to resolving the information asymmetries that problematize the governance of the CDM. The reader is encouraged to return to the description of individual project’s offered here when reviewing the results of sustainable development and additionality in the next two chapters.
5. Results: Sustainable Development

This chapter summarizes research findings about the sustainability of all nine projects investigated. It brings research findings together in a systematic manner to facilitate comparisons across countries and tease out causal factors. I conclude that carbon finance projects have met conditions for both strong sustainability and weak sustainability in seven out of eleven cases, with one case where I believe weak sustainability has been achieved though not strong sustainability (Figure 29). In other words, in nearly two-thirds of cases, the CDM effectively contributed to sustainable development. Recall that “cases” either grouped together villages when a project had similar impacts on them or distinguished between villages involved in the same project when the sustainability impact differed. I further distinguish between projects that had “Level 1” and “Level 2” sustainability rankings, in order to distinguish between different grades of projects.

More interesting are cases where the conditions of sustainability were violated. First, one project led to clear violations of conditions for both strong sustainability and weak sustainability: the Uganda CDM afforestation project in the case of Kirungu. Here the Uganda CDM afforestation project delivered few economic benefits to villagers and cut villagers off from agriculture and grazing lands that had a direct effect on their food security. Nonetheless, this CDM project met conditions for both strong sustainability and weak sustainability in the case of RECPA—the community-based organization involved in this project, though with the majority of its members based in another, less isolated village whose lands were not affected by the CDM project.

Second, the Tanzania biofuel project was the sole project that clearly led to a violation of weak sustainability, though its impact on CNC is questionable. Despite significant controversy surrounding the biofuel project in Tanzania in local and international media (Carrington et al., 2011; John, 2010), my findings indicate that the project did not violate food security—at least in the case of Mtamba village—though there are legitimate concerns there about water access. However, the suspension of the project due to financial problems facing British Sun Biofuels represents a significant opportunity cost that led the project to violate conditions of weak sustainability. The impact of this project in terms of strong sustainability is less clear. There are
concerns about the impact of the biofuel plantation on local freshwater supplies, though a responsible investor might remedy this in the future.

Third, in Bursuceni village, which was involved with the CDM afforestation project in Moldova, I found that the project compromised pasturceland to an extent that proved unsustainable in the village. Villagers here were more dependent on grazing than in other villages investigated but also had fewer other economic alternatives to offset the temporary costs of afforesting degraded pastures. Coupled with the very meagre MMC benefits of the project, my findings suggest that the project does not meet conditions of weak sustainability in this case—though the CDM afforestation project was found to be sustainable in the case of the other Moldovan villages investigated. The distinguishing characteristic between these cases and that of Bursuceni was the degree to which villages were open to participation. The negative impacts of the project could have been mitigated through more participatory governance impacts at the village level in Bursuceni. However, more detailed cost-benefit analysis would be necessary to confirm that violation of strong and weak sustainability was indeed the case.

In one case, the Uganda CDM cogeneration project’s impact on the village of Kagogwa, my findings suggest conditions of weak sustainability have been met though not strong sustainability. More precise economic measurement would be necessary to determine if MMC benefits in Kagogwa village outweigh the costs of CNC reductions, particularly household land size, as a result of sugarcane expansion. Here it would be necessary to determine the degree to which land scarcity in Kagogwa is due to sugarcane expansion and to local population pressure. However, given a lack of tension around food prices and land scarcity in Kagogwa, I tentatively conclude here that MMC benefits are greater than these CNC costs so that the project meets conditions of weak sustainability.
Figure 29: Sustainability matrix
Table 17: Evaluation of CDM impact in terms of strong sustainability

<table>
<thead>
<tr>
<th>Country/Project/Case</th>
<th>CNC</th>
<th>Strong Sustainability Evaluation</th>
<th>Biodiversity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local CNC</td>
<td>National CNC</td>
<td>Total Score</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Strong Sustainability – Level 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moldova Bioenergy Pilot - Chiscareni</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Moldova CDM Afforestation – Sâlți &amp; Chiscareni</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Tanzania CDM Cookstove - Cookstove</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><strong>Strong Sustainability – Level 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uganda CDM Afforestation – RECPA</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Uganda Plan Vivo Ref - Bitereko</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tanzania CDM Afforestation – Mapanda &amp; Idete</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Moldova Rural Energy Modernization – Ursoaie &amp; Cotujeni Mici</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Violation of Strong Sustainability</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uganda CDM Cogeneration - Kagogwa</td>
<td>-2*</td>
<td>1</td>
<td>-2</td>
</tr>
<tr>
<td>Moldova CDM Afforestation - Bursuceni</td>
<td>-2**</td>
<td>1</td>
<td>-2</td>
</tr>
<tr>
<td>Uganda CDM Afforestation - Kirungu</td>
<td>-2</td>
<td>1</td>
<td>-2</td>
</tr>
<tr>
<td>Tanzania Biofuel – Mtamba</td>
<td>-2***</td>
<td>0</td>
<td>-2</td>
</tr>
</tbody>
</table>

For scoring of CNC please refer to Figure 30

*Unclear if land scarcity due to CDM project or population growth; **Reduction in pastureland (temporary) but also gains in soil fertility (long-term); ***Potential water scarcity issue engendered by jatropha plantations, though also avoidable.
### Table 18: Evaluation of CDM impact in terms of weak sustainability

<table>
<thead>
<tr>
<th>Country/Project/Case</th>
<th>CNC</th>
<th>MMC</th>
<th>CNC + MMC</th>
<th>Weak Sustainability Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local</td>
<td>National</td>
<td>Local</td>
<td>National</td>
</tr>
<tr>
<td><strong>Weak Sustainability – Level 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moldova Bioenergy Pilot - Chiscareni</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Tanzania CDM Cookstove – Endabash</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Moldova CDM Afforestation – Sâlții &amp; Chiscareni</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Weak Sustainability – Level 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uganda CDM Afforestation – RECPA</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Tanzania CDM Afforestation – Mapanda &amp; Idate</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Uganda Plan Vivo Ref – Biterenko subcounty</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Moldova Rural Energy Modernization – Unsoaie &amp; Cotujeni Mici</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Uganda CDM Cogeneration – Kagogwa</td>
<td>-2*</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><strong>Violation of Weak Sustainability</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moldova CDM Afforestation - Bursuceni</td>
<td>-2**</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tanzania Biofuel - Mtamba</td>
<td>-2***</td>
<td>0</td>
<td>-2†</td>
<td>0</td>
</tr>
<tr>
<td>Uganda CDM Afforestation – Kirungu</td>
<td>-2</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

*For scoring of CNC and MMC, please refer to Figure 30 and Figure 31.
† Ranking Scores: Local MMC: 2 = increase, 0 = remains same; -2 = decrease; National CNC: 1 = increase, 0 = remains same, -1 = decrease.
Ω National MMC: 1 = National MMC Increased; 0 = National MMC Remains Same; -1 = National MMC Decreased.
†† Opportunity cost of lands transferred to failed biofuel project.
*Unclear if land scarcity due to CDM project or population growth; **Reduction in pastureland (temporary) but also gains in soil fertility (long-term);
***Potential water scarcity issue engendered by jatropha plantations, though also avoidable.
**Figure 30: Placement of cases in CNC ranking matrix**

<table>
<thead>
<tr>
<th>LOCAL CRITICAL NATURAL CAPITAL BENEFITS</th>
<th>NATIONAL CRITICAL NATURAL CAPITAL BENEFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased or Need for Local Critical Natural Capital Substitution Reduced (2)</td>
<td>Moldova Bioenergy Pilot (Chiscareni)</td>
</tr>
<tr>
<td>Increased or Need for Critical Natural Capital Substitution Reduced (1)</td>
<td>Moldova CDM Afforestation (Sălțita and Chiscareni)</td>
</tr>
<tr>
<td>Unchanged or No Net Effect on Need for Critical Natural Capital Substitution (0)</td>
<td>Tanzania CDM Cookstove (Endabash)</td>
</tr>
<tr>
<td>Decreased or Need for Critical Natural Capital Substitution Increased (-2)</td>
<td>Uganda CDM Afforestation (RECPA)</td>
</tr>
<tr>
<td>Decreased or Need for Local Critical Natural Capital Substitution Increased (-2)</td>
<td>Uganda CDM Cogeneration (Kagogwa)</td>
</tr>
<tr>
<td></td>
<td>Tanzania Plan Vivo Reforestation (Bitereko)</td>
</tr>
<tr>
<td></td>
<td>Tanzania CDM Afforestation (Mapanda and Idete)</td>
</tr>
<tr>
<td></td>
<td>Moldova CDM Rural Energy Mod (Ursoaie and Cotujeni Mici)</td>
</tr>
<tr>
<td></td>
<td>Tattoo Biofuel (Mtamba)</td>
</tr>
<tr>
<td></td>
<td>Moldova CDM Afforestation (Bursuceni)</td>
</tr>
<tr>
<td></td>
<td>Uganda CDM Afforestation (Kirungu)</td>
</tr>
</tbody>
</table>
**Figure 31: Placement of cases in MMC ranking matrix**

<table>
<thead>
<tr>
<th>LOCAL MAN-MADE CAPITAL BENEFITS</th>
<th>NATIONAL MAN-MADE CAPITAL BENEFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>National Man-Made Capital Increased</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Local Man-Made Capital Increased (2)</td>
<td>Participants &amp; Non-Participants Benefit (or) Broad Community Benefits (1)</td>
</tr>
<tr>
<td></td>
<td>Participants Benefit Only (0)</td>
</tr>
<tr>
<td>Local Man-Made Capital Unchanged (0)</td>
<td></td>
</tr>
<tr>
<td>Local Man-Made Capital Decreased (-2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.1. Strong Sustainability

I evaluated the strong sustainability impact of each CDM project in terms of a project’s total impact on CNC in individual cases. I found conditions of strong sustainability were met in seven of eleven cases investigated (Table 17 and Figure 30). I also identified two groups of strongly sustainable projects. Projects meeting conditions of what I refer to as “Level 1” strong sustainability had relatively high CNC impact. Projects meeting conditions of “Level 2” strong sustainability, had generally neutral effects on CNC. An overview of the different types of CNC costs and benefits—at local and national levels— imparted by each carbon projects is presented in Table 19 and Table 20 below.

There were three cases where carbon projects clearly violated conditions of strong sustainability: the case of the Uganda CDM project’s impact on Kirungu village, the case of Bursuceni involved in the CDM afforestation project in Moldova and the case of the Tanzania biofuel project’s impact on Mtamba village. The clearest negative effects of a CDM project on local CNC was found in the case of Kirungu, where land used for the project clearly came at the expense of villagers’ food security. Nonetheless, this project did contribute to the restoration of timber reserves in Uganda, one element of national CNC. Second, villagers in Bursuceni lost temporary access to pastureland—though recognizing it was highly degraded—in a manner that undermined their short-term CNC, though recognizing that the long-term restoration of soil fertility was in their and Moldova’s national interests. Finally, though land scarcity did not appear to attributed to the Tanzania biofuel project, there were sufficient concerns about its impact on water access for villagers; as this project had failed to be implemented, it had no effect on elements of CNC at the national level. I am less confident about my conclusion in the case of the CDM cogeneration project on Kagogwa village where it was not possible to identify an appropriate control; nonetheless, my final evaluation is that the project. Finally, the CDM cogeneration in Uganda did seem to put upward pressure on agricultural land and food prices as sugarcane production expanded, though my findings are not as robust as in other cases.
### Table 19: Identification of Local CNC losses and benefits

<table>
<thead>
<tr>
<th>Country/Project/Village</th>
<th>Local CNC Benefits</th>
<th>Local CNC Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Improved Soil Fertility</td>
<td>Reduced Reliance on Fossil Fuels</td>
</tr>
<tr>
<td>Tanzania</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation – Mapanda &amp; Idete</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Biofuel – Mtimba</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>CDM Cookstove – Endabash</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Uganda</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation - Kirungu</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>CDM Afforestation – RECPA</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Plan Vivo Reforestation – Bitereko</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>CDM Cogeneration-Kagogwa</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Moldova</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation – Sâlji &amp; Chiscareni</td>
<td>Yes</td>
<td>/</td>
</tr>
<tr>
<td>CDM Afforestation – Bursuceni</td>
<td>Yes</td>
<td>/</td>
</tr>
<tr>
<td>Rural Energy Modernization – Ursoaie &amp; Cotujeni Mici</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Bioenergy Pilot - Chiscareni</td>
<td>/</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Table 20: Identification of National CNC benefits

<table>
<thead>
<tr>
<th>Country/Project/Village</th>
<th>National CNC Benefits</th>
<th>Land Degradation / Improved Soil Fertility</th>
<th>Reduced Reliance on Non-Renewable Biomass</th>
<th>Reduced Reliance on Timber Imports</th>
<th>Reduced Reliance on Fossil Fuel Imports</th>
<th>Reduced Reliance on Sugar Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanzania</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation – Mapanda &amp; Idete</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biofuel – Mtimba</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Cookstove – Endabash</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
<td>/</td>
</tr>
<tr>
<td>Uganda</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation - Kirungu</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation – RECPA</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
<td>/</td>
</tr>
<tr>
<td>Plan Vivo Reforestation – Bitereko</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Cogeneration-Kagogwa</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
<td>/</td>
</tr>
<tr>
<td>Moldova</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation – Sâlji &amp; Chiscareni</td>
<td>Yes</td>
<td>Yes</td>
<td>/</td>
<td></td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation – Bursuceni</td>
<td>Yes</td>
<td>Yes</td>
<td>/</td>
<td></td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>Rural Energy Modernization – Ursoaie &amp; Cotujeni Mici</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Bioenergy Pilot - Chiscareni</td>
<td>/</td>
<td>Yes</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
</tbody>
</table>
5.1.2. **Strong Sustainability – Level 1**

There were four cases where carbon projects had high strong sustainability impact, what I refer to as “Level 1,” with sustainability scores between 2.0 and 3.0. On the one hand, the Moldova CDM afforestation project in Săiţi and Chiscareni and the Moldova bioenergy pilot project (also in Chiscareni) had positive CNC effects at both the local and national levels. On the other hand, the Tanzania CDM cookstove project increased CNC (conserving fuelwood), though its impact was restricted to the local level and subject to considerable uncertainty. I discuss each in more detail below.

**Moldova CDM afforestation project in Săiţi and Chiscareni**

The CDM afforestation project in Moldova in Săiţi and Chiscareni led to improvements in CNC by restoring degraded land—an ecosystem service important at the national as well as local level. As discussed earlier, in Chapter 5, the government had launched a series of initiatives to address land degradation, including the 2003 *Strategy for the Sustainable Development of the Forestry Sector (2003-2020)*, which set a goal of expanding forest cover to 130,000 ha that was largely to be achieved through the 2003 *State Program for Afforestation and Regeneration of the Lands of the Forest Estate for the Period of 2003-2020*. By planting trees, the CDM project thus reduced the need for costly substitutes for soil restoration, such as chemical fertilizers and larger infrastructure projects. And while some areas were planted with native species (oak), the extent of degradation made exotics most suitable and might permit native species to be re-introduced in the future. As the trees become mature, the CDM afforestation project can also be expected to reduce Moldova’s dependency on imports of sawnwood to meet current demand (see FAO, 2011: Table 5)—though recognizing that the size of individual parcels afforested are small and, thus, that the national-level effect will be rather modest.

More important are the project’s CNC impacts at the local level. The project promised to provide a supply of forest products and services, offer opportunities for community-based management of project lands (after canopy closure) and biodiversity conservation (CDM-PDD, 2008d: 3-4; 2010: 4-5). Amongst ecosystem services, the afforestation projects will produce firewood that will result in a significant reduction in the effort for villagers to find energy substitutes. Firewood
scarcity and lack of access to natural gas was an important reason for villages to agree to afforestation. Both Săiţi and Tocuz in the south had access to natural gas, though neither village did in the north. But while use of natural gas was marginally higher than in villages without natural gas access, use of fuelwood, dung and crop residues was still high (Table 21). Indeed, natural gas appeared to be used largely for cooking—even in villages without direct access to natural gas—who instead purchased natural gas tanks and used other fuels for heating.

### Table 21: Frequency of fuel use across four households in Moldova

<table>
<thead>
<tr>
<th>Region</th>
<th>Village</th>
<th>Type Village</th>
<th>Fuelwood</th>
<th>Charcoal</th>
<th>Dung</th>
<th>Crop Residues</th>
<th>Gas Tanks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern</td>
<td>Săiţi</td>
<td>Project</td>
<td>77%</td>
<td>10%</td>
<td>50%</td>
<td>30%</td>
<td>80%</td>
</tr>
<tr>
<td></td>
<td>Tocuz</td>
<td>Control</td>
<td>69%</td>
<td>3%</td>
<td>41%</td>
<td>55%</td>
<td>76%</td>
</tr>
<tr>
<td>Northern</td>
<td>Bursuceni</td>
<td>Project</td>
<td>70%</td>
<td>13%</td>
<td>57%</td>
<td>37%</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>Chiscareni</td>
<td>Project</td>
<td>93%</td>
<td>40%</td>
<td>3%</td>
<td>10%</td>
<td>60%</td>
</tr>
</tbody>
</table>

All villages investigated where afforestation had been undertaken in Moldova were marked by a certain degree of tension surrounding the allocation of lands for afforestation. In Săiţi in the south, Moldsilva’s initial effort in 2002 to plant 58 ha had resulted in a low-level conflict, with villager uprooting seedlings. But in Săiţi and Chiscareni, these tensions were subsequently deflated as the village government began to engage more with village residents. The reasons were the greater transparency of village government decision-making and public participation in the designation of lands for afforestation as well as the scarcity of pastureland due itself to greater non-farm economic opportunities which relaxed dependency on livestock rearing. In Chiscareni, Moldsilva had initially sought to afforest lands close to the village center which had initially led to similar conflict as in Săiţi, but subsequent efforts were successfully made further away.

---


108 Business Manager, Săiţi Village, Interview M1, 1 August 2009; Business Manager, Săiţi Village, Interview M2, 2 August 2009; Villager, Săiţi Village, Interview M11, 27 July 2009.

Initial conflicts over afforestation subsided over time in both these villages. In Chiscareni, the initial resentment to afforestation mollified as villagers were able to graze their cattle under the canopy while collecting firewood,\textsuperscript{110} despite the apparent transgression of the Forest Code. As one respondent explained, “If [villagers] are against afforestation, it’s only for a short period of time.” Similarly in Săiţi, which had earlier seen villagers uproot part of the afforested area, villagers had more recently suggested afforestation of a 4-5 ha tract of degraded pastureland, though further away from the village centre.\textsuperscript{111} The degree of villager participation in designating land for afforestation had much to do with these conflicts. During Moldsilva’s 2002 initial attempt at planting trees in Săiţi, one former village counsellor described the lack of transparency in the following terms:

> [T]he village council had decided which land to give to afforestation. [But] people didn't know. This was the problem. People didn't know where they were going to go afforest. [Moldsilva] afforested as much as they could. When people started protesting, they just left. Maybe [Moldsilva] had an agreement with the mayor or something. But the villagers didn't know.\textsuperscript{112}

While there had been initial resistance to afforestation in Chiscareni, subsequent allocation of land for afforestation was relatively free of disputes. A process had been put in place to improve relations between villagers and the village government including a weekly radio bulletin and two regular village meetings per year.\textsuperscript{113} In addition, consultations were actively sought in specific cases, as the former mayor of Chiscareni explained:

> If it is a question which affects a certain amount of people from the village, then they ask those persons to come. Like if you are looking to afforest land in a particular area. If it is pastureland used by the locals then they hold a local meeting and ask people from this part of the village to come. People from other parts are not invited because it is pastureland used by this one. If it is public land that is not pastureland and it is degraded and people are not using it anyway, they don't ask people. It is just a meeting of the council.\textsuperscript{114}

As a result of this process, the allocation of certain tracts of land for afforestation had been recalled: the Chiscareni village government had annulled one of its afforestation decisions and

\textsuperscript{110} Villager, Chiscareni Village, Interview M71, 19 August 2009.

\textsuperscript{111} Business Manager, Săiţi Village, Interview M1, 1 August 2009; Business Manager, Săiţi Village, Interview M2, 2 August 2009.

\textsuperscript{112} Villager, Săiţi Village, Interview M17, 27 July 2009.


\textsuperscript{114} Villager, Chiscareni Village, Interview M39, 22 August 2009.
moved another after concerns from villagers. But the CDM afforestation project had still been executed in other areas.

The relative scarcity of pastureland and abundance of forest explains village tensions to an important degree. First, with Moldsilva owning 1,084 ha of forest at the perimeter of the village, any of the forest products and related benefits of afforestation might not have significant allure. Afforestation taking place in Chiscareni amounted to only 2% of village lands. Livestock levels in Chiscareni had decreased since 1990, following general trends in Moldova (UNDP, 2010c: 79).

However, Săiți’s control village, Tocuz, had declined the afforestation project on the grounds that relatively significant tracts of village lands were already forested (10%) while also pointing to an additional 700 ha of forest located in a neighbouring village. The mayor also explained that the project had been refused because there was not enough pastureland in the village. In Tocuz, there was at least the same amount of cattle as during the Soviet period, which may again explain why the village had refused the afforestation project. With few forest resources in the immediate proximity of Săiți, it appears that there was a greater incentive for afforestation in Săiți. Livestock levels in Săiți had also seen important declines since 1990. Finally, the acceptance of afforestation in Săiți and Chiscareni is also related to their relatively more prosperous local economies which relieved pressure on land. Săiți was home to a small winery which was currently employing 30 people in the village, though down from 45 during the Soviet period. But the winery’s prospects were poor given Russia’s 2006 embargo and

---

115 Village Government Officer, Chiscareni Village, Interview M34, 18 August 2009.
116 Village Government Officer, Chiscareni Village, Interview M34, 18 August 2009.
117 Village Government Officer, Tocuz Village, Interview M3, 4 August 2009.
118 Village Government Officer, Tocuz Village, Interview M3, 4 August 2009.
119 Village Government Officer, Tocuz Village, Interview M3, 4 August 2009.
120 Business Manager, Săiți Village, Interview M1, 1 August 2009; Villager, Săiți Village, Interview M14, 27 July 2009; Villager, Săiți Village, Interview M17, 27 July 2009.
121 Village Government Officer, Tocuz Village, Interview M3, 4 August 2009.
122 Business Manager, Săiți Village, Interview M7, 30 July 2009.
difficulties meeting EU regulations.\textsuperscript{123} Chiscareni was a former district capital (until 1956) and had more socioeconomic infrastructure including an Italian clothes factory employing approximately 100 people and a winery.\textsuperscript{124}

There could be significant future problems in Săiţi and Chiscareni village, and undoubtedly in Bursuceni, discussed below, if the international CDM authorities follow through with enforcement of the official CDM methodology. Grazing rights on forest lands were included in the original version of the CDM project as recently as 2007: “Grazing in the newly established forests is possible after the canopy closure, which is expected to occur 15 years after the planting” (CDM-PDD, 2007c: 85). However during third-party validation of the project in 2008, the validators objected, observing that grazing rights did not conform with the CDM approved methodology which does not permit any grazing (SGS, 2008: Annex 3, CAR2). Nor is it consistent with the Forest Code, which prohibits grazing on forest lands (Article 38). The Moldsilva agent responsible for developing the project resolved the issue by simply removing the provision for resumed grazing in the afforested areas from the final version of the CDM project document (CDM-PDD, 2008d: 101-102; SGS, 2008: Annex 3, CAR2), well after the project’s implementation. There are no grazing rights on afforested areas under the current design of the project. Yet it was precisely the prospect of being able to graze their cattle under the canopy after the 10 year management contract with Moldsilva had expired that had led many villagers to agree to the CDM afforestation project.

\textit{Moldova bioenergy pilot project in Chiscareni}

The bioenergy pilot project in Moldova significantly reduced the village of Chiscareni’s coal consumption in favour of a local, renewable biomass energy resource and also disincentivized the expansion of natural gas—allowing the village to become more self-reliant in terms of energy production. As the mayor of Chiscareni explained, biomass was (i) cheaper, (ii) produced local economic benefits and (iii) had ecological benefits in that it was reducing emissions but also

\textsuperscript{123} Business Manager, Săiţi Village, Interview M7, 30 July 2009.

\textsuperscript{124} Village Government Officer, Chiscareni Village, Interview M34, 18 August 2009.
leading to better management of wheat residue that was typically burned in the field.\textsuperscript{125} The energy independence afforded by biomass was however appreciated during the 2009 gas crisis.\textsuperscript{126} These views were supported by a number of households interviewed.\textsuperscript{127}

The pilot project’s performance also allayed concerns about biomass supply, which was a major preoccupation of officials in villages which had declined the biomass energy component of the CDM rural energy modernization project. Yet I found the local Agricultural Leader in Chiscareni—a former head of the collective farm in the village—capable of coordinating the harvest of sufficient residues despite a fragmented agricultural base. Privatization of collective farms in Moldova resulted in the allocation of lands in a manner such that individual household received non-contiguous scattered plots (IMF, 1999: 71). Local land markets, which had been expected to consolidate some of the land holdings, have failed to materialize because villagers have lacked cash or other means (Kutuzov and Haskins, 2003: 12).\textsuperscript{128}

In contrast to concerns about biomass supply voiced in villages which had declined biomass boilers as part of the SIF2/CDM project, almost all respondents in Chiscareni found there to be adequate supply.\textsuperscript{129} The school consumed approximately 270 tonnes of biomass each winter, or 18,000 bales.\textsuperscript{130} The mayor explained that 100 ha was enough land for producing the biomass necessary for the school if the harvest was good. One of the local Agricultural Leaders managed

\begin{itemize}
\item \textsuperscript{125} Village Government Officer, Chiscareni Village, Interview M34, 18 August 2009.
\item \textsuperscript{126} Village Government Officer, Chiscareni Village, Interview M34, 18 August 2009.
\item \textsuperscript{127} Villager, Chiscareni Village, Interview M61, 19 August 2009; Villager, Chiscareni Village, Interview M71, 19 August 2009.
\item \textsuperscript{128} There continues to be debate about what farm size is optimal in terms of economic productivity. Recent data from Moldova demonstrate that small farms under 50 ha are more productive than large ones—many of the economies of scale assumed for large farms do not obtain because labour productivity does not rise with the size of land under cultivation (Lerman and Sutton, 2008: 117). Swinnen et al. have argued that “Corporate farms are using more land (than is efficient) and act as a brake on agricultural growth and competitiveness. Corporate farms pay lower rental prices than family farms, are more likely to pay rents in kind than family farms (which pay cash), have rental contracts of longer duration (locking in land), and often use their political powers/relationships to influence policies that shift effective land property rights in their favour (Swinnen et al. 2006: iii-iv). However, corporate farms may realize comparative advantage in the marketing and sale of agricultural production (Wittmaack, 2006).
\item \textsuperscript{129} Villagers, Chiscareni Village, Interviews M61, M62, M63, M65, M66, M71, AND M72, 19 August 2009.
\item \textsuperscript{130} Village Government Officer, Chiscareni Village, Interview M34, 18 August 2009. Each bale weighed approximately 15 kg.
\end{itemize}
400 ha of land (including 120 ha of wheat), most sourced from Chiscareni residents. He claimed productivity of approximately 4.5 tonnes per ha, meaning that 60-90 ha was sufficient to supply the school. There were however important logistical challenges to the use of bioenergy in Chiscareni. Storage was the most important. In Chiscareni, biomass was kept in a warehouse a good distance away from the village centre. But it had once been the victim of arson and the village was anxious to construct a new storage facility.

Renewable bioenergy represents an element of national CNC in Moldova. While the 2004 Economic Growth and Poverty Reduction Strategy Paper committed to “raising the share of non-traditional sources of energy (such as solar, wind, biogas)” (GoM, 2004: 79), there were few other details. A more comprehensive strategy to renewable energy was only launched in 2007 through a 2007 Energy Strategy to the Year 2020 (Government of Moldova, 2007) and formalized with the passage of the 2007 Law on Renewable Energy. However, the CDM rural energy modernization projects investigated were launched as early as 2005.

**Tanzania CDM cookstove project in Endabash**

Results demonstrate that the CDM cookstove project in Tanzania provided significant benefits to participants by reducing their consumption of firewood. Reductions in fuelwood consumption due to use of the cookstoves were significant. An initial field survey undertaken by KDA found that average daily household firewood consumption was 13 kg/day amongst households using a traditional three-stone hearth and only 4 kg/day amongst those using the KDA stove—an almost 70% reduction in fuelwood consumption (KDA, 2009). These results were largely verified during 2009 fieldwork which estimated that households in the control village of Bassodawish consumed an average of 11.8 kg/day while in Endabash it was found to be 6.6 kg/day (Table 22). Without the improved cookstoves, fuelwood consumption would have been higher in Endabash.

---

131 *Business Manager, Chiscareni Village, Interview M35, 18 August 2009.*

132 *Village Government Officer, Chiscareni Village, Interview M34, 18 August 2009.* Each bale weighed approximately 15 kg.

133 Note that this is based on survey questions regarding weekly fuel consumption. For conversion, headloads were assumed to be 24 kg and sacks of charcoal 35 kg, as reported in KDA (2009). But Endabash’s average of 6.6 kg/day
Table 22: Fuel consumption and associated costs in Endabash and Bassodawish

<table>
<thead>
<tr>
<th>Village</th>
<th>Households</th>
<th>Firewood (N) (kg/day)</th>
<th>Charcoal (kg/day)</th>
<th>Crop Residues (kg/day)</th>
<th>Kerosene (litre/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endabash</td>
<td>22</td>
<td>6.6</td>
<td>0.1</td>
<td>/</td>
<td>0.1</td>
</tr>
<tr>
<td>-Improved stove</td>
<td>13 (9*)</td>
<td>5.1 (4.0*)</td>
<td>/</td>
<td>/</td>
<td>0.2</td>
</tr>
<tr>
<td>-3-stone hearth</td>
<td>8 (23*)</td>
<td>7.7 (13.0*)</td>
<td>/</td>
<td>/</td>
<td>0.1</td>
</tr>
<tr>
<td>-Charcoal</td>
<td>1</td>
<td>13.7</td>
<td>2.5</td>
<td>/</td>
<td>0.1</td>
</tr>
<tr>
<td>Bassodawish</td>
<td>25</td>
<td>11.8</td>
<td>1.1</td>
<td>1.4</td>
<td>0.2</td>
</tr>
<tr>
<td>-Improved stove</td>
<td>8</td>
<td>13.6</td>
<td>/</td>
<td>1.6</td>
<td>0.1</td>
</tr>
<tr>
<td>-3-stone hearth</td>
<td>4</td>
<td>2.6</td>
<td>6.6</td>
<td>/</td>
<td>0.3</td>
</tr>
<tr>
<td>-Charcoal</td>
<td>21</td>
<td>17.7</td>
<td>179</td>
<td>13.9</td>
<td>1216</td>
</tr>
</tbody>
</table>

*Indicates field results reported by KDA (2009)

As a result, women interviewed claimed that they were exposed to less smoke and the period of time a single headload of firewood would last was extended. Firewood was collected less frequently. For example, the improved stoves reduced the frequency of firewood collection from once every two days to once every eight days. Such a reduction could generate further economic efficiencies by making the purchase of fuelwood affordable and obviating the need for collecting it. Cookstoves could also save considerable amounts of time: some respondents traveled as far as 16 km to fetch fuelwood. Significantly the incentives from the CDM cookstove played a part in dissuading villagers from adopting charcoal stoves, which is usually the next stage in the “energy ladder” when households move away from basic firewood hearths represents households using improved cookstoves, traditional 3-stone hearths and charcoal. However, while the data are less robust due to the smaller sample size, a significant difference is maintained within Endabash data themselves: improved cookstove users consumed less than those using 3-stone hearths, 5.1 and 7.7 kg/day, respectively.

Given that the KDA sample size for traditional stove users was more robust (n=23) and involved direct measurement of fuelwood consumption, a 13 kg/day consumption rate for traditional 3-stone hearths in Endabash appears appropriate. This is important because it demonstrates that without the cookstove project, fuelwood consumption in Endabash and the control villages of Bassodawish was at comparable levels.

134 Given that the KDA sample size for traditional stove users was more robust (n=23) and involved direct measurement of fuelwood consumption, a 13 kg/day consumption rate for traditional 3-stone hearths in Endabash appears appropriate. This is important because it demonstrates that without the cookstove project, fuelwood consumption in Endabash and the control villages of Bassodawish was at comparable levels.

135 Villager, Endabash Village, Interview T40, 6 April 2009; Villager, Endabash Village, Interview T42, 8 April 2009; NGO Officer, Karatu Town, Interview TD3, 4 April 2009; Village Government Focus Group (T43), Bassodawish Village, 17 August 2009.

136 NGO Officer, Karatu Town, Interview TD3, 4 April 2009.

137 Villager, Endabash Village, Interview T40, 6 April 2009.

138 Villager, Endabash Village, Interview T40, 6 April 2009.
(Kammen and Lew, 2005: 3). Of the households surveyed in 2009, nearly 60% already had stoves and approximately 20% said they were seeking to obtain one. Villagers in Endabash were actually demanding more stoves than the single workshop was able to provide.\textsuperscript{139}

While conserving firewood constituted an element of CNC at the level, it was not a national priority in Tanzania and thus does not constitute an element of national CNC as I have defined it. Rather the government has favoured modern energy practices. While various national energy policies have recognized the importance of arresting fuelwood depletion, it will be recalled from Chapter 5 that the government has dedicated most resources to the expansion of electricity and fossil fuels. Current support for improved cookstoves comes mainly from donors and the NGO community. Thus, while highly meaningful at the local level, I conclude that the project did not affect national CNC in a significant way.

There is concern however that reductions in fuelwood achieved through the CDM cookstove project at the household level are not reflected at the landscape level. While reducing emissions at the household level, the cookstove project may have left more fuelwood available for consumption outside the project’s immediate purview—a phenomenon known as Jevons’ paradox. Jevons’ paradox admonishes that increased technological efficiency in the use of energy does not necessarily lead to reduced energy consumption. Instead, increased energy efficiency often results in reduced costs which actually increases consumption (Alcott, 2005; Jaccard and Bataille, 2005; Polimeni et al., 2008; Zein-Elabdin, 1997). As one village respondent indicated, “There are many ways that people use firewood for other things than cooking. So the over-consumption is continuing. Nothing has changed.”\textsuperscript{140} Most important was fuelwood consumed in the production of bricks for expansion of the town centre. Notably there was no joint forest management arrangement between the village and the adjacent forest reserve. If the project developer were able to improve monitoring of the forests from where fuelwood was sourced, concerns about Jevons’ paradox at the landscape level might be alleviated. Nonetheless, while the ultimate impact of the project at the landscape level is questionable, it is likely that the

\textsuperscript{139} Village Government Focus Group (T43), Bassodawish Village, 17 August 2009; Village Government Focus Group (T7), Endabash Village, 9 April 2009.

\textsuperscript{140} Villager, Endabash Village, Interview T41, 7 April 2009.
project would have reduced consumption of fuelwood in the area surrounding Endabash though not necessarily at the levels claimed in the project document.

The main problem with the Tanzania CDM cookstove project was that it was suspended in 2010, subsequent to fieldwork. The foreign technical advisor had withdrawn and UNDP carbon finance brokerage services had thus come to a close. The suspension of the project as a result of the loss of international financial support speaks strongly in support of the additionality of the project, but also of the vulnerability of over-reliance on carbon finance. I discuss these issues in more detail in the section on additionality.

5.1.3. **Strong Sustainability – Level 2**

In four cases carbon finance projects contributed to strong sustainability, but in a rather modest way with sustainability scores of between 0.0 and 1.0. These include the case of the community-based organization known as RECPA which was involved with the CDM afforestation project in Uganda, the case of both villages involved with the CDM afforestation projects in Tanzania, the case of the Plan Vivo reforestation project in Uganda and, finally, the case of the two villages investigated in the context of the CDM rural energy modernization project in Moldova.

**Uganda CDM afforestation project impact on RECPA**

For the majority of RECPA’s membership, the CDM afforestation project in Uganda did not significantly affect local CNC in either a positive or negative way and had a relatively benign effect on biodiversity compared to other large-scale afforestation efforts investigated. For villages outside the central forest reserve, such as Rwoho village which hosted the community-based organization known as RECPA, the project did not affect food security through loss of agricultural or grazing land. Though the project has clearly compromised the grasslands that have been dominant in the forest reserve’s designated plantation sites, approximately twenty percent of the area will be planted with indigenous *Maesopis* (CDM-PDD, 2006d: 5). In terms of water quality, the National Forestry Authority has argued that the tree roots penetrate the soil and make it more porous for the absorption of rainwater (CDM-PDD, 2006d: 26).
Forests and timber products are elements of national CNC in Uganda. Uganda’s current timber demand is met by timber plantations planted in the 1960s and 1970s which have almost all been exhausted (SPGS, 2007: 11). It has been estimated that at least 120,000 ha of plantation forest will be needed by 2020 (SPGS, 2011: 4), though only 52,000 ha of timber plantations have been planted in Uganda since 2004.\textsuperscript{141} Forest cover is down to 3.6 million ha or 17.6\% of the national territory, largely due to the conversion of 1.2 million ha of woodlands into croplands (FAO, 2011; Nakakaawa et al., 2011: 35). The Permanent Forest Estate retains 1.5 million ha of forest that is to be maintained in perpetuity and degazetting any part requires compensation through the establishment of a forest reserve elsewhere (MWLE, 2001: 2).\textsuperscript{142} In response to these scarcities, the government prioritized private and community forestry in the 2005 \textit{Poverty Eradication Action Plan} and also advocated for linkages with the CDM (MoFPED, 2005: 77-78). More recently, and subsequent to the CDM projects investigated, Uganda’s 2010 \textit{National Development Plan} (NDP) commits to restoring Uganda’s forest cover to 1990 levels, 4.9 million ha or 24\% of the national territory, by 2015 (MoFPED, 2010: 95-96).

\textbf{Tanzania CDM afforestation project in Mapanda and Idete}

The CDM afforestation projects in Tanzania had little effect, positive or negative, on local CNC of the villages of Mapanda and Idete. While noting the problems with response rates in Mapanda on food security questions during field surveys, I conclude that the food security situation was similar between it and its control village of Luhunga. The main reason is that the planting sites for the CDM afforestation project were unused village lands at considerable distance from the village. In the case of the afforestation projects, the lands acquired were not productive agricultural lands but mainly hilly \textit{Hyparrhenia} grassland with a few scattered trees and shrubs (CDM-PDD, 2007a: 13-14; 2008f: 8-9).\textsuperscript{143} Villagers interviewed supported this view. For

\begin{itemize}
  \item \textsuperscript{141} Based on numbers presented in Kawooya (2011) & Tugumisirize (2011) and assuming that 80\% of SPGS planting has taken place in CFRs, which was the case as recently as 2010 (Jacovelli, 2009: 121).
  \item \textsuperscript{142} Sections 10-11 of the 2003 \textit{National Forestry and Tree Planting Act} maintain that a number of public consultations be held, an EIA undertaken and an area at least equivalent in size to be declared a forest reserve to replaced that which has been degazetted (Mwebaza & Kaggwa, 2007: 10).
  \item \textsuperscript{143} \textit{Hyparrhenia} grasses are successful under conditions of low soil nutrient availability and are often associated with abandoned fields (Fynn et al., 2005). \textit{Hyparrhenia} grasslands are also characterized by the regular occurrence of fire without which grasslands tend to become taken over by trees (Garnier and Dajoz, 2001).
\end{itemize}
example, one elder in Mapanda stated: “People were living there before but when the company came here, no people were living there. No one was displaced.” He continued: “[GRL] said that they would be helping the village, especially social services, if they could be given that land that was bare land. No one was living there.”

It would be noted that, in early 2009 tree-planting activities were taking place at least 15 km from the villages. At the same time, grazing did not appear to be an important livelihood strategy in any of the afforestation project villages (Table 51). Livestock levels were low in Mapanda and its control village of Luhunga. While livestock levels were relatively higher in Idete, they were significantly less than in the control village of Ipilimo.

There are however legitimate concerns about timber plantations compromising ecosystem services: large-scale afforestation can lead to important reductions in streamflow and water runoff, especially when trees are planted on grasslands (Silveira and Alonso, 2009). Pine consumes significant quantities of water, though less than *Eucalyptus* which is particularly water-demanding (Munishi, 2007; Scott and Lesch, 1997; Van Lill et al., 1980). However, there were no reported issues surrounding streamflow and access to water in any of the afforestation projects villages investigated. Notably, the afforestation projects have implemented a monitoring programme for water balance and water yield in the project areas (CDM-PDD, 2007a: 81; 2008f: 65).

The largely monoculture afforestation projects clearly compromised biodiversity. Although some of the original grassland ecosystem is protected along with riverine areas (CDM-PDD, 2007a: 76-78; 2008f: 62-64), the CDM afforestation projects in Tanzania have planted the majority of the project area with exotic pine (and some *Eucalyptus*). However, the use of exotic tree species is not confined to forest plantations promoted by foreign investors in Tanzania. The government owned Sao Hill Plantation in Mufindi district also comprised exotic tree species while villagers were found to favour pine on their household lands (Table 49, Appendix 3). The reason for this was clear: the price of pine timber made it competitive with maize (Table 23). In other words,

---

144 Villager, Mapanda Village, Interview T20, 5 March 2009.
145 Villager, Mapanda Village, Interview T20, 5 March 2009.
the use of exotics is not precipitated by the international carbon market *per se* as some literature suggests (Karumbidza and Menne, 2009; Kosoy and Corbera, 2010).

Table 23: Comparative economic value of 1 hectare of pine plantation and maize after 6, 10 or 15 Years in Luhunga and Mapanda

<table>
<thead>
<tr>
<th></th>
<th>Pine Plantation Value* (Million Tsh/ha)</th>
<th>Maize Value*</th>
<th>Average Maize Productivity (Million Tsh/ha)</th>
<th>High Maize Productivity (Million Tsh/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LUHUNGA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Year Value (million Tsh)</td>
<td>3.71</td>
<td>1.64</td>
<td>1.89</td>
<td></td>
</tr>
<tr>
<td>10 Year Value (million Tsh)</td>
<td>4.94</td>
<td>2.74</td>
<td>3.15</td>
<td></td>
</tr>
<tr>
<td>15 Year Value (million Tsh)</td>
<td>6.75</td>
<td>4.11</td>
<td>4.73</td>
<td></td>
</tr>
<tr>
<td><strong>MAPANDA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Year Value (million Tsh)</td>
<td>2.47 – 7.41</td>
<td>2.47</td>
<td>2.68</td>
<td></td>
</tr>
</tbody>
</table>

* The value of 1 hectare of pine as reported from three household surveys (n = 3) each in Luhunga and Mapanda where the respondent had already harvested trees and knew the price. Most people in Luhunga and Mapanda had only started tree planting in recent years, which explains the low n. 

a Average maize productivity in Luhunga and Mapanda being 913 and 823 kg/ha, respectively. High maize productivity 1050 and 892 kg/ha, respectively. Maize value assessed at price of 6,000 Tsh per 20 kg maize.

While the projects did lead to significant timber resources, my review of Tanzanian forest policy suggests that forestry is not viewed as national CNC. It is estimated that in 1990, Tanzania had 34.7 million ha of forests, a number reduced to 33.4 million ha by 2010 (FAO, 2011: 110; MNRT, 1998: 8). But the vast majority of Tanzania’s forest area, more than 90%, is relatively unproductive miombo woodlands. Approximately 135,000 ha of Tanzania’s forests are used in the industrial production of timber and paper (World Bank, 2003b: 3). Considering growth at GRL operations, one of Tanzania’s leading private forestry outfits, current industrial plantations are estimated at nearly 85,000 ha—more than double Uganda’s.146 The forest sector is currently not one of the “lead” sectors identified for public investment under the 2005 National Strategy for Growth and Reduction of Poverty (GoT, 2005: Annex 1, page 3). Timber processing and mills are more important for the forest sector than actual tree-planting given current timber stands.

---

146 As of 2008, GRL managed about 38,000 ha across the country, including approximately 24,000 ha amongst the two CDM projects investigated (GRAS, 2009: 13-14).
**Uganda Plan Vivo reforestation project in Bitereko Subcounty**

The Plan Vivo project in Uganda effectively incentivized smallholders to plant indigenous tree species such as *Maesopis* on their household lands and consequently increased biodiversity. However, the local CNC benefits apart from biodiversity are modest. Respondents mentioned non-monetary benefits such as fuelwood (often obtained by pruning branches), control of erosion and shade. Grazing was permitted underneath the canopy and a number of respondents also cultivated crops there such as coffee, cassava and even sugarcane.\(^{147}\) The planting of indigenous species is arguably another sustainable development impact of the project. Ironically, the planting of indigenous species contributed to smallholders’ concerns about tenure security because such species are mostly planted in protected areas which implied that Plan Vivo trees indicated government land.\(^{148}\) However, because *Maesopis* is vulnerable to termites, its use is largely restricted to internal use, such as in furniture.

Because of its reliance on low-utility *Maesopis* and the rather small-scale nature of the project, I conclude that the Plan Vivo project does not lend itself to industrial forestry and the significant timber shortages facing Uganda; smallholders in Bitereko sub-county relied more on *Eucalyptus* for fuelwood than *Maesopis*. Households participating in the Plan Vivo project had also already planted significant amounts of *Eucalyptus*, an exotic species—not permitted under Plan Vivo. Results from field surveys indicated that, on average, households involved in the Plan Vivo project had already 0.50 ha of *Eucalyptus* in addition to 0.94 ha of Plan Vivo tree species. In its literature, EcoTrust suggests that *Eucalyptus* is planted because of a lack of technical services for indigenous tree species (Plan Vivo-PDD, 2009). But the local coordinator explained that land tenure concerns regarding the planting of indigenous species, discussed above, did not extend to *Eucalyptus*.\(^{149}\) There had also been a history of the Bitereko Women’s Group promoting *Eucalyptus* as part of renewable energy projects in the sub-county. Plan Vivo also argues that the use of indigenous species minimizes the risk of natural disturbances and pest outbreaks (Plan Vivo-PDD, 2009).

---


\(^{148}\) NGO Officer, Bitereko Subcounty, Interview UD13, 26 May 2009.

\(^{149}\) NGO Officer, Bitereko Subcounty, Interview UD13, 26 May 2009.
Vivo-PDD, 2009). But as has been discussed earlier, biodiversity does not necessarily count as CNC and is therefore not scored in my CNC matrix. Consequently, I conclude that there is little CNC impact at the national level.

**Moldova CDM rural energy modernization project in Ursoaie and Cotujeni-Mici**

The CDM rural energy modernization project in Moldova is also of “Level 2” strong sustainability. Despite the project’s official title, “*Moldova Biomass Heating in Rural Communities Project*”, villagers elected to revamp their coal-heated schools with natural gas boilers rather than bioenergy ones. The failure of the bioenergy component of the project in Moldova means that the project has largely resulted in fuel switching from coal to natural gas. While natural gas generates fewer emissions than coal, its importation violates strong sustainability principles: replacing one imported fossil fuel with another (albeit cleaner) does not meet the definition of strong sustainability used here. However, if natural gas were found to replace non-renewable sources of biomass, such as illegal fuelwood harvesting, it may have reduced some pressure on local resources. Approximately 360-380 thousand m$^3$ of wood is extracted annually from Moldova’s forests, nearly 80% of which is used as firewood for domestic heating (ICAS cited in UNDP, 2010c: 71). Amongst the villagers investigated though local governments relied on coal for heating public buildings rather than fuelwood.

One important reason why the bioenergy component was not adopted were concerns about biomass supply. Despite the assertion in the CDM project documents that “there is an enormous potential of straw, which is burned in the fields” (CDM-PDD, 2005a: 17; 2005b: 17), officials in all three CDM project villages were concerned about the security of biomass supply. In Prepeliţa, the school officials were concerned there was insufficient land available while the local Agricultural Leaders might not be willing to sell biomass. There were rumours that in

---

150 My conclusion that the Plan Vivo reforestation project delivers only modest strong sustainability may strike many proponents of the project (such as the Prince of Wales) as incorrect. It really points to the need to better understand the contribution of biodiversity to CNC and thus strong sustainability.

151 Village Focus Group, Prepeliţa Village, Interview M33, 17 August 2009; Village Government Officer, Ursoaie Village, Interview M28, 24 July 2009; Village Government Officer, Cotujenii-Mici Village, Interview M32, 17 August 2009

152 Village Focus Group, Prepeliţa Village, Interview M33, 17 August 2009.
nearby Chiscareni, where the bioenergy pilot project had been initiated, it had been necessary to source biomass from outside the village when the Agricultural Leader raised prices. In Ursoaie, it was explained that the agricultural base was too fragmented to cultivate sufficient quantities of biomass.

But concerns about biomass supply are only part of the story. There was also an association of biomass with outdated modes of household energy provision, which led village government officials in Prepeliţa to prefer natural gas. In Ursoaie in Căuşeni district, the village had already been connected to the district natural gas pipeline. They were consequently not interested in bioenergy. As the school superintendent in Ursoaie explained, bioenergy was only being considered in villages that lacked gas. Throughout the villages investigated, there was a notion that natural gas was a modern energy service, something bioenergy did not represent. Yet one school superintendent in Prepeliţa appreciated the potential benefits of biomass, particularly given the 2009 natural gas crisis which had forced the school to close for three days in January. If the school had had a hybrid natural gas-biomass boiler, they could have switched very easily to biomass and avoided interruptions due to the Russia-Ukraine gas conflict.

Another reason to favor natural gas boilers over biomass ones was that they would demonstrate demand for natural gas and provide reason to the central government to extend pipelines into the village. Under the 2002 National Program for Gasification and the 2005 National Program “Moldovan Village”, the central government set itself the goal of providing natural gas to all villages in the country (Government of Moldova, 2007: 39). However, the existence of this

---

153 Village Focus Group, Prepeliţa Village, Interview M33, 17 August 2009.
155 Village Government Officer, Prepeliţa Village, Interview M74, 17 August 2009.
157 The school superintendent stated “[I know] about two schools that use biomass heaters. One in Taraclia, and one in Stefan-Voda. Why did they use biomass instead of gas? Because in those regions, they don't have gas pipelines. But in Căuşeni, which is 5 km from here, there is gas for 30 years. This is the reason why we used gas - because it's cheaper and the technology is here for a long time. We don't have to pay to bring it here” (Village Government Officer, Ursoaie Village, Interview M28, 24 July 2009).
159 Village Government Officer, Ursoaie Village, Interview M28, 24 July 2009.
program did not automatically result in the central government paying for pipeline extensions to all villages—villagers had to first demonstrate demand. For example, in Cotiujenii-Mici, to qualify for the program, villages needed to demonstrate that at least fifty percent of households would purchase natural gas. But as of 2009, only forty-two percent of households in the village had committed to gas. Given problems with demonstrating villagers’ ability to pay, the village government had decided to use CDM project funds to purchase hybrid coal-gas boiler for the school. A similar story was heard in nearby Prepelița village.

Such views were supported by findings from Chiscareni, which hosted the bioenergy pilot project. Chiscareni was not connected to the natural gas network, though a pipeline was at the border of the village. Despite favourable views of the bioenergy pilot project in Chiscareni and dispelling of concerns about biomass supply, discussed above, most Chiscareni villagers surveyed would still have preferred natural gas. For some, natural gas was held to be more efficient. Others noted that there were problems generating enough heat from the biomass boiler to heat the school entirely. Others thought of the additional benefits that natural gas would bring to the village. As in Cotujeni-Mici, once a pipeline was brought into the village for heating the school, individual houses could be more easily connected. But some Chiscareni residents simply saw the biomass boilers as less representative of modernization than natural gas. As one respondent explained, “Chiscareni is quite developed and should have gas.” If natural gas had been available, the mayor explained that it would have been preferred if natural gas and

---

160 In addition, villagers had to sign a contract with Moldovagaz and also pay an upfront fee of 2,970 MDL to trace a pipeline to their home and purchase a natural gas furnace (Village Government Officer (M32), Cotiujenii-Mici Village, Interview, 17 August 2009).

161 Village Focus Group, Prepelița Village, Interview M33, 17 August 2009.

162 Village Government Officer, Chiscareni Village, Interview M34, 18 August 2009.

163 Villagers, Chiscareni Village, Interviews M57, M59, M60, M63, M64, M65, M66, M67, M68, M69, 19 August 2009.

164 Villagers, Chiscareni Village, Interviews M68 & M69, 19 August 2009.

165 A smaller schoolroom was connected to the first by an exterior pipeline, which resulted in significant heat loss.

166 Villagers, Chiscareni Village, Interviews M63 & M72, 19 August 2009.

167 Villager, Chiscareni Village, Interview M65, 19 August 2009.
biomass energy were found to have similar costs. But she also maintained that if biomass energy were less expensive it would have been selected. If the village had had budgetary autonomy, it would have preferred a hybrid gas-biomass boiler.

However, natural gas and bioenergy do not play on a level playing field, where the price of bioenergy could compete equally with natural gas. In its 2004 Economic Growth and Poverty Reduction Strategy Paper, the Government of Moldova has emphasized a need to expand its natural gas network (GoM, 2004: 78). Development of the natural gas sector in the Republic of Moldova falls under the 2002 National Program for Gasification and the 2005 National Program “Moldovan Village”, an initial attempt at reform Moldova’s regional development policy (Government of Moldova, 2007: 39). As a result of these initiatives, villages with access to gas have risen from 22 localities in 2000 to 725 in 2006 (Ibid.). If the policy field had been more level, villages might have been more interested in the biomass energy projects. The “modern” appeals of natural gas might disappear if villages were required to make energy decisions independently.

5.1.4. Violation of Strong Sustainability

I observed four cases where CDM projects affected strong sustainability in a negative manner: the case of the Uganda CDM bagasse cogeneration project in Kagogwa village, the case of the Uganda CDM afforestation project in Kirungu village, the case of Bursuceni village involved in the CDM afforestation project in Moldova as well as the case of Mtamba involved in the Tanzania biofuel project.

---

168 Village Government Officer, Chiscareni Village, Interview M34, 18 August 2009.
169 Village Government Officer, Chiscareni Village, Interview M34, 18 August 2009.
170 As one donor argued: “If [Village councils] were a little more independent in making financial decisions and being in charge of their finances, they would probably be less concerned with modernity and more concerned with efficiency and getting bang for their buck. If a local mayor had to sort of, draft his own budget and really again not rely so much on what is given to him from above, really trying and go for a little exercise of budgeting and setting priorities, whatnot and have some flexibility and independence to do so, they would really be a little more inclined to explore these efficiency and economic gains (Multilateral Donor Agency Officer, Chisinau, Interview MN4, 26 August 2009).”
**Uganda CDM cogeneration project in Kagogwa**

It is likely that the expansion of sugarcane production in the context of the CDM bagasse cogeneration project in Uganda was linked to food insecurity and land scarcity in the case of Kagogwa village. The majority of respondents reported they were food insecure, including three of the five household growing sugarcane (Table 30). However, crop productivity in Kagogwa was not particularly different from other regions, particularly maize—the staple crop in the area—suggesting food insecurity was due to land shortages (Appendix 6, Table 50). Kagogwa villagers also possessed amongst the smallest household landholdings of any of the villages surveyed in Uganda (at an average of 0.6 ha) and had the highest degree of land tenancy of any village in Uganda investigated (Appendix 6, Table 49). Nearly half of the households surveyed in Kagogwa were tenants: tenants who were found to have, on average, smaller landholdings than landowners (0.3 to 1.0 ha, respectively). This suggests that landlords have dedicated the majority of land to sugarcane production. Yet tenants were typically unable to engage in the sugarcane economy because KSW required them to possess 1 ha of land in order to participate in the outgrower scheme (KSW, 2006).

The risk of food security amongst villagers was to be regulated by KSW. After receiving an application for assistance from KSW, a supervisor would visit and make a sketch of the owner’s land and note the amount of land set aside for food. In addition to screening for a total of 1 ha, KSW would want to ensure that a minimum of 0.4-0.8 ha was set aside for food security. As was explained by the chairperson of the BSGA, “[KSW doesn’t] give you aid unless you have the space for food. If you don’t spare your land for food, they’ll not plant for you sugarcane.” In Kagogwa, the system appeared to be working relatively well: of the households surveyed, only two of the five growing sugarcane held less than 1 ha of land. Almost all of households planting sugarcane owned land; only one rented. There are reportedly some who plant sugarcane on their land after Kakira’s inspectors have completed their report. But as one resident

---

171 NGO Officer, Kakira District, Interview UD3, 10 June 2009.
172 NGO Officer, Kakira District, Interview UD3, 10 June 2009.
173 NGO Officer, Kakira District, Interview UD3, 10 June 2009.
174 Local Government Focus Group (U25), Kagogwa Village, 11 June 2009.
observed, there was a potential conflict of interest: “The concern of Kakira is measuring that land that you have for sugarcane. They are not concerned about how much land you have for food.” However, it is also too simplistic to characterize all tenants as poor. In Kakira there were also a number of local entrepreneurs who rented land from a large number of landholders in order to sell cane to KSW.

Some Kagogwa residents maintained that food insecurity in the village was due to drought. This explanation is questionable because climatic conditions were relatively favourable across southern Uganda during the period when Kagogwa was investigated in May 2009 (FEWS NET, 2009e; f). Maize productivity was also relatively high, at 1018 kg/ha, in comparison to villages visited in Tanzania at approximately the same time (all other villages investigated in Uganda grew banana). See Appendix 6, Table 50. It should also be noted that Kagogwa had the highest monthly expenditures of any village investigated in Uganda, dedicating over fifty percent to the purchase of food; however, annual incomes were amongst the lowest measured (Appendix 6, Table 51). This suggests that Kagogwa villagers were relatively more reliant on exchange and less able to provide for themselves with available lands than amongst other villages investigated in Uganda.

Because my investigation of the Uganda CDM cogeneration project lacked an appropriate control village, I find it difficult to conclude whether land scarcity was due to the expansion of the CDM cogeneration project and concomitant expansion of KSW sugar plantation. Other causes identified include rising prices due to emergency demand from conflict in Sudan as well as a rising population which would increase land scarcity, put upward pressure on food commodity prices and, as observed by villagers, lead to increased theft of crops in the field. Comparison with an appropriate control village, at least another village located further away from the city of Jinja to reduce the effect of population, would shed light on these causal processes.

175 Local Government Focus Group (U25), Kagogwa Village, 11 June 2009.
176 Small Business Owner, Kakira District, Interview UD16, 8 June 2009.
In hindsight, the most appropriate comparison with the situation in Kagogwa would have been to have selected a control village still adjacent to the KSW estate but subject to lower population pressure, such as on the far side of the KSW estate relative to Jinja. This would have allowed control of the variable of population change, though maintaining the same dependent variable of CDM project impact. If food insecurity were found at comparable levels in the control village, this funding would indicate that sugarcane expansion was not responsible and, rather, that population growth was engendering land scarcity and consequent reduction in household farmland. With variation in the population pressure yet the presence of KSW sugarcane maintained, it might have been possible to have determined if population pressure was in fact a causal factor—something that might be verified through future investigation.

Finally, as discussed in Chapter 5, the sustainability of the Uganda CDM cogeneration project is uncertain because both forests and sugarcane represent elements of CNC in Uganda. Forest resources in Uganda, as suggested above, are considered an element of national CNC. Furthermore, the threat of further forest loss in southern Uganda has been at the heart of numerous recent controversies involving the expansion of sugarcane and palm oil production independently of the CDM—with Mabira central forest reserve being perhaps the most well-known recent example of such a controversy (Child, 2009). The expansion of the KSW’s sugarcane estate since the 1930s has clearly come at the expense of local forests and wetlands (see KSW, 2010b). But Uganda also posts a sugar deficit that requires the importation of sugar (USCTA, 2010) which, from the government’s perspective, would also constitute national CNC. The country has been faced with sugar shortages and price spikes (Busharizi, 2011; Mukasa, 2011).

**Uganda CDM afforestation in Kirungu**

Violation of the conditions of strong sustainability was most clearly observed in the case of Kirungu village involved with the CDM afforestation in Uganda. By enforcing the boundaries of the Rwoho central forest reserve in order to establish the CDM afforestation project to its maximum area, the NFA compromised the village’s food security. The village had been established on the border of the central forest reserve at least since 1953, about the same time the
reserve was established if not earlier (UFRIC, 1999). I estimate that Kirungu lost access to approximately 300 ha of the central forest reserve that villagers had been using for generations as agricultural and grazing land. While the exact number is unclear, between 10-100 households had no choice but to leave the village because of lack of access to land.\footnote{Village Government Officer (U1), Kirungu Village, Interview, 22 May 2009; Villager, Kirungu Village, Interview U6, 20 May 2009.}

This land clearly represented local CNC. Food security in Kirungu was critical at the time of the 2009 fieldwork—with nearly all households reporting food insecurity (Table 30). In contrast to its control village of Rwerazi, which was located well away from the central forest reserve, land holdings in Kirungu were smaller yet more land was left fallow and agricultural productivity was lower (Table 49 and Table 50). Loss of access to CFR lands was directly linked by many Kirungu residents to food shortages they endured.\footnote{Villager, Kirungu Village, Interview U9, 20 May 2009.} For example, one resident explained “We used to grow crops in the forest and had enough food. But since [NFA] started, when they chased us from the forest, there has been a serious shortage of food.”\footnote{Villager, Kirungu Village, Interview U9, 20 May 2009.} Agricultural productivity was lower, which was compounded by lower market prices for agriculture: the price fetched for bananas, the staple crop, was 33\% higher in Rwerazi. Higher prices were to be expected in Rwerazi because of it being closer to the main agricultural market, Chitwe.\footnote{Village Focus Group (U11), Rwerazi, 23 May 2009.} But Rwerazi was also home to a cooperative association known as the Rwerazi Matooke Growers Association initiated in 2003.\footnote{Village Focus Group (U12), Rwerazi, 23 May 2009.}

Food insecurity was compounded by the Kirungu’s isolation from both traders and essential services. Located on a hilltop adjacent to the Rwoho CFR, access had been restricted until recently when the NFA was able to improve roads.\footnote{Village Government Officer, Kirungu Village, Interview U1, 22 May 2009; Villager, Kirungu Village, Interview U6, 20 May 2009.} Consequently, agricultural extension services have been slow to reach Kirungu and it depends on Rwoho village for medical...
services, approximately 5 km by foot. Notably the NAADS agriculture extension programme had only been heard about in Kirungu, but was present, though only very new, in Rwerazi. In part due to its greater proximity to local markets, the control village of Rwerazi was able to organize itself into a cooperative and sell more of its produce and gain a higher price. While one-third of residents in the control village also reported food insecurity, the better access and apparent effectiveness of the Matooke Growers Association there buoyed agricultural productivity. Climatic factors can also be ruled out in explaining these differences: in southern Uganda climate conditions had generally been favourable during 2008-2009 (FEWS NET, 2009e; f).

As stated in the case of this CDM project’s impact on RECPA, the community-based organization involved in this project though largely comprised of individuals not resident in Kirungu, the implications of the afforestation project were positive for national CNC. However, not our commitment to Pareto efficiency at the local level, national CNC benefits cannot outweigh local CNC losses. Consequently, I concluded that the Uganda CDM afforestation project has led to a violation of strong sustainability in the case of Kirungu.

**Moldova CDM afforestation project in Bursuceni**

Another case where the conditions of strong sustainability were violated was Bursuceni, a village involved in the CDM afforestation project in Moldova. Tensions surrounding the allocation of village lands to afforestation were highest of any of the villages investigated. In Bursuceni, 90-120 ha tract of land on the far side of the village had already been planted under the CDM. But results of household surveys also show Bursuceni had the smallest land area, dedicated the largest percentage of village land to pasture (35%), and had the highest percentage of village land already afforested (6%). See Appendix 6, Table 52. Bursuceni also had the highest frequency of households with cattle of any of the villages investigated (Appendix 6, Table 51). A number of villagers I interviewed in Bursuceni claimed that if afforestation proceeded, there

---

183 Village Focus Group (U10), Kirungu village, 19 May 2009.
184 Village Focus Group (U10), Kirungu village, 19 May 2009.
185 Village Focus Group (U11), Rwerazi village, 23 May 2009.
would be insufficient land for grazing livestock.\textsuperscript{186} But firewood scarcity was also particularly problematic in Bursuceni. Most telling, in the winter of 1995-96 there was insufficient coal and the village was forced to clear an entire forested hillside for heating—the same one that was being considered for afforestation.\textsuperscript{187} Despite this, some villagers maintained their opposition to afforestation in Bursuceni argued for the use of crop residues and dung instead of firewood, citing insufficient pastureland.\textsuperscript{188} The importance that livestock plays in Bursuceni is likely also due to limited economic opportunities. Compared to other villages investigated, there were few local prospects apart from agriculture and livestock.

Nonetheless, there are reasons to question whether scarcity of pastureland is the sole or even primary cause of tensions in Bursuceni. First, it was only in Bursuceni that I heard reference made to a Japanese funded project to mitigate the adverse livelihood impact of involuntary loss of degraded pastures. As the mayor explained, 31 ha of pastureland were restored and two rows of trees were planted under a programme.\textsuperscript{189} Strangely then, the only village I investigated that had benefited from the Japanese programme was found to have the highest tension surrounding pastureland, suggesting certain inadequacies of the programme. Such a finding is incongruous and points to the need for a deeper explanation.

Second, a lack of village government transparency and participation was an even more important factor in Bursuceni.\textsuperscript{190} Many claimed that there had been no village meeting held to discuss afforestation.\textsuperscript{191} Summarizing the situation, one respondent in Bursuceni stated: “It’s a good project but [it] should be transparent so that people know.”\textsuperscript{192} Significantly, a lack of village

\textsuperscript{186} Villagers, Bursuceni Village, Interviews M44, M47, M52 and M53, 13-15 August 2009.
\textsuperscript{187} Villagers, Bursuceni Village, Interview M40, M43, M50, M54, 13-15 August 2009.
\textsuperscript{188} Villager, Bursuceni Village, Interview M47, 13 August 2009.
\textsuperscript{189} Village Government Officer, Bursuceni Village, Interview M38, 15 August 2009.
\textsuperscript{190} Villager, Bursuceni Village, Interview M42, 13 August 2009; Villager, Bursuceni Village, Interview M44, 13 August 2009; Villager, Bursuceni Village, Interview M49, 13 August 2009.
\textsuperscript{191} Villager, Bursuceni Village, Interview M42, 13 August 2009; Villager, Bursuceni Village, Interview M44, 13 August 2009.
\textsuperscript{192} Villager, Bursuceni Village, Interview M40, 13 August 2009.
government transparency did not appear to be restricted to the CDM afforestation project. One respondent claimed that the mayor was often “hard to find” and another claimed that there had been no open meetings with villagers over the six years the mayor had been in office.

Tensions over the allocation of lands for afforestation aside, the CNC benefits Bursuceni received from the project in terms of restoration of degraded lands would have been comparable to other villages investigated in the context of the CDM afforestation project. If no action was taken to restore soil fertility, pasturelands in Bursuceni would continue to degrade. The CDM project would have provided fuelwood, the supply of which was particularly problematic in the village. Higher resolution analysis of the CNC costs and benefits of the project would be necessary in order to determine if the conditions of strong sustainability were genuinely violated in this case.

**Tanzania biofuel project in Mtamba**

The case of the Tanzania biofuel project in the case of Mtamba village also appeared to have violated the conditions of strong sustainability—though not for reasons related to food security. My findings here contrast with other studies of the this project which have insinuated that food security has been compromised as a result of land transferred from crop production to biofuel production (Habib-Mintz, 2010). I find these criticisms largely unwarranted, stemming from the lack of comparative methods used by investigators. However, in terms of national CNC, the project has little impact.

First, I found that the food security situation observed during fieldwork was largely unrelated to land acquisitions but rather was due to local climate and the availability of rains. Evidence of this is provided by the comparative methods used: the food security situation was similar in those villages involved with land acquisitions and in their respective control villages (Table 30) . The majority of villagers in both Mtamba and its control Maguruwe reported that they faced food insecurity at some point in the 2008-2009 agricultural season. However, because of the

---

193 Villager, Bursuceni Village, Interview M40, 13 August 2009.
194 Villager, Bursuceni Village, Interview M43, 13 August 2009.
195 Villager, Bursuceni Village, Interview M47, 13 August 2009.
unreliability of the survey responses on food security questions, it is important to seek confirmation of this trend in other results. Maize crops in particular had suffered, reflected in low maize yields of 726 and 438 kg/ha in Mtamba and the control village, respectively (Table 50). This was largely due to a particularly bad drought in the area over 2008-2009 (FEWS NET, 2009a; d). But other factors affecting food security include lack of inputs, particularly fertilizer. Cassava yields in Mtamba and Maguruwe were relatively high, but again without any significant difference between villages—see Appendix 6, Table 50). Indeed, surplus cassava was being sold on the market, and many villagers described their harvest in terms of lorry loads. As a tuber, cassava is often suggested as a security food because of its capacity to remain in the soil until needed (Liu et al., 2008). However, the traditional local dietary preference was for maize (Olson, 1996: 610). During fieldwork, agricultural extension workers from the Ministry of Agriculture were in Mtamba demonstrating methods and recipes for cooking cassava to encourage local consumption as a food security strategy.

The second reason that food security was not compromised by the CDM project is that the lands acquired were largely degraded forest, already over-exploited as a result of charcoal and firewood production. The British company behind the project claimed: “No food cropping or community buildings were displaced and no communities were removed” (Sun Biofuels, 2009). The balance of available evidence supports this view. Interviews in Mtamba suggested that lands acquired had been used for growing palm trees, a source of clay for pottery, charcoal as well as farming. 

Interviews were not able to confirm the extent of farming. One respondent indicated that there had been “a lot” of farms in the area while another stated that the land was “bare land used for charcoal and poles.” At the village meeting it was stated that compensation had only been paid to individuals with fruit trees located inside the project lands, with no mention of farms having been displaced by the project. In addition, very few households possessed livestock, suggesting that grazing was not an important livelihood strategy in the area. The


197 Village Government Focus Group (T8), Mtamba Village, 30 April 2009; Villager, Mtamba Village, Interview T39, 1 May 2009.

198 Village Government Focus Group (T8), Mtamba Village, 30 April 2009.
The degraded status of the lands acquired by Sun Biofuel is further substantiated by a recent NGO report which stated that: “Much of [the Sun Biofuel project] area has already been degraded by the dense human population close to Dar es Salaam, although areas of natural coastal bushland, grassland and thicket are still present. The severe charcoal crisis is the major source of forest clearance both in and outside forest reserves” (WWF, 2008: 52). A consortium of NGOs promoting forest conservation concluded that “the intended output of reducing pressure and dependence on forest resources in Kazimzumbwi, Pugu and Ruvu South [Forest Reserves] was not achieved” (Kaale and Mwakifwamba, 2006: vi). The overall impression is that the land acquired from Mtamba for the biofuel project had been heavily degraded by the charcoal trade and was therefore only used for agriculture to a limited extent. The reality of the charcoal trade makes it difficult to criticize the biofuel project in terms of biodiversity. Instead of restoring the coastal forest, the biofuel project replaced it with a jatropha plantation. However, given difficulties posed by illegal charcoal extraction and establishing JFM in the area, forest restoration appears unrealistic.

It is however less clear how local ecosystem services would be affected by the Tanzania biofuel project—especially now that the project has been suspended. High yields from jatropha require irrigation (Gerbens-Leenes et al., 2009; Jongschaap et al., 2007; Renner et al., 2008), though its capacity to grow under dry conditions appear to make it appropriate for arid regions (van Beukeringa et al., 2007: 22). Given current water scarcity in Kisarawe district, and Mtamba village in particular, there is cause for concern with the biofuel project. Water access was the most important development issue raised by villagers. During the dry season there was only one reliable source of water available in the village, and it was found in the concession granted to Sun Biofuel (Oxfam, 2008: 22). While the same report indicates that Sun Biofuel has granted Mtamba assurances that they will continue to have access to the waterhole, villagers did not have any documentation attesting to this. Mtamba Village Assembly minutes from 23 August 2006 indicate that villagers accused Sun Biofuel of placing the boundary without consulting them.

---

199 Village Government Focus Group (T8), Mtamba Village, 30 April 2009.
200 Village Government Focus Group (T8), Mtamba Village, 30 April 2009.
While it is not clear from the minutes, this dispute may have been over access to water or, alternatively, burial grounds.\footnote{The Village Assembly minutes from 23 August 2006 do not refer to water or burial grounds but only areas of significant “community activities”.}

Should Sun Biofuel require irrigation of its biofuel project, as the current drought- and finance-induced shutdown it is facing suggests, due regard needs to be given to local needs for fresh water. Two futures are possible: one where Sun Biofuel (or its successor) competes for water with Mtamba and other villages or one where the company invests in the appropriate technology to ensure that sufficient water is available for all parties (see Ewing and Msangi, 2009). If done correctly, Sun Biofuel or its successor could bundle its irrigation needs with improved water provision for villagers—though this tends to violate strong sustainability by introducing irrigation technology to substitute for increased water use.

Finally, the biofuel project would also not have promoted national CNC issues in Tanzania. The biofuel to be produced is destined for European markets, rather than domestic ones. Sun Biofuels has exported its first shipment of biofuel from Mozambique to Germany (Biofuels Digest, 2011a). Assuming biofuel from the Tanzania project would have similarly been exported, it would have done very little to address national CNC in Tanzania.

5.2. Weak Sustainability

I found conditions of weak sustainability were met in eight of eleven cases investigated (Table 18). I evaluated the weak sustainability impact of each CDM project in terms of a project’s total impact on CNC and MMC in individual cases. CNC effects have been discussed earlier, in our discussion of strong sustainability. An overview of the different types of MMC costs and benefits imparted by each carbon projects, at the local and national levels, is presented in Table 24 and Table 25, respectively. The placement of projects in the MMC ranking matrix is found in Figure 31.

I identify two groups of projects. Projects meeting conditions of what I refer to as “Level 1” weak sustainability produced little in the way of MMC benefits at the national level and few at
the local level, yet their impact on CNC was relatively high. At the local level, MMC benefits were restricted to those able to participate directly in the project and, hence, there were limited economic multiplier effects or MMC benefits that were virtually non-existent. Projects meeting conditions of “Level 2” weak sustainability, had generally neutral effects on CNC. Yet their MMC benefits tended to be more pronounced.

There were two cases where carbon projects clearly violated conditions of weak sustainability: the case of the Tanzania biofuel project’s impact on Mtamba village and the case of the Uganda CDM project’s impact on Kirungu village. The Tanzania biofuel project imparted few benefits in terms of CNC and resulted in actual MMC costs while the Kirungu village involved with the Uganda CDM afforestation project received insufficient MMC benefits to compensate for reductions in CNC. My results were however inconclusive in two cases: the impact of the CDM cogeneration project on Kagogwa village and the effect of the CDM afforestation project in Moldova on Bursuceni village. Notably, it was not possible to identify an appropriate control village in the field in either case.

Table 24: Identification of local MMC benefits and opportunity costs

<table>
<thead>
<tr>
<th>Country/Project/Village</th>
<th>Local MMC Benefits</th>
<th>Employment</th>
<th>Direct Payment</th>
<th>Subsidized Infrastructure</th>
<th>Compensation</th>
<th>Financial Savings</th>
<th>Opportunity Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanzania</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation – Mapanda &amp; Idete</td>
<td>Yes</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Biofuel – Mtamba</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Cookstove – Endabash</td>
<td>Yes</td>
<td></td>
<td>Yes (stoves)</td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uganda</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation - Kirungu</td>
<td>Yes, but insignificant</td>
<td>Yes</td>
<td></td>
<td>Yes (roads)</td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>CDM Afforestation – RECPA</td>
<td>Yes, but delayed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan Vivo Reforestation – Bitereko</td>
<td>/</td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Cogeneration-Kagogwa</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moldova</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation – Sâlț &amp; Chiscareni</td>
<td>/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation – Bursuceni</td>
<td>/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural Energy Modernization – Ursale &amp; Colujeni Micl</td>
<td>/</td>
<td></td>
<td>Yes</td>
<td>Yes (boilers)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bioenergy Pilot – Chiscareni</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 25: Identification of National MMC benefits and opportunity costs

<table>
<thead>
<tr>
<th>Country/Project/Village</th>
<th>National MMC Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reduced Reliance on</td>
</tr>
<tr>
<td></td>
<td>Fossil Fuels Imports</td>
</tr>
<tr>
<td></td>
<td>Reduced Reliance on</td>
</tr>
<tr>
<td></td>
<td>Timber Imports</td>
</tr>
<tr>
<td></td>
<td>Reduced Reliance on</td>
</tr>
<tr>
<td></td>
<td>Sugar Imports</td>
</tr>
<tr>
<td></td>
<td>Increased Electricity</td>
</tr>
<tr>
<td></td>
<td>Generation</td>
</tr>
<tr>
<td></td>
<td>Land Rents to Central</td>
</tr>
<tr>
<td></td>
<td>Government</td>
</tr>
<tr>
<td><strong>Tanzania</strong></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation –</td>
<td>/</td>
</tr>
<tr>
<td>Mapanda &amp; Idete</td>
<td>/</td>
</tr>
<tr>
<td>Biofuel – Mtemba</td>
<td>/</td>
</tr>
<tr>
<td>CDM Cookstove –</td>
<td>/</td>
</tr>
<tr>
<td>Endabash</td>
<td>/</td>
</tr>
<tr>
<td><strong>Uganda</strong></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation –</td>
<td>/</td>
</tr>
<tr>
<td>Kirungu</td>
<td>Yes</td>
</tr>
<tr>
<td>CDM Afforestation –</td>
<td>/</td>
</tr>
<tr>
<td>RECPA</td>
<td>/</td>
</tr>
<tr>
<td>CDM Cogeneration-Kapova</td>
<td>/</td>
</tr>
<tr>
<td><strong>Moldova</strong></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation –</td>
<td>/</td>
</tr>
<tr>
<td>Săiţi &amp; Chiscañeni</td>
<td>/</td>
</tr>
<tr>
<td>CDM Afforestation –</td>
<td>/</td>
</tr>
<tr>
<td>Bursuceni</td>
<td>/</td>
</tr>
<tr>
<td>Rural Energy Modernization – Ursoaie &amp; Cotujeni Mici</td>
<td>/</td>
</tr>
<tr>
<td>Bioenergy Pilot –</td>
<td>Yes</td>
</tr>
<tr>
<td>Chiscañeni</td>
<td>/</td>
</tr>
</tbody>
</table>

5.2.1. **Weak Sustainability – Level 1**

**Moldova bioenergy pilot project in Chiscañeni**

The Moldovan bioenergy pilot project delivered sizeable benefits in Chiscañeni, one of the villages where it was piloted. As the mayor explained, biomass was cheaper and produced local economic benefits by giving value to biomass residues that would have otherwise been burnt in the field. But as a pilot project, the bioenergy pilot only targeted five villages in the country (GEF, 2005a). If scaled-up to a larger, national programme, the bioenergy project might make a significant contribution to Moldova’s national economy by reducing reliance on imported natural gas. In addition, despite access to natural gas most villagers still used fuelwood and biomass for heating and gas for cooking.

Yet as the project was limited to the school, it did not appear to have much other direct economic impact such as provision of household energy. The production of biomass in Chiscañeni was claimed to have generated employment for 12 people.²⁰² Local economic benefits were realized largely through payments to the local Agricultural Leader for biomass, the price of which rose as the project proceeded. There were two primary Agricultural Leaders in Chiscañeni as well as an

additional small entrepreneur. Nearly half of respondents surveyed were renting land to one of the Leaders. But there was no evidence that benefits were being passed on to villagers. I also detected no employment generating effects of the bioenergy pilot project (Figure 54g).

Replicating trends across Moldova, Agricultural Leaders in Chiscareni rented agricultural land from local household in exchange for agricultural produce in lieu of cash payment. Thus, while the MMC benefits of the project were not insignificant, the employment opportunities with an Italian clothes factory were much more significant.

However, a serious oversight in the bioenergy pilot project was its assumption that the costs of using biomass residues would be almost zero. In Chiscareni, biomass residue costs increased significantly once a market appeared, though concerns about price gouging by local Agricultural Leaders appeared exaggerated given the ease of sourcing biomass residues nearby at a competitive price. When the project began in 2006, a public auction saw the price of a 15 kg bale fetch 3.5 MLD. Straw was originally sourced from one of the local Agricultural Leaders. But the price continued to move upward reaching 8, 10 and, finally 14 MDL per bale by 2009. At this point the village government decided to buy from a neighbouring village for 9 MDL per bale.

By way of comparison, the market price for wheat proper in Chiscareni was 15-23 MDL per 15 kg. In other words, at 9 MDL per bale, the price of wheat chaff residue had risen to 40-60% of the price of wheat itself. The significance of a cash value for wheat residue should not be understated—finding a market for agricultural crops was itself a challenge. But these benefits were largely retained by the Agricultural Leaders.

The reasons for the rising price for biomass residues in Chiscareni are unclear. Some characterized it as profiteering on the part of the Agricultural Leader. But there were other issues involved. First, as one Agricultural Leader in Chiscareni explained, a lack of capital made

---


204 Village Government Officer, Sâşti Village, Interview M3, 30 July 2009; Business Manager, Sâşti Village, Interview M1, 1 August 2009.

205 Village Government Officer, Chiscareni Village, Interview M34, 18 August 2009.

upfront purchases difficult, particularly for gasoline.\textsuperscript{207} A better system would be one where fifty percent of the payment was made available before delivery.\textsuperscript{208} But the village government was restricted to paying only ten percent of the costs of the biomass upfront, the remainder to be paid upon receipt. As discussed earlier, Moldovan villages are highly restricted in their fiscal discretion and Chiscareni’s village government simply did not have disposable cash for entering into purchase agreements with local suppliers of biomass.\textsuperscript{209} Second, there had also been a bad harvest in 2007\textsuperscript{210} and an ice storm in 2009 that had destroyed a number of crops in Chiscareni which some believed had contributed to the rising prices.\textsuperscript{211}

\textbf{Tanzania CDM cookstove project in Endabash}

The Tanzania CDM cookstove project was clearly delivering MMC benefits at the local level. Of the households surveyed, nearly 60% already had adopted the improved stoves and approximately 20% said they were seeking to obtain one. The Karatu Development Association (KDA) designed the CDM cookstove project in Tanzania to subsidize the purchase of an improved cookstove by villagers. There was also a modest, local economic multiplier effect as groups were effectively mobilized as small businesses to build and maintain the stoves. However, the impact of this was almost negligible when measured (see Figure 54c in Appendix 6).

While the popularity of the stoves in Endabash was due to the fuelwood reductions it led to, discussed earlier, in our discussion of strong sustainability, it was also linked to the price of stoves which was subsidized under the pilot project. While each stove cost 6,000 Tsh, individual households only paid 2,500 Tsh.\textsuperscript{212} Under the full CDM project, the full costs of the stove were to be absorbed by carbon finance, rendering the stoves basically free.\textsuperscript{213} Another factor

\begin{footnotesize}
\footnotesize
\textsuperscript{207} \textit{Business Manager, Chiscareni Village, Interview M35, 18 August 2009.}
\textsuperscript{208} \textit{Business Manager, Chiscareni Village, Interview M35, 18 August 2009.}
\textsuperscript{209} \textit{Villager, Chiscareni Village, Interview M39, 22 August 2009.}
\textsuperscript{210} \textit{Villager, Chiscareni Village, Interview M58, 19 August 2009.}
\textsuperscript{211} \textit{Villager, Chiscareni Village, Interview M39, 22 August 2009.}
\textsuperscript{212} \textit{NGO Officer, Karatu Town, Interview TD3, 4 April 2009.}
\textsuperscript{213} \textit{NGO Officer, Karatu Town, Interview TD3, 4 April 2009.}
\end{footnotesize}
contributing to the stoves’ uptake is appropriate gender roles. The stoves are manufactured by a village woman’s group organized specifically for the project and trained in stove construction and maintenance. Because cooking and household energy matters are largely women’s responsibility in this part of Tanzania, implementation of the project through gender lines appears to have helped facilitate stove adoption. The women’s group collects information on stove use, after which KDA carries out a monthly inspection to determine if stoves are being used or not and are working properly. Other direct economic benefits included employment of 12 technicians in the women’s group: each team of three was paid 5,000 Tsh per stove. In addition, the women’s group hired six male labourers at the village to prepare materials at the workshop. The full project, which includes activities in Endabash and the ten other villages, is claimed to employ 30 people directly and indirectly provide part-time employment for 700 (KDA, 2008: 11). But the impact of the cookstove project outside household users and the production team was limited.

However, the Tanzania CDM cookstove project was not without concern. Of the 11 villages involved with the pilot project, only 5 were reported to be performing as well as Endabash. Underperforming villages were claimed to have uncooperative village leaders and an unwillingness to pay for even the subsidized cookstoves. This unwillingness explains why the CDM project sought to subsidize stoves completely. In addition, a lack of certain local resources—particularly soils suitable for making bricks for the stoves—also proved an important constraint. Unfortunately, time and logistical constraints prohibited a visit to project villages other than Endabash in order to investigate reasons for cookstove uses.

The chief drawback of the Tanzania CDM cookstove project is that its national level impact tended to be rather insignificant. In comparison to other forms of renewable energy, such as the

214 Village Government Focus Group (T7), Endabash Village, 9 April 2009; NGO Officer, Karatu Town, Interview TD6, 3 April 2009.
215 Villager, Endabash Village, Interview T40, 6 April 2009.
216 Village Government Focus Group (T7), Endabash Village, 9 April 2009.
217 NGO Officer, Karatu Town, Interview TD6, 3 April 2009.
218 NGO Officer, Karatu Town, Interview TD6, 3 April 2009.
bioenergy project in Moldova and CDM bagasse cogeneration project in Uganda, the cookstove project provides rather limited potential to leverage a “continuing effect” linking local economic growth to national economic growth. While the cookstove project was clearly transformative at the household level, the rather limited national development implications explain the lack of interest on the part of the national government and why most rural energy projects focused instead on rural electrification. This explains why the project came to be reliant on carbon finance for its implementation. However, when the financial arrangements collapsed with UNDP—which served as a carbon finance broker for European banks—the cookstove project was shelved.

**Moldova CDM afforestation project in Săiţi and Chiscareni**

The Moldova CDM afforestation project generated few MMC benefits in all three villages investigated. Benefits tended to accrue at only the national level, by providing the state with a low-cost means of addressing land degradation (a government priority). As described in the examination of additionality below, the CDM project was undertaken in a way that saw the financing directed largely to project implementation rather than financial profits for Moldsilva. The primary reason that few MMC benefits were generated in the villages involved is due to the small size of lands afforested. Afforested areas were generally well under 150 ha and represented only a small fraction of village lands: Săiţi (58 ha) and Chiscareni (70 ha). See Table 52. Consequently, the afforestation projects could not contribute in a significant way to local employment in the villages investigated. Local village occupations remained largely based on agriculture (though influenced by the role of Agricultural Leaders, discussed below) with pensioners a very close second while many were also working abroad (Figure 54g).

The Moldova CDM afforestation project claims it will supply fuelwood, timber, and non-timber products and employment opportunities to local communities (CDM-PDD, 2008d: 97-99). Moldsilva did at times employ villagers in the afforestation effort, through in-kind payments

---

219 Business Manager, Săiţi Village, Interview M1, 1 August 2009; Business Manager (M2), Săiţi Village, Interview, 2 August 2009; Village Government Officer (M3), Săiţi Village, Interview, 30 July 2009; Villager (M15), Săiţi Village, Interview, 27 July 2009.
such as firewood, but this appeared to have had only a limited impact. Villagers favourable to the CDM described benefits largely in non-monetary terms. Otherwise, most of the planting was undertaken by district forest enterprises under Moldova’s authority (CDM-PDD, 2008d: 19-20, 80-81). Given the lack of detail about future employment and the important role that local forest enterprises have already played, it is unlikely that such benefits will accrue to villagers. Finally, in contrast to the situation with the CDM afforestation projects in Tanzania, carbon revenues were not shared with the villages.

5.2.2. Weak Sustainability – Level 2

Uganda CDM afforestation project impact on RECPA

The CDM afforestation project in Uganda delivered benefits at both the national and local levels. As discussed earlier when considering CNC benefits, forest and timber resources are scarce in Uganda and the overall benefits to national MMC significant in terms of timber and revenue generation. Local benefits were largely restricted to those able to participate in the community-based organization headquartered in Rwoho village, known as RECPA, which had entered into a partnership with NFA.

RECPA had been formed independently of the CDM project in 1998, though formally gaining status in 2003 as a NGO, in order to plant trees around Rwoho village. Annual subscription is 5,000 Ush with a one-time initial fee of about 10,000 Ush which is used to maintain plantations on others’ land (Krishnan, 2010). In order to become a part of the CDM project, members need to pay an additional 100,000 Ush for a share. While some have reported a membership of 270, a 2009 survey of RECPA found it to have 52 members in Rwoho and 12 in Kirungu who had planted a total of 160 ha and 11 ha over 1998-2009, respectively.

---

220 Villager, Bursuceni Village, Interview M41, 13 August 2009; Villager, Bursuceni Village, Interview M51, 13 August 2009.
221 NGO Focus Group (U8), Rwoho, 19 May 2009.
222 NGO Focus Group (U8), Rwoho, 19 May 2009.
223 Based on survey undertaken by RECPA in 2009 for the author.
There are two parts to RECPA’s partnership with the NFA: RECPA was granted a 60 ha tree farming license and a community forest management agreement was arranged (RECPA & NFA, 2006). The tree farming license states that the land is to be used “to establish and manage a forest plantation”—upon the condition that RECPA plants at least 10% of the area per year—while also clearly stating that ownership of the land is not vested in RECPA but remains with the NFA.\(^{224}\) The goal has been to establish a 200 meter “community ring” as a buffer around Rwoho Central Forest Reserve.\(^{225}\) In this community forest management area, members of RECPA are allocated special licenses for the commercial harvest of such resources including timber, charcoal/firewood and bee-keeping.\(^{226}\) Importantly, if the CDM project succeeds in attracting buyers for the carbon credits, RECPA shareholders would be entitled to carbon credits under the project which, along with forest harvesting, is expected to equal 150,000 Ush a year per ha (Krishnan, 2010). While carbon payments had not yet been delivered, the overall MMC impact resulting from RECPA’s membership appeared salutary.

Significantly, the majority of RECPA’s membership was based in Rwoho village. This village appeared less vulnerable to land issues confronting Kirungu village, discussed below. While residents in Rwoho village have also seen their grazing lands reduced (Krishnan, 2010), they appeared to be less dependent on forest reserve lands for agriculture and their location along the primary road offers greater trading opportunities and communication. Efforts could be made to improve RECPA’s representation of surrounding communities by, for example, lowering membership rates for less well-off community residents, such as those living in Kirungu.

---

\(^{224}\) National Forestry Authority Tree Farming License in Central Forest Reserves No. 321 with Rwoho Environmental Conservation and Protection Association (March 15, 2007).

\(^{225}\) Community Forest Management Arrangement Agreement between the National Forestry Authority and Rwoho Environmental Conservation and Protection Association (February 9, 2007), Schedule: Establishment and Management of CFM Plantations by RECPA.

\(^{226}\) Community Forest Management Arrangement Agreement between the National Forestry Authority and Rwoho Environmental Conservation and Protection Association (February 9, 2007), Schedules: Timber Harvesting through Bee-Keeping.
In Tanzania, the CDM afforestation project clearly delivered employment benefits at the local level, even displacing agricultural production to a significant degree as the primary economic activity amongst villagers (Figure 54a). And while afforestation projects generate most of their employment at the initial stage (Coomes et al., 2008), they also create opportunity for local employment in the future—something which the EIA requires be first offered to villagers (CDM-PDD, 2008f: 68). During interviews, it was also learned that Green Resources, the Norwegian firm behind the project, has committed to 10% carbon revenue sharing and was on its way towards meeting its promises made regarding social services (despite earlier delays). A copy of the carbon revenue sharing contract is found in the Tanzania case-study found in Appendix 7. Overall, these MMC benefits outweighed the low level of compensation villagers received. Because the land was largely unproductive grassland that villagers had not been farming, as discussed earlier in relation to CNC impact, there was no opportunity cost of transferring the land. In addition, by transferring unproductive village lands for foreign investment, the CDM afforestation project contributed significantly to MMC at the national level in the form of land rent paid to the central government upon transfer of land.

The Tanzania CDM afforestation project had seen both villages involved, Mapanda and Idete, transfer significant amounts of village land towards the project. Village Council minutes in Mapanda record an initial meeting with GRL, the private company implementing the afforestation project, in June 1997, when the company requested 20,000 ha. At a subsequent Village Assembly meeting in October 1997, the Village Council recommended the area be given over. The vote was 272 to 1 in favour of the land transfer. Note however that the final extent of Mapanda village lands transferred to GRL stood at 4,652 ha. Minutes from a Village Assembly meeting in September 1997 in Idete indicate that GRL initially sought a large tract of land, up to 70,000 ha. But minutes from a 1998 meeting of an ad-hoc District Land Acquisition Committee indicate that GRL initially requested 24,993 ha. This was reduced by the district

227 The minutes read that the area granted will include the area which “in the northern part is bounded by Sao Hill forest and, in the east, by River Mkungwe to River Mwenga. In the south western part, it is bounded by River Mwenga.”
government to 15,000 ha though, in the end, only 11,663 ha were ultimately transferred in Idete.\textsuperscript{228} No minutes from the district government were identified for Mapanda’s land transfer, but district interviews indicated a similar level of district over-sight occurred.\textsuperscript{229} Because the acquisitions involved lands greater than 250 ha, it was necessary that GRL obtain approval from the National Commissioner for Lands at the Ministry of Lands and also undertake an Environmental Impact Assessment (CDM-PDD, 2007a: 117).\textsuperscript{230}

In some of the most significant legal reforms under the 1999 Land Acts, villagers are now entitled to “full, fair and prompt compensation to any person whose right of occupancy or recognised long-standing occupation or customary use of land is revoked or otherwise interfered with to their detriment” for lands transferred into General Land (\textit{Land Act} s.1(1)g and \textit{Village Land Act} s.3(1)(h)). However, information on the amount of financial compensation paid to villagers involved in the Tanzania CDM afforestation projects is not published in any of the official documentation associated with the two projects. It could, however, be reconstructed from information gathered in the field and other secondary sources (Table 26). Compensation was provided to only a limited number of individuals (19 in Mapanda and 9 in Idete) for their “unexhausted improvements” and not for other unused village land. Altogether, compensation was only granted for about 10\% and 2\% of total lands acquired, in Mapanda and Idete, respectively.

The patterns of compensation above are significant because they reveal how the government interprets and applies the compensation provisions of the \textit{Land Act} and \textit{Village Land Act}. Recall that there are conflicting understandings of the extent of compensation procedures under Tanzania’s land tenure, depending on how “General Land” is defined. The Land Act defines

\begin{itemize}
  \item \textsuperscript{228} Mufindi District Government Officer, Mufindi Town, Interview TD1, 9 March 2009; Villager, Idete Village, Interview T32, 10 March 2009.
  \item \textsuperscript{229} Mufindi District Government Officer, Mufindi Town, Interview TD1, 9 March 2009.
  \item \textsuperscript{230} The EIA, conducted for both Mapanda and Idete afforestation projects, concluded that the project would “create employment to local community, generate revenue to the Government, contribute numerous socio-economic and environmental benefits as well as technology transfer to the country and the local community. The environmental benefits include conservation of biodiversity and ecological improvement through control of local microclimate and regulation of local hydrological processes in the project area” (CDM-PDD, 2007: 129-132).
\end{itemize}
General Land as “all public land which is not reserved land or village land and includes unoccupied or unused village land” (s.2). However, much of the public and media appear to subscribe to the interpretation in the Village Land Act as “all public land which is not reserved or village land” and expect compensation for all Village Land. For example, a recent publication on the Sun Biofuel paper writes “According to the Village Act of 1999, every piece of land has a value and without proper valuation, rights cannot be transferred” (Habib-Mintz, 2010: 3994). However, Section 181 of the Land Act states that it prevails in case of conflict, which is consistent with research findings.

Despite the low rates of compensation, there was relatively little controversy surrounding the land acquisition that this project involved, especially compared to the Tanzania biofuel project. Most villagers were highly favourable towards the afforestation projects in Mapanda and Idete, especially in terms of employment and income. During the Village Focus Group in Idete one person stated: “With GRL around, life has improved compared to before.” In Mapanda, a local official stated: “Before the company, there were only 40 tin-roofed houses. Now there are 1,900 tin-roofed houses.” While a few individuals in Mapanda and Idete questioned the land transfer on the grounds that it had not been sufficiently transparent, they appeared to be in the minority. Most villagers indicated that they had the right to refuse the offer from GRL but chose not to.

---

231 Village Focus Group (T1), Mapanda Village, 6 March 2009 and Village Focus Group (T4), Idete Village, 12 March 2009. In addition, one businessman claimed that in 2003 there was only one retail shop in Mapanda and that by 2009 there were several. Other improvements associated with the projects were daily bus service connecting Mapanda to the district capital and better roads (Ibid.). In Idete, respondents indicated that they were expanding their agricultural lands in order to sell surplus crops to employees working on the CDM projects (Villager, Idete Village, Interview T31, 10 March 2009 and Villager, Idete Village, Interview T34, 12 March 2009).

232 Village Focus Group (T4), Idete Village, 12 March 2009.

233 Local Government Officer, Mapanda Village, Interview T3, 7 March 2009.

234 For example, one resident in Mapanda indicated that the Village Council set the terms of the agreement and that the arrangement was presented to the Village Assembly as if the deal were already concluded, with the result being that “The right to saying ‘No’ [was] not there” (Villager Government Focus Group (T14), Luhunga Village, Interview, 2 March 2009).

235 At Idete’s village meeting it was stated “We could have said ‘No’. No one can restrict us from saying ‘No’ but we accepted because it is our land” (Villager, Idete Village, Interview T30, 10 March 2009).
Nonetheless, villagers expressed four principal grievances about the performance of GRL. First, the compensation rates paid to individuals were too low and represented a village decision rather than one negotiated between individual landholders and GRL. One individual whose lands were officially compensated in the process was interviewed. He did not feel that he received sufficient compensation for lands he lost to the CDM project, but when he brought his concerns to the village government, it was explained to him that “compensation had passed through the village government and that, because the agreement had been already signed, they have been given what they had received. So though there is a problem that he was not satisfied with the level of the compensation that he got, but there is nothing he can do.” Nonetheless, this individual also maintained “that there is benefit to the community in general…I am happy because [GRL] has assisted us to improve our livelihood.”

Second was wages, which some villagers found too low. As one villager explained: “Somehow [the afforestation project] is a success. But we’re not happy with the salaries we’re getting. It’s like the company is sucking our blood…We’re doing [the] work; [but] it doesn’t mean we’re satisfied with the working conditions the way it is. We’re doing it because we have to do it. Because it’s a source of income.” The third major criticism was the slow delivery of promised social services, which tended to be voiced mostly in Mapanda. Fourth, the 2009 planting sites were at least fifteen kilometres from Mapanda and a four hour hike from Idete.

However, GRL had begun to address some of these concerns. Regarding wages, it should be noted that the minimum wage of the lowest sector in Tanzania was 65,000 Tsh per month in 2008, equal to the monthly salary of labourers in the afforestation projects (US Department of State, 2009a). More progressive has been GRL movement on social services. In late 2008, GRL

236 Villager, Idete Village, Interview T5, 12 March 2009.
237 Villager, Idete Village, Interview T5, 12 March 2009.
238 Villager, Mapanda Village, Interview T22, 5 March 2009.
239 Village Focus Group (T1), Mapanda Village, 6 March 2009; Villager, Mapanda Village, Interview T23, 6 March 2009.
240 Village Focus Group (T4), Idete Village, 12 March 2009; Villager Government Focus Group (T14), Luhunga Village, Interview, 2 March 2009; Village Focus Group (T1), Mapanda Village, 6 March 2009; Villager, Mapanda Village, Interview T22, 5 March 2009; Villager, Mapanda Village, Interview T23, 6 March 2009.
had entered into formal contracts with Mapanda and Idete whereby it agreed to grant 10% of gross carbon revenues towards a list of prioritized development projects identified by the village. In explaining GRL’s improved social responsibility, villager leaders pointed to Forest Stewardship Council (FSC) certification for the Mapanda project (Green Resources, 2011) as well as competition from other firms for village land for afforestation: Highland, a small Kenyan forestry company, and Mufindi Paper Mill. 241 Subsequent to its land deal with GRL, in 2006 Mapanda transferred an additional 1,700 ha to Highland. In terms of wages, Highland offered slightly more than GRL at 2,750 Tsh/day versus 2,500 Tsh/day. 242 But villagers preferred GRL to Highland because the latter generally only agreed to cash payments instead of the provision of social services. 243 Similarly, in Makunga ward, adjacent to Idete, village lands here had initially been granted to Mufindi Paper Mill for tree-planting, but the deal had been rescinded because the Mill had not fulfilled its contractual obligations for village service provision. The villages in Makunga ward had turned instead to GRL. 244

Table 26: Compensation payments associated with land transfers for the Tanzania CDM afforestation project

<table>
<thead>
<tr>
<th></th>
<th>Mapanda</th>
<th></th>
<th>Idete</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area</td>
<td>Value</td>
<td>Area</td>
<td>Value</td>
</tr>
<tr>
<td></td>
<td>(ha)</td>
<td>Million Tsh</td>
<td>Thousand USD</td>
<td>(ha)</td>
</tr>
<tr>
<td>Initial Village Land Request</td>
<td>20,000</td>
<td>/</td>
<td>/</td>
<td>20,000</td>
</tr>
<tr>
<td>Village Lands Acquires*</td>
<td>4,652</td>
<td>37.2-83.7*</td>
<td>$28.6-$64.4</td>
<td>11,663</td>
</tr>
<tr>
<td>Individual Lands Compensated</td>
<td>462</td>
<td>11.5*</td>
<td>$8.8</td>
<td>219</td>
</tr>
<tr>
<td>Unaccounted Village Lands</td>
<td>4,191</td>
<td>25.7-72.2</td>
<td>$19.8-$55.5</td>
<td>11,444</td>
</tr>
<tr>
<td>Annual Rent Paid to Central Govt</td>
<td>4,652</td>
<td>2.3*</td>
<td>$1.8</td>
<td>11,663</td>
</tr>
</tbody>
</table>

* Based on a market rate between 0.008 – 0.018 million Tsh/ha for bare or idle lands derived from 2009 fieldwork

† Based on a compensation rate of 0.025 million Tsh/ha, as was indicated to have been paid by GRL.

‡ Based on a rate of 494 Tsh/ha/year as indicated in the CDM-PDD (2007a: 117)

‡ All monetary conversions are based on a 2009 exchange rate of 1305 Tsh = 1 USD

241 One local government representative in Mapanda explained: [B]efore the coming of Highland, Green Resources was slow. But after the coming of Highland, Green Resources is trying, competing in providing services for the village. For example, [the Village Council] wrote a letter asking [GRL & Highland] to provide some desks in the schools. They said okay, both of them, and then both of them provided assistance in taking timbers for building the secondary schools… so it seems that they have competition (T3).

242 Villager, Mapanda Village, Interview T20, 5 March 2009.

243 Villager, Mapanda Village, Interview T23, 6 March 2009.

244 Ward Government Focus Group (T6), Makungu Village, 13 March 2009.
Uganda Plan Vivo reforestation project in Bitereko subcounty

The Plan Vivo reforestation project in Uganda was found to deliver sizeable financial benefits at the local level, though effects of the project beyond the sub-county level have been rather modest. The primary socio-economic benefit of the Plan Vivo project was the delivery of carbon payments to smallholders for the planting of indigenous tree species. The capacity of the Plan Vivo project to scale down to engage with individual smallholders is the most remarkable aspect of the project.

Plan Vivo claimed to deliver approximately $761 USD per hectare over the course of a ten year financing period, with $532 USD delivered in the first three years (EcoTrust, 2011: 17, 31). This was largely confirmed through field surveys (Table 27). After the tenth year, landholders remain contractually bound to maintain the trees until 20 years of age, but the future value of the planted trees is expected to be sufficient to ensure that trees are retained. After this 20 year period, trees are expected to be selectively harvested between their 20th and 40th year (Table 28). Over a long-term harvest cycle, Plan Vivo trees are expected to generate $7,750 per ha in revenues for landowners. The carbon finance is thus only a small fraction of total project benefits. Establishment and maintenance costs for the first five years of the project were estimated to be $238 USD per hectare during household surveys. Such costs could however be significant: some Plan Vivo participants had withdrawn because they found the costs greater than benefits.

---

245 It is estimated that indigenous tree species such as *Maesopis sp.* will sequester a total of 458 tCO2 per ha over a 20 year period (Plan Vivo, No Date -b). In order to be conservative, however, Plan Vivo sells only under half of the carbon sequestered over this twenty year period, 203 tCO2 per ha (EcoTrust, 2011: 31).

246 Villager, Bitereko Subcounty, Interview U20, 27 May 2009. As another Bitereko resident explained, “The first batch of the money I received, I spent it on buying trees and planting. The second batch we used it for plants and for weeding. We expected in the third batch to have gotten some little money but again it was wasted cleaning the work of the plantation” (Villager, Bitereko Subcounty, Interview U15, 27 May 2009). One issue here was access to seedlings. During the pilot stage of the project, seedlings were distributed for free, but as the project grew this cost was passed onto the smallholders themselves (NGO Officer, Bitereko Subcounty, Interview UD13, 26 May 2009). From household surveys, seedling costs averaged at 180,000 Ush/ha ($77/ha).
The price for carbon was not negotiated with any of the Plan Vivo participants though it was set for the duration of the Plan Vivo crediting period.\textsuperscript{247} Those who purchase Plan Vivo credits have reportedly paid between $4-10 per tCO\textsubscript{2}e though averaging closer to $4 (EcoTrust, 2007b: Table 5).\textsuperscript{248} Carbon payments to Plan Vivo participants stood at nearly $4 in 2010 though have historically ranged from $3-6 per tCO\textsubscript{2}e (EcoTrust, 2008: Table 4; 2011: 17, 31).\textsuperscript{249} However, price did not appear to be a point of contention locally: “We couldn’t bargain for things we didn’t know” one farmer explained.\textsuperscript{250} Another stated “The organization came as if it is going to give people help. So people were really ready to get help. There was no chance to bargain when someone is coming to help.”\textsuperscript{251}


\textsuperscript{248} NGO Officer, Bitereko Subcounty, Interview UD13, 26 May 2009.

\textsuperscript{249} It is estimated that indigenous tree species such as \textit{Maesopis sp.} will sequester a total of 458 tCO\textsubscript{2} per ha over a 20 year period (Plan Vivo, No Date -b). In order to be conservative, however, Plan Vivo sells only under half of the carbon sequestered over this twenty year period, 203 tCO\textsubscript{2} per ha (EcoTrust, 2011: 31).

\textsuperscript{250} Villager, Bitereko Subcounty, Interview U16, 27 May 2009.

\textsuperscript{251} Villager, Bitereko Subcounty, Interview U21, 27 May 2009.
### Table 27: Carbon sequestration, carbon credit generation and payment schedule, per hectare, for Plan Vivo participants

<table>
<thead>
<tr>
<th>Source</th>
<th>Y0</th>
<th>Y1</th>
<th>Y2</th>
<th>Y3</th>
<th>Y4</th>
<th>Y5</th>
<th>Y6</th>
<th>Y7</th>
<th>Y8</th>
<th>Y9</th>
<th>Y10</th>
<th>Y20</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carbon Sequestration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tonnes CO₂e Sequestration</td>
<td>(Plan Vivo, No Date: Figure 1 &amp; Table 7)</td>
<td>/</td>
<td>1.4</td>
<td>2.9</td>
<td>4.5</td>
<td>6.2</td>
<td>8.0</td>
<td>9.8</td>
<td>11.8</td>
<td>13.8</td>
<td>15.9</td>
<td>18.1</td>
<td>45.0</td>
</tr>
<tr>
<td>Tonnes Carbon Credit (tCO₂e)</td>
<td>(Plan Vivo, No Date: Figure 2)</td>
<td>/</td>
<td>0.6</td>
<td>1.3</td>
<td>2.0</td>
<td>2.8</td>
<td>3.6</td>
<td>4.4</td>
<td>5.3</td>
<td>6.2</td>
<td>7.2</td>
<td>8.2</td>
<td>20.2</td>
</tr>
<tr>
<td><strong>Payment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Total Payment</td>
<td></td>
<td>30%</td>
<td>20%</td>
<td>20%</td>
<td>/</td>
<td>/</td>
<td>10%</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>20%</td>
<td>/</td>
<td>100%</td>
</tr>
<tr>
<td>Payment Instalment</td>
<td>(EcoTrust, 2011: 17, 31)</td>
<td>$228</td>
<td>$152</td>
<td>$152</td>
<td>/</td>
<td>/</td>
<td>$76</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>$152</td>
<td>/</td>
<td>$761</td>
</tr>
<tr>
<td>Payment Instalment</td>
<td>Household Surveys</td>
<td>$205</td>
<td>$130</td>
<td>$137</td>
<td>/</td>
<td>/</td>
<td>$69</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>$137</td>
<td>/</td>
<td>$852</td>
</tr>
<tr>
<td><strong>Costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Five Years Establishment Costs</td>
<td>Household Surveys</td>
<td>------- Costs From First Five Years -------</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>$238</td>
</tr>
</tbody>
</table>

### Table 28: Expected harvesting schedule for Plan Vivo Mixed Native Woodlot

<table>
<thead>
<tr>
<th>Units</th>
<th>Y20</th>
<th>Y21</th>
<th>Y22</th>
<th>Y23</th>
<th>Y24</th>
<th>Y25</th>
<th>Y26</th>
<th>Y27</th>
<th>Y28</th>
<th>Y40</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maesopis Trees/ha</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>100</td>
</tr>
<tr>
<td>Medium Rotation Species Trees/ha</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>/</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>10</td>
<td>150</td>
</tr>
<tr>
<td>Slow Growers Trees/ha</td>
<td>17</td>
<td>4</td>
<td>4</td>
<td>/</td>
<td>7</td>
<td>/</td>
<td>/</td>
<td>3</td>
<td>25</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Total Harvest Trees/ha</td>
<td>35</td>
<td>52</td>
<td>39</td>
<td>39</td>
<td>/</td>
<td>32</td>
<td>25</td>
<td>25</td>
<td>28</td>
<td>35</td>
<td>310</td>
</tr>
<tr>
<td>Value Harvest* USD/ha</td>
<td>$875</td>
<td>$1300</td>
<td>$975</td>
<td>$975</td>
<td>$800</td>
<td>$625</td>
<td>$625</td>
<td>$700</td>
<td>$875</td>
<td>$7,750</td>
<td></td>
</tr>
</tbody>
</table>

*Estimated at $25 per tree as suggested by Plan Vivo (Plan Vivo, No Date: Table 3)
While there are indications that even the Plan Vivo project largely benefitted smallholders of relatively higher socio-economic strata, there was greater food security amongst Plan Vivo participants relative to villagers who were not involved with the project (Table 30). Food security appeared less related to agricultural productivity than to size of land holding. Agricultural productivity was comparable between those claiming and not claiming food security and between Plan Vivo participants and the control group. Landholdings of Plan Vivo participants were significantly larger than the control group (at 6.2 ha and 2.1 ha, respectively) and they earned greater household annual incomes (at $3,899 and $777, respectively). They correspondingly used less of their land for agriculture and had significantly more fallowland and planted *Eucalyptus* stands than control households. Nonetheless, villagers of the control group also had *Eucalyptus* planted on their plots, likely for fuelwood and construction. See Table 50 and Table 51.

The finding that Plan Vivo participants are of a higher socio-economic class corresponds with other studies (Carter, 2009: 22-23). One reason for the skewed distribution of Plan Vivo land holdings is that any participant in the program needed a minimum of 1 ha to participate. To address concerns that only project participants are benefitting, the project has developed a special Community Development Fund, representing 10% of sales of carbon credits, in order to promote initiatives that are for the benefit of the “general community” (Plan Vivo-PDD, 2009). However, this fund also appears to function as a Carbon Community Fund, kept as buffer reserve in the event of natural disturbance such as fire or insect outbreak that would release carbon stored in the trees back into the atmosphere (Plan Vivo-PDD, 2009).

However, the Plan Vivo reforestation project is not generating much in the way of MMC benefits at the national level. For example, the indigenous tree species promoted do not lend themselves to industrial applications such as construction and pulp and paper—despite the high scarcity of these resources in Uganda (discussed earlier). Nor does the project entail business arrangements to boost processing of limited wood products such as furniture that could result from the project. This stands in contrast to the Sawlog Production Grant Scheme (SPGS), a successful public-private partnership funded by the EU to spur tree-planting and plantation establishment amongst

---

252 *NGO Officer, Bitereko Subcounty, Interview UD13, 26 May 2009.*
private landholders. The disadvantage of SPGS is that it only works with landholders possessing a minimum of 25 ha of land (Jakovelli, 2009: 121), which would render ineligible all participants in the Plan Vivo project.

**Moldova CDM rural energy modernization project in Ursoaie and Cotujeni-Mici**

The CDM rural energy modernization project in Moldova also delivered benefits largely at the local level. Through interviews in Ursoaie and Cotujeni Mici, I found that the project facilitated the adoption of natural gas boilers in public schools that would undoubtedly improve conditions for learning and was key to leveraging government support to connect villages to Moldova’s gas pipeline network under the 2002 *National Program for Gasification*. The financing provided through the CDM also provided a limited degree of fiscal liberalization at the local level as village governments could use the carbon finance as they saw fit—rare in Moldova’s still largely centralized governance system. Indeed, as the carbon finance was not really necessary for the purchase of boilers (see discussion of additionality below), it could be used for other things. In Cotiujenii-Mici; instead, carbon finance was used to restore the village square.\(^{253}\) Even such relatively small funds were appreciated because they were completely at the discretion of the village government. The village government did not need to obtain approval from the district government but could respond more directly to village priorities.\(^{254}\) However, the national benefits of the rural energy modernization project were rather limited given the relatively small-scale of the project: it targeted only about two-hundred public buildings across the country. Furthermore, continued reliance on natural gas carries certain risks, because it is sourced from Russia through Ukraine and Transnistria, as discussed earlier.

**Uganda CDM cogeneration project in Kagogwa**

The CDM bagasse cogeneration project in Uganda was also delivering significant MMC benefits, though it is unclear if this is capable for compensating for increasing land scarcity. The analytic problem, however, as discussed earlier in the strong sustainability assessment, is that it is difficult to know whether increasing land scarcity was due to the expansion of sugarcane for the CDM project or to population growth.

\(^{253}\) *Village Government Officer, Cotiujenii-Mici Village, Interview M32, 17 August 2009.*

\(^{254}\) *Village Government Officer, Cotiujenii-Mici Village, Interview M32, 17 August 2009.*
The CDM project was clearly delivering MMC benefits. Sugarcane generated sizeable economic benefits for those local landholders who possessed enough land to become sugarcane outgrowers. Moreover, individual outgrowers proved themselves capable of effectively organizing into collectives such as the Busoga Sugarcane Growers’ Association (BSGA) to negotiate prices. The BSGA was established in 1993, in the words of one small business owner, “to unite all the farmers” in order to negotiate with KSW and is open to any outgrower registered with KSW. The sugar industry has also clearly had important multiplier effects in the local economy such as the provision of electricity (which was on its way in Kagogwa) and higher non-farm employment. Overall, a significant portion of the local population in Kagogwa directly or indirectly benefits from KSW in terms of MMC benefits. However, only five households were growing sugarcane in Kagogwa. The infrequency of sugarcane production was mostly due to a minimum household land size of one hectare required by KSW, which most owners and tenants alike were unable to meet. Otherwise, it was estimated that another 50 Kagogwa residents were working for KSW indirectly as cane cutters, drivers, porters and other forms of casual labour.

This was observed in household surveys, where nearly 25% of respondents were working for KSW and thus, by extension, the CDM project (Figure 54h).

Compounding low agricultural production, food commodity prices were rising: the price of maize flour had risen from 500 per kg in 2007, 800 Ush per kg in 2008 and was currently 1400 Ush in 2009. There was concern amongst Kagogwa residents that the price of maize had already surpassed that of sugarcane. Rising food commodity prices suggest land scarcity. But another reason was rampant theft of maize, often attributed to destitute, landless casual workers at KSW. But residents also pointed to the high demand for food in Sudan at the time. However, it was assumed that KSW would raise the price of sugarcane in order to offset rising

---

255 Small Business Owner, Kakira, Interview UD16, 8 June 2009.
256 Local Government Focus Group (U25), Kagogwa Village, 11 June 2009.
257 Local Government Focus Group (U25), Kagogwa Village, 11 June 2009; Village Focus Group (U26), Kagogwa Village, 11 June 2009.
258 Village Focus Group (U26), Kagogwa Village, 11 June 2009.
259 Village Focus Group (U26), Kagogwa Village, 11 June 2009.
260 Village Focus Group (U26), Kagogwa Village, 11 June 2009.
maize prices and ensure its cane supply. The NAADS agricultural programme did have a presence in Kagogwa, though it had only recently moved from its sensitization campaign to delivering actual assistance programmes. Fertilizer was not part of the NAADS extension programme in Kagogwa, largely because of a lack of local demand. A local leader explained that farmers were unaware of fertilizer’s benefits, which was confirmed during household surveys (Table 50). Finally there was not mention of smallholders irrigating their fields, though it was common knowledge that KSW used this for their sugarcane (also see World Bank, 1996: 3).

The CDM bagasse cogeneration project clearly generated significant benefits for Uganda’s national economy. These include greater sugar production, reduced sugar prices and increased electricity provision. Increasing rural electrification is a high priority for the government, as discussed earlier, and is mentioned in the 2005 Poverty Eradication Action Plan and received special attention through a Rural Electrification Strategy and Plan 2001-2010 which established the Rural Electrification Agency (REA) and a rural electrification target of 10% by 2010.

In conclusion, it is difficult to determine if local benefits exceeded costs for Kagogwa villagers unable to participate in the CDM project, notably because of uncertainty about whether the observable land scarcity (and thus food scarcity) was due to expansion of Kakira Sugar Works (KSW) sugarcane estate or because of population growth. Given the difficult circumstances facing rural smallholders with insufficient land to participate in the sugarcane economy directly, assistance such as food subsidies might be required. Nonetheless, the rather important MMC benefits which accrue to those able to participate directly and indirectly in the sugarcane expansion, suggest that it would have had a weakly sustainable effect if higher resolution cost-benefit analysis had been feasible. Kakira Outgrowers for Rural Development (KORD), a local NGO funded jointly by the BSGA and KSW, has been established to promote development projects in the area.

---

261 Village Focus Group (U26), Kagogwa Village, 11 June 2009.
262 Local Government Focus Group (U25), Kagogwa Village, 11 June 2009.
263 Local Government Focus Group (U25), Kagogwa Village, 11 June 2009.
264 Local Government Focus Group (U25), Kagogwa Village, 11 June 2009.
5.2.3. Violation of Conditions of Weak Sustainability

Uganda CDM afforestation project impact on Kirungu village

There were significant MMC benefits accruing to residents of Kirungu, involved with the Uganda CDM afforestation project, though the capacity for such benefits to compensate for costs of land loss are doubtful.

There were a number of benefits of the project. A number of residents recognized the economic benefits of employment and other economic opportunities brought on by the project such as roads and future timber harvesting. First, by improving roads, as suggested above, agricultural traders were able to more easily access Kirungu. However, the extent of such market penetration was much lower in Kirungu than in Rwerazi. From household surveys, it was found that Kirungu residents sold significantly less of their banana production, 27% versus 71% in the control village of Rwerazi. Second, it was possible for Kirungu to join RECPA and benefit directly from the CDM project. However, participation in RECPA’s carbon group appeared to be beyond the reach of most Kirungu residents; the costs of membership were too high. In 2009, RECPA was composed of only 12 members from Kirungu who had planted a total of 11 ha over the period 1998-2009.

Third, and most significantly, labour in the CDM afforestation project represented an important economic opportunity in Kirungu. It represented the second most important economic activity in the village after agriculture (Figure 54d). Approximately 100 jobs in Kirungu had been created in the village through plantation activities. A day’s wage (for a work shift from 6am to 11am) was 1,500 Ush per day or 45,000 Ush ($22 USD) per month. By way of contrast, minimum wage in Uganda has been set at 6,000 Ush per month since 1984 (US Department of State, 2009b). It has also been estimated that about 200 people will be needed in the future for fire protection, thinning and pruning throughout Rwoho CFR; and NFA has committed to sourcing 60% of this labour from local villages, such as Kirungu (CDM-PDD, 2006d: 28). But in contrast to

---


266 Based on survey undertaken by RECPA in 2009 for the author.

267 Village Focus Group (U10), Kirungu, 19 May 2009.
afforestation projects in Tanzania, employment with the CDM project in Kirungu has not supplanted agriculture as a primary occupation amongst residents.

As the government has operated on the basis that Kirungu residents had been illegally encroaching on the forest reserve, no compensation was awarded to Kirungu residents for loss of land nor for livestock impounded. This did not happen immediately; NFA made at least three visits to sensitize villagers before enforcing the reserve’s boundaries.\(^{268}\) As a resident of nearby Rwoho village explained, “In the beginning it was almost total war. In fact, some of the seedlings were uprooted.”\(^{269}\) This initial hostility had abated since the economic benefits of the project were realized.\(^{270}\) Yet for many Kirungu residents interviewed, the costs of losing land outweighed benefits of the CDM project: “We lost a lot. We can’t compare to what we [were] getting [before].”\(^{271}\) Another explained that “I don’t see any future benefit from the afforestation project. At least previously we could grow our crops and that for us was better because we are farmers. The trees, we also need them. But again it would have been better if we could grow crops.”\(^{272}\) Another put it more directly, “[Payment] of 1500 Ush per day is nothing. Food was more.”\(^{273}\) There was also little opportunity for expansion of agricultural lands for future generations and, consequently, a feeling amongst Kirungu residents that migration would be necessary.\(^{274}\) Many Kirungu residents also had to sell off their livestock when the CDM project was implemented, as the NFA began impounding livestock caught grazing.\(^{275}\) Illegal grazing is estimated to have affected 50% Rwoho CFR (RECPA & NFA, 2006: 10). The collection of fodder in the CFR is permitted and NFA has secured access for watering animals (RECPA & NFA, 2006).\(^{276}\)

\(^{268}\) Villager, Kirungu Village, Interview U6, 20 May 2009.

\(^{269}\) NGO Focus Group (U8), Rwoho Village, 19 May 2009

\(^{270}\) NGO Focus Group (U8), Rwoho Village, 19 May 2009

\(^{271}\) Villager, Kirungu Village, Interview U4, 21 May 2009.

\(^{272}\) Villager, Kirungu Village, Interview U5, 21 May 2009.

\(^{273}\) Villager, Kirungu Village, Interview U5, 21 May 2009.

\(^{274}\) Village Focus Group (U10), Kirungu, 19 May 2009.

\(^{275}\) Village Focus Group (U10), Kirungu, 19 May 2009; NGO Focus Group (U8), RECPA, 19 May 2009; Villagers, Kirungu Village, Interview U7, U8 and U9, 20 May 2009.

\(^{276}\) Village Focus Group (U10), Kirungu, 19 May 2009

202
Given the gravity of the food security situation in Kirungu, a minimum remedial action would see sufficient lands restored to ensure food security. Some Kirungu residents suggested permission to plant crops amongst trees. However, such a practice of “taungya” is explicitly prohibited in the tree-farming license between RECPA and the NFA (NFA, 2007b: Schedule A). Another strategy suggested would be to permit grazing in the CFR once trees are mature. Grazing is however explicitly prohibited in the 200 m buffer strip granted to RECPA (RECPA & NFA, 2006: 21). Alternatively, one resident suggested that a higher wage at 5000 Ush/day would make the situation more bearable. If the above remedial actions are not possible, the only remaining solution may be to relocate the village of Kirungu to a place where their long-term welfare can be assured. It is important to also consider the CDM afforestation project in the broader development context. Kirungu was already among the most isolated of the villages investigated across any of the three countries and this frustrated the provision of education, medical and agricultural extension services. These chronic development issues would have remained, and actually been worse, in the absence of the project.

It is however unclear if Kirungu was not in adverse possession of lands villagers had come to occupy in Rwoho Central Forest Reserve (see Mugyeni et al., 2005). Villagers in Kirungu knew they were encroaching on the forest reserve: “Before the project began, so many people were knowing the boundary… They knew because [the boundary] was ever there. It was ever there for so long.” Kirungu was established in 1953 if not earlier when a group of Bakiga ethnic group from what is now Kabale district requested permission to settle in the area, joining a small group of Banyankole already resident there (UFRIC, 1999). It is not certain when this group of Banyankole had first arrived: before or after the establishment of the forest reserve. The initial gazettement of the Bugamba and Rwoho Forest Reserves was undertaken in 1939 and extended over an area of 26,400 ha area, though subsequently reduced to their present size (RECPA & NFA, 2006: 9; Uganda Forest Department, 1984: 2).

277 Villager, Kirungu Village, Interview U5, 21 May 2009.
279 Villager, Kirungu Village, Interview U5, 21 May 2009.
281 Village Government Officer, Kirungu Village, Interview U1, 22 May 2009.
It is uncertain how well boundaries had been enforced in the early years of Rwoho CFR. The earliest planting records are in Bugamba CFR, to the north, from the mid-1950s, with Rwoho CFR only being planted in the 1960s (Figure 16). Another respondent spoke of complicity on the part of local forest officials who tolerated encroachment in exchange for crops. The lack of attention given to the forest reserve by the NFA was also reflected in the story, widely told in Kirungu, that a group of retired army veterans had arrived and planted crops on NFA lands, taking them in lieu of the army pension that was their due. It seems reasonable to conclude that until the CDM project’s establishment, the boundaries of the rather remote Rwoho CFR had not been well-enforced. Kirungu residents acted as de facto landowners of the parts of Rwoho Central Forest Reserve they had come to use and occupy. Yet with the establishment of the CDM project in 2006, the original boundaries were enforced and the encroachers in Kirungu expelled.

In conclusion, while the project clearly had a direct negative impact on Kirungu, if accommodation for villagers there could be made, either by granting them forest reserve land or compensating them with land in the vicinity, the sustainable development impact of the CDM project could be redeemed. With a few relatively minor policy changes, the CDM afforestation project could have net benefits at the local level.

**Tanzania biofuel project in Mtamba**

There were few MMC benefits to villagers in Mtamba, associated with the Tanzania biofuel project, while the project’s suspension means that the villagers have suffered a terrible opportunity cost. Results from field surveys found no evidence of employment in the project amongst villagers Mtamba. But in 2009, the project was only at its initial stage and employment in the project area by Mtamba residents was limited to manual labour, mostly clearing land—the clearing of 100 m$^2$ of land was reportedly valued at 20,000 Tsh. Sun Biofuel, the British company behind the biofuel project, stated that 400 people across the eight villages had been

---

282 Villager, Kirungu Village, Interview U2, 21 May 2009.

283 The CDM project is not the first tree-planting effort in Kirungu, with a number of residents mentioning the “Peri-Urban Project” (Village Government Officer, Kirungu Village, Interview U1, 22 May 2009), a reference to one component of a World Bank Forestry Rehabilitation Project during the 1980s which sought to recruit local peoples for tree-planting (World Bank, 1996a). However, there is little mention of this older World Bank project in any of the project documents, suggesting it had been rather ineffective.

284 Village Government Focus Group (T8), Mtamba Village, 30 April 2009.
employed during this initial phase, and that employment would rise to 1,500 as the project continued (Daily News, 2010; Lane, 2010). However, the biofuel project has faced significant difficulties since 2009 fieldwork. Financing problems and drought in 2011 have forced Sun Biofuels to suspend operations and lay off 300-600 workers (Lane, 2011; Simbeye, 2011), though under new ownership the plantation may continue (Carrington et al., 2011). Consequently, I conclude that there have been no employment benefits from the project. But in addition, villagers indicated that Sun Biofuel had not made any commitments to the provision of social services.  

Compensation to villagers for lands transferred for the biofuel project was small, similar to that of the afforestation project discussed earlier. The debate here is whether the amount of compensation paid was sufficient. In email correspondence, the company has maintained that it was: “[t]he independently-approved valuer [sic] duly informed all village leaders of landowners’ right to submit claims for compensation. All claims were then duly considered and those that were independently verified to be legitimate claims – as per the schedule in the village lands act for land, trees and buildings - were paid in full by the company” (John, 2010). Information on the amount of financial compensation is not published in any of the official documentation associated with biofuel, but I could reconstruct it from fieldwork and other secondary sources. Results presented in Table 29 indicate that compensation was provided to only a limited number of individuals for their “unexhausted improvements” and not other unoccupied or unused village land, revealing how the Tanzanian central government interprets and applies the compensation provisions of the Land Acts. Total compensation for all 8,211 ha of the biofuel project lands was initially rumoured at $613,000 but by 2010 had been reduced to $220,000 (Cleaver et al., 2010: 40; John, 2010; Kisembo, 2007; Lusekelo and Felister, 2008; Oxfam, 2008: 22; Simbeye, 2010). This sum was paid to 152 individuals for 714 ha of land (Cleaver et al., 2010: 40; Oxfam, 2008: 22)—which represents less than 10% of lands acquired.

The media tend to portray British-based Sun Biofuels as having paid insufficient compensation for lands acquired (Carrington et al., 2011; Carrington and Valentino, 2011; John, 2010; Kisembo, 2007; Lusekelo and Felister, 2008; Simbeye, 2010). However, the fact that patterns of

285 Village Government Focus Group (T8), Mtamba Village, 30 April 2009.
compensation were similar between the Tanzania biofuel and the CDM afforestation project, which was largely viewed positively by community members, suggests that the controversy with the biofuel project was due to the fact that it failed to generate anticipated benefits, not necessarily because of the low levels of compensation for the lands acquired.

Finally, in terms of national MMC, the project generated little in the way of benefits for the Tanzanian national economy. As a failed project, it cannot be assumed that land rents (estimated at $3,000 per year) still accrue to the central government. Even if the project had been successfully implemented, it promised to export most of the biofuel to Europe rather than use it to meet Tanzania’s energy needs, as discussed earlier. Either way, the benefits of the project at the national level can be described as modest at best.

**Table 29: Compensation payments associated with village land transfers to Sun Biofuels**

<table>
<thead>
<tr>
<th>Area Involved in Phase 1 of the Sun Biofuels Land Transfer</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ha)</td>
<td>Million Tsh</td>
</tr>
</tbody>
</table>
| Initial Village Land Request | 20,000 | / | /
| Village Lands Acquired | 8,211 | / | /
| - Value as Degraded Forest | Unknown | Unknown |
| - Market Value as Farmland* | 3,695 | $2,841.0 |
| - Annual Value as Productive Forest** | 287 | $220.0 |
| Individual Lands Compensate (152 people) | 714 | 287 | $220.0 |
| Unaccounted Village Lands | 7,497 | / | /
| - Value as Degraded Forest | Unknown | Unknown |
| - Value as Farmland* | 2,901 | $2,230.3 |
| - Annual Value as Productive Forest** | 226 | $174.0 |
| Annual Rent Paid to Central Gov† | 8,211 | 4 | $3.0 |

* Based on a reported value for farmland in Mtamba of 0.45 million Tsh/ha.
** Based on a reported annual value for productive forest of 35,000 Tsh per hectare per year (Sulle & Nelson, 2009: 53)
† Based on a rate of 494 Tsh/ha/year as indicated in the CDM-PDD (2007a: 117)
‡ All monetary conversions are based on a 2009 exchange rate of 1305 Tsh = 1 USD

The biofuel project in Tanzania was also found not to be weakly sustainable, though this differs from popular interpretations of the project. The biofuel project had imposed an important opportunity cost on villagers in Mtamba because they had transferred their rights to village land to a foreign investor with little, almost nothing, in return. It was unsustainable because it was a
bad business deal, not because of low levels of compensation or possible reductions in local natural capital. Certainly the unreasonably low compensation rates work against villages under the current land tenure system in Tanzania and expose villagers to considerable risk should projects fail. But the compensation rates were not illegal.

Indeed, findings presented here clarify the ambiguity about the interpretation of unoccupied village lands under the Land Act and Village Land Act. A first step to deflating the controversy surrounding land acquisitions in Tanzania would be to clearly explain the compensation procedures for unused Village Land. Nonetheless, the controversy surrounding the biofuel project has been amplified because villagers have no apparent legal recourse to recover lands should a rural economic development project fail.

**Moldova CDM afforestation project in Bursuceni**

The meagre MMC benefits of the CDM afforestation project in Moldova appear insufficient to cover the costs of the project’s implementation at the local level in the case of Bursuceni, a village still dependent on pastureland. The continued tensions (if not conflict) in this village raise doubts as to whether the projects benefits at the local level exceed its costs. There were two causes of tensions surrounding land. First, tensions were partly due to poor communication and inadequate participation in decision-making at the local level. These matters were governance issues between village governments and villagers themselves. As indicated earlier, a lack of village government transparency and participation was an important factor in Bursuceni.286 Similar tensions had been encountered in the two other villages involved with the Moldova CDM afforestation project, but had subsided over time as the village government offered further information. Particularly in the case of Chiscareni, the village government began to better communicate about local development issues by holding regular open meetings which were announced on the village radio.

But there were also signs that loss of degraded pastureland provoked greater hardship in Bursuceni than in the two other villages because of the lack of alternative sources of livelihood and higher dependency on grazing. Greater local MMC benefits would be necessary to overcome these reductions in local CNC. Ironically, conflict over pastureland was anticipated in the project

and means had been devised to manage it: a programme for mitigating the adverse livelihood impact of involuntary loss of degraded pastures, supported by a near $1 million grant from Japan, was incorporated into the project at the behest of the project’s EIA (World Bank, 2003a: 54-56). However, high levels of tension in the village suggest that such efforts have been insufficient in Bursuceni. Directing a greater portion of carbon finance towards this program would have bolstered the project’s overall sustainability and allowed better compensation for the temporary reductions in CNC. Overall, given the high degree of tension surrounding the CDM afforestation project in Bursuceni village, it is likely that the project would not be found to be even weakly sustainable.

5.3. Alternative Factors in Sustainability and Food Security

Given concerns about food security with rural economic development projects, some discussion of the food security situation in the villages investigated is warranted—even if food security was generally not found to be caused by the carbon finance projects investigated. Given the importance of correctly identifying causal factors in research on food security, I briefly explain here the various causal factors affecting food security in the cases investigated.

A number of villages suffered from food insecurity in Tanzania and Uganda. Villages which stand out in Tanzania were the project and control villages investigated for the CDM cookstove project in Tanzania (Endabash and Bassodawish) and, in Uganda, the project villages involved with the CDM afforestation project (Kirungu) and the CDM bagasse cogeneration project (Kagogwa). Was the CDM project activity responsible for food insecurity? In only one case did food insecurity appear directly linked to a CDM project: the case of Kirungu village involved in the CDM afforestation project in Uganda. Evidence of this is provided by the comparative methods used: the food security situation was similar in villages involved with land acquisitions and their respective control villages, except in one case of Kirungu. Here the food security situation was significantly different from its control village (Table 30). For the other cases where food security was observed, drought and population pressure appeared to be the primary drivers. Overall, the comparative research design used was able to demonstrate that food security is not related directly to land acquisitions as suggested by the critical “land grab” literature (Anseeuw et al., 2011; Arrighi et al., 2010; Cotula and Vermeulen, 2011; Zoomers, 2011).
Food security was not an issue in Moldova, at least not in terms of crop productivity amongst villages surveyed in 2009. Tensions surrounding access to grazing land in Moldova, such as in Bursuceni, were not related to villager’s capacity to produce sufficient crops but rather possibilities for grazing livestock as an alternative income generator. Poor technical design, and lack of communication and participation at the local level between villagers and village governments, was to blame for most of the tension surrounding the Moldova CDM afforestation project rather than actual land scarcity. Given low population growth rates in Moldova, it is unlikely that population growth itself is the main driver of land scarcity in Bursuceni village. It should be noted however that food security had reached crisis levels in Moldova as recently as 2007 when drought, the worst in sixty years, had led to losses in crop production of 50-70%, the unnecessary slaughter of livestock and significant rise in local food prices (FAO/WFP, 2007; UNDP, 2010c: 82).

5.3.1. Drought

Drought was found to be the main factor driving food insecurity amongst villages investigated in Tanzania. In late 2008/early 2009, weather conditions had been favourable to agriculture in central Tanzania where the afforestation projects were found (FEWS NET, 2009a; b; c; d). But early 2009 was a particularly bad year in eastern and northern Tanzania where the biofuel and CDM cookstove project, respectively, were located (Ibid.). Food security was a major issue in Karatu district, where the CDM cookstoves were located, because of poor vuli rains over September to December 2008/2009 and utter failure of the masika rains from March to June 2009 (Ibid.). Instead of the loss of land due to land acquisitions, local climate remains the primary variable in explaining food security.

Food security did not appear to be a significant concern in any of the four villages investigated with regard to the Tanzania CDM afforestation projects. This finding is not statistically robust with regards to the first village pairing of Mapanda and Luhunga as the household food security groupings sample size was not large enough. Mapanda in particular had a small sample size. The majority of households in its control village, Luhunga, were food secure though in Mapanda,

287 Amongst Moldovan villages, the average productivity of maize and wheat ranged between 2,000 and 4,000 kg/ha and inputs were also used to a larger degree, though there were significant gaps between villages in their use of fertilizer and insecticide (Table 50).
where \( n = 11 \), it was roughly even between food secure and insecure households, though noting the small sample size (Table 30). However, interviews indicated that food security was not an issue in 2009 in Mapanda and Luhunga, though it had been an issue in the recent past. The Mapanda ward government had banned the sale of food crops in 2008. As one village leader in Luhunga explained, “In some years, the rain will not be enough and we face some shortage of food. It depends on the season.” More robust are food security groupings in Idete and Ipilimo where food security was not found to be a concern (Table 30); a conclusion supported by interviews. Furthermore, differences in maize productivity between village pairings, where sample sizes were sufficiently large, were not statistically significant (Table 50). However, maize productivity in the two villages involved with the Tanzania biofuel project was significantly less than in the four villages investigated in the context of the afforestation projects (\( M_{\text{Afforest}} = 1091 \) kg/ha, \( M_{\text{Biofuel}} = 650 \) kg/ha, \( M_{\text{Cookstove}} = 734 \) kg/ha). Note that the national average for smallholder maize productivity was estimated at 750 kg/ha in 2003 (GoT, 2003b: xiii-xiv).

In contrast to the villages investigated in the context of the Tanzania CDM afforestation projects, both village pairings investigated in the context of the Tanzania biofuel project and CDM cookstove were found food insecure (Table 30). For the two villages investigated in the context of the biofuel project, differences in maize productivity and cassava between village pairings were also not statistically significant (Table 50). They were significantly different between the two villages investigated in the context of the CDM cookstove project. In the control village of Bassodawish nearly three-quarters of respondents indicated that they were currently food insecure while crop productivity was almost zero (Table 30). In Endabash, maize productivity prior to the drought was high: estimated at over 1,400 kg/ha—the highest of any of the regions visited in Tanzania in 2009 (Table 50). This difference in agricultural productivity was however due to the difference in timing between sampling the Endabash and its control village: Agricultural productivity in Endabash reflects harvests made prior to the drought of 2008/2009; while data in Bassodawish were gathered in August 2009 when the effect of the drought was observable. If the two had been sampled at the same time, it is likely that crop productivity was substantially lower in Bassodawish.

288 Village Focus Group (T1), Mapanda Village, 6 March 2009.
289 Villager, Luhunga Village, Interview T12, 1 March 2009.
would have been similar. It should also be noted that there was little tradition of planting cassava in the two villages, a crop that was being promoted as a security food in Karatu district and farming continues to be rainfed.\footnote{291}{Village Government Focus Group (T7), Endabash Village, 9 April 2009.}

Input was relatively high in Mufindi district, where the Tanzania CDM afforestation projects were located, as the result of the government led fertilizer voucher system (except for Idete where villagers claimed fertilizer was not necessary).\footnote{292}{No fertilizer—organic nor inorganic—was used in Idete. Indeed, at the village council meeting it was stated that “even if the fertilizer was brought here, we will not participate because we don’t need it”. The villagers appeared justified: Idete had the highest maize productivity of any of the villages investigated at 1329 kg/ha.} See Table 50. At the time of fieldwork in early 2009, the voucher system had not yet arrived in Kisarawe district where the biofuel project was located and, consequently, inputs were generally underused. Compared to the other regions visited in Tanzania, there was relatively high use of purchased seeds and organic manure amongst villages investigated in the context of the CDM cookstove project, but still very little use of fertilizer because of its relatively high price. The voucher system that had been initiated in Tanzania in 2009 had been received late in Endabash, after the January planting period.\footnote{293}{Village Government Focus Group (T7), Endabash Village, 9 April 2009.}

Partially because of the relatively heavy use of mechanization and continuous cultivation (insufficient fallow periods), soil fertility and erosion have become major issues in the district where the CDM cookstove projects were located (Ringo et al., 2007: 70). More tractors were available in Endabash and there were between 10-20 milling machines in the Endabash town centre.\footnote{294}{Village Government Focus Group (T7), Endabash Village, 9 April 2009.}
### Table 30: Food security status across villages in Tanzania and Uganda

<table>
<thead>
<tr>
<th>Country</th>
<th>Project</th>
<th>Village</th>
<th>Food Security Status</th>
<th>n</th>
<th>AGRICULTURAL PRODUCTIVITY</th>
<th>Land Holding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maize kg/ha</td>
<td>Cassava kg/ha</td>
</tr>
<tr>
<td>Tanzania</td>
<td>CDM Afforestation</td>
<td>Mapanda</td>
<td>Food Insecure</td>
<td>6</td>
<td>845 / /</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Luhunga</td>
<td>Food Insecure</td>
<td>5</td>
<td>1038 / /</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Idete</td>
<td>Food Insecure</td>
<td>1</td>
<td>1977 / /</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ipfilimo</td>
<td>Food Insecure</td>
<td>0</td>
<td>/ /</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mtamba</td>
<td>Food Insecure</td>
<td>5</td>
<td>563 4100 /</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Magaruwe</td>
<td>Food Insecure</td>
<td>12</td>
<td>237 3713 /</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Endabash</td>
<td>Food Insecure</td>
<td>19</td>
<td>1381 / /</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bassodawish</td>
<td>Food Insecure</td>
<td>4</td>
<td>1668 / /</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kirungu</td>
<td>Food Insecure</td>
<td>24</td>
<td>/ /</td>
<td>6810 /</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rwerazi</td>
<td>Food Insecure</td>
<td>3</td>
<td>/ /</td>
<td>4019 /</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plan Vivo Participants</td>
<td>Food Insecure</td>
<td>2</td>
<td>/ /</td>
<td>7976 /</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PV Control</td>
<td>Food Insecure</td>
<td>28</td>
<td>/ /</td>
<td>6926 /</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kagogwa**</td>
<td>Food Insecure</td>
<td>21</td>
<td>1061 / /</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cogeneration</td>
<td>Food Secure**</td>
<td>2</td>
<td>593 / /</td>
<td>/</td>
</tr>
</tbody>
</table>

† Mean maize productivity differed significantly across the six villages investigated: F(5, 97) = 5.74, p < 0.001. Post hoc Tukey-HSD tests showed that, in terms of maize productive, the maize productivity amongst the two villages involved with the biofuel project was less than the four villages investigated in the context of the afforestation projects. Differences in maize productivity between villages were not statistically significant.

†† Two independent-samples t-test were conducted for cassava productivity to account for the unequal sample sizes. When all data were analyze, there was no significant difference in the scores for Mtamba (SD=1877) and Magaruwe (SD=1882): t (33)=1.16, p = 0.257; when equal sample sizes were analyzed, Mtamba (SD=1877) and Magaruwe (SD=1882): t (26)=1.29, p = 0.208.

††† Annual banana productivity was estimated from monthly bunch production, multiplied by 12 months and assuming that 1 bunch = 10 kg. Wairegi et al. (Wairegi et al., 2007) observed average bunch weights to fall within 9.8 to 11 kg. in southern Uganda.

* Crop productivity in Endabash does not reflect the effects of drought in late 2008 and early 2009. Agricultural productivity in Endabash reflects harvests made prior to the drought of 2008/2009; while data in Bassodawish were gathered in August 2009 when the effect of the drought was observable.

** Of the two people claiming Good Food Security in Kagogwa, one was a tenant and the other owner, both were sugarcane producers possessing 1:3 ha.
Table 31: Relationship between food insecurity and projects

<table>
<thead>
<tr>
<th>Country/Project/Village</th>
<th>Food Insecurity in Project Village</th>
<th>Food Insecurity Attributed to Project</th>
<th>Identified Cause of Food Insecurity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanzania</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation – Mapanda &amp; Idete</td>
<td>No</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Biofuel – Mtamba</td>
<td>Yes</td>
<td>No</td>
<td>Drought</td>
</tr>
<tr>
<td>CDM Cookstove – Endabash</td>
<td>Yes</td>
<td>No</td>
<td>Drought</td>
</tr>
<tr>
<td>Uganda</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation - Kirungu</td>
<td>Yes</td>
<td>Yes</td>
<td>Individual and communal land loss</td>
</tr>
<tr>
<td>CDM Afforestation – RECPA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Plan Vivo Reforestation – Biteroko</td>
<td>No</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>CDM Reforestation-Kagogwa</td>
<td>Yes</td>
<td>Indeterminate</td>
<td>Sugarcane expansion or population growth</td>
</tr>
<tr>
<td>Moldova</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation – Săiți &amp; Chiscareni</td>
<td>No</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>CDM Afforestation – Bursuceni</td>
<td>Yes</td>
<td>Yes</td>
<td>Loss of (degraded) pastureland</td>
</tr>
<tr>
<td>Rural Energy Modernization – Ursoaie &amp; Cotuijeni Mici</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

5.3.2. Population Pressure

Population pressure was really only a factor affecting food security in the case of the Uganda CDM bagasse cogeneration project’s impact on Kagogwa. This project was located approximately 11 km from Jinja, Uganda’s second largest city. Jinja district also has the highest population densities of any of those investigated. But because of the lack of a control village in this case, it cannot be concluded with certainty that population density was the sole driver of land scarcity in this instance. It would be necessary to compare socioeconomic indicators in Kagogwa with an appropriate control village, at least another village located further away from the city of Jinja to reduce the effect of population.

Uganda and Tanzania are known to have some of the highest rural population growth rates in the world, while Moldova’s is effectively zero (Figure 32a). Yet between the two African countries, Uganda’s population growth rate has been greater. Consequently Uganda has the highest rural population density of the three countries (Figure 32b). Individual landholdings amongst the villages were, on average, considerably smaller in Uganda than Tanzania, suggesting that population pressure in the former is more significant (see Table 49). To round out the comparison it should be noted that Moldova has seen population growth decline to below zero.
since the collapse of the Soviet Union (World Bank, 2011d). The average size of household landholdings in Moldova was however comparable to that in Uganda (Table 49). This is not due to population pressure but rather a result of Moldova’s privatization process, which saw similarly sized plots of lands distributed to all villagers in a given village—as discussed in Chapter 4

**Figure 32: Population statistics in Tanzania, Uganda and Moldova**

![Figure showing population statistics](source: World Bank (World Bank, 2011d))

The above analysis pertains only to the state of food security at the time of 2009 fieldwork and does not consider the needs of a growing population in Tanzania and Uganda. Given a lack of information on demographic trends in the villages involved and extent of village lands available, it is difficult to reach a firm conclusion on the amount of land needed for expansion. Population growth rates in rural areas amongst the three countries suggest a doubling of the villages in 30 years in Tanzania, 23 years in Uganda and nearly 200 years in Moldova (Table 32). Urban growth rates are faster, which was relevant in the case of the CDM bagasse cogeneration project, and would see its population double in just sixteen years.

Is there enough land available for expansion amongst villages in Africa? An immediate answer to this question is not available for all lands because of a lack of information on current village land size in Tanzania and Uganda. The estimated future land needs of villages investigated are presented in Table 32, drawn from an estimate of current agricultural land use. It would be important to confirm exactly how much land has been retained for future agricultural growth in each village—something that was not feasible during 2009 fieldwork. Some information can be gleaned from recent population studies in Tanzania. Despite being located in areas with different population densities in Tanzania (AfricaScope, 2010), household land holdings were not found to
differ significantly between the Tanzania CDM afforestation and biofuel projects (Table 49). However, villages investigated in the course of the Tanzania CDM cookstove project were of noticeably smaller size.

There are two factors that would however significantly reduce the amount of agricultural land required for expansion. First would be increasing yields on current farmlands rather than opening up new lands (Jama and Pizarro, 2008; Juma, 2010; Vitousek et al., 2009). This however assumes the adoption of modern agricultural practices and moving away from traditional, shifting agriculture practices (see Grandstaff, 1978). If a lack of use of inputs is any indicator, shifting cultivation remains the norm amongst the villages investigated—though there have been recent efforts to introduce a fertilizer voucher. A second factor that would reduce the amount of agricultural land required in the future is rural non-farm income. Rural non-farm income plays a significant role in assuring food security by providing income to purchase food in the face of external shocks such as drought (Barrett et al., 2001; Reardon, 1997). To the extent that the carbon finance projects create additional non-farm sources of income, they can actually increase local food security and resilience—though only in terms of weak sustainability, not strong sustainability.
Table 32: Future Land Needs of Villages Based on Population Growth Rates

<table>
<thead>
<tr>
<th>Country</th>
<th>Project</th>
<th>Village</th>
<th>Avg Land Holding</th>
<th>Households</th>
<th>Current Used Ag Village Land (Avg Land Holding x HHs)</th>
<th>Years to Double Population*</th>
<th>Total Available Village Ag Land</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Ha)</td>
<td>(n)</td>
<td>(Ha)</td>
<td>Rural (Yrs)</td>
<td>Urban (Yrs)</td>
<td>(Ha)</td>
</tr>
<tr>
<td>Tanzania</td>
<td>CDM Afforestation</td>
<td>Mapanda</td>
<td>3.2</td>
<td>980</td>
<td>3,136</td>
<td>30</td>
<td>nr**</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td>CDM Afforestation</td>
<td>Idete</td>
<td>3.5</td>
<td>883</td>
<td>3,091</td>
<td>30</td>
<td>nr</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td>Biofuel</td>
<td>Mtamba</td>
<td>3.7</td>
<td>240</td>
<td>888</td>
<td>30</td>
<td>nr</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td>CDM Cookstove</td>
<td>Endabash</td>
<td>1.5</td>
<td>920</td>
<td>1,380</td>
<td>30</td>
<td>nr</td>
<td>Unknown</td>
</tr>
<tr>
<td>Uganda</td>
<td>CDM Afforestation</td>
<td>Kirungu</td>
<td>1.0</td>
<td>350</td>
<td>350</td>
<td>23</td>
<td>nr</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td>Plan Vivo Reforestation</td>
<td>Bitereko Subcounty</td>
<td>4.1</td>
<td>4,738</td>
<td>7,000</td>
<td>23</td>
<td>nr</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td>CDM Bagasse Cogeneration</td>
<td>Kagogwa</td>
<td>0.6</td>
<td>178</td>
<td>107</td>
<td>23</td>
<td>16</td>
<td>Unknown</td>
</tr>
<tr>
<td>Moldova</td>
<td>CDM Afforestation</td>
<td>Sâiți</td>
<td>3.2</td>
<td>760</td>
<td>2,432</td>
<td>173</td>
<td>nr</td>
<td>2,500*</td>
</tr>
<tr>
<td></td>
<td>CDM Afforestation</td>
<td>Bursuceni</td>
<td>3.2</td>
<td>671</td>
<td>2,147</td>
<td>173</td>
<td>nr</td>
<td>1,312*</td>
</tr>
<tr>
<td></td>
<td>Bioenergy Pilot / CDM Afforestation</td>
<td>Chiscareni</td>
<td>1.2</td>
<td>2,750</td>
<td>3,300</td>
<td>173</td>
<td>nr</td>
<td>4,144*</td>
</tr>
</tbody>
</table>

** nr = not relevant
* Actual measure of available village agricultural land (see Table 3-3 in Chapter 3)
5.4. Effectiveness of the DNA in Regulating Sustainable Development

Having evaluated the sustainable development impact of projects empirically, I consider my findings next to the regulatory system called for under the CDM—the establishment of a sustainable development screening agency known as the DNA. In comparison to my assessment of the sustainable development impact of projects investigated, the DNA did not appear to be very effective at screening out unsustainable projects (Table 33). The DNA was wrong in four of the eleven cases investigated, or 36% of the time. Of the two CDM projects in Tanzania, neither had received a Letter of Approval from the DNA to confirm that the project met the government’s criteria of sustainable development. However, I found both these projects to be both strongly and weakly sustainable. In contrast, although the DNA in Uganda and Moldova had approved all CDM projects investigated, the projects had led to violations of strong and weak sustainability in the case of the Uganda CDM afforestation project in Kirungu and the likely violation in the case of the Moldova CDM afforestation project in Bursuceni.

In contrast, an EIA certificate was awarded incorrectly in only two of the seven cases where an EIA was called for, or 29%. The screening of foreign investment projects was only important in the context of the Tanzania CDM afforestation projects; projects in Uganda and Moldova were led by domestic project developers (though with support from the World Bank). The CDM afforestation projects in Tanzania were all found to meet conditions of sustainable development. Nonetheless, the DNA was at best redundant to existing state regulatory authorities for EIA and foreign investment. The DNA’s assessment of the sustainable development of individual CDM projects still comes after a project has already passed through all existing regulatory steps. CDM projects could and did pass through all regular regulatory steps, only to be blocked from accreditation as CDM projects by the DNA.

The poor performance of the DNA (and the EIA process) supports Thompson’s (1993) observation that such “after-the-fact” administrative controls should not be used when consequences are difficult to monitor. Because sustainable development involves a large number of actors, it lends itself better to a “before-the-fact” institutional framework which seeks to creative incentives and constraints to regulate behaviour.
Table 33: CDM Sustainable Development Evaluation and Regulation

<table>
<thead>
<tr>
<th>County/Project</th>
<th>Case</th>
<th>Food Insecurity Impact</th>
<th>Strong Sustainability</th>
<th>Weak Sustainability</th>
<th>Project Regulation</th>
<th>EIA Approved</th>
<th>International Investment Facilitation Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>--------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Tanzania</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>--------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>CDM Afforestation</td>
<td>Mapanda &amp; Idete</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Biofuel</td>
<td>Mtamba</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>CDM Cookstove</td>
<td>Endabash</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No*</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>--------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Uganda</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>--------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>CDM Afforestation</td>
<td>Kirungu</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>RECPA</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Plan Vivo Ref</td>
<td>Biterek SC</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>CDM Cogeneration</td>
<td>Kagogwa</td>
<td>Unclear</td>
<td>No</td>
<td>Yes if MMC [1] ≥ CNC [1]</td>
<td>Yes</td>
<td>Yes</td>
<td>No** (Withdrawn)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>--------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Moldova</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>--------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>CDM Afforestation</td>
<td>Săiți &amp; Chisacareni</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td>Bursuceri</td>
<td>Partially</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Rural Energy Modernization</td>
<td>Urosești &amp; Cotușeni</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Bioenergy Pilot</td>
<td>Chisacareni</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
</tbody>
</table>

Notes: (*) the first Tanzanian CDM afforestation projects in Mapanda appears to have abandoned its aspirations of gaining approval. Subsequently, the project in Mapanda has withdrawn from the CDM process (rejected on a technicality in 2009) though has succeed in gaining accreditation in the voluntary markets (VCS, 2010). The second CDM afforestation project Idete is still listed on the CDM project validation website and, therefore, appears to still be seeking registration; (**) the CDM bagasse cogeneration project was withdrawn from the CDM by the project developer, as explained in Annex 2; (***) an EIA was not required under Moldovan law for the CDM rural energy modernization project (World Bank, 2003a).

The first CDM afforestation project was deemed ineligible for the CDM because it was initiated in 1997 but had still not been registered by 2006, thus not meeting a deadline imposed by the UNFCCC (Confidential Interview (TD9), Mufindi District, March 2009). CDM projects that had started before 2000 have been eligible for the CDM but only if submitted for registration before 31 December 2005 (UNFCCC, 2001: para.13).
5.5. Conclusion

The comparative field investigated summarized here has demonstrated that the performance of the CDM projects in terms of sustainable development was salutary, with carbon projects leading to weak and strong sustainability in eight of eleven cases. Strikingly, there was a symmetry between my findings in terms of weak and strong sustainability: projects that failed to meet conditions of strong sustainability also failed to meet conditions of weak sustainability. The challenge is to explain the variation observed in sustainable development impact, one element of the dependent variable examined in this dissertation. I undertake such an explanation in Chapter 8, which follows the meta-analysis of carbon finance projects in terms of additionality—the second element of CDM effectiveness considered.
6. Results: Additionality

This chapter summarizes research findings about the additionality of the carbon finance projects investigated. The reader will recall that that only seven carbon finance projects were considered for additionality, compared to the nine for sustainable development (two of the projects I have investigated are not claiming carbon credits). Briefly, I found only three of the seven projects claiming carbon credits to genuinely do so. I have most confidence with the CDM afforestation projects in Moldova and Uganda which were implemented by their respective state forest agencies. There was considerable uncertainty about the amount of carbon credits generated under the Uganda Plan Vivo reforestation project because of the lack of an appropriate baseline, though the conservativeness built into the carbon credit determination alleviates concerns that carbon credits are not genuine. The other NGO-led project, the CDM cookstove project in Tanzania, appeared to be additional but ultimately failed to be implemented. Projects implemented by the private sector led to significant, though not complete violations of additionality. Finally, the Moldova CDM rural energy modernization project, which was implemented by the Moldova Carbon Finance Unit (MCFU) failed to coordinate with the larger donor-sponsored project onto which it was grafted, leading to violation of the conditions of financial additionality.

These findings indicate that the type of organization implementing carbon finance projects and its organizational capacity are key for additionality. With the global price of carbon low, few organizations implementing CDM projects can rely on carbon finance alone. Except in the case of a few stalwart NGOs, which were only capable of implementing rather small and risky projects, project developers need to undertake carbon finance projects with recourse to resources other than carbon finance. Under such conditions, organizations able to successfully implement CDM projects either (i) reduce their operational costs such that projects were not completely reliant on carbon finance or (ii) had recourse to non-carbon sources of finance, including donor support and domestic sales in order to maintain profitability. But implementation does not mean a project is additional. Only the former type of financing scenario was additional, where the project developer was able to implement CDM projects with little profitability.

The private sector, naturally does not respond well to such incentives; the organizations that proved most capable of implementing “additional” carbon finance projects were state agencies.
These organizations implemented projects not for financial reasons but in order to meet the state’s developmental objectives. However, not all state organizations are equal. The example of the Moldova CDM rural energy modernization project demonstrates the vulnerability of government bodies without broad state support and designed simply to engage with international carbon markets. While expert on financial opportunities in the carbon markets, the MCFU lacked the authority to coordinate and implement CDM projects—especially when projects were out of sync with government development priorities.

The determinants of additionality sketched above lead to the identification of three carbon finance scenarios corresponding to three types of project developer: state organizations, private sector and NGOs (see Figure 31). An additionality assessment for each of the seven carbon finance project, provided below, is the basis for assigning each of the seven carbon finance projects to a carbon finance scenario. Table 38 outlines the additionality performance of the seven projects investigated while Table 39 presents various financial performance indicators of the projects investigated as well as those of comparable non-CDM projects.

**Figure 33: Determinants of Additionality under Current Carbon Market Conditions**
<table>
<thead>
<tr>
<th>Carbon Finance Scenario</th>
<th>Country</th>
<th>Project</th>
<th>Project Developer</th>
<th>Technical Support</th>
<th>Carbon Credits</th>
<th>Crediting Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(tCO$_2$e)</td>
<td>Project Implementation Period</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(tCO$_2$e) (%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Financial Additionality Bogus Credits (%)</td>
</tr>
</tbody>
</table>

**SCENARIO 1: GOVERNMENTAL ORGANIZATION AS PROJECT DEVELOPER**

Scenario 1a: State Agency with Latent Organizational Capacity for Implementation

Moldova
- **CDM Afforestation**
  - State Agency
  - World Bank
  - 7,391,196 tCO$_2$e
  - 100% Expected
  - Negligible Financial Additionality
  - Negligible Background Additionality
  - 2002-2008 Project Implementation Period
  - 2002-2035 Crediting Period
  - 20 yrs & 30 yrs Crediting Window

Uganda
- **CDM Afforestation**
  - State Agency
  - World Bank
  - 647,745 tCO$_2$e
  - 100% Expected
  - Negligible Financial Additionality
  - Negligible Background Additionality
  - 2006-2010 Project Implementation Period
  - 2006-2029 Crediting Period
  - 20 yrs each Crediting Window

Scenario 1b: Government Department with Insufficient Organizational Capacity for Implementation

Moldova
- **CDM Rural Energy Modernization**
  - State Ministry of Environ.
  - World Bank
  - 357,768 tCO$_2$e
  - 0% Expected
  - 95% Financial Additionality
  - Negligible Background Additionality
  - 2005-2007 Project Implementation Period
  - 2006-2017 Crediting Period
  - 10 yrs Crediting Window

**SCENARIO 2: PRIVATE SECTOR AS PROJECT DEVELOPER**

Tanzania
- **CDM Afforestation**
  - Private Sector
  - Private Sector
  - 8,508,155 tCO$_2$e
  - 25% Expected
  - Negligible Financial Additionality
  - 75% Background Additionality
  - 2006-2013 Crediting Period
  - 20 yrs each Crediting Window

Uganda
- **CDM Cogeneration**
  - Private Sector
  - World Bank
  - 378,793 tCO$_2$e
  - 31% Expected
  - 64% Financial Additionality
  - 5% Background Additionality
  - 2004-2008 Project Implementation Period
  - 2008-2014 Crediting Period
  - 7 yrs Crediting Window

**SCENARIO 3: NGO AS PROJECT DEVELOPER**

Uganda
- **Plan Vivo Reforestation**
  - NGO
  - Private Sector
  - 277,208 tCO$_2$e
  - 100% Expected
  - Negligible Financial Additionality
  - Unknown Background Additionality
  - 2003-variable Project Implementation Period
  - 2003-variable Crediting Period
  - 20 yrs Crediting Window

Tanzania
- **CDM Cookstove**
  - NGO
  - UNDP
  - 587,200 tCO$_2$e
  - Not Implemented
  - Negligible Financial Additionality
  - Unknown Background Additionality
  - 2008-2010 Project Implementation Period
  - 2009-2020 Crediting Period
  - 10 yrs Crediting Window

*While highly additional at the current time, a change in background afforestation rates by Moldsilva or NFA could see violations of background additionality if a certain threshold planting rate is surpassed.

**Had the development context not changed though, carbon credits issued after 2010 would be considered bogus because of the significant ODA financing received in the form of a $25 million loan.

***Uganda Plan Vivo Reforestation project discounts credits issued by at least half the actual sequestration rate.

****The Tanzania CDM Cookstove project was closed in 2010.
Table 35: IRR, NPV and carbon prices of CDM projects investigated

<table>
<thead>
<tr>
<th>CDM Financing Scenario</th>
<th>Country</th>
<th>Project Type</th>
<th>Reference</th>
<th>Measure</th>
<th>Without Carbon</th>
<th>With Carbon</th>
<th>Carbon Price (USD/t CO₂)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>Uganda</td>
<td>CDM Afforestation</td>
<td>(CDM-PDD, 2006a; b; c; d; 2009)</td>
<td>IRR</td>
<td>13.6%</td>
<td>14.7%</td>
<td>$4.15*</td>
</tr>
<tr>
<td></td>
<td>Moldova</td>
<td>CDM Afforestation</td>
<td>(CDM-PDD, 2008d: 53-54)</td>
<td>IRR</td>
<td>Negative</td>
<td>Negative</td>
<td>$7*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20 yrs</td>
<td>IRR</td>
<td>3.7%</td>
<td>5.6%</td>
<td>$7*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40 yrs</td>
<td>IRR</td>
<td>4.1%</td>
<td>5.8%</td>
<td>$7*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>60 yrs</td>
<td>IRR</td>
<td>Negative</td>
<td>7.7%</td>
<td>$2*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(CDM-PDD, 2010: 39)</td>
<td>IRR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario 2</td>
<td>Tanzania</td>
<td>CDM Afforestation</td>
<td>(CDM-PDD, 2008f: 39-40)</td>
<td>IRR</td>
<td>11.3%</td>
<td>14.6%</td>
<td>$6</td>
</tr>
<tr>
<td></td>
<td>Uganda</td>
<td>CDM Cogeneration</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coal to Biomass</td>
<td></td>
<td>NPV</td>
<td>$939</td>
<td>$2,189</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Small Buildings</td>
<td></td>
<td>NPV</td>
<td>$11,417</td>
<td>$13,602</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium Buildings</td>
<td></td>
<td>NPV</td>
<td>$3,457</td>
<td>$3,911</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large Buildings</td>
<td></td>
<td>NPV</td>
<td>$12,497</td>
<td>$13,405</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coal to Natural Gas</td>
<td></td>
<td>NPV</td>
<td>$26,756</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Small Buildings</td>
<td></td>
<td>NPV</td>
<td>$3,457</td>
<td>$3,911</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium Buildings</td>
<td></td>
<td>NPV</td>
<td>$12,497</td>
<td>$13,405</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large Buildings</td>
<td></td>
<td>NPV</td>
<td>$26,756</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>Uganda</td>
<td>Plan Vivo Reforest</td>
<td>(EcoTrust, 2004; 2007b; 2008; 2009)</td>
<td>IRR</td>
<td>NA</td>
<td>NA</td>
<td>$3.8-4.9</td>
</tr>
<tr>
<td></td>
<td>Tanzania</td>
<td>CDM Cookstove</td>
<td>(KDA, 2008)</td>
<td>IRR</td>
<td>NA</td>
<td>NA</td>
<td>$12.5</td>
</tr>
<tr>
<td>Non-Carbon Finance</td>
<td>Uganda</td>
<td></td>
<td></td>
<td>IRR</td>
<td>10-14%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Afforestation</td>
<td>New Zealand, Australia</td>
<td></td>
<td></td>
<td>IRR</td>
<td>8.0-8.5%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Brazil, Chile, Spain, Turkey</td>
<td></td>
<td></td>
<td>IRR</td>
<td>10-12%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>UK</td>
<td></td>
<td></td>
<td>IRR</td>
<td>3-5%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Germany</td>
<td></td>
<td></td>
<td>IRR</td>
<td>0.5-1.0%</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Price estimated from volume of credits purchased by World Bank and total price paid; see individual country chapters for further information.
6.1. Scenario 1: Governmental Organization as Project Developer

Under Scenario 1, carbon finance alone was not sufficient to see a project implemented but could be tapped by a government organization in order to implement a project. When the government possessed sufficient latent organizational capacity to implement a project, the resulting project was found to be highly additional. Amongst the cases investigated here, this was the case of projects implemented by state agencies who had a political mandate to reach developmental goals similar to those sought by the CDM project. Examples include the CDM afforestation projects in Moldova and Uganda, where tree-planting efforts in the CDM projects investigated were both led by state agencies: Moldsilva and the Uganda National Forestry Authority (NFA), respectively. In effect, CDM financing made it possible for Moldsilva and NFA to plant more trees than they would have been able to do independently in order to reach forest development goals set by government. While the projects between the two countries differ in size and technical sophistication, this is a difference of degree and not kind. However, when the government body did not have sufficient organizational capacity, this resulted in non-additional projects. This was exemplified by the Moldova Carbon Finance Unit (MCFU) in the case of the Moldova CDM rural energy modernization project. MCFU was a small department established at the Ministry of Environment that sought to develop carbon finance projects.

6.1.1. Moldova CDM afforestation project

Moldsilva has claimed that in the absence of the CDM project, this area would see “further degradation under growing population demands and will result in adverse impacts on adjoining lands” (CDM-PDD, 2008d: 40-42; 2010: 46-52). Apart from the carbon finance, it was argued, there were limited financial resources for tree-planting except what Moldsilva’s forest enterprises could generate themselves through harvesting timber. How does the additionality claim stand up to scrutiny?

My assessment is that during the implementation phase of the Moldova CDM afforestation project from 2002-2008, carbon finance did not crowd out other afforestation efforts in Moldova but rather allowed Moldsilva to double its baseline planting effort. It is highly unlikely that such high planting would have happened “anyway,” including over the project’s 35 year crediting
period. And while our additionality assessment is limited to data available up to 2008, we can with confidence conclude that it is unlikely that the conditions of additionality will be violated before the crediting period comes to an end in 2035. To violate additionality, Moldsilva would need to sustain a planting rate of 3,900 ha/yr, which is well beyond observed historical rates. Thus the 7.4 MtCO$_2$e of credits would appear to be genuine (Figure 35). Monitoring of Moldsilva’s independent tree-planting rate to verify if it passes the 3,900 ha/yr threshold could be used as an index of the project’s additionality over time.

**Scope of Additionality**

Additionality should be assessed by considering the CDM financed afforestation effort relative to other, non-carbon finance forestation efforts in the rest of Moldova occurring at the same time as the carbon finance projects. Apart from carbon finance, the national afforestation effort was also undertaken with funds provided under the 2003 *State Program for Afforestation and Regeneration of the Lands from the Forest Fund for the period of 2003-2020* which targeted 95,118 ha of degraded land. Recall however that the ultimate goal set by government is to expand forest cover by 130,000 ha by 2020. Together tree-planting efforts in the CDM project area and non-CDM areas represent the scope of the additionality assessment, which in this case is the total afforestation and reforestation effort in Moldova during the carbon finance crediting period.

Distinguishing between the carbon finance supported tree-planting effort and the government’s own, non-CDM efforts is possible with data that Moldsilva maintains on its national forestry effort (*Moldsilva*, 2010a, 2010b). These data do not distinguish CDM financed from non-carbon financed planting. But planting effort is described in the CDM project documents, which could then be subtracted from data on Moldova’s national afforestation and reforestation effort. Recalling that included with my assessment of the CDM is the World Bank voluntary carbon finance agreement with Moldsilva. Its total planting effort for the five year period was 8,170 ha, which gives 1,634 ha/yr.

Recall that data on Moldova’s national forestation effort includes data on afforestation, reforestation and assisted natural regeneration (ANR). Only the first two were retained for baseline determination. ANR is the human protection and preservation of natural tree seedlings in forested areas, and would not be feasible on unforested, degraded lands where the government seeks to expand forest cover. ANR is expected to only contribute to the maintenance of Moldova’s existing forest, not establishment of new forests. However the distinction between afforestation and reforestation in the field can be sufficiently unclear in the field that it warranted including both measures. Recall that the scope of additionality should ensure that the economic activities compared to the CDM are of similar output (i.e., carbon sequestration), but not in the way that this output is produced.
Results are presented in Figure 34. Baseline tree-planting averaged 1,161 ha/yr through 1997-2001 and 3,323 ha/yr over 2002-2008. In comparison, the average CDM tree-planting effort—which includes the two CDM projects and World Bank voluntary carbon finance agreement with Moldsilva—stood at 5,356 ha/yr over 2002-2008.

**Background Additionality**

Figure 34 demonstrates that there was hardly any tree-planting ahead of 2002 and the passage of the 2003 *State Program for Afforestation and Regeneration of the Lands from the Forest Fund for the period of 2003-2020*. Over the period 2002-2008 a total of 60,115 ha was afforested and reforested by Moldsilva, a period corresponding to the planting period of the CDM afforestation project. Of this, 22,621 ha was planted independently by Moldsilva while the CDM and the World Bank voluntary carbon finance projects led to the planting of 37,449 ha over the 2002-2008 period—nearly doubling Moldsilva’s independent planting effort. Altogether these results suggest that the carbon finance projects were highly additional because they did not displace but actually added to afforestation efforts that Moldsilva was able to undertake independently.

This interpretation of the additionality of the project is supported by other evidence. For example, the 2003 planting effort determined above corresponds with a World Bank report which observed that Moldsilva afforested a total of 7500 ha of degraded agricultural lands, including around 5000 ha of the CDM project lands (World Bank, 2004b: 18-19). More importantly, discussion with key informants and review of policy documents substantiates the data presented here. An agent of one of Moldsilva’s forest enterprises estimated that the CDM project had permitted 30,000 additional hectares to be planted over the eight years of the project, which corresponds to numbers presented here. An official at the World Bank reported during conversation that Moldsilva would have afforested 30,000 ha on its own and that the CDM projects allowed for 30,000 ha more, roughly corresponding to the analysis above.

---

298 Moldsilva Rayon Agent (MD5), confidential interview.

299 The World Bank official explained “[In 2008, Moldsilva] claimed they had overall afforested since 2001 about 60,000 ha…Of those 60000, 30,000 ha have been afforested under [World Bank] projects. So I would again [claim] in the spirit of what we believe is true for additionality and these protects that without our carbon finance funds, they wouldn’t have afforested the additional 30,000 hectares and they would have stayed with the 30,000 that they would have afforested on their own. Those 30,000 are beyond our project (*Multilateral Donor Agency Officer, Chisinau, Interview MN4, 26 August 2009*).” While this overlooks the voluntary market project, it is correct with regard to the CDM.
While one can be confident that the carbon finance projects were additional over the implementation period, additionality over the entire crediting period extending to 2035 cannot be known with certainty. The crediting periods of the three carbon projects vary, but altogether extend from 2002 through 2035 for a total of 33 years. Baseline planting rates may change into the future. The concern is that afforestation undertaken on land used for carbon finance projects would have been undertaken at a later date by Moldsilva “anyway”.

Additionality would be violated only if, by the end of the CDM crediting period, Moldsilva had planted enough trees independent of the CDM to reach the government’s 130,000 ha forest cover target. We can assert with confidence that it is highly unlikely that additionality will be violated before the crediting period comes to an end. For example, if Moldsilva were slow to meet its 2020 forest cover target of 130,000 ha and 40,000 ha still remained available by 2040 (about the area considered for the carbon finance projects), planting would not violate additionality because the carbon finance projects would have been over by the time Moldsilva’s planting reached them. To violate additionality, Moldsilva would need to sustain a planting rate of at least 3,900 ha/yr annually through 2035. However, Moldsilva’s independent planting rates averaged 3,323 ha/yr from 2002-2008. Thus the 7.4 MtCO$_2$e of credits appear genuine (Figure 35), though monitoring of Moldsilva’s independent tree-planting rate to verify if it passes the 3,900 ha/yr threshold could be used as an index of the project’s additionality over time.

**Financial Additionality**

Despite poor financial performance, the political expediency of the Moldova CDM afforestation project grew out of concerns about land degradation and the call for an increase in Moldova’s forest estate by at least 130,000 ha by 2020 as set out in the *Strategy for the Sustainable Development of the Forestry Sector (2003-2020)*. The carbon finance projects simply became an extension of government policy, albeit a policy for which they did not have enough resources. As an official of Moldsilva explained, in the absence of the CDM projects afforestation would have proceeded but only at a smaller scale:

> The CDM was a financial supplement for the project, without these carbon credits, they would have still implemented this kind of a project, but on a smaller area. The profit margin [for afforestation] is very small. The internal rate of return, even with financial support from carbon credits is [still] very small. But there were exact and direct orders from the President of Moldsilva, who said that this project should be implemented.

---

300 Moldova Government Officer, Chisinau, Interview MN9, 10 August 2009.
This description of the low financial attractiveness of the carbon finance afforestation projects is supported by the financial analysis presented in the CDM project documents. The IRR of the first CDM afforestation project only becomes positive forty years after implementation and only at a meagre 5.6% (compared to 3.7% without carbon finance) while commercial loans in Moldova require an IRR of 15-20% (CDM-PDD, 2008: 50-54).

While the carbon finance projects themselves are not commercially attractive, nor is Moldsilva in a position to be wasting money. It is well established that Moldsilva has been chronically underfunded. Budget allocations to the forest sector in 2002 and 2005 covered only about 4% and 19% of the Moldsilva’s financing requirements, respectively (Government of Moldova, 2006). Carbon finance was very beneficial to the organization. From interviews with Moldsilva, the CDM appeared to resolve cash flow problems of the otherwise latent afforestation capacity of Moldsilva.\(^{301}\) In the first year of implementation, in 2002, carbon finance supported nearly two-thirds of total planting efforts in the country (Figure 34). Its share declined over time as Moldsilva directed its resources to planting on the non-CDM project lands.\(^{302}\)

A final piece of evidence in favour of the financial additionality claims of the project were, ironically, tensions surrounding the afforestation projects in some of the villages investigated. One village counsellor was quite clear that if it had not been for the afforestation project the area “would have remained pasture.”\(^{303}\) Another district official spoke of the challenge of restoring degraded lands: “Since [the Soviet period], more land has become degraded and there is a national plan for improving degraded land, but the amount of money granted is insufficient for implementing the project.”\(^{304}\) Altogether the key informants and experience in the field supports the financial additionality claims of the CDM project.

---

\(^{301}\) Moldova Government Officer, Chisinau, Interview MN9, 10 August 2009.

\(^{302}\) Moldova Government Officer, Chisinau, Interview MN9, 10 August 2009.

\(^{303}\) Business Manager, Săiţi Village, Interview M1, 1 August 2009.

\(^{304}\) District Government Officer, Căușeni, Interview MD1, 7 August 2009.
Figure 34: Total Afforestation Effort in Moldova, 1997-2008


Figure 35: Additionality Assessment of Moldova CDM Afforestation Project

(a) Additionality claim of CDM projects

(b) Additionality claim adjusted for remodelled baseline, assuming non-CDM baseline planting ends 2008
6.1.2. **Uganda CDM afforestation project**

NFA claims that without carbon finance the afforestation project would not have been able to proceed for two primary reasons: a lack of funds and the inability to attract them (CDM-PDD, 2006d: 15-16). NFA also claims that the baseline afforestation rate in the 2,015 ha CDM project area is effectively zero: no afforestation would have happened in this area if not for the CDM through the project’s 25 year crediting period from 2006-2029. How well does this argument stand up to scrutiny?

My assessment is that the CDM project is highly additional as long as NFA continues to struggle financially and maintains a non-CDM planting rate of under 171 ha/yr in Rwoho CFR. During the project’s implementation period, the CDM effort clearly surpassed the baseline planting observed elsewhere in the Rwoho CFR and in neighbouring Bugambe CFR where planting rates averaged between 100-126 ha/yr over the five year CDM project implementation window. Monitoring of the baseline planting rate to determine if it reaches the 171 ha/yr threshold over the CDM crediting period could be used as an index of the project’s additionality and used to adjust the carbon credits generated by the project. Thus the 0.65 MtCO$_2$e of credits are genuine (Figure 37).

**Scope of Additionality**

The baseline planting rate in Rwoho CFR relative to the CDM planting rate could be verified by two means: comparison of CDM planting rates to NFA’s non-CDM finance planting in Rwoho and to those in nearby Bugamba CFR. Bugamba CFR is located to the north of Rwoho and also managed by the NFA, though only Rwoho has been involved in the CDM project. Planting rates for both CFRs were located in their forest management plans; the two are generally managed together (NFA, 2007a; Uganda Forest Department, 1984). Distinguishing between trees planted in Rwoho CFR independent of carbon finance and those planted through the CDM could be determined by subtracting annual CDM planting effort presented in the CDM project documents from total planting effort reported by NFA in its management plan for Rwoho.

In undertaking the additionality assessment, care needs to be taken to ascertain exactly how much land in Rwoho CFR is available for afforestation. While Rwoho CFR extends across a total of 9,073 ha, only approximately 6,000 ha has been designated for afforestation. There is a 2,978
ha block in the northern section of Rwoho CFR set aside for biodiversity conservation (NFA, 2007a: 14). Of the designated afforestation area in Rwoho, approximately 2,015 ha was to be planted under the CDM. Another 2,406 ha is allocated by NFA to private investors and 211 ha to community organizations such as RECPA for non-carbon plantations while 1,480 ha is comprised of existing plantations which will be harvested and need to be replanted in the near term (NFA, 2007a: 14-15, 28-29). The concern with additionality is that CDM afforestation may crowd out non-CDM tree-planting in other designated plantation areas.

**Background Additionality**

Data on planting effort in Rwoho and Bugamba CFRs from 1956 to 2012 are presented in Figure 36. They generally support the additionality claims of the CDM: planting has historically been restricted to approximately 100 ha/yr in each reserve, though there are important gaps in such planting during the 1980s and early 2000s. Planting efforts focused initially in Bugamba with Rwoho only coming online in the late 1960s. Over the 2006-2010 CDM project implementation period, independent non-CDM planting by NFA in Rwoho CFR averaged 126 ha/yr. Planting at adjacent Bugamba CFR has remained at under 100 ha/yr throughout this period. In comparison, during 2006-2010, the CDM was responsible for having financed the planting of 403 ha/yr, increasing overall planting rates in Rwoho CFR to 529 ha/yr. In other words, over the 2006-2010 CDM project implementation period, a total of more than 2,643 ha were planted in Rwoho of which 2,015 ha was due to the CDM project activities. It is also worth noting that, according to forest management plans, NFA planting was expected to return to the historical rate of about 100 ha/yr in 2010, after the CDM project’s implementation period came to a close. This was expected to result in an additional 373 and 276 ha planted in Rwoho and Bugamba, respectively, over 2011-2013.

While one can be confident that the CDM project was additional over the implementation period from 2006-2010, additionality over the entire 25 year crediting period extending to 2029 cannot be known with certainty. Baseline planting rates in Rwoho CFR may change in the future. However, we can better understand the risk that additionality would be violated in the future. The concern that climate change mitigation activities would have taken place “anyway” in this particular case is that afforestation undertaken on the 2,015 ha of Rwoho land designated for CDM afforestation would have been undertaken at a later date by NFA independently “anyway”.
Recall that the CDM afforestation area represents only about a third of the approximately 6,000 ha available for planting area in Rwoho CFR. As of 2007, there remains 2,406 ha available for private investors and another 1,480 ha soon to be harvested—a total of 3,886 ha non-CDM designated afforestation area. At the historical baseline planting rate of approximately 126 ha per year, it would take NFA an additional 31 years to plant the 3,886 ha available for afforestation outside the CDM area. In light of historical planting rates and the amount of available land, it would take NFA until 2037 to have all 3,886 ha planted as measured from the 2006 start date of the CDM project. But the CDM crediting period would have come to a close already by 2029.

NFA’s baseline planting would only violate additionality if, by the end of the CDM 25 year crediting period, it resulted in planting all 3,886 ha available in Rwoho CFR. In such a case, once it finished planting on the non-CDM lands, it would abut on the CDM designated lands and risk being crowded out by the CDM effort.

What is the risk of the non-CDM planting effort abutting on lands planted under the CDM and breaching additionality? In order to assess this, I estimate a threshold additionality planting rate. Here it is important to recognize that over the CDM’s implementation period, 2006-2010, NFA had planted 630 ha of the non-CDM designated planting area in Rwoho. This leaves 3,256 ha to be planted. Above an annual non-CDM planting rate of 171 ha/yr, NFA would complete planting of the non-CDM lands in Rwoho in the 19 years before the CDM crediting period came to a close in 2029. Barring a rapid increase in planting rates above 171 ha/yr, which is highly unlikely, this CDM project is found to be highly additional.

**Financial Additionality**

As in Moldova, the CDM afforestation project in Uganda was not financially attractive. The Bank of Uganda does not consider forestry an interesting investment option in Uganda (JACO CDM, 2009: 10). Alternative investments yield higher IRR to forestry projects including Treasury Bills (15%) and agricultural activities like maize (24%). Investment analysis of the Uganda CDM afforestation projects is 13.6 % without carbon finance and only 14.7 % with carbon finance, assuming carbon credits valued at $3/tCO₂e (see Table 35).
But it is also known that, since its initial funding allocation in 2003, NFA has not received any further donor funding and has struggled to keep itself financially afloat.¹⁰⁵ The 2002 National Forest Plan expected that the NFA would sustain itself from revenues from timber sales and timber license fees from forest reserves. Of the funds NFA received for activities over 2003-2013, nearly 70% of this was allocated in the first three years of the organization’s existence to help with its establishment (MWLE, 2002: 142). A recent review concluded that NFA’s revenues have failed to meet projected targets and planned programmes have not been implemented due to lack of finance; revenue from timber sales is expected to decline further in the near term as remaining mature plantations are harvested (LTS, 2010: 15). This has been compounded by an alleged corruption issue which has seen NFA’s bank accounts frozen since 2009 by court order (Ibid.). In terms of performance, NFA has been outshone by a public-private partnership for tree-planting in Uganda, the SPGS. Given the success of SPGS relative to NFA, it was SPGS which was awarded additional donor financing—in 2009, SPGS received an additional $20.8 million from donors in order to plant 30,000 ha by 2013 (SPGS, 2009b).

¹⁰⁵ Of the funds NFA received for activities over 2003-2013, nearly 70% of this was allocated in the first three years of the organization’s existence to help with its establishment (MWLE 2002: 142).
Figure 36: Planting Effort in Rwoho and Bugamba Central Forest Reserves, 1956-2012

Sources: 1956-1980: Uganda Forest Department (1984: Appendix 1, Bugamba and Rwoho Area Statements); NFA (2007: Tables 3, 4, 17 & 18) and CDM Project Design Documents (CDM-PDD 2006a, b, c, d and 2009)

Figure 37: Additionality Assessment of Uganda CDM Afforestation Project

(a) Additionality claim of CDM project

(b) Additionality claim adjusted for remodelled baseline, assuming non-CDM baseline planting ends 2013
6.1.1. **Moldova rural energy modernization**

The additionality claim of the Moldova CDM rural energy modernization project is largely a financial one: that in the absence of the carbon finance, donor financing through the SIF2 programme would not have gone to energy retrofits, natural gas and bioenergy but other village development priorities. As argued in the CDM project documents: “the availability of carbon revenues for energy system rehabilitation is a financial incentive for the communities to elect these types of investments from a wide array of community priorities. Without the revenue generated by selling the emission reductions, the project activities have a negative net present value” (CDM-PDD, 2005b: 16).

Recall that different types of project activities were targeted in the CDM project: bioenergy, energy efficiency and fossil fuel-switching from coal to natural gas. Yet it was learned that none of the villages involved with the CDM project had adopted biomass boilers and most had adopted natural gas boilers. This was confirmed during field visits to the three CDM project villages investigated.³⁰⁶ The adoption of natural gas and hybrid coal-gas boilers is itself not an indication that the CDM project as a whole was not additional; the adoption of cleaner natural gas boilers can lead to reductions in emissions relative to coal.

**Scope of Additionality**

The scope of additionality assessment is the use of SIF2 funds by villages not involved in the CDM project. There was no requirement that SIF2 funds be used for retrofitting public buildings with either bioenergy boilers, natural gas boilers or energy efficiency improvements. SIF2 funds could go to any village projects identified by villagers.

**Background Additionality**

The Moldovan CDM rural energy modernization project was least sensitive to changing background conditions amongst all investigated. It is true that natural gas was found to be financially attractive on its own terms, in the absence of carbon finance (Table 35). But as discussed earlier, poorer Moldovans are struggling to afford natural gas and villages had

---

³⁰⁶ Two had adopted hybrid coal-natural gas boilers (Cotiujenii-Mici and Prepeliţa in Singerei district) while a third (Ursoaie in Căuşeni district) had adopted a natural gas only boiler.
difficulty affording new natural gas boilers to replace coal fired ones. Furthermore, the price of natural gas is expected to rise in the mid-term as Russia raises prices to EU market rates.

Financial Additionality

The deployment of carbon finance to the CDM rural energy modernization project does not appear necessary. There have been important incentives to adopt improved natural gas boilers for public buildings in Moldova both on their own terms and through the SIF2 project during the CDM project’s implementation period. As the CDM project did not appear to deflect the decision-making of village officials from the course they would have taken were the CDM project absent, it can be concluded that none of the CDM credits from these two projects are genuine. CDM aside, however, the evidence also indicates that the use of SIF2 financing towards natural gas boilers and related retrofits in village public buildings was not the most effective use of donor financing.

The SIF2 project and CDM were supposed to be coordinated in a way that would have seen the CDM project create incentives for the adoption of additional rural energy modernization activities under SIF2. SIF2 was expected to finance 400 projects in rural Moldova, with an estimated 250-300 being related to energy infrastructure for public buildings such as schools, community halls and health centres (CDM-PDD, 2005a: 5). The CDM project was grafted onto the SIF2 project and sought to steer it towards bioenergy, natural gas and energy retrofits. To ensure the sustainability of projects undertaken, SIF2 requires local villages to contribute 15% to total project costs (World Bank, 2004c: 6). This was argued, in the context of CDM additionality, to be a significant barrier preventing energy-related projects from going ahead which CDM financing would overcome.

The additionality of the CDM project appears highly unlikely. A significant number of villages which were involved with SIF2 but not the CDM project undertook natural gas and energy efficiency projects. School and gasification projects appear to have been highly popular on their own with the SIF2 program. Of the 354 projects approved for implementation under SIF2, 50% involved school renovations and 23% involved natural gas (Table 36). It is not possible to tell from these numbers if the categories for school renovations involved measures to improve energy efficiency. But it seems likely that a majority of SIF2 projects were already directed...
towards energy modernization in public buildings and the CDM project was responsible for their adoption.

<table>
<thead>
<tr>
<th>Projects Type</th>
<th>Total proposals</th>
<th>Approved For implementation</th>
<th>Identification Stage</th>
<th>Evaluation Stage</th>
<th>Rejected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>52</td>
<td>37</td>
<td>0</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>School</td>
<td>195</td>
<td>177</td>
<td>2</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Roads</td>
<td>71</td>
<td>48</td>
<td>0</td>
<td>1</td>
<td>22</td>
</tr>
<tr>
<td>Gas</td>
<td>89</td>
<td>82</td>
<td>0</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Other</td>
<td>15</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>422</td>
<td>354</td>
<td>2</td>
<td>9</td>
<td>57</td>
</tr>
</tbody>
</table>

Source: (FISM, 2009: 11)

The reason for such overlap was the failure of the MCFU to coordinate the CDM project with the much larger SIF2 program. Recall that the CDM project was quite small relative to SIF2. SIF2 was also under the autonomous non-profit organization administered by a committee headed by the Prime Minister (MSIF, No Date), whereas the MCFU was government department within the Ministry of Environment and Natural Resources whose primary role has been the facilitation of CDM projects (Gobjila, 2007). However, it is questionable whether the MCFU had the organizational capacity to effectively coordinate the CDM rural energy modernization projects. It was located in a single office within MENR and did not have prior experience with managing or regulating energy projects. Consequently, there was poor coordination between the CDM and SIF2 project:

[T]here was a little bit of a lack of synchronization in timing between the [the CDM project] and [SIF2]. It was a really good idea on paper, but when we tried to implement it on the ground, SIF2 just zipped through very quickly, over-subscribed. By the time we sort of caught up with them, money was out the door already and [SIF2] couldn’t commit anything more. We tried to find some donor funding. We approached the Japanese, we approached the Swedes, we approached different people, and it just never happened because they didn’t have the money to allocate for this.\(^{307}\)

The extra funds referred to above were intended to cover the additional costs of biomass energy. In sum, SIF2 had already committed to village requests for natural gas boilers prior to the financial benefits of the bioenergy component of the CDM project being sufficiently explained to villagers. Arguably, had villagers known about the greater carbon finance associated with the bioenergy component of the project, and hence its reduced cost, they might have been more open.

\(^{307}\) Multilateral Donor Agency Officer, Chisinau, Interview MN4, 26 August 2009.
to the technology. Nonetheless, the CDM project has since been officially registered, carbon credits issued and carbon payments made to the villages involved.

While the CDM project sought to incentivize three different types of mitigation activities—bioenergy, energy efficiency and fossil fuel-switching from coal to natural gas—there is evidence that the latter two were financially attractive on their own. Table 37 demonstrates that only the combination of mitigation activities as a whole is financially unattractive without carbon finance (negative NPV) and that some of the individual activities were financially attractive. Aside from bioenergy, the most financially attractive type of project in the absence of carbon finance is fuel-switching from coal to natural gas. It reduces costs in the range of $3,500 to $27,000. In the absence of carbon finance, switching from coal to biomass is attractive for larger buildings though not small ones. Importantly, these patterns do not change with the addition of climate finance; only the relative attractiveness of each option is improved in the range of 0.7% to 13.1%. When presented with a choice between switching to natural gas or biomass, natural gas was the better financial option, with or without carbon finance.

Fieldwork supports the conclusion that natural gas was attractive on its own terms. There are good reasons, independent of SIF2 or the CDM, for adopting natural gas or coal-gas hybrid boilers. Some were related simply to costs. Compared to wood and charcoal, natural gas was actually a cheaper source of fuel. Similarly, the new hybrid coal-gas boiler in Prepeliţa consumed one-third of the coal of the boiler it had replaced. Carbon finance added little to these cost savings. In Cotiujenii-Mici, carbon finance was only a small part of overall project financing. The village council had signed a contract with the MCFU for 23,000 MDL, less than five percent of the 845,798 MDL used towards the new boilers.

---

308 Village Government Officer, Cotiujenii-Mici Village, Interview M32, 17 August 2009.
309 Village Focus Group (M33), Prepeliţa Village, Interview, 17 August 2009.
Table 37: Financial analysis of three different project activities: coal-gas fuel switching, coal-biomass fuel-switching and energy retrofitting (coal-coal) as presented in Moldova CDM project documents

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Project Type</th>
<th>Scenario</th>
<th>Costs Reductions Relative to Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>without carbon finance</td>
</tr>
<tr>
<td>Small Building (Size A)</td>
<td>Energy Efficiency</td>
<td>Gas-Efficient Gas</td>
<td>-$11,131</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coal-Efficient Coal</td>
<td>-$10,935</td>
</tr>
<tr>
<td></td>
<td>Fuel Switching</td>
<td>Coal-Efficient Gas</td>
<td>-$7,903</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coal-Efficient Biomass</td>
<td>$3,457</td>
</tr>
<tr>
<td>Medium Building (Size B)</td>
<td>Energy Efficiency</td>
<td>Gas-Efficient Gas</td>
<td>-$16,678</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coal-Efficient Coal</td>
<td>-$14,893</td>
</tr>
<tr>
<td></td>
<td>Fuel Switching</td>
<td>Coal-Efficient Gas</td>
<td>$12,497</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coal-Efficient Biomass</td>
<td>$939</td>
</tr>
<tr>
<td>Large Building (Size C)</td>
<td>Energy Efficiency</td>
<td>Gas-Efficient Gas</td>
<td>-$24,301</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coal-Efficient Coal</td>
<td>-$45,489</td>
</tr>
<tr>
<td></td>
<td>Fuel Switching</td>
<td>Coal-Efficient Gas</td>
<td>$26,756</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coal-Efficient Biomass</td>
<td>$11,417</td>
</tr>
<tr>
<td>TOTAL</td>
<td>Project</td>
<td></td>
<td>-$24,960</td>
</tr>
</tbody>
</table>


Figure 38: Additionality assessment of Moldova CDM rural energy modernization project

(a)Additionality claim of CDM project

(b) Additionality claim adjusted for financial and baseline additionality assessment
6.2. Scenario 2: Private Sector as Project Developer

Two CDM projects demonstrate the challenges of motivating private sector actors to partake in emission reduction projects: the Tanzania CDM afforestation and Uganda CDM cogeneration projects. The project developers in both cases made use of international donor financing which led to violations of project finance additionality: to a large degree in the Uganda CDM cogeneration project and a more limited degree in the Tanzania project. Firms involved in both projects also sold commodities on the domestic (and to a lesser degree international) markets to generate revenue. Recourse to domestic markets for timber and electricity in itself does not infringe on additionality. However, changing market conditions undermined the background additionality claims of these projects—particularly for the Tanzania CDM afforestation project. Notably, for all three projects, financial indicators such as the internal rate of return (IRR) or net present value (NPV) demonstrate that carbon finance contributed only marginally to the financial attractiveness of the CDM projects investigated (Table 35), suggesting that most of the heavy financial lifting was being done through other means.

6.2.1. Uganda CDM cogeneration project

Scope of Additionality

The additionality assessment for the Uganda CDM cogeneration project was the most complex of any project investigated because emission reductions were measured at the level of Uganda’s national grid. The appropriate comparative baseline then is not just emissions associated with other renewable energy technologies, but all electricity generating activities in the country.

For financial additionality, the project proponents claimed that Kakira Sugar Works would not have been able to purchase the cogeneration technology to produce electricity for the national grid without CDM financing. To assess their claim, it was necessary to trace the history of the CDM cogeneration project at KSW and determine if there were other significant sources of financing for the project, and, if so, what emission reductions could be attributed to them. Expanding electrification in the country has consistently been a top development priority, with electrification goals becoming more bold with each iteration of Uganda’s national development strategy (MoFPED, 2000; 2005: 65-66; 2010: 149-155). Indeed, there have been important
reforms to Uganda’s power sector since 1999, as discussed earlier, as well as significant donor support, particularly through the World Bank.

For background additionality, the CDM project developers claimed that cogenerated electricity would displace fossil fuel emissions on Uganda’s national grid. To assess claim, it was important to model baseline emissions as they evolved over the project’s crediting period of 2008-2014. This task was achieved by re-calculating Uganda’s national grid emissions factor since the 2005-2007 period that frames the baseline emissions analysis for the CDM (CDM-PDD, 2007b: 17). The CDM project claims to reduce emissions by displacing thermal, fossil fuel generated electricity with bagasse cogeneration. Recalculating the grid emissions factor entailed using a tool to calculate Uganda’s grid expansion factor developed by Praher (2008) using available ex-post data on power generation updated to account for Uganda’s expected power mix through 2014. The dynamic grid emission factor thus constructed was contrasted to the one used in the original CDM analysis and differences in carbon credits generated reported.

Financial Additionality

Additionality has been claimed on the grounds that carbon finance was necessary to incentivize KSW to produce additional electricity for Uganda’s national grid. The CDM project developers have argued that securing financing through traditional private sector channels was not possible because local banks “do not have the appetite or experience for long-term project financing. Although there are international banks that offer loans in Uganda, the process to get such loans is long and complex, since foreign banks are generally not willing to lend for long terms in the country without significant levels of guarantees and secured currency” (CDM-PDD, 2007b: 14). To a certain extent, this is true. Structural adjustment reforms to the electric power sector, namely the creation of the REA and ERT programmes, have struggled to cultivate private sector lending for renewable energy. But donor support has been significant for the expansion of KSW’s sugar production and cogeneration. The history of this financing, from 1982-2012 is presented in Box 5 and condensed into a timeline in Figure 39. None of the donor financing described above is referred to in any of the project documents for the Uganda CDM cogeneration project. Rather, KSW claimed that securing financing through traditional private sector channels was not possible because local banks “do not have the appetite or experience for long-term project financing” (CDM-PDD, 2007b: 14).
Despite significant donor financing, the CDM has been at least partially effective in reducing emissions: it accelerated access to financing in a manner that has augmented power exports during the first phase of Kakira’s planned expansion. However, there are two problems with the claim of financial additionality as presented in the CDM project documents. The first is adoption of a historical baseline scenario consisting of zero export capacity at KSW, despite indications that financing had been received as early as 2003 for exporting 5-7 MW. The second is continued support for further expansion of KSW cogenerating capacity, which changes the baseline over the course of the CDM project’s crediting period 2008-2014. Together, these changes to the baseline claimed in the CDM project reduce carbon credits generated from a total of 378,793 tCO₂e to between 74,699-117,711 tCO₂e (See Figure 40). Note however the final additionality assessment requires combining this, the assessment of financial additionality, with the assessment of baseline additionality.)

I address the historical financial baseline first. Sufficient donor financing was secured as early as 2004 to increase cogeneration to enable the export of 5-7 MW to the national grid. While the plant was not commissioned until 2008, this donor-influenced-baseline should form the basis of the project. The CDM project developers have, however, claimed emission reductions from the final 12-14 MW exported to the grid after first phase expansion was completed in 2008. But the CDM only increased capacity by adding 7 MW relative to the donor influenced historical baseline. This addition significantly affects the amount of carbon credits generated. The original CDM project assumed 378,793 tonnes of carbon credits would be generated over the crediting period 2008-2014. See Figure 17(a). However, with a revised baseline to accommodate the 5-7 MW expansion anticipated in 2003, the amount of genuine carbon credits generated might be reduced to approximately 189,396 tonnes.³¹¹

A further issue has been the additional project financing after the completion of the CDM-related upgrade towards the second phase of KSW’s expansion. KSW expansion is now receiving significant GEF attention under the Cogeneration for Africa project. However, this has thus far only led to the commissioning of an additional 3 MW, which came online in 2010. If this expanded cogeneration capacity were to supply the national grid, then the emission reductions

³¹¹ It would be noted that, perhaps in relation to this, the CDM methodology governing the project type was revised in 2008, resulting in significantly fewer carbon credits which Kakira has been disputing (Naus, 2010: 91).
associated with this expansion should be subtracted from the carbon credits associated with the CDM project because they have taken place during the crediting period, which ends in 2014. Incorporating this dynamic baseline would reduce the genuine carbon credits to approximately 117,711 tonnes (Figure 40c).\textsuperscript{312}

Altogether, the above analysis suggests that the CDM has accelerated the capacity of KSW to export electricity, but not at the rate claimed in the CDM project documents. The initial intervention by the World Bank and Netherlands succeeded in securing cogeneration technology, but the costs of electricity limited export to the national grid to 5-7 MW. With CDM financing, tariffs for the cogeneration were able to be further subsidized and permitted the export of an additional 7 MW to Uganda’s national grid. Discussions with those familiar with the CDM project also suggest that the CDM’s role is to accelerate the implementation of projects that were already planned. As the project manager at KSW explained:

\textit{As a matter of fact this whole project was conceived without any carbon credit funding. I don’t know if I’m shooting myself in the mouth, because it has certain commercial implications, but it is the truth. Reality is...\textit{reality}...We are already making money out of the power we are generating. Obviously we are trying to fight with the state utility for a higher tariff, but that is a different issue. But [the CDM’s] role is more like a catalyser [sic], more like a encourager. It’s not as if without [the CDM], the world will not go on.}\textsuperscript{313}

Recall that the CDM project generates credits not simply from increased cogeneration capacity at KSW but from the capacity for expanded cogeneration to be purchased on the national grid. As other attempts at cogeneration demonstrate, notably by Sugar Corporation of Uganda (SCOUL), a too high tariff can result in a deal not happening at all. SCOUL proposed in 2005 to sell 3 MW to the grid at a tariff of $0.076 per KWh, which was considered too high by government and rejected (Mutambi, 2010: 6). Assuming that a higher tariff were not possible, it is reasonable to conclude that expansion in the first phase of the cogeneration project would have been limited to the 5-7 MW expansion.

\textsuperscript{312} KSW has expected an additional 32 MW to be exported by 2012, which I anticipate would be made possible through Uganda’s renewable energy feed-in-tariff. However, as of 2013 this does not appear to have been implemented and I do not include it in my analysis of the project’s dynamic baseline. If the 32 MW upgrade were implemented as planned, it would reduce carbon credits further to approximately only 74,699 tonnes.

\textsuperscript{313} Business Manager, Kakira District, Interview UD1, 8 June 2009.
Figure 39: Timeline of Uganda CDM cogeneration financing, 2002-2014

Figure 40: Financial additionality assessment

(a) Additionality claim of CDM project

(b) Additionality claim adjusted for historical financial baseline and GEF influenced dynamic financial baseline
Box 5: History of KSW Donor Financing 1982-2012

In order to understand financial additionality, it is first necessary to understand the history of donor support for KSW’s expansion and cogeneration. As the analysis here shows, KSW expansion and cogeneration are directly related—contrary to what is suggested in the CDM project documents.\(^{314}\) While donor support for KSW was initially undertaken in order to revive Uganda’s sugar industry, subsequent government and donor support represent efforts to expand rural electrification and renewable energy as part of larger reforms in Uganda’s electricity sector.

**Initial Support for KSW Expansion and Cogeneration**

Kakira Sugar Works (KSW) has long been a significant recipient of donor financing (Wardrop, 2004: i; World Bank, 1996: ii). This began with a $62 million World Bank led sugar rehabilitation project in the late 1980s as KSW re-established itself following the end of Uganda’s civil conflict (World Bank, 1996: ii).\(^ {315}\) By 1990, KSW was producing 735 tonnes cane per day and 4,500 tonnes sugar per year (World Bank, 1996: iii). Production quickly rose in 1995 to 2,000 tonnes cane per day and over 50,000 tonnes sugar per year by 1995 (World Bank, 1996: 27).\(^ {316}\) However, KSW has long sought to expand its sugar production further. As early as 1996, KSW proposed an expansion from 3,500 to 5,000 tonnes cane per day (Wardrop, 2004: Appendix A). In the context of the CDM project, the company has set itself the goal of expanding production to 6,000 tonnes cane per day (CDM-PDD, 2007b: 2) and producing 100,000 tonnes of sugar per year (Madhvani Group, 2007).

The idea to use waste bagasse to generate electricity at the KSW sugar mill is also not new. By the late-1990s, KSW was generating 4 MW of its own electricity from bagasse (CDM-PDD, 2007b: 2-3; Wardrop, 2004: 20). Under this configuration, KSW also produced 350,000 tonnes of bagasse annually (Wardrop, 2004: 12, 83). Two-thirds of this bagasse was used for two turbogenerators capable of generating 4 MW for in-house power consumption; the remaining 113,000 tonnes was dumped and burned in fields (Wardrop, 2004: 12; World Bank, 2001: 62).

Cogeneration has consistently been suggested as a simultaneous activity to the expansion of sugarcane production in order to efficiently use waste bagasse. KSW indicated as much in the late 1980s, stating that “Future plans [for KSW] also include proposals for usefully disposing excess bagasse resulting from continuing expansion of cane production” (World Bank, 1996: iv).\(^ {317}\) In the mid-1990s, a French consulting firm, suggested cogeneration as an integral part of disposing additional bagasse resulting from expansion (World Bank, 1996: Plan for the Operational Phase of the Project). Subsequently, a feasibility study of expansion and cogeneration was funded by a US development agency in 1998 (Payne, 1998).

The idea to sell cogenerated electricity on the national grid also has a long history. In 1998, KSW submitted a proposal to MEMD to sell 18 MW to the national grid at $0.080 per KWh (GEF, 2007: 37; Mutambi, 2010: 4). However, the government decided not to pursue the 1998 KSW proposal because it was expecting that significant hydroelectric capacity would soon come online—the 250 MW Bujagali hydroelectric (GEF, 2007: 37; Mutambi, 2010: 4). The tariff rate that KSW sought was significantly higher than that paid for large hydro. As the Bujagali large-scale hydro project faced serious setbacks, in 2001 KSW submitted a revised version of the cogeneration project to the Uganda government to supply 7 MW of power (Mutambi, 2010: 4). There was again little response from government.

**Support for Cogeneration from the World Bank**

While government proved uninterested in the cogeneration project because of the prospects of cheaper hydroelectricity, KSW found support from the World Bank ERT programme (Wardrop, 2004: i). The ERT

---

\(^{314}\) It is disingenuous for the CDM project document to maintain that the “expansion is not part of the CDM project” (CDM-PDD, 2007: 2).

\(^{315}\) Kakira Sugar Works was re-established in 1985 after the Madhvani family returned to Uganda following the expulsion in 1972 of Uganda’s Asian population by the dictator Amin (Madhvani Group, 2010).

\(^{316}\) This was achieved from expanding its nucleus estate to 7,840 ha while sourcing another 3,336 ha in the adjacent area from 1,400 outgrowers (World Bank, 1996: 27).

\(^{317}\) The Plan for Operation Phase of the Project Per Annum Steady State Targets (1996-97 onwards) further reads “A steady state over 45,000 MT of bagasse will become available which has to be disposed off. Currently it is envisaged that boilers in neighbouring factories will utilise these quantities. However, a long term solution is only through burning of bagasse in a cogeneration plant which is envisaged as an integral part of the Outgrower’s Expansion Scheme, currently being studied under a grant from ADB funded study by an International Consultancy Firm” (cited in World Bank, 1996: 62).
The Role of CDM Financing

The CDM project was established as a financial mechanism of the ERT programme. This took place as a loan from the East African Development Bank backed by the Bank of Uganda (Juuko, 2004; KSW, 2010a; World Bank, 2009a: 76). Together with funding from the Netherlands Development Finance Institution, these funds were sufficient to secure 5-7 MW for export to the grid.

The second disbursement under the ERT programme, in 2004, was for an additional $7.7-$8.6 million through the ERTRF—the re-financing mechanism of the ERT programme. This took place as a loan from the East African Development Bank backed by the Bank of Uganda (Juuko, 2004; KSW, 2010a; World Bank, 2009a: 76). Together with funding from the Netherlands Development Finance Institution, these funds were sufficient to secure 5-7 MW for export to the grid.

The CDM project appears as a simple addition to the ERT programme anticipated two phases for KSW’s expansion (GEF, 2001: 62-63). For the first phase, from 2000-2004, the ERT project anticipated an increase in cane production to 4,000 tonnes per day and an expansion of KSW generation capacity by 14-15 MW to a total of 18-19 MW (GEF, 2001: 62; Kayizzi, 2004; Mufumba, 2005; Wardrop, 2004: 23-27). However, more than half of the 14-15 MW additional supply would go towards in-house consumption and only 5-7 MW were to be exported to the national grid (Ibid.) (Ibid., . . .) . This is of key importance to the assessment of CDM financial additionality because it indicates that export capacity to the national grid prior to the CDM project was expected to be 5-7 MW. The 5-7 MW scenario is the appropriate initial baseline scenario for the CDM project.

The first phase of KSW’s expansion is reported to have cost a total of $30.6 million of which at least $23.6 million was derived from external financing delivered over the period 2003-2005: $11-12 from the ERT as well as $11.7 million from the Netherlands Development Finance Institution (Juuko, 2004; Mufumba, 2005). Of these, about $14 million was directed to the cogeneration project (Juuko, 2004; Mufumba, 2005). Two disbursements were made under the ERT programme. First, a $3.3 million tariff subsidy was allocated through the REA as early as 2003, using funds from the GEF (Kalyango, 2004; Kayizzi, 2004; MEMD, 2004: 10). This subsidy brought down the price in the purchase power agreement signed between KSW and UETCL to $0.049 per kWh (Mutambi, 2010: 4). While this was more than double the prevailing generating price paid for hydroelectricity at the time, it was below the $0.080 per kWh rate originally proposed by KSW in 2003 (GEF, 2007: 37). 319

The second disbursement under the ERT programme, in 2004, was for an additional $7.7-$8.6 million through the ERTRF—the re-financing mechanism of the ERT programme. This took place as a loan from the East African Development Bank backed by the Bank of Uganda (Juuko, 2004; KSW, 2010a; World Bank, 2009a: 76). Together with funding from the Netherlands Development Finance Institution, these funds were sufficient to secure 5-7 MW for export to the grid.

318 A cost of $14 million for the first phase of KSW’s cogeneration expansion is supported by other accounts (Kayizzi, 2004; GEF, 2001).

319 Agreement on a generating tariff took longer than expected because of the unknown costs of renewable energy and competition with established tariff agreements with the large-scale hydroelectric provider, Eskom (see Winkler, 2005: 34, Lule, 2006). “Negotiations for small power investors to sell power to UETCL have been taking too long because UETCL is not willing to take the more expensive energy from these power plants than that supplied by Eskom [which produces nearly 60% of Uganda’s power] at off peak hours” (Lule, 2006).

320 The ERT programme established the refinance facility for the programme at the Bank of Uganda, meaning that a private bank (in this case the East African Development Bank) had to first disburse its own funds and subsequently submit expenditure documents/letters of credit to the Bank of Uganda for reimbursement (World Bank, 2009: 75).

321 The only known discrepancy with this interpretation is found in a 2007 GEF project which mentions the export of 12 MW to the national grid though only making reference to the ERT programme financing (GEF, 2007)—though ERT financing accounts for only half of the financing for KSW’s first phase expansion.

322 With reference to the original plan to export 5-7 MW to the national grid, the turbo generators were described to have the capacity to expand: “This equipment would have a marginal extra capacity to produce additional power if greater demand occurs and adequate bagasse is available” (Wardrop, 2004: 25).
ahead but at a very high price. A very high tariff. So when they get their carbon financing, they have a fair tariff to charge to the consumer.” However, the analysis here suggests that the project would have gone ahead anyway with the expansion of 5-7 MW capacity while the CDM increased this to 12-14 MW.

**Post-CDM Expansion**

The second phase envisioned for KSW’s expansion has only just gotten underway in 2010. While some expansion of cogeneration has occurred, it is unclear if this has been exported to the grid. There is no mention of a purchase power agreement signed with the Uganda authorities. Originally, the second phase of KSW expansion anticipated exporting 20-25 MW to the national grid (GEF, 2001: 63). More recently, KSW has indicated it will be able to export 32 MW by 2012 (KSW, 2010c). Costs for this second phase of expansion have been estimated at $25 million (AFREPREN/FWD, 2009). Strangely, no firm financial commitments to KSW’s further expansion are found under the ERT. Recently however KSW has been approached by the GEF through its Cogeneration for Africa project (AFREPREN/FWD, 2009; GEF, 2007). Under this project, GEF has funded a 3 MW addition to KSW’s cogeneration capacity (at unknown cost) which became operational in 2010 and has also supported a feasibility study for further expansion (UNEP, 2011a). It is unclear however if this additional electricity has been exported to the grid.

Regarding the 32 MW that KSW targets for export by 2012, it would be presumed that KSW will pursue this through the renewable energy feed-in-tariff (REFIT) described earlier. It would be noted that the REFIT offers a tariff of $0.075 per kWh for bagasse co-generation which is close to the original tariff rate of $0.080 per kWh originally proposed by KSW. The company has dryly noted that: “had the government accepted Kakira’s original [1998] proposal to sell 18 MW to the grid, the cogeneration plant using a more efficient design would have been completed and already selling power to the grid” (GEF, 2007: 37).

**Background Additionality**

The CDM project claims that the energy generated from bagasse would enter the Uganda electricity grid and *displace* fossil fuel consumption from thermal generators: “The export of bagasse-based power will displace equivalent power from the grid where the Government’s recent expansion has come largely from fossil fuel based power stations” (CDM-PDD, 2007b: 3). The question on which additionality hinges is the following: does the expansion of thermal power represent the trajectory of Uganda’s future power generation capacity relevant to the seven year CDM crediting period from 2008-2014?

It is true that thermal generating capacity expanded significantly in Uganda after the drought in 2005. But thermal power generation is only a short-term strategy to address delays in the commission of the Bujagali large-scale hydroelectric station (UETCL, 2008: 39). Despite the drought experience, Uganda intends to expand hydroelectric generating capacity significantly in the very near future: the 250 MW Bujagali hydroelectric plant is expected to come online in late 2011 (Bujagali Energy Ltd., 2010) and the 650 MW Karuma hydropower project by 2016 (John, 2011). Ironically, greater hydrogenation capacity is being sought despite concern that drought

---

323 *Ugandan Government Officer, Kampala, Interview UN20, 12 May 2009.*  
324 *Ugandan Government Officer, Kampala, Interview UN20, 12 May 2009.*
will only become a more significant factor in the future as climate change proceeds (see Karekezi et al., 2009).

The method used to estimate emission reductions from the CDM project is not able to accommodate the changes in Uganda’s power mix described above. It is based on a so-called “ex-ante option” which derives emission reductions from a static baseline emissions factor associated with Uganda’s average grid electricity generation over the period 2005-2007 (CDM-PDD, 2007b: 23-25; CDM EB, 2007b: 4). This baseline grid emissions factor is projected through the end of the CDM’s credit period in 2014.

A dynamic baseline (“ex-post option”) is a second option under this CDM methodology (CDM EB, 2007b: 4). Here the baseline grid emissions factor is updated annually, over the course of the CDM project’s crediting period. While recognizing the CDM project’s crediting period has closed, this dynamic baseline can be modeled with the benefit of more recent data and greater certitude about the status of generating capacity to come online by 2014 (see Appendix 8).

Figure 41a presents the ex-ante grid emissions factor from the CDM project and contrasts it with the dynamic baseline grid expansion factor. It can be seen that the ex-ante baseline grid emissions factor tends to under-estimate baseline emissions until 2011 as Uganda became more reliant on thermal power. However, as the Bujagali large-scale hydroelectric plant is slated to come online in 2012, it comes to over-estimate the actual grid emissions factor.

As it turns out, the total amount of carbon credits expected under the ex-ante approach (378,793 tonnes) does not differ significantly from the dynamic approach (360,029 tonnes). See Figure 41b&c. However, this is only a happy coincidence due to the fact that the CDM project developers over-estimated the amount of electricity that KSW would generate on an annual basis at 103,606 MWh per year (CDM-PDD, 2007b: 24). But available data on KSW generating capacity through 2010 and prudent linear regression through 2014 suggest that such generating

---

325 Note the baseline emission factor presented here has been developed with spreadsheet prepared by Praher (2008) and updated with information available in CDM-PDD (2007: 23-25, 34-35).
capacity will not be reached until 2012 when significantly more generating capacity at KSW comes online.  

**Combined Financial and Background Additionality Assessment**

Combining the two additionality assessments brings a substantial change to the amount of carbon credits estimated over the crediting period 2008-2014 (Figure 41). The project originally claimed 378,793 tonnes of carbon credits (Figure 41b). As presented earlier, financial additionality assessment based on KSW’s original claims alone reduced this to between 74,699-117,711 tonnes CO$_2$e (Figure 40). Though starting from a lower initial claim of 360,029 tonnes carbon credits to accommodate dynamic grid expansion factors, the final amount of carbon credits left after accommodating historical and dynamic financial baselines is actually somewhat greater: 89,645-116,731 tonnes CO$_2$e (Figure 41b-e). The difference between financial additional assessment and combined additionality assessment is due to the bulge in carbon credits between 2009-2011 resulting from expanded thermal generation on Uganda’s grid (Figure 41a & c). Furthermore, the carbon credits that would be deemed non-additional after 2012—when Kakira would have ramped up additional generating capacity through planned additional 15-17 MW by 2012—is deflated by significant hydroelectric generating capacity coming on grid at that time in the combined additionality assessment.

---

326 Measured electricity generation from the plant has only reached a maximum 87,850 MWh in 2009 though declined to 80,314 MWh in 2010 (ERA, 2010c). A prudent linear extension of power being exported by KSW to Uganda’s grid through 2014 is 85,112 MWh/yr in 2011 which increases to 101,576 MWh/yr in 2012 with an additional 16 MW of cogeneration capacity coming online (see Table 58).
Figure 41: Combined Financial and Background Additionality Assessment for Uganda CDM cogeneration project

(a) Uganda’s grid-based emissions, as modeled ex-ante and dynamically over the CDM crediting period

(b) Additionality claim of CDM project

(c) Additionality claim of CDM project adjusted for dynamic grid emissions factor

(d) Additionality claim of CDM project adjusted for dynamic grid emissions factor, historical financial baseline and GEF influenced dynamic financial baseline
6.2.3. Tanzania CDM Afforestation

The firm implementing the Tanzanian CDM afforestation project, Green Resources Limited (GRL), argued that a lack of available domestic financing in Tanzania prevented the afforestation in the project area from proceeding (CDM-PDD, 2007a: 33-34; 2008f: 40-41). A large investment, it is argued, is required which “is only possible with the incentive from the CDM” (CDM-PDD, 2007a: 36). Carbon finance would resolve “the perceived investment risks of the project by providing a more steady timing and guaranteed (fixed purchase price of CO₂) income stream that makes the project more independent from timber market risks and the risks associated with long transport distances from timber markets” (CDM-PDD, 2008f: 40-41). In the absence of the CDM project, the area would remain grassland: “The grassland with scattered trees and shrubs has remained as it is since generations and is therefore assumed to remain steady state (CDM-PDD, 2007a: 37). The question is whether this baseline would remain over the 20 year crediting period of the CDM projects through to 2025.

Scope of Additionality

Evaluating whether carbon finance activities undertaken inside the CDM project area are additional requires comparison with non-CDM afforestation rates outside the project area. However, in contrast to CDM afforestation projects in Uganda and Moldova, precise information on lands available for afforestation outside the CDM project areas in Tanzania was lacking. Lands available for afforestation were not predetermined through an administrative process, as was the case of forest reserves in Uganda or degraded lands in Moldova, but actively acquired by GRL for commercial purposes. Similarly, information on forest operations in other plantations and forest reserves in the area such as Sao Hill Plantations and Unilever Tea Estates could not be found. Some insight might be gleaned from comparing GRL’s planting rates with data on tree-planting effort by individual villagers across the district, as discussed below. Because of the lack of information, more important than analysis of afforestation rates are changing incentives for tree-planting, both in Mufindi district and nationally.

327 The project document reads: “A key issue facing the forestry sector is that despite a relatively comprehensive institutional and legal framework…implementation is severely limited by inadequate human and financial capacity and the delayed finalization of various institutional arrangements. As the domestic funds for the forestation are limited, local farmers are usually not able to fully finance forest establishment because it is hard for them to get loans from banks for the purpose of reforestation activities (loans for agricultural activities are much easier to obtain)” (CDM-PDD, 2007: 33-34, emphasis in the original).
**Financial Additionality**

GRL received donor financing in 2003 and 2010. The first was a $2 million USD loan from Norfund (Norfund, 2011a). Norfund is a hybrid company owned by the Norwegian Government through the Ministry of Foreign Affairs and acts as a key instrument of Norwegian development policy; the Norwegian parliament allocates annual capital grants to Norfund in its development assistance budget (Norfund, 2011b). In 2010, the Norwegian parent company of GRL received loans of $25 million USD from the World Bank ($18 million) and Norfund ($7 million), largely for its Tanzanian forestry operations—including tree-planting (GRAS, 2009: 5; Norfund, 2011a). The Norwegian parent company also received close to $1 million USD from the World Bank, Norway and Austria (GRAS, 2009: 5).

Without intimate knowledge of GRL’s financing, it is difficult to determine how these funds affected the additionality of the CDM projects. For example, it is not clear how the $2 million 2003 loan was used. To be conservative in my critique of the additionality of this project, I assume that these funds have not been used towards afforestation efforts. However, the $25 million 2010 loan went towards planting 12,000 ha of new forest and other forestry-related activities in Mufindi district (GRAS, 2009: 5). Nonetheless, both CDM projects maintain that no public funding was used (CDM-PDD, 2007a: 21; 2008f:24).

Finally, it is worth noting that carbon finance has hardly been decisive in the afforestation projects. The international rate of return (IRR) of the afforestation projects is 11.3% without and only 14.6% with-carbon-finance (CDM-PDD, 2008: 40). Significantly, the with-carbon-finance IRR of Tanzanian CDM afforestation projects is based on a price of 6 USD per tCO₂e by 2013, which is certainly overly optimistic (CDM-PDD, 2008: 40). The carbon finance layer is too thin to be considered to have changed the decision to proceed with the project or not.

In the final analysis, the concerns with financial additionality with this project, particularly the large 2010 loan, are superseded by more important changes in the background development context of the project that occurred in 2005-2006 (discussed below). Consequently, I consider the violations of financial additionality to have a negligible effect on whether carbon credits are genuine or not. Had the development context not changed though, carbon credits issued after

---

328 As a private firm, GRL’s accounting is not in the public domain.
2010 would be considered bogus because of the significant ODA financing received in the form of a $25 million loan.

**Background Additionality**

The demonstration of background additionality requires distinguishing the amount of tree planting undertaken through the CDM between 1997-2014, the CDM project’s implementation period, from non-CDM planting efforts during the same period. While data are limited, those available indicate important increases in afforestation outside the CDM project area. Furthermore, important district and national level incentives for afforestation were found to have changed in a significant manner over the course of the project’s implementation and inform our additionality analysis.

As discussed earlier, there is limited information on lands available for afforestation outside the CDM project area. However, limited information on tree-planting efforts by individual villagers across the district was available from the district government (see Figure 42). These data show a near doubling of the afforestation rate between 2005 and 2006. Explaining this doubling requires examination of changing incentives for afforestation to which even villagers might be responding, including local and national incentives.

![Figure 42: Afforestation effort in Mufindi District, 1995-2007](image)

I begin first with changing local incentives. The concentration of plantation activities in Mufindi district is the result of an earlier effort to establish a pulp and paper industry in the region, with

---

329 The implementation period of the Tanzania CDM afforestation project is rather long: it is safe to say that it extends from 1997 through 2014. The first CDM project associated with Mapanda was initiated in 1997 and scheduled to be completed in 2004, yet was found during fieldwork to have been pushed back to 2014. For the second CDM project, associated with Idete village, its implementation period is officially slated from 2006-2013.
the re-establishment of government owned Sao Hill Plantations followed by the establishment of Mufindi Paper Mill. The mill was established in 1985 as a state-owned enterprise, though never reaching full capacity, and was forced to shut its doors in 1997 (Murison, 2002; World Bank, 2003b). It was not until 2004 that the mill was privatized and sold to the Rai Group Ltd of Kenya which resumed operation in 2005 (Kulekana, 2008). \(^{330}\)

Much depends on the success of the Mufindi Paper Mill. A World Bank analysis published in 2003—before the mill’s sale—found that the government’s Sao Hill Plantations were losing money (World Bank, 2003b: 76). But if the mill were to come online, the economic value of Sao Hill Plantations would rise from effectively zero to an estimated value of US$10.8-14.7 million, almost entirely because the price of timber would rise from nearly $0 per m\(^3\) up to 14 $US per m\(^3\) (World Bank, 2003: 76). \(^{331}\) The implication is that since the mill opened in 2005, it has become profitable to practice forestry in the district. This explains the near doubling of afforestation rate amongst villagers between 2005 and 2006 in Figure 42, as there was the prospect of a new market for timber. It also partially explains the extent of tree-planting on individual household plots in Mapanda and Luhunga (see Table 49).

But there have also been changing incentives at the national level. The most important of these have been changes in forest product royalty rates. The vast extent of government plantations in Tanzania (and concentrated in Mufindi district) allows the national government a monopoly on forest products and the power to set prices. Royalty fees and other permits are set out in “Schedule 14” of the official regulations of the 2004 Forest Regulations, which can only be changed through an act of Parliament (Milledge et al., 2007: 244-245). While the royalty rates are supposed to conform to market forces, the actual method of determining the appropriate price

---

\(^{330}\) As of 2008, the mill was producing nearly 40,000 tonnes of paper annually and had plans to reach a maximum capacity of 130,000 tonnes. Ironically, the mill has recently submitted a CDM project, entitled 35.6 MW Biomass Power Plant project of Mufindi Paper Mills Limited – Tanzania (CDM-PDD, 2008b). The project intends on using wood residues that would normally be left on the forest floor to decay (and thereby releasing methane) with a guaranteed sourcing from Sao Hill Plantations as well as Tanganyika Wattle Limited (140 km away). Unfortunately the author was unaware of the CDM project at Mufindi Paper Mill, which had only been posted on the UNFCCC website in late 2008/early 2009. The mill was approached during the March 2009 field effort, though in discussions no mention was made of the CDM.

\(^{331}\) The almost zero present value of the Sao Hill Plantations was evidenced by the large amount of over-mature trees in its inventory, an effective way of avoiding the low price for timber.
for forest products is, in the words of one government official, “totally political.”

In 2006, an attempt was made by the then Minister of Natural Resources and Tourism to raise the price of forest products nearly four-fold in order to reflect the environmental value of the forest products and approach global market prices. However, the proposed royalty rate hike contributed to a political backlash that ultimately saw the Minister transferred in 2008 away from MNRT.

Backing down slightly, Parliament eventually assented in 2007 to a rate hike that nearly doubled the 2002 value of royalty rates (Table 38). While collection of these royalty fees has been found to be dramatically inefficient—with under-collection of royalties estimated at 96% (Milledge et al., 2007: 4)—it is assumed that the rise in royalty rates has had some effect on forest practices.

Another changing incentive, though one coming later, has been “buzz” surrounding carbon finance. Officials from the National Environment Management Council (NEMC) of Tanzania had visited Mufindi district in 2008 where they discussed tree planting as it related to the carbon market. Local government officials in Luhunga understood from the NEMC visit that there would soon come a time when people would receive carbon payments for tree planting. In Idete, the villagers had similarly been told by an agricultural extension officer to register their lands with GRL in order to record their tree planting effort and entitle them to carbon payments. While there have been no other forest carbon finance projects executed in the district other than the CDM projects investigated here, there were raised expectations surrounding carbon finance in the district.

Changing conditions surrounding afforestation, described above, have created enough alternative incentives for tree planting to attribute all planting efforts by GRL starting in 2005 to them. To recount, the first was the opening of Mufindi Paper Mill in 2005, the second the 2006/2007 change in timber royalty rates and the third the $25 million World Bank and Norfund loan in 2010. (I have overlooked a fourth, the rather small Norfund loan in 2003). The rather buoyant

---

332 Tanzania Government Officer, Dar es Salaam, Interview TN6, 30 March 2009.
333 Tanzania Government Officer, Dar es Salaam, Interview TN6, 30 March 2009.
334 See news stories surrounding Minister Maghembe’s policies and resignation (Mbunda, 2007).
335 Village Government Focus Group (T14), Luhunga Village, Interview, 2 March 2009.
336 Villager, Idete Village, Interview T29, 10 March 2009.
economic conditions encountered during fieldwork in 2009 were not the same as those in the late 1990s when the CDM afforestation project was initiated.

The implication is that the CDM afforestation projects were not financially attractive when first initiated in 1997, but since 2005 their financial footing is more secure as there is now a local market for timber. The Tanzania CDM afforestation project is thus both additional and non-additional. Tree-planting undertaken from 1997-2005 has been additional, but since 2005 non-additional. Figure 43 attempts to model the total amount of carbon credits anticipated under the two projects, controlling for the effects of the change in development context. Instead of the 8.5 million tonnes of carbon credits anticipated, only 2.2 million are the result of planting taken place in 2005 or earlier and able to be considered genuine.
Table 38: Change in royalty rates for forest products felled on government owned forests in Tanzania between 2002 and 2007

<table>
<thead>
<tr>
<th></th>
<th>2002</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tsh/m³</td>
<td>Tsh/m³</td>
</tr>
<tr>
<td><strong>All softwood plantation species except <em>Juniperus procera</em></strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class I (DBH &lt; 10 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class II (DBH 11-20 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class III (DBH 21-25 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class IV (DBH 26-30 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class V (DBH 31-35 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class VI (DBH &gt; 35 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Juniperus procera</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All sizes</td>
<td>50,000</td>
<td>50,000</td>
</tr>
<tr>
<td><strong>All hardwood plantation species except <em>Eucalyptus</em></strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cederella, Grevillea, <em>Acacia Acrocarpus</em> and <em>Maesopis</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class I (DBH &lt; 10 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class II (DBH 11-20 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class III (DBH 21-30 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class IV (DBH – 2002: &gt; 30 cm; 2007: 31-35 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class V</td>
<td></td>
<td>20,000</td>
</tr>
<tr>
<td><strong>Teak</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class I (DBH &lt; 10 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class II (DBH 11-20 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class III (DBH 21-30 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class IV (DBH – 2002: &gt; 30 cm; 2007: 31-35 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class V</td>
<td></td>
<td>160,000</td>
</tr>
<tr>
<td><strong>All Other Hardwood Plantation Species</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class I (DBH &lt; 10 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class II (DBH 11-20 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class III (DBH 21-30 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class IV (2002: DBH &gt; 30 cm; 2007: DBH &gt; 31-35 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class V</td>
<td></td>
<td>15,000</td>
</tr>
<tr>
<td><strong>All <em>Eucalyptus</em> species</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>E. salinga</em> &amp; <em>E. grandis</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class I (DBH &lt; 10 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class II (DBH 11-20 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class III (DBH 21-30 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class IV (DBH &gt; 30 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>All Other Eucalyptus species</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class I (DBH &lt; 10 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class II (DBH 11-20 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class III (DBH 21-30 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class IV (DBH &gt; 30 cm)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Schedule 14 (Part II, Section B) under regulation 29(i) of the Forest Act.*
6.3. Scenario 3: NGO as Project Developer

Because the price of carbon is low, instances where carbon finance makes or breaks a project are rare. Only one project relying solely on CDM financing was successfully implemented on the basis of carbon finance alone—the Plan Vivo reforestation project in Uganda. The Tanzania CDM cookstove project also relied largely on carbon finance, but the failure of this project to get off the ground demonstrates the risks involved in relying on carbon finance alone. While the project appeared quite promising when visited in 2009, by 2010 the foreign technical advisor had withdrawn and UNDP carbon finance brokerage services had thus come to a close. Though both projects appear additional, because of a lack of organizational capacity of the project developers, questions surround how the baselines changed over time. As a result, the amount of genuine carbon credits is unclear.

6.3.1. Uganda Plan Vivo reforestation project

In contrast to CDM projects, there has been little formal analysis of the additionality of the Plan Vivo project. The analysis conducted here suggests that the project has been highly additional during its implementation phase, though questions remain about how the baseline might change.
over the crediting period. However, safeguards built into the project, where under half the carbon sequestered is accredited, are a significant buffer on the possible risk of infringing additionality. Therefore, despite uncertainties surrounding the baseline, I assert that the carbon credits generated per ha are highly likely to be additional (Figure 44).

**Scope of Additionality**

Evaluating whether carbon finance activities incentivized through the Plan Vivo project are additional requires comparison of land-use activities amongst households involved with Plan Vivo and those of an appropriate control group which has not been involved with carbon finance. The Plan Vivo project differs from the other CDM forest projects investigated in that the implementation period varies from household to household across the districts where it has been established. The result is that project implementation is staggered across households as recruitment into the project has been on-going since 2003.

Unfortunately, the additionality assessment is thwarted because the control group of villagers in Bitereko sub-county who were not involved with Plan Vivo proved unsuitable. Non-participants in Bitereko sub-county were of a different socio-economic class, possessing significantly less land and lower income (Table 39). Households of the control group were found to plant substantially fewer trees than Plan Vivo participants—only 0.19 ha compared to the Plan Vivo participants who planted an average of 1.54 ha. The frequency of households with *Eucalyptus* was also significantly less in the control group than amongst Plan Vivo participants. The fewer planting areas of the control group is unlikely due to the absence of the Plan Vivo project but the fact that they possessed significantly less land (and income) with which to plant.

To assess additionality, it would have been necessary to compare Plan Vivo participants with households of a comparable socioeconomic class in order to avoid confusing the effects of class with those of carbon finance. This would have required sampling in an adjacent sub-county

---

337 As suggested by reported harvesting densities and stand age (> six years) amongst respondents, such *Eucalyptus* plantings were likely being used towards fuelwood. Assuming that villagers maintained a constant fuelwood supply on their lands, *Eucalyptus* stands would be limited to sequestering at a rate of 300 tCO2e per ha over a twenty year period. Average planting density of *Eucalyptus* was 2700 stems per hectare, suggesting production for fuelwood. Eucalyptus is usually recommended to be spaced at 3m x 3m for timber (1111 stems/ha) and up to 2m x 2m for fuelwood (2500 stems/ha) (SPGS, 2009: 4-5). In addition, more than 80% of *Eucalyptus* stands amongst household surveys were older than 6 years, at which age it may be harvested for fuelwood. At six years of age, a stand of Eucalyptus sequesters approximately 300 tCO2e/ha (Schumacher et al., 2004).
where Plan Vivo was not in operation and controlling for class (via data on land holdings and income)—an additional research effort which was unfortunately not possible in the context of the current study. Lacking an appropriate control group, it is possible to glean some understanding of the project’s additionality from land-use practices amongst Plan Vivo participants themselves. I discuss these results below, with due regard to the empirical limitations of this approach.

Table 39: Household tree planting effort and associated carbon sequestration amongst participants in the Plan Vivo project and control group

<table>
<thead>
<tr>
<th></th>
<th>Eucalyptus</th>
<th>Plan Vivo</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HH Freq.</td>
<td>Planting Effort</td>
<td>CO2 Sequestered</td>
</tr>
<tr>
<td></td>
<td>Ha</td>
<td>tCO2e/ha/20yrs</td>
<td>Ha</td>
</tr>
<tr>
<td>Plan Vivo (n = 29)</td>
<td>86%</td>
<td>0.50</td>
<td>150</td>
</tr>
<tr>
<td>Control (n = 31)</td>
<td>45%</td>
<td>0.19</td>
<td>57</td>
</tr>
</tbody>
</table>

Background Additionality

Putting aside problems with the control group, interviews and examination of land use patterns amongst Plan Vivo participants suggest that the project was additional because there was little incentive other than to plant the types of trees promoted by Plan Vivo. Amongst Plan Vivo participants, household land areas planted specifically for Plan Vivo nearly doubled the extent of *Eucalyptus* planted during the same time period, at 0.94 and 0.50 ha, respectively (Table 39). Furthermore, four households involved in the project had no trees planted other than the indigenous species via Plan Vivo. It is possible that in the absence of the Plan Vivo project, participants would have dedicated the same amount of land to reforestation but have undertaken it all with *Eucalyptus*. However, *Eucalyptus* was only a short-rotation species that was harvested for fuelwood (or similar local use) in 1½ to 3 years and would not lead to net carbon sequestration as the Plan Vivo plantings would.\(^{338}\) Altogether, these findings suggest the project is additional, but without an appropriate control group, it cannot be determined what the actual baseline *Eucalyptus* planting rate would be.

\(^{338}\) *NGO Officer, Bitereko Subcounty, Interview UD13, 26 May 2009.*
While there are indications that the Plan Vivo project was additional during the initial 6 years in Bitereko sub-county, additionality over the entire 20 year crediting period cannot be known with certainty. There are at least two reasons to be concerned that the unplanted status of the Plan Vivo planting areas would have remained. First are changing financial incentives as alternative tree-planting schemes enter Bitereko sub-county. Since late 2009 there have been a limited number of alternative tree-planting schemes in Bitereko sub-county which, though of limited scale, may come to partially undermine the additionality claims of the project.

Alternative tree-planting initiatives have been increasing their presence in Bitereko sub-county. For example, FIEFOC had not yet been initiated in Bitereko when visited in early 2009, but it was to arrive in September of that year. A local representative of NFA explained that already 31 persons were registered to receive pine and *Eucalyptus* seedlings which would also be planted on their household plots.\(^{339}\) Similarly, as Plan Vivo expands into other parts of Bushenyi district and other districts, it is likely to overlap with tree-planting initiatives elsewhere in the district, such as FIEFOC and TIST. It is not clear how such alternative tree-planting schemes will be coordinated with Plan Vivo in order to avoid a duplication of efforts or double-accounting, whereby a person planting trees would claim carbon credits under both TIST and Plan Vivo. Improved coordination between the various planting efforts is a possibility. For example, FIEFOC, TIST and Plan Vivo could agree to only engage separate households, reporting participants to a centralized authority.

Second, with ecological conditions already propitious for forests, there is also the possibility that some vegetation (itself sequestering carbon) will grow back if household lands are left unattended. Such regeneration is common in areas practicing swidden agriculture, where cleared land is left fallow in order to regain its fertility. Notably Plan Vivo participants reported little use of chemical or organic fertilizer (Table 50), which suggests that swidden agriculture was still the norm.

Interviewees were mixed on the issue of future land use of Plan Vivo lands. Some households indicated that lands dedicated to Plan Vivo would remain unforested in its absence while others might be naturally revegetated. For example, on one hand, one village participant explained “If

we were not getting enough money, we would just leave [the Plan Vivo trees with] no care, no
tending, no effort, and [the land] would be won out by the bush”.\textsuperscript{340} On the other hand,
participants in the Plan Vivo project had rather relatively large numbers of livestock, suggesting
land was kept in a low-carbon state by grazing (Table 51). Some of the information required for
tracking natural land-use change may actually be furnished through the “Plan Vivo” land-use
plans created for each household involved in the project.

Nonetheless, the risk of allocation of bogus carbon credits is accommodated in the project’s
conservative design, which credits just under half of the emissions removals achieved. The
technical specifications for the project indicate that tree-planting will result in 415 tCO\textsubscript{2}e per
hectare sequestered over a 20 year crediting period. In addition, 10\% of the credits are set aside
as a buffer pool, further reducing the carbon credits issued. Overall, only 186 tCO\textsubscript{2}e per hectare
are credited—less than half of the carbon sequestered is paid out as carbon finance to project
participants.(Plan Vivo, No Date: Figure 1 & Table 7).

\textbf{Financial Additionality}

As a project in the voluntary sector, the Plan Vivo project is not legally bound by the separation
of carbon finance and ODA as under the CDM. Donor financing has played only a limited role.
The pilot project for the Plan Vivo project was established in 2003 with financial support from
DFID and USAID (Plan Vivo-PDD, 2009); however, review of the project’s annual reports from
2004-2010 indicate that donor financing was initially used towards the establishment of the pilot
project in Bitereko and development of technical tools (with ICRAF), while recent donor
financing has been used to expand the programme into other districts (EcoTrust, 2004; 2005;
2006; 2007a; 2008; 2009; 2011).\textsuperscript{341} Notably, carbon finance generated in 2008 was greater that
in any of the preceding years, while donor financing has remained fixed (\textit{Ibid.}). This suggests
that donor financing was used to launch the project, though it is almost entirely supported by
carbon finance now.

\textsuperscript{340} \textit{Villager, Bitereko Subcounty, Interview U14, 27 May 2009.}

\textsuperscript{341} Total costs were also about $350,000: EcoTrust’s operational costs were about $100,000 that year, about $50,000
spent on third-party verification and nearly $200,000 being paid out to villagers, leaving an additional $40,000 from
carbon finance at EcoTrust’s disposal.
6.3.2. Tanzania CDM cookstove project

The additionality claim of the Tanzania CDM cookstove project is largely a financial one. KDA indicated that without the carbon finance brokered by the UNDP, the project would have been “impossible” to scale-up. While foreign aid in the form of a grant from a Danish NGO had been important in piloting the project, such funds were limited to the deployment of a modest 1,800 cookstoves. As a KDA technician explained regarding the 22,000 cookstove CDM project, “if you want to put it out on the bigger scale and come out and really do something that matters…it's clear the only way is if you use carbon funding.”

The suspension of the cookstove project as a result of the loss of international financial support speaks strongly in support of the additionality of the project. If the project had gone ahead, it would have been highly additional during the project’s implementation period. Without carbon...

---

342 NGO Officer, Karatu Town, Interview TD3, 4 April 2009.
343 NGO Officer, Karatu Town, Interview TD3, 4 April 2009.
finance, the project has not been able to proceed. Despite the project’s suspension, it is still worthwhile undertaking an additionality assessment of the project as it appeared in 2009.

I have actually already undertaken this assessment earlier. The Tanzania CDM cookstove project was unique because it reduced emissions by conserving fuelwood, which represented critical natural capital (CNC) in Karatu district. Thus the assessment of the project in terms of strong sustainability, as conducted earlier, applies for the assessment of additionality as well. From this, it was evident that the project was effectively reducing emissions at the household level, though its effects at the landscape level were uncertain. Though cookstoves may at first appear to not require a significant land-use component, they still require land governance organizations to control for emissions leakage at the landscape level.

While the ultimate impact of the project at the landscape level is questionable, I assert that it is likely that, had it proceeded, the project would have reduced consumption of fuelwood in the area surrounding Endabash though not necessarily at the levels claimed in the project document (Figure 45c). Because the project came to a halt in 2010, only 12,096 tCO₂e were generated, but they are unlikely to be claimed.

**Scope of Additionality**

Evaluating whether the adoption of the CDM cookstove is additional requires comparison with activities that consume firewood that are outside the targeted users of the CDM project. The activities compared to the CDM need to be similar in their output (i.e., emissions from consumption of fuelwood), but differ in the way that fuelwood is consumed. As discussed in the strong sustainability assessment of this project, there are two activities to consider. First, is fuelwood consumption amongst households not involved in the CDM project? Second, does reduction of fuelwood consumption result in the retention of standing forest, an issue which at the landscape level is complicated by Jevons’ paradox? Determining if reduced fuelwood consumption results in increased carbon retention in the forests where fuelwood is sourced would ultimately require monitoring of these forests. This would have involved complicated analysis of deforestation trends from areas where fuelwood was collected: an analysis which was simply beyond the scope of the project.
Financial Additionality

A compelling example of the financial additionality of the CDM cookstove project is that it failed when carbon finance fell through. Non-CDM sources of finance were not readily available because the Tanzanian government did not have the political will to support an improved cookstoves programme and the district government in Karatu lacked the funds. As discussed earlier in our review of the development context for this project, afforestation and related cookstove programmes to address fuelwood and women’s health issues in Tanzania were scaled-back significantly during structural adjustment in the 1990s. The government focus has since been on reform of the forest sector’s institutional and technical structure as well as improving access to modern energy such as electricity. The promotion of the cookstove project has largely become a focus of NGOs and, only quite recently, the international donor community through initiatives such as the 2010 Global Alliance for Clean Cookstoves. This suggests that in terms of financial additionality, the Karatu CDM cookstove project was highly additional at the time of its inception. Significantly, carbon finance was found to have a major impact on its viability: it had a with-carbon-finance IRR of over 150% (see Table 35).

Background Additionality

Despite the financial additionality of the CDM cookstove project, two issues complicate the assessment of background additionality. First is the issue of non-renewable biomass. Carbon credits are only to be generated from improved cookstoves if they reduce consumption of fuelwood that is not renewed through forest regrowth (CDM EB, 2007a: 2-3). If forest carbon stocks on lands where fuelwood is collected can be demonstrated to be systematically decreasing, then the biomass is considered non-renewable.344 But if fuelwood collected for cooking is replenished –absorbing the CO₂ emitted during combustion—then use of fuelwood is already carbon neutral and reductions in its consumption would do little to affect emissions. The history of Karatu’s development context and specific studies on the district fuelwood resources, discussed earlier, indicate that the fuelwood situation is only getting worse. It thus appears that

344 The following indicators are suggested for demonstrating that biomass is obtained from non-renewable sources: (i) increasing time spent or distance travelled by users for gathering fuelwood; (ii) increasing trends in fuel wood price indicating scarcity; (iii) trends in the type of biomass collected by users, suggesting scarcity of woody biomass (CDM EB, 2007: 3).
the project’s claim that all biomass is derived from non-renewable sources is justified (UNDP, 2008).

Second, and more important is the possibility of emissions leakage at the landscape level. To recapitulate from the assessment of the strong sustainability impact of the Tanzania CDM cookstove project, reductions in the consumption of fuelwood at the household were valid but, in light of Jevons’ paradox, it is unclear if these emission reductions are achieved at the landscape level. Though it may appear that improved cookstove projects require monitoring at only the household level, they still require land governance to control for emissions leakage at the landscape level. The ultimate impact of the project on emissions is uncertain (Figure 45b).

**Figure 45: Additionality assessment of Karatu Energy Efficient Stove Project**

(a) Additionality claim of CDM project

(b) Additionality claim adjusted for additionality under hypothetical scenario where the original CDM financing had been secured to implement the project but landscape emissions remain unmeasured

(c) Additionality claim adjusted for project suspension and additionality
6.4. Conclusion

This chapter has sought to summarize the additionality assessments of the seven carbon finance projects investigated by drawing attention to the project developers associated with each project type. The capacities and interests of project developers goes far in explaining the additionality of carbon finance projects under current carbon prices. The price of carbon is too low to incentivize the private sector in a meaningful way, with the result being that only project developers motivated by non-financial interests genuinely act on carbon finance alone. For NGOs, carbon is often the only financial layer in their carbon finance projects. As the carbon market is currently unstable, this imposes considerable risks on the viability of NGO-led projects. On the other hand, projects led by state bodies are resilient to the vicissitudes of the carbon market. If the project developer possesses a latent organizational capacity for project implementation, such as state agencies, carbon finance projects tend to be highly additional because carbon finance is directed to national development priorities that the state agency is already addressing. The question is why do state agencies with latent organizational capacity exist in certain countries and certain economic sectors and not others? I answer this question in the next chapter.
7. Explaining the Effectiveness of Carbon Finance Projects

Empirical research findings summarized in the two previous chapters show considerable variation in the effectiveness of A/R and bioenergy carbon finance projects to deliver sustainable development and genuine carbon credits. The current chapter aims to explain a significant part of the variation observed in terms of the two dimensions of state power for development I have identified: state administrative capacity and political economy preferences. It is the degree to which the state is able to use its administrative capacities to bring carbon finance projects into alignment with national development objectives that explains project effectiveness in terms of sustainable development and additionality. Paradoxically, the state has been able to achieve this alignment most effectively through institutions and organizations associated with liberal economic reforms. I conclude that, at least amongst the countries investigated here, a stronger commitment to liberal economic reforms has functioned as an animating set of ideas that ensures coherency across the bureaucracy and also encouraged the establishment of institutions and organizations which, while the fruit of the neoliberal structural adjustment policy and of limited capacity, can also generate state power for development in a manner analogous to the developmental state. However, while I am prepared to extend the first part of my argument to carbon finance efforts in general, whether commitment to liberal economic reforms plays the role of an animating set of ideas in other countries, especially emerging economies, remains to be determined. However, amongst Tanzania, Uganda and Moldova it is the differences in their preferences for liberal economic reforms that are most important.

Elements of liberal economic reforms include adoption of individualized land tenure systems, an important factor in the sustainable development of A/R and bioenergy projects, and state agencies, found key for the implementation of additional projects under currently low global carbon prices. The important role liberal economic reforms play in achieving coherency across the state bureaucracy is demonstrated by the degree of cooperation between the CDM regulatory authority (the Designated National Authority, DNA) and agencies responsible for foreign investment and environmental impact assessment. See Figure 46 below. While the primary
objective of such institutional and organizational arrangements has certainly not been to promote
effective carbon finance projects, they have resulted in conditions that increase the likelihood
that carbon finance projects are effective both in terms of sustainable development and, at least
in the forestry sector, additionality.

More specifically, in terms of sustainable development, at least for A/R and bioenergy projects,
Uganda’s embrace of more individualized land rights masks an investment regime which, by
attempting to drive investment into certain sectors, actually verges on developmentalism. A lack
of coherence however marks Tanzania’s land tenure and investment regime: the legacy of
Ujamaa villagization and the authority accorded to village governments over land complicates
the use of land for investment purposes and has seen government establish a convoluted and
arguably unfair land acquisition process to make unused village lands productive. Finally, in
Moldova, a history of socialist rule has resulted in important restrictions on land transactions that
villagers can enter into and has also frustrated the development of adequate norms and
procedures for public participation at the local level.

In terms of additionality, liberal economic reforms has seen the establishment of state agencies
that possess a latent organizational capacity for project implementation: sufficient in-house
resources to initiate a project but not enough to attain development goals mandated by
government. This latent capacity in combination with a motivation to improve performance and
pursue international business opportunities leads to conditions of propitious for highly additional
projects. However, the beneficial effects of liberal economic reforms for additionality, at least
amongst the developing countries investigated here, are limited to the forest sector where the
state has sufficient administrative capacity. In the energy sector, such capacity was ceded to the
private sector in Uganda and Moldova while, more skeptical of liberal economic policy,
Tanzania has actually retained latent organizational capacity for implementation in the energy
sector. However, for the same reasons, the Tanzanian government has not treated the CDM as a
genuine opportunity.

Overall, the state in Uganda has perceived the CDM as a real development opportunity around
which the state apparatus can coherently organize. In Uganda, the state is reaching out to “grab”
before plunging into the details of the institutional and organizational context of projects investigated, it is helpful to point out that my argument that state power for development is important in explaining carbon finance project performance finds support in the number of projects that have been approved in the three countries investigated (Table 40). as of march 2013, the largest number of registered projects—twelve—is found in uganda, compared to seven in moldova and only two in tanzania. note that given the size of the projects in moldova, they generate a similar number of carbon credits to those registered in uganda. second, there are considerably more projects in uganda and moldova at the validation stage than in tanzania, suggesting that there are altogether fewer incentives to developing cdm projects in tanzania. overall, these findings suggest that uganda has been highly proactive in promoting the cdm while the administrative environment in tanzania has been less conducive with moldova falling somewhere in the middle.
Table 40: CDM projects reaching validation and registration stages, March 2013

<table>
<thead>
<tr>
<th>Country</th>
<th>Validation</th>
<th>Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># Projects</td>
<td>Carbon Credits (tCO₂e)</td>
</tr>
<tr>
<td>Tanzania</td>
<td>11</td>
<td>789,526</td>
</tr>
<tr>
<td>Uganda</td>
<td>18</td>
<td>1,523,233</td>
</tr>
<tr>
<td>Moldova</td>
<td>16</td>
<td>2,378,717</td>
</tr>
</tbody>
</table>

This is based on an evaluation of the CDM project cycle by March 2013, available online at: http://cdm.unfccc.int/Projects/Validation/index.html.

All CDM projects are to be validated by a third party auditor who assess the correctness of the information provided in the CDM project documents. Only upon successful validation will a CDM project documents be forwarded to the CDM Executive Board for consideration for registration. Registration represents the point where a project activity is accepted as a CDM project, making it eligible to generate carbon credits.

7.1. Explaining Sustainable Development Impact

Development involves the risk that it will be unsustainable. Variation in the sustainable development impact of carbon finance A/R and bioenergy projects is explained by differences in the way that the state in Tanzania, Uganda and Moldova allocates the risks involved in rural economic development through its land tenure and investment regime. On the one hand, large pay-offs for the rural poor, such as through successful large-scale land transactions in Tanzania, entail high costs in terms of CNC and/or MMC should a project fail. On the other hand, when projects have low MMC benefits, such as the Moldova CDM afforestation project, the result is muted local interest—if not exacerbated tensions—in what are otherwise highly sustainable projects. The striking feature of the A/R and bioenergy carbon finance projects in Uganda was the absence of large-scale land acquisitions by foreign investors. This is due in part to a land tenure system that recognizes individual, customary rights to land ownership and thus enables direct payments to individual landholders as well as a more selective foreign investment regime that curtails foreign acquisition of land.

Variation in this institutional framework is ultimately a result of each state’s political economy orientation. My results indicate that MMC benefits for A/R and bioenergy projects are best promoted by a coherent set of rules for land tenure and investment that offers opportunities for smallholders to engage directly with the carbon markets at minimal risk and creates incentives
for domestic investors—an institutional framework most closely approximated in Uganda. While such institutions share many similarities with neoliberalism, the selectivity of Uganda’s foreign investment regime suggests that the approach is better described as *developmental*. Land tenure also plays an important role in shaping CNC risks of land scarcity. The risk that land comes to represent CNC is affected by the way that a land tenure regime accommodates historical land governance practices. Land tenure systems in Uganda and Moldova have both over-looked significant historical governance failures that can increase the likelihood that land represents CNC and thus sustainability risk—encroachment in Uganda and a lack of public participation in Moldova, respectively. Tanzania has done a much better job of accommodating historical land governance failures, such as Ujamaa villagization, in its current land-tenure system. But other factors outside the control of states are also relevant to CDM sustainable development impact. These include population density and drought. Unfortunately, other studies have tended to conflate the causal influence of these factors with that of carbon finance projects—a problem related to the lack of comparative methods used in most research.

Finally, elements of state administrative capacity conspicuous by their absence are state organizations charged with regulating sustainable development, including the Designated National Authority (DNA) and agencies responsible for Environmental Impact Assessments (EIAs). The underperformance of the DNA and environmental agencies raises important concerns about the regulatory approach to sustainable development, which has focused on *ex-post* project screening rather than institutional incentives for sustainability. Overall, my results support Thompson’s (1993) argument that “before-the-fact” administrative controls should be used for policies of which the consequences are not easily monitored, such as sustainable development, as opposed to “after-the-fact” controls.
7.1.1. **Land Tenure, Investment Regime and Man-Made Capital (MMC) Effects**

**Uganda: a developmental land/investment regime**

While projects in Uganda were more modest in size than those in Tanzania or Moldova, the risks involved in Uganda’s projects were more equitably distributed between project developers and smallholders. When encroachment was not a factor, which was the case in all investigated except one, smallholders were able to secure considerable MMC benefits from participation in carbon projects. Furthermore, through organizational innovations of project developers, MMC benefits were extended to those not holding sufficient land to participate directly. At the same time, Uganda’s investment regime places important restrictions on foreign investment in the rural sector in order to prevent large-scale land acquisitions. The apparent result is the promotion of domestic investors in the forest and bioenergy sectors—projects investigated in Uganda were implemented by a state agency, an Ugandan NGO and an Ugandan firm.

*Evidence of the Relationship between Land/Investment Regime and MMC in Uganda*

Two of the three projects in Uganda involved individual land rental contracts between individual households and project developers, including the Plan Vivo reforestation project and CDM bagasse cogeneration project. The lack of formal titles did not pose a significant obstacle to advancing these projects. Indeed, both EcoTrust and KSW produced their own contracts which were functionally equivalent to formal government leases. For EcoTrust, the contract took place as a “Plan Vivo”—a land management plan developed by each individual smallholder who maps out areas for tree-planting and long-term land-use. KSW contracts with individual outgrowers to ensure that cane is not diverted to other buyers and food is secure. Significantly, these

---

345 Average carbon credits across the seven carbon projects was Tanzania: 4.5 MtCO2e, Uganda: 0.4 MtCO2e and Moldova: 3.9 MtCO2e.

346 Business Manager, Kakira, Interview UD4, 9 June 2009; Small Business Owner (UD16), Kakira, Interview UD16, 8 June 2009.
contracts were enforceable: KSW had reportedly already taken 30 farmers to court for breach of contract.\textsuperscript{347} A copy of the KSW contract can be found in Appendix 9.

The prevalence of such individual land rental contracts, I argue, is a consequence of Uganda’s more liberal land tenure system that recognizes individual, customary land rights. Uganda’s land tenure is unique in Africa in upholding individual land ownership rights—including customary land ownership rights. Consequently, under the country’s land tenure system, large unused tracts of land do not exist; almost all lands are owned individually under customary law and project developers need to negotiate with (customary) landowners directly.

The association of MMC benefits with land use means that those without land or with insufficient land to take part in carbon finance projects cannot directly benefit from carbon finance projects while the carbon projects may also increase land scarcity. This was associated with two projects in Uganda. I observed indications, though inconclusive, that the expansion of KSW’s sugarcane supply in the context of the Uganda CDM bagasse cogeneration project was having such an impact: villagers in Kagogwa not participating as sugarcane outgrowers in the CDM cogeneration project had some of the smallest landholdings encountered in Uganda. However, there were no indications that the Plan Vivo project was driving the acquisition of land or otherwise putting pressure on land scarcity.

In both the Uganda CDM cogeneration project and Plan Vivo reforestation project, the project developers had established special funds to extend benefits to non-participants. The BSGA and KSW have jointly established the Kakira Outgrowers for Rural Development (KORD), a local NGO, to promote development projects in the area. Similarly, EcoTrust established a Community Development Fund representing 10\% of carbon sales of the Plan Vivo reforestation project to bring some project benefits to local residents unable to participate in the project. It would be important to gauge the impact such programmes are having, something which was unfortunately not feasible in the current dissertation.

\textsuperscript{347} NGO Officer (UD3), Kakira, Interview, 10 June 2009; Village Focus Group (U26), Kagogwa Village, 11 June 2009.
Land Tenure in Uganda

The empirical findings summarized above are consistent with Uganda’s land tenure system. The trajectory of land tenure reform in Uganda has moved along an arc towards greater recognition of customary land tenure, including customary land ownership, and the curtailment of the discretionary powers of land-owners (Coldham, 2000; Green, 2006). The fundamental principle of land tenure in Uganda distinguishes it from the Tanzanian and Moldovan experience: the 1995 Constitution of Uganda states that “Land in Uganda belongs to the citizens of Uganda and shall vest in them in accordance with the land tenure systems provided for in this Constitution” (Article 237(1)). The Ugandan government still owns sizeable tracts of land such as forest reserves and protected areas, but the majority of Uganda’s land is not owned by government, but Ugandan citizens. The right of Ugandan citizens to own land is unique in sub-Saharan Africa. As legal experts have commented, “Ugandans have some of the most extensive legal protections for their land claims in Africa” (Knight et al., 2011: 18).

The 1995 Constitution recognized mailo, freehold, leasehold and customary land tenure systems as means of owning land (Article 237(3)). Mailo land is unique form of freehold tenure which finds its origins in the colonial period when the British found it politically expedient to grant land ownership to elites of the Buganda kingdom (Apter, 1997 [1961]; Low, 1964; Reid, 2002: 425). More important for our purposes was the Constitution’s recognition of customary land tenure (McAuslan, 2003a: 284). Customary tenure is defined in the Land Act as tenure which applies:

- local customary regulation and management to individual and household ownership, use, occupation of, and transactions in, of land in perpetuity; providing for communal ownership and use of land; in which parcels of land

348 Article 237(2)(b) of the Constitution recognizes the power of government to “hold in trust for the people and protect natural lakes, rivers, wetlands, forest reserves, game reserves, national parks and any land to be reserved for ecological and touristic purposes for the common good of all citizens.”

349 In an effort to secure political support in the Buganda Kingdom, the British formally acknowledged the personal land claims of both the Kabaka and elites in the 1900 Buganda Agreement (Low 1964: 427-30, West 1972, Mugambwa 1987). Specifically, the 1900 Buganda Agreement stated “One thousand chiefs and private landowners will receive the estates of which they are already in possession, and which are computed at an average of 8 square miles per individual, making a total of 8,000 square miles” (Thomas, 1928; West, 1972). The creation of mailo land also changed the political fabric of the country by divorcing the allocation of land to elites from the Kabaka’s authority (Batungi, 2008).
may be recognized as subdivisions belonging to a person, a family or a traditional institution; and which is owned in perpetuity (Land Act: s.4(1)(a)-(h)).

Although smallholders and communities may choose to obtain formal proof of their customary lands, customary land ownership is legally recognized without it (Knight et al., 2011: 18). Yet in an effort to formalize rural economy and improve domestic markets, the government has also provided means for formalizing individual customary tenure into certificates of customary ownership and freehold title (Land Act: s.4-8 and 9-15).

Communal land tenure does not play a prominent role in Uganda, though this did not undermine the sustainability of A/R and bioenergy projects. One reason for this is that, in contrast to Tanzania and Moldova, land tenure in Uganda is distinct from village governments. Obtaining a community customary certificate (as opposed to the individual type) is complicated by the need to first form a legal body to represent the “community”. In the words of one expert, “In order to apply for a title, there has to be a legal person, a legal entity. A ‘community’ is not a legal entity”. The particular form envisioned in the Land Act was a Communal Land Association (CLA). A CLA allows individual and common land to be managed by a collective and for any revenue generated to be retained by the community (Land Act: s.15-26). A number of unsuccessful applications have been made to formalize certain community forest management schemes into CLAs, mostly in Masindi district (EMPATFORM, 2006: 8; ULA, 2007: 7). However, as of 2009, no individual titles or CLAs had been granted in Uganda (ULA, 2007). Certainly no CLAs were encountered amongst the projects investigated during the course of this dissertation.

Notably, the form of participatory forest management used in the CDM afforestation project in Uganda is not predicated on land tenure such as a CLA but paid membership in a local, legally constituted community-based organization (CBO) known as RECPA. Known as collaborative forest management (CFM), participatory forest management schemes were created under the Forestry Act to allow the NFA to enter “into a collaborative forest management arrangement

---

351 Multilateral Donor Agency Officer, Kampala, Interview UN3, 15 May 2009; NGO Officer, Kampala, Interview UN16, 12 May 2009.
with a forest user group for the purpose of managing a central or local forest reserve or part of it” (Forestry Act: s.15, MWLE, 2003). A “forest user group” is defined in the Forestry Act “as a group comprising members of a local community registered” as an NGO or CBO. But because CBOs such as RECPA do necessarily represent all village residents, the MMC benefits of the Uganda CDM afforestation project were muted. Significantly, participation in RECPA appeared to be beyond the reach of most Kirungu residents. Of RECPA’s 200 members, only 12 were from Kirungu.352 The distinction between land tenure and village government bodies in Uganda thus does entail some risk—a situation that contrasts with Tanzania where village government remain key players in the governance of land. The only local government bodies in Uganda with a mandate for land management are the District Land Boards.353

The reason why few customary land certificates have been issued, individual or community-based, is that Ugandans perceive efforts to formalize customary rights as an attempt by the government to extend its control: “Everybody believes government wants to grab their land, so [certification] is one way government will find out how much land they have and will tax them”.354 With consistent evidence that domestic land markets are operating in Uganda without the issuance of customary certificates (Baland et al., 2007; Deininger et al., 2008), there appears to be little incentive to obtain one. Furthermore, the administrative apparatus for producing freehold and customary land certificates has faced significant constraints in terms of human resources and organizational capacity. The allocation and registration of such titles, in contrast to mailo lands, was delegated to District Land Boards and sub-county Area Land Committees (Land Act: s.64). But the District Land Board in Bushenyi district was staffed by only five people at the time of 2009 field surveys and had registered fewer than 10% of land owners.355

352 A survey commissioned by the author found that RECPA member in Kirungu had only planted a total of 11 ha over the period 1998-2009.
353 These have the power under the Constitution “to hold and allocate land in the district which is not owned by any person or authority” (Act 241(1)(a)).
354 NGO Officer, Kampala, Interview UN16, 12 May 2009.
355 District Government Officer, Bushenyi, Interview UD14, 25 May 2009
If a land certificate is sought, Uganda landholders themselves favour freehold title, which may be leased to foreign investors. Foreign investors are permitted under Article 237(c) of the Constitution to lease land directly from Uganda citizens, albeit for a limited number of purposes discussed below.

_Uganda’s investment regime: verging on developmentalism_

Elements of developmentalism are most evident in Uganda’s investment regime. In contrast to Tanzania, there has been a conscious attempt by the Ugandan government to steer foreign investment in certain directions. The 2000 Investment Code Act allows the government to identify priority business areas for foreign investments, which are then eligible for special incentives. Relevant to the CDM projects under investigation are “crop processing” and “processing of forest products” (Investment Code Act: s.13(2)-(3)). Yet the Act places important restrictions on leasing land to foreign investors. Section 10(2) states that no foreign investor shall acquire, be granted or lease land for the purpose of crop production or animal production. Nonetheless, under Section 10(4), the government may exempt any business from the restrictions above where it deems it necessary that land should be leased to ensure a regular supply of raw materials.

It is not clear if the Ugandan government has granted exemptions for foreign investment in the forest and bioenergy sectors. Public lands in Uganda such as its forest reserves have been leased to foreign investors (Kron, 2011; NFA, 2005a), though the largest forestry programme on private/customary lands, the Sawlog Production Grant Scheme (SPGS), is a public-private partnership designed to incentivize domestic investment (Jacovelli, 2009; SPGS, 2009a).

---


357 This statutory instrument is known as the Investment Code (Acquisition of Land by Foreign Investors) (Exemption) Instrument. According to Angualia (2010: 15) the companies currently exempted are: Annamemi Agro-Products (U) Ltd, Channan Agricultural Company Ltd, Kibimba Rice Scheme Company Limited, Mukwano Industries Ltd, Nsimbe Estates Ltd, Rwenzori Highlands Tea Company Ltd and Tilda Uganda Ltd.
However, many news stories on biofuels in Uganda refer to domestic rather than foreign companies (Biofuels Digest, 2011b; Kagolo, 2010; Onyango, 2011a; b; Pearce, 2007). While many sugarcane estates in Uganda are only partially owned by Uganda citizens, the lands were acquired well before the reign of Museveni and current investment regime. Given the surprising lack of foreign investment in biofuels in Uganda, this sector appears to not fall under the definition of “crop production” and is thus barred from foreign investment. Altogether, large-scale land acquisitions of private land by foreign investors for forestry and bioenergy of the type encountered in Tanzania do not seem feasible in Uganda.

The powers accorded to Uganda’s foreign investment agency also suggest a more active and selective role. Similar to the Tanzania Investment Centre, the Uganda Investment Authority (UIA) was established under the Act to be a “one-stop shop” allowing investors to register, obtain investment license and secure necessary secondary clearances (UIA, 2009: 8). In contrast to the situation in Tanzania, however, the Ugandan government has not granted the UIA as wide-ranging authority to compel cooperation by other government bodies. Consequently, the government can play only a limited role in inciting development in land, which is in contrast to Tanzania where the government has established a “Land Bank” under the Tanzania Investment Centre (TIC)—a country to which we now turn.

**Tanzania: promoting large-scale land acquisitions**

The institutional framework in Tanzania for rural development places the burden of risk on villagers themselves through a collective land tenure system in combination with an aggressive foreign investment regime that does relatively little to spur domestic investment. The land tenure system in Tanzania does not allow villagers to engage directly with foreign investors to realize the economic potential of their land, but instead requires that they first transfer it to the central government who then leases it out to investors. This offloads project risks onto villagers who only receive compensation for their lands and not payment that reflects its true market value; the real benefits of any village investment project can only be the employment and ancillary benefits it generates. When foreign investment projects are successful, villagers overlook the low rates of compensation as the direct economic benefits are large compared to other potential economic
opportunities. But when a project fails, villagers are left with few benefits and little recourse as the land is no longer theirs. At the same time, the Tanzanian investment regime is very liberalized with the result being that it has created few incentives for domestic investors to become meaningfully involved in forestry or bioenergy.

**Evidence of the Relationship between Land/Investment Regime and MMC Benefits in Tanzania**

The most concrete example of how the risks involved in the “burden of the cost of development” is scaled against villagers in Tanzania comes from the two projects that involved large-scale land acquisitions. Specifically, my reconstruction of compensation rates for lands acquired for the Tanzanian biofuel and CDM afforestation projects demonstrated that payment was only extended to a relatively small number of individuals in villages involved who could demonstrate they had active farms or other such fixed assets in the lands under question. This indicates that the central government abides by the interpretation that unused village land is General Land, as suggested in the *Land Act*. However, much of the public and media appear to subscribe to the interpretation of General Land in the *Village Land Act* that unused Village Land is also conserved Village Land for purposes of compensation.

Nonetheless, the low compensation rates in Tanzania do not alone determine the sustainability of projects involving large-scale land acquisitions. Important is the relationship between MMC and CNC costs and benefits. On the one hand, the biofuel project was controversial because villages have suffered tremendous opportunity costs by transferring their land for a project which has been suspended indefinitely and which has not produced anticipated employment benefits. On the other hand, the CDM afforestation project in Tanzania generated considerable MMC benefits as it employed nearly 30% of villagers surveyed. Indeed, villagers in Mapanda had transferred additional village lands to another forestry company as recently as 2007. While villagers had some grievances about the CDM afforestation projects, on balance villagers found that benefits outweighed the low rates of compensation. The low sustainability of the Tanzania biofuel project then is more a result of it being a bad business deal than due to low compensation rates. Villagers had transferred their land with little in return. A possible remedy would be to provide villagers
some legal recourse should an economic development project predicated upon the acquisition of village lands fail.

Strikingly, participatory natural resource management was found ineffective amongst projects investigated, an unexpected finding given acclaim for Tanzania’s common property institutions. Tanzania is also well known for its advancement of participatory forest management, which was the result of significant institutional reform in Tanzania’s forest sector (Blomley and Iddi, 2009; Blomley and Ramadhani, 2006). Participatory forest management is a term encompassing two broad types of forest management: community forests (including village land forest reserves and community forest reserves) and joint forest management (JFM). It is made possible through the 1999 Village Land Act, which recognizes village customary title, the 2002 Forest Act which enables local communities to declare and gazette forest reserves and the 1982 Local Government Act which enables the establishment of village by-laws covering forest access and use (Milledge et al., 2007: 97). The appeal of community forests is that villagers retain all benefits accruing from the forests they have established, including 100% of revenue from the sale of forest products, levying and retaining fines and confiscation of illegally harvested forest products (Blomley and Iddi, 2009: 33). In turn, JFM allows for the establishment of a special management agreement between a village government (or community group) to co-manage central, district and even private forest reserves (Forest Act: s.16).

But participatory forest management was absent from the Tanzania CDM afforestation projects, supporting observations elsewhere that tree-planting is better managed as a system of individual private property than as a group system (Otsuka and Place, 2001: 18; Skutsch, 1985). For example, individual tree-planting was very popular in Luhunga, one of the control villages to the Tanzania CDM afforestation projects. Here more than 40% of those surveyed were independently engaged in tree-planting on their household plots. Compared to what income farmers could hope to receive from growing maize, tree planting was simply more lucrative—by nearly a factor of two over a short 6-year time horizon (Table 41).
Table 41: Comparative economic value of 1 hectare of pine plantation and maize after 6, 10 or 15 Years in Luhunga and Mapanda

<table>
<thead>
<tr>
<th>Pine Plantation Value*</th>
<th>Maize Valuea</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Million Tsh/ha)</td>
<td>Average Maize Productivity (Million Tsh/ha)</td>
</tr>
<tr>
<td><strong>LUHUNGA</strong></td>
<td></td>
</tr>
<tr>
<td>6 Year Value (million Tsh)</td>
<td>3.71</td>
</tr>
<tr>
<td>10 Year Value (million Tsh)</td>
<td>4.94</td>
</tr>
<tr>
<td>15 Year Value (million Tsh)</td>
<td>6.75</td>
</tr>
<tr>
<td><strong>MAPANDA</strong></td>
<td></td>
</tr>
<tr>
<td>10 Year Value (million Tsh)</td>
<td>2.47 – 7.41</td>
</tr>
</tbody>
</table>

* The value of 1 hectare of pine as reported from three household surveys (n = 3) each in Luhunga and Mapanda where the respondent had already harvested trees and knew the price. Most people in Luhunga and Mapanda had only started tree planting in recent years, which explains the low n.

a Average maize productivity in Luhunga and Mapanda being 913 and 823 kg/ha, respectively. High maize productivity 1050 and 892 kg/ha, respectively. Maize value assessed at price of 6,000 Tsh per 20 kg maize.

Villagers in the control village of Luhunga had also planted a six hectare community forest. But its small size was an indication of limited organizational capacity to plant trees communally while villagers also voiced misgivings about the benefits that the community forest, still young, had generated. Indeed, there was a sense of frustration amongst some with the community-based model; village leaders did not want to see it extended to afforestation efforts under the carbon market. As one local government official in Luhunga explained: “Our opinion is not to deal with this issue [afforestation under the carbon market] in that kind of community basis because we have proved failure with so many projects that are based on community or all those projects which are under control of groups.”

---

358 Villager (T12), Luhunga Village, Interview T12, 1 March 2009. Another villager in Luhunga described the community forest in the following terms: “It seems as if we’re doing charity. We just planted the trees and take care of the forest, but we’re getting nothing from the forest” (Villager, Luhunga Village, Interview T13, 2 March 2009). Harvesting trees was not yet permitted within the community forest, though once mature, all royalties would accrue to the community group if the decision to harvest were made (Milledge et al., 2007: 245, Blomley & Iddi, 2009: 33-34).

359 As one local government official in Luhunga continued, “That is why it comes a time that people now are trying to see that it is better to deal with individual issues. On our side…because many people here have acres of trees, so it sounds better if this issue would be dealt very individually…You know people in this ward are very hard-working. Everybody has gotten his own trees. So when you talk about [doing this on an individual] basis it is very possible. In
Nor did any of the villages demonstrate joint forest management (JFM) to be effective. In Luhunga village, referred to above, there were no benefits from JFM apart from the collection of firewood. JFM also had little impact on the Tanzania cookstove project, despite the proximity of the project village to Marang Forest Reserve and the fact that many people were collecting firewood from it. But the most striking example of JFM’s failure was found in the case of the Tanzania biofuel project, where local forest reserves had been pillaged for the fuelwood trade despite their designation under JFM. The apparent reason for JFM’s shortcomings is that the Forest Act provides no guidance on how the benefits arising from JFM are to be shared (Blomley and Iddi, 2009: 33).

In the area surrounding the Tanzania biofuel project, there have been frequent efforts to conserve forests and thwart the illegal charcoal economy, including an extensive international NGO effort in the 2000s to engage local villages in JFM (Kaale and Mwakifwamba, 2006). Mtamba village, involved with the Tanzania biofuel project, has sought JFM of Ruvu South Forest Reserve. The situation has verged on the edge of violence as armed charcoal traders threatened villagers and government forest guards alike (Kaale and Mwakifwamba, 2006: 19). A consortium of NGOs promoting forest conservation concluded that “the intended output of reducing pressure and dependence on forest resources in Kazimzumbwi, Pugu and Ruvu South [Forest Reserves] was not achieved… Conservation of the forest reserves required law enforcement and legal powers which [the project] partners NGOs did not have” (Ibid.: vi-viii). A more recent NGO report concluded that: “Much of [the Sun Biofuel project] area has already been degraded by the dense human population close to Dar es Salaam, although areas of natural coastal bushland, grassland and thicket are still present. But the severe charcoal crisis is the major source of forest clearance both in and outside forest reserves” (WWF, 2008: 52). Ironically, it was JFM’s failure and the extent of ensuing forest degradation due to illegal charcoal harvesting that made the area attractive for the Tanzania biofuel project.

comparison, other places are very reluctant to plant trees. That's why they are thinking about community. Because they are afraid of being responsible. But not in this place. People are very responsible in doing their own things.”

Villager, Luhunga Village, Interview T13, 2 March 2009.

360
Land Tenure in Tanzania

The empirical findings above can be explained by Tanzania’s land tenure system, which saw major reform in the 1990s, resulting in the 1999 Land Act and 1999 Village Land Act (GoT, 2008; McAuslan, 2003b; Roughton, 2007; Shivji, 1998; Sundet, 2005). Despite reforms, the 1999 Land Acts maintain radical title of the President over all land, consistent with the British colonial system. Tanzanians cannot own land but are accorded land rights under a right of occupancy system (Land Act s.1-14). However, the new legislation also recognized customary lands rights through the creation of a new land tenure category, Village Land and customary rights to occupancy therein. Village Land is now one of three basic land tenure categories created under the Land Act (s.4), alongside Reserved Land and General Land.

Reserved Land is generally protected areas and government forest reserves (Land Act: s.6). General Land is a residual category of land under the authority of the central government that is neither Reserved Land nor Village Land, though there is a lack of clarity as to whether this includes both occupied and unoccupied Village Land—an issue that is important in the context of projects involving land acquisitions. Significantly, only General Land under the direct control of the central government can be leased to foreign investors (Land Act: s.22(1)(b); s.25(1)(h)). Because the majority of land in Tanzania is Village Land, foreign investment projects almost always involve some transfer of Village Land to General Land. In other words, outside of Tanzania’s already extensive protected areas system, 97% of the country’s lands are on Village Land. Approximately 70% of Tanzania’s land is Village Land, 28% as Reserve Land but only 2% as General Land (MLHHSD, 2010; NLUPC, 2005).

361 In responding to the recommendation of the 1994 Presidential Commission of Inquiry into Land Matters that the President be divested of radical title and invested in other government bodies, the government responded “The President as Head of State is responsible for the development of the country and the well-being of the people, and land being an important element for development has to be controlled by the President. If land is vested in [the] Board of Land Commissioners and the Village Assemblies then the Government will be turned into a beggar for land when required for development… The Investment Promotion Policy will be impossible when the Government does not have a say in land matters” (Shivji 1998: 81).

362 “Seventy percent of the land in Tanzania, the authority to transfer that land is the village authority. Now the national lands, we have the reserve, that is the state land, the national parks and forests and all of this, and the granted government. All this is thirty percent, formed under the authority of the nation,” (Interview with Director General of Tanzania’s National Land Use Planning Commission, Dar es Salaam, 30 March 2009).
The fact that most of Tanzania’s land lies locked away from foreign investment as Village Land was to be solved by compensating villagers for its transfer to General Land. In some of the most significant legal reforms under the 1999 *Land Act* and *Village Land Act*, villagers are now entitled to “full, fair and prompt compensation to any person whose right of occupancy or recognised long-standing occupation or customary use of land is revoked or otherwise interfered with to their detriment” for lands transferred into General Land (*Land Act* s.1(1)g and *Village Land Act* s.3(1)(h). Despite the apparent clarity of these compensation provisions, considerable controversy has surrounded compensation because, as my research has shown, the central government does not interpret compensation provisions to extend to unused village land.

Under the *Land Act*, compensation was only to be granted for “unexhausted improvements”. These are permanent investments in land such as trees, standing crops and produce “resulting from the expenditure of capital or labour by an occupier or any person acting on his own behalf” (*Land Act*: s.20.3 and Interpretation). In other words, compensation is only to be extended to used land. The *Village Land Act* at Section 7.1 goes into considerable detail about what might constitute Village Land; it includes fallowland, land used for depasturing cattle or passage for cattle “which the villagers have been, during the twelve years preceding the enactment of [the *Village Land Act*] regularly occupying and using as village land.” However, it is unclear how *unoccupied and unused* Village Land is treated under the law because of conflicting definitions of General Land (Isaksson and Sigte, 2010: 7-8; Sundet, 2005: 3-4). The *Village Land Act* defines General Land as “all public land which is not reserved or village land” (s.2). However, the *Land Act* defines General Land as “all public land which is not reserved land or village land and includes unoccupied or unused village land” (s.2, emphasis added). Furthermore, Section 181 of the *Land Act* states that it prevails in case of conflict. The upshot is that if deemed unused, land within village boundaries is considered *de facto* General Land without need for compensation.

**Tanzania’s investment regime: open and with teeth**

In contrast to the dilemma’s on bringing land to market under Tanzania’s land tenure system, Tanzania’s foreign investment regime is very open to investment, if not aggressively so. First,
there are few restrictions on foreign investment in Tanzania. A NEPAD/OECD study concluded that “the [1997] Investment Act did away with sectoral restrictions on FDI from nearly every economic activity” (NEPAD/OECD, 2005: 47). This contrasts with the more selective, developmental investment regime in Uganda.

Second, in addition to liberalizing the international investment regime, the 1997 Investment Act also established an investment agency— the Tanzania Investment Centre (TIC). Similar to its counterpart in Uganda, the objective of the TIC is “to co-ordinate, encourage, promote and facilitate investment in Tanzania and to advise the Government on investment policy and related matters” (Investment Act: s.5). But in contrast to the situation in Uganda, the TIC has been vested with important powers for co-ordination and authority to grant positive incentives to foreign investors in land and priority sectors.363 The 1997 Tanzania Investment Act states that all government departments, agencies and other public authorities “shall co-operate fully with the Centre in the performance of its functions” (s.16(1)) and empowers the TIC to request the in-house presence of officers from any other relevant ministry (s.16(8)). The 1999 Land Act also grants the TIC important powers over land: “Land to be designated for investment purposes...shall be identified, gazetted and allocated to the Tanzania Investment Centre which shall create derivative rights to investors” (s.20(2)). With such powers, the TIC has sought to play a more direct role in coordinating land acquisition through what is being called the Land Bank. However, to date, the TIC has not actually acquired land for the Land Bank (Isaksson and Sigte, 2010: 27). Instead, the TIC has played only a facilitative role in the land transfer process between investor and villages (Isaksson and Sigte, 2010: 37). Because of the individual land rights of Ugandan citizens are better protected, such a Land Bank is not possible in Uganda.

**Moldova: restricted liberalization**

As would be expected in a former Soviet Republic, the Moldovan government has placed significant restrictions on land-use and therefore on the ability of villagers to directly engage with carbon finance. Despite differences in administrative capacity, most clearly indicated by its functioning land cadastral system, Moldova shares different elements of land tenure with

363 Tanzania Government Officer, Dar es Salaam, Interview TN8, 30 May 2010.
Tanzania and Uganda. Like Tanzania, Moldova is moving away from a history of collectivization but one which was significantly more firmly entrenched and effective. Like Uganda, Moldova allows individual villagers to lease land to foreign investors but this opportunity has been frustrated by other obstacles that include an overly fragmented land-base while land-use remains tightly controlled by the state. At the same time, Moldova’s foreign investment regime is relatively tepid and its investment facilitation body showed little interest in carbon finance. As a result, carbon finance is viewed as a tool of development financing rather than being a real source of investment.

**Evidence of the Relationship between Land/Investment Regime and MMC Benefits in Moldova**

Restraints in Moldova’s land tenure and investment regime manifest themselves in three ways. The first two restrictions are relevant for the CDM afforestation project. First, individual households are unable to undertake tree-planting on their own lands. Under the *Land Code*, land designated for agriculture is required by law to be used for that purpose alone; owners also need to take measures to protect and improve the soil or otherwise risk losing their ownership rights (Articles 24, 29, 36, 50). In order to plant trees, it is first necessary to have land officially recognized as degraded and declared unsuitable for agriculture or pasture by a resident village land engineer.\(^{364}\)

Second, given the extent of land degradation and the need to address it in a more systematic manner, the 2000 *Law on the Improvement of Degraded Lands through Afforestation* established special procedures for identifying degraded lands and designating them for afforestation (Articles 5-10). At the initial stage of the Moldova afforestation project, information on degraded lands retained in the national cadastral system formed the basis of special district commissions to identify potential degraded lands for afforestation (World Bank, 2003a: 12-13)—a commission to which all village mayors in each district were included.\(^{365}\) Indeed, the administrative system

---

\(^{364}\) *Village Government Officer, Bursuceni Village, Interview M37, 14 August 2009.*

\(^{365}\) *District Government Officer, Singerei Interview MD2, 12 August 2009.*
for allocating degraded lands for afforestation accords considerable authority to village governments.

At the heart of this is the village land engineer. The village land engineer is tasked under the Land Code (Article 10) to continuously monitor village land and update the village cadaster and contribute to the upkeep of the national cadastre.\textsuperscript{366} In the words of one village land engineer: “Nobody knows better than the local authority which lands are degraded. The government cannot know better.”\textsuperscript{367} Any recommendation made by the village land engineer to change the designation of a parcel of land in the national cadastre needed approval by the village council and District Land-Use Commission,\textsuperscript{368} who verified the information with maps maintained by the district land agency representative (SALRC, 2004). Only after the change of land designation was verified was the information submitted to the land agency’s national office.\textsuperscript{369} Once identified as degraded, afforestation is compulsory under the Forest Code (Article 54). This proved politically sensitive at the village level because the majority of lands—nearly 70%—anticipated for the CDM projects were actually not designated as degraded land but as village pasture (CDM-PDD, 2008d: 37-38; 2010: 35).

Those interviewed in Moldova emphasized that the final determination about whether lands were degraded or not was under the authority of the village council.\textsuperscript{370} As one district official explained: “[the allocation of lands for afforestation is] a local decision at the village council level, because each village council should decide if they have enough resources or land to be afforested.”\textsuperscript{371} Village governments could and sometimes did decline Moldsilva’s entreaties to plant trees on their lands, as evidenced by the control village of Tocuz. Furthermore, the Law on

\begin{footnotesize}
\begin{enumerate}
\item Village Government Officer, Bursuceni Village, Interview M37, 14 August 2009.
\item Ibid.
\item Village Government Officer, Bursuceni Village, Interview M37, 14 August 2009; Moldova Government Officer, Chisinau, Interview MN10, 22 August 2009.
\item Village Government Officer, Bursuceni Village, Interview M37, 14 August 2009; Moldova Government Officer, Chisinau, Interview MN10, 22 August 2009..
\item Village Government Officer, Chiscareni Village M34, Interview, 18 August 2009; Village Government Officer, Bursuceni Village, Interview M38, 15 August 2009.
\item District Government Officer, Căușeni, Interview MD1, 7 August 2009.
\end{enumerate}
\end{footnotesize}
the Improvement of Degraded Lands permits village governments to retain ownership of land. Management rights to afforested lands are transferred to Moldsilva for only 10-15 years while the forest establishes itself, though a final contract between Moldsilva and the village ensures the land will remain afforested through the CDM crediting period (CDM-PDD, 2008d: 27). Such assurances were needed to secure the project. In 1996, in an effort to control illegal logging, the central government passed legislation which transferred the ownership of nearly all village forests (20,320 ha) to Moldsilva, an issue that has remained sensitive in many villages (Gulca, 2010: 84). The upshot of the procedures for identifying degraded lands for purposes of afforestation is that most land-use decisions involved the village authorities. Thus sustainability depends on how this authority is exercised. As will be discussed in the subsequent section on land scarcity and CNC, it was a rather closed political culture at the village level that exacerbated local CNC concerns.

The third type of restriction embedded in Moldova’s land tenure regime is less obvious, but contributed to the failure of the biomass component of the CDM rural energy modernization project: the fragmentation of Moldova’s landholdings. Privatization has however resulted in a considerable amount of fragmentation of the land base. While of uniform size, land parcels granted to villagers are often scattered over different parts of a village in order to equitably represent different grades of agricultural land, vineyards and orchards (IMF, 1999: 71). Local land markets, which had been expected to consolidate some of the land holdings, failed to materialize because villagers have lacked cash or other means (Kutuzov and Haskins, 2003: 12). During interviews in villages that had declined the bioenergy component of the CDM rural energy modernization project, it was clear that villagers were concerned that this fragmented land-base might jeopardize bioenergy supply—though upon investigation of the bioenergy pilot project, I found these concerns unjustified.

The problem of fragmentation of the land base has been partially resolved through so-called “Agricultural Leaders”, encouraged under the NLP (IMF, 1999: 72). These are local businessmen, often the former managers of state and collective farms, who rent individual
household plots, typically for three years, paying in agricultural produce. Agricultural Leaders are responsible for managing as much as 57% of individual peasant farm plots (Lerman and Cimpoies, 2006: 441; Gorton, 2001: 276; Gorton & White, 2003: 326-327). However, government appears to be unsatisfied with results obtained by these Agricultural leaders. The fragmented nature of land holdings in Moldova has been the topic of a series of reforms intended to foster consolidation (Calancea and Horjan, 2007). Consolidation was first addressed in 2002 through a series of amendments to the Land Code (Articles 70/1-70/5) and most recently in the Land Market Development and Agricultural Lands Consolidation Policy under the 2007 National Strategy for Republic of Moldova Agro-Industrial Complex Sustainable Development, 2008-2015 (MAIA, 2007: 41-42). All aim to reduce transaction costs for land consolidation. Further revisions to the Land Code have been undertaken in 2010 to stimulate farmers to buy land (Info-Prim Neo, 2010b). The prospect of consolidation has been contentious because it is unclear if consolidation of land will proceed under individual ownership or a structure that resembles the former collective farm system. Some in the donor community asserted that government efforts towards consolidation are predisposed towards big farms, like the collective farms from the past: “The subsidies are going to these big agro-industrial farms and not to the most vulnerable people that really need them.”

Fragmentation has had significant effects on the sustainability impact of bioenergy projects investigated by allowing local Agricultural Leaders to capture most of the benefits from production of bioenergy, which is simply the biomass residues left after harvesting wheat. While the Agriculture Leader in Chiscareni raised the price of biomass as the bioenergy project proceeded, this did not increase payments to villagers from whom he rented land—they continued to be paid in-kind. Since villagers can only really benefit indirectly from bioenergy, local support for bioenergy is low—especially given the “modern” appeals of natural gas.

372 Though many Leaders would prefer to buy land, this is discouraged by regulatory fees and other transaction costs (Lerman & Cimpoies, 2006: 452). Short leases also discourage more significant investments into land improvements and infrastructure that would be incentivized through ownership (Lerman & Cimpoies, 2006: 448).

373 Moldova Government Officer, Chisinau, Interview MN14, 20 July 2009.

374 Village Government Officer, Bursuceni Village, Interview M37, 14 August 2009.

375 Multilateral Donor Agency Officer, Chisinau, Interview MN11, 28 July 2009.
Land Tenure in Moldova

The above empirical findings are also consistent with Moldova’s land tenure system and the limited expression therein for liberal economic reforms. In contrast to Tanzania and Uganda, which have sought to formalize customary land tenure and extend state authority to hinterlands through land reform, the bulk of land reforms in Moldova have been towards privatization (Chivriga, 2009; Csaki and Lerman, 2002; Gorton, 2001; Gorton and White, 2003; Lerman and Cimpoies, 2006; Prosternam and Mitchell, 1995). As part of the former Soviet Union, land-tenure was organized around state and collective farms (kolhozes) and state ownership of other land resources, such as forests. During the twilight of the USSR, the Moldovan SSR was already making movements towards privatization with the 1991 Law on Property and Law on Privatization. Large-scale privatization only really began upon Moldova’s independence in 1991, including passage of the 1991 Land Code and 1992 Law on Peasant Farms.

During privatization, the Land Code established that ownership of agricultural lands of state and collective farms was allocated to individual villagers, though the village government retained ownership of village public lands (Articles 12, 42-51). Special Land Committees, led by village governments but also involving experts from other state agencies, the agricultural sector and villagers themselves, determined individual land allocations (Land Code: Article 6; Chiriac et al., 2000).376 Degraded lands and pasturelands were not privatized during the 1990s, but allocated to village governments (Article 12)—only productive agricultural lands were actually privatized.377 Initial designation of degraded lands relied on data collected during the Soviet era and subsequently validated by a National Commission on Degraded Lands.378 The Commission’s recommendations were delivered to village Land Committees which took the final decision on the designation of degraded lands, pasturelands and productive agricultural lands (Lerman et al., 1998). All information from this initial designation during privatization has since been digitized

376 Article 12 the Land Code specified conditions for allocating land to villagers, with the result being that not all villagers were eligible for an equal share of the fruits of privatization. These constraints led to a number of disputes during the privatization process, so much so that the former village land manager recounted that “For a long time, I was sleeping with an axe near my bed” (Villager, Săiţi Village, Interview M17, 27 July 2009).
377 District Government Officer, Căuşeni, Interview MD1, 7 August 2009.
378 Village Government Officer, Bursuceni Village, Interview M37, 14 August 2009.
and incorporated into a national cadastral system maintained by the State Agency for Land Relations and Cadastre (SALRC).

Initial privatization efforts met resistance from state and collective farm managers who mobilized political opposition into the ADP party which gained power in 1994. The ADP was able to pass amendments to the Land Code in 1995, the key effect of which was to impose limits on whether individuals could exit from the collective farms as permitted in the 1991-1992 privatizations. The second wave of privatization only became possible only after the Constitutional Court declared in 1996 that amendments to the Land Code were unconstitutional (Gorton, 2001: 273). Indeed, these amendments were an important test of the new Moldovan Constitution adopted in 1994 and its guarantees of fundamental rights, freedoms and duties. The Court’s decision cleared the way for further privatization efforts targeting the larger state and collective farms which culminated in the National Land Programme (NLP) of 1998 (USAID, 1999). The NLP effectively created nearly 8 million land titles for 2.8 million new land owner (Gorton, 2001: 276; Lerman and Cimpoies, 2006: 441).

Despite the transfer of land ownership during privatization, there are important restrictions on the use of land. The Land Code recognizes seven land-use categories including agricultural land, municipal land, industrial and special designation lands, conservation lands, forest estate, wetlands estate and reserve land estate (Article 1). Such designations are important because each type of land-use category is associated with different set of rights and responsibilities. For example, agriculture land must be used “consistent with its purpose” (Article 29), and failure to use land for its designated purpose can result in sanctions or loss of ownership rights (Articles 24 and 25). The permitted uses of forest land are set out in Article 36-42 of the 1996 Forest Code where the definition encompasses all forests “irrespective of ownership or management” (Article 2(2)). Changing the category of land requires official approval by the district government (Land Code: Articles 9 and 71).

Finally, forested areas previously under the control of collective farms were also transferred to village ownership (EMC, 1998), though the bulk of Moldova’s nearly 300,000 ha of forest were retained under state ownership during the transition period (Gulca, 2010: 84). However, in an
effort to control illegal logging, the government passed Governmental Decision No. 595 in 1996 which had the effect of placing nearly all village forests under the ownership of Moldsilva, resulting in the transfer of 20,320 ha from village governments to Moldsilva (*Ibid.*). This decision has been remembered in the villages, where residents remain skeptical of Moldsilva’s efforts to acquire land—even if for only a limited time—for CDM afforestation.

**Moldova’s investment regime: reduce capacity for limited opportunities**

Moldova has more limited experience with attracting foreign investment given the uncertainty of its positing in a shift regional climate between the EU and Russia, resulting in only rudimentary investment facilitation services and greater restrictions on investment than Tanzania and Uganda. The *1997 Law of Normative Price of Land and Procedure for Sale and Purchase of Land* precluded the purchase of agricultural or forest land by foreigners (Article 4(3)). However, the *Land Code* still permits foreigners to lease agricultural land (Article 41), free of price controls (Lerman et al., 1998: 33). These restrictions on land transactions were recognized in the *2004 Law on Investments in Entrepreneurial Activity* which permits foreign investments in any area of the country in any sector except ownership of agricultural and forest land (Articles 5(1), 6 and 22).

The Moldovan Investment and Export Promotion Organization (MIEPO), first established in 1999 for export purposes alone, would appear to aspire to a full investment facilitation organization like in Tanzania or Uganda but lacks fundamental powers to issue business licenses and incentives. As a non-profit agency under the Ministry of Economy, MIEPO’s main powers are to organize information to support foreign investors in Moldova and related consultative services. But these reforms may not be sufficient to attract significantly more foreign investment. The American Chamber of Commerce in Moldova has advocated for the establishment of a State Agency for Investment Recruitment (*AmCham Moldova*, 2009: 14).

---

379 1999 Government Decision No. 105 on the Creation of the Organization for Promotion of Export of Moldova, s. 6-7.
Key regulatory services are not housed at MIEPO but found distributed across the bureaucracy.  

7.1.2. **Historical Land Governance and Critical Natural Capital (CNC)**

The previous discussion has focused largely on MMC and not CNC effects of the carbon finance projects investigated. Here it is important to recall the distinction between natural capital and critical natural capital. CNC refers to natural elements or ecosystems whose absence would lead to sharp declines in human utility or would risk such declines. I argue that the likelihood that land constitutes CNC is shaped by each country’s history of land governance. Some land tenure regimes do a better job of accommodating the peculiarities of a country’s land-use history than others in a way that reduces risks to CNC. Of the three countries investigated, Tanzania has accommodated its past into its current land tenure system best. The land tenure systems of Uganda and Moldova have over-looked significant historical land governance practices that can increase the likelihood that land comes to represent CNC. When a carbon finance project involves land under these circumstances, there is a risk that CNC will be affected and that the conditions of sustainability (weak and strong) are violated.

In Figure 47, I group all 11 cases in terms of whether land represented CNC and whether land was used in each carbon project. Cases where conditions of strong sustainability were violated are found in the upper left-hand corner as the project made use of land which was an element of local CNC. With the possible exception of water access being compromised in the Tanzania biofuel project, reductions of CNC almost always took the form of increasing land scarcity.

It is worth observing that the continuity in Tanzania’s land tenure system has been made possible by a stable political environment and engaging land policy process. The 1999 Land Acts were established only after an extensive inquiry into land governance in the early 1990s (Government of the United Republic of Tanzania, 1994) followed by the adoption of a national land policy

---

380 The registration of foreign company needs to take place under the auspices of the State Chamber of Registration, following the same procedures as registering a local company (2004 Law on Investments in Entrepreneurial Activity, No. 81-XV, Article 18(1)), while obtaining a business license requires a visit to the National Licensing Chamber (MIEPO, 2010: 15-18).
Shivji, 1998; Sundet, 2005). Notably, an exercise to adopt a national land policy has not been concluded in Uganda, though a number of drafts have been produced over the years (MLHUD, 2009). Moldova has also had no serious national debate on land tenure; rather, changes in land tenure after the fall of the Soviet Union, as in nearby Ukraine, followed an elite assessment of the need for privatization (see Allina-Pisano, 2008).

Figure 47: Land use and CNC matrix

<table>
<thead>
<tr>
<th>Carbon Project Used Land</th>
<th>Land Represents CNC</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>-Tanzania Biofuel*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Uganda CDM Cogeneration</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Moldova CDM Afforestation (Bursuceni)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Uganda CDM Afforestation (Kirungu)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>-Tanzania CDM Afforestation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Uganda CDM Afforestation (RECPA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Uganda Plan Vivo Reforestation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Moldova CDM Afforestation (Săiţă and Chiscareni)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Possible water scarcity

Tanzania: the Legacy of Ujamaa

In Tanzania, land scarcity issues did not arise in either the CDM afforestation project or the biofuel project, which I attribute largely to the recognition and accommodation of Ujamaa villagization in Tanzania’s current land tenure system.381 The extent of unused village lands in Tanzania is due, in part, to the centralization of the scattered homesteads undertaken during Ujamaa villagization over which many Tanzanians still claim customary land rights by virtue of the accommodation of Ujamaa lands in Tanzania’s current land tenure regime.

For example, during research into the CDM afforestation projects in Tanzania, one respondent in Mapanda stated: “People were living there before [in the area acquired for afforestation] but

381 For more on ujamaa and villagization see McHenry (1979), Schneider (2007), and GoT (1994: 43).
when the company came here, no people were living there. No one was displaced.” 382 During the village meeting it was explained that this was largely due to Ujamaa: “Not more than 50 [people had farms in the area acquired for afforestation]. They're not sure. It's like this—people were living there before, but they were living there before Ujamaa. So during Ujamaa [the] village, all of them, moved here. But maybe they left their things there, maybe trees. That's what the company compensated.” 383 A similar situation is suggested for the Tanzania biofuel project. Villagers in Mtamba were found to have little control over the more distant, forested areas of the village that were acquired for the biofuel project. Indeed, much of this area appeared to have succumbed to the illegal charcoal trade, though certain areas were used for agriculture or set aside for their cultural significance (such as burial sites). It would be important to determine more precisely areas important to villagers, something that was not adequately done during the land acquisition.

The above findings indicate that Tanzania’s current land tenure incorporates significant elements of Ujamaa villagization. The period of Ujamaa villagization was important for securing significant village governance structures (Blomley and Iddi, 2009: 8 & 14; Lund, 2007: 308). While village governments were actually abolished as Ujamaa was initiated in the early 1970s (GoT, 1994: 45-48), by 1975 the Village and Ujamaa Villages Act formally re-established Village Assemblies, which comprise all the adults in a village, and Village Councils, which are elected bodies of 15 to 25 representatives capable of owning property and entering into legal contracts with other parties. The 1982 Local Government (District) Authorities Act, while repealing the 1975 Village and Ujamaa Villages Act, maintained its village government structures and also re-established district level government (which had also been abolished during Ujamaa). It is notable that these formal village government organizations have largely displaced customary institutions at the local level (NLUPC, 2005: 1). Indeed, the repeal of colonial legislation that had accorded authority to chiefs was amongst the first legislative acts in Tanzania after independence (Mniwasa and Shauri, 2001), many of whom were simply

382 Villager, Mapanda Village, Interview T20, 5 March 2009.
383 Village Focus Group (T1), Mapanda Village, 6 March 2009.
maintained in position of authority by the British through their colonial policy of indirect rule (Crowder, 1964).

Most important for our purposes, the Village Land Act recognized village demarcations established in the 1970s during Ujamaa villagization. Under the current Village Land Act, village boundaries under previous legislation are recognized (Village Land Act s.7(1)) while each village is eligible to receive a new land certificate or have recognized a certificate issued under previous legislation that confers upon the village council the functions of village land management and affirms the occupation and use of village land in accordance with the customary law of the area (Village Land Act s.7(7)b & c, my emphasis). Notably, the issuing of a village land certificate does not require that the exact extent of village lands be demarcated, only that village boundaries have been agreed (Village Land Act s.7(6)). The village councils of all villages investigated in Tanzania had recognized jurisdiction over village lands, as they all possessed a Certificate of Village Land. This enabled them to claim customary rights over ancestral lands which they currently use only infrequently. Consequently, project developers had to negotiate with villages to acquire unused village land.

**Uganda: the Legacy of Civil Conflict**

The situation in Uganda could hardly be more different than that in Tanzania. Much of Uganda’s land tenure system has been designed with the intention of addressing power imbalances in the landlord-tenant relationship that grew out of Uganda’s unique mailo land tenure system, itself the product of the colonial period (Coldham, 2000; Green, 2006). However, Uganda’s land tenure system has over-looked the country’s more recent past and the challenges resulting from over fifteen years of civil conflict, particularly the problem of encroachment on state land—a problem unique to Uganda amongst the three countries investigated. There are issues of illegal forest resource extraction in Tanzania (i.e., illegal charcoal production) and Moldova (i.e., illegal timber harvesting), but these are not of the character of Uganda’s encroachment where entire “illegal” settlements have been established on government forest reserves. The state’s attempts to reassert itself in areas of encroachment increases the risk of land scarcity and infringing on
CNC—something that proved unsustainable in Kirungu village who had encroached over the years onto Rwoho Central Forest Reserve, subject of the Uganda CDM afforestation project

Mugyeni et al. (2005) present a succinct history of the problem of encroachment. The Forestry Policy of 1929, established under British colonial authority, led to the initial demarcation of forest reserves across Uganda, nationalizing all forests except those on private land (which in contrast to other colonies, was considerable in Uganda). By 1940, most forest reserves had been demarcated in the field, though the procedures are unlikely to have met current standards for free, prior and informed consent. Regardless, at independence in 1964, forests became property of the Ugandan government. However, during Uganda’s period of political instability from 1970-1986, the Forest Department lost control of the forest estate leading to outstanding losses in Uganda’s forest cover. Indeed, under the Amin regime during the 1970s, encroachment into the forest reserves was actively encouraged (van Orsdol, 1986; Webster et al., 2003: 167). Upon obtaining power in 1986 President Museveni initially ordered the eviction of all encroachers (van Orsdol, 1986; Webster et al., 2003: 167). His position has since vacillated: encouraging encroachment in the mid-1990s (Mugyeni et al., 2005: 31), permitting encroachment in a 2006 executive order (Candia, 2006), and insisting on their expulsion in 2009 (Tebajjukira, 2009). With their fortunes hanging in the balance, and no where else to settle, it seems reasonable that villagers would have wanted to stay put. Recall that Kirungu village had been established in 1953, if not earlier.

The Constitution, Land Act and National Forestry and Tree-Planting Act are silent on the issue of encroachment. However, a close read of the Land Act and its intent to safeguard the rights of tenants vis-à-vis predatory landlords, makes it doubtful that the eviction of villagers who had encroached on central forest reserve land was entirely legal. The Land Act grants important rights to bona fide occupants, though often considered to apply to tenant-landlord relations on mailo land. Section 29(2)(a) of the Land Act states “‘Bona fide occupant’ means a person who before the coming into force of the Constitution had occupied and utilised or developed any land unchallenged by the registered owner or agent of the registered owner for twelve years.” Under the Land Act, bona fide occupants enjoy "tenancy by occupancy." This includes security of tenure (Land Act: s.31). It confers upon the tenant quasi-freehold land rights themselves,
including inheritance and sub-dividing as well as the right of first refusal should the owner wish to sell (Coldham, 2000: 67). Amendments to the Land Act passed in 2010 seek to further limit the powers of landlords by setting sharp penalties for anyone who evicts or attempts to evict tenants without order of court and by requiring a six month grace period before an eviction order can be effected (Nalugo, 2010).

The notion of “bona fide occupant” resonates with the situation of residents of Kirungu village. While the villagers had knowingly encroached on the forest reserve, the fact that such usage had been on-going for generations (the village was settled in 1953, if not earlier) suggests an abdication of the government’s ownership responsibility of the area. The only difference is that the landowner is government, not a mailo landlord. In this light, it seems reasonable to assert that villagers such as those in Kirungu were in adverse possession of the forest reserve lands they occupied (see Mugyeni et al., 2005). If found in adverse possession of forest reserve land, Kirungu resident may be due compensation for loss of land to the CDM afforestation project. The Constitution grants government important powers to “acquire land in the public interest” (Article 237(2)(a)), but citizens are to be protected from the indiscriminate acquisition of land through Constitutional provisions requiring the provision of “prompt payment of fair and adequate compensation” (Article 26(2)(b)(i)).

**Moldova: the Legacy of Totalitarianism in Rural Society**

The lack of public participation between villagers and village governments exacerbated tensions surrounding CNC losses in Moldova, particularly the temporary loss of access to pastureland during the CDM afforestation project. As the World Bank observed, “the responsibility to mediate conflicts and possibly identify compensatory measures lies with the mayoralty which therefore has had an inherent interest not to allocate too much land for afforestation (World Bank, 2003a: 33). During privatization, villagers also found themselves at the end of a decision-making process that under-valued local opinion, itself the result of a Soviet centralized decision-making process that discounted local public participation (Badescu et al., 2004: 325-330).

Public participation is legally required in the Moldovan SEE process (Ivanov, 2009: 268), though there are significant shortcomings. Zaharchenko and Goldenman (2004) conclude that the SEE in
Moldova “did not have the procedural requirements including a public comments stage that are typical for the western EIA, and therefore there was no opportunity for the public concerned to express its opinion with regard to the SEE” (p. 251). However, Moldovan law does permit civil society to undertake a “public” ecological expertise, at their own expense, though its results need not necessarily be taken into account (Zaharchenko and Goldenman, 2004: 251).

A lack of participatory methods is associated with tensions surrounding the Moldova CDM afforestation project in the case of Bursuceni, which make it difficult to determine if CNC was really compromised or whether a lack of participation rendered villagers especially concerned. Certainly, physical land scarcity was an issue here: Bursuceni also had the smallest land area, it dedicated the largest percentage of village land to pasture (35%), had the highest percentage of village land already forested, and the highest frequency of households that owned cattle (numbers were up 2-3 fold since the Soviet era). A number of villagers claimed that if afforestation proceeded, there would be insufficient land for grazing livestock. Nonetheless, there are reasons to question whether scarcity of pastureland was the sole or even primary cause of tensions in Bursuceni. In two Moldovan villages investigated, the initial decision to afforest lands was taken by the village council but behind closed doors. Some villagers did not learn about the specifics of these decisions until Moldsilva came to plant the trees, which resulted in conflict. A more transparent system would have deflated tensions around the CDM afforestation projects. Indeed, in Chiscareni, the Moldova village where tensions surrounding afforestation were lowest, the village government had initiated regular local radio broadcasts of Village Council decisions and also moved to meetings in subsections of the village when land was an issue.

Tensions surrounding land-use in Moldova also raise concerns about the programme for mitigating the adverse impacts of the afforestation project on villagers dependent on (degraded) pastures. This programme was supported by a nearly $1 million grant from Japan that would direct support to villages through a “Special Project Compensation Program” (World Bank, 2003a: 54-56). This programme included (a) provision of alternative grazing grounds; (b) provision of livestock fodder during the project; (c) grant villages priority status for receiving benefits from the forests (temporary employment and fuelwood); (d) allowing local communities
to grow vegetables between the seedling rows until the trees grow and shade these areas; and (e) direct financial support to affected individuals and communities.

However, upon closer examination the programme looks more like an afterthought to the CDM project it was never really capable of addressing land scarcities across all villages that could possibly be involved. The programme only had resources to address a very small portion of the villages involved in the project: 50 of 600 (or 8%). The programme’s effectiveness is also questionable given that tensions were highest in Bursuceni, the only village where the programme was found to have been used.

7.2. Explaining Additionality

In this section I explain conditions where carbon finance results in genuinely effective climate change mitigation activities. My argument is that, under current market conditions, carbon finance projects generate real carbon credits when the state is able to bring projects into alignment with its national development priorities, with the result being that carbon finance becomes an extension of government policy. Amongst the projects I have examined, the mechanism through which such alignment was an organization that was able to maintain a latent organizational capacity for implementation and a motivation to act on opportunities such as that offered through the carbon market (Figure 48). Amongst the projects investigated, was achieved by state agencies in the forest sectors of Uganda and Moldova.

**Figure 48: Model of Additionality**
State agencies in the forest sector retain a certain level of in-house resources to achieve national development priorities but are also actively seeking new financial opportunities as a result of their more business-like management approach. Through the establishment of agencies, liberal economic reforms can actually generate considerable developmental power for the state, in a manner that was likely not anticipated by neoliberalism’s architects. While the afforestation project in Moldova was more sophisticated than in Uganda given its greater administrative capacity, this is a difference in degree not kind. However, not all state agencies have retained a latent organizational capacity for implementation; notably, energy agencies in Uganda and Moldova no longer retain such capacity, though those in Tanzania do. But because of its skepticism of liberal economic policy, the Tanzanian government has been reluctant to pursue energy-related CDM projects.

To summarize, at current carbon prices, CDM projects lead to genuine emission reductions when the state is able and willing to play an active, developmental role in project implementation. Ironically, however, at least in the forest sector, such power for low-carbon development has been retained and actually enhanced through the adoption of state agencies—organizations promoted through structural adjustment. The reason is that administrative capacity alone is insufficient for effective engagement with the international carbon market; also necessary is a state political economy orientation that is favourable towards opportunities in the international market. Despite this, in LDCs, the ability of the state to retain latent organizational capacity is restricted to sectors such as forestry that are relatively less technically sophisticated—for which reason no projects in the energy sector were found additional. In states with greater capacity, such as in emerging economies, the ability of the state to effectively implement more sophisticated carbon finance projects in the energy sector may be feasible.

7.2.1. **International Factors Affecting Additionality**

There are two international factors explaining CDM additionality. First is the elephant in the room—the price of carbon. Largely set by international ambition to engage with the carbon markets, it is a key contextual variable explaining additionality. With the price of carbon low, organizations implementing CDM projects cannot rely on carbon finance alone and need to
either reduce operational costs (the strategy of state agencies and NGOs) or obtain funds from other sources (the strategy of private sector project developers). The latter strategy leads to risks of violating the conditions of additionality. However, if the price of carbon were to rise to a level where the private sector could reliably base projects upon it, the importance my results accord state agencies could give way.

The price of carbon is the key causal factor determining additionality for two reasons. First, it determines the role which carbon finance actually plays in economic decision-making. If the carbon finance layer were larger in any of the projects investigated, project developers would have been able to more firmly base projects on it. Results presented here support arguments amongst practitioners that the current price of carbon is not high enough to have a significant transformative effect on economic decision-making (Black, 2009; EcoSecurities and CD4CDM, 2007: 76-77). Such a conclusion has escaped the climate policy community, which is largely divorced from practice. To the best of my knowledge, amongst the plethora of policy studies on carbon finance none have considered at what level carbon prices would be effective—largely because there has not been empirical measurement of when projects themselves are effective.

A situation where carbon finance alone can make or break a project is quite rare. Apart from NGO-led projects presented here, this situation has only been observed in the destruction of industrial gases such as HFC where carbon finance has been the sole revenue stream. But HFC destruction projects have been strongly criticized for inflating the costs of destroying these gases; it would have been cheaper to have financed global HFC destruction through a separate international agreement rather than through the carbon market (Victor, 2011; Victor and Cullenward, 2007). The actual cost of destroying these gases is lower than the value of the carbon credits associated with them. An optimal price for carbon would be high enough to serve as an incentive for private sector project developers to invest in CDM projects but still low enough that the cost of project implementation is higher than the value of the project in terms of carbon credits. The possibility of such international financial engineering is however unlikely. What are the opportunities for driving real emission reductions under current carbon market prices?
Second are limitations in CDM accounting rules, specifically the methodologies used to measure emission reductions—with specific issues related to financial and “background” additionality. Problems with financial additionality are linked to the forced distinction between carbon finance and official development assistance (ODA) under the Kyoto Protocol. CDM projects require an affirmation that any such public funding is separate from and is not counted towards ODA commitments (UNFCCC, 2005a: Appendix B, para(m)). As a result, instead of aligning interests between public and private financing sources, the CDM actually promotes competition, obfuscation and false reporting of financial accounts. My analysis of additionality has demonstrated that it is possible to parse out emission reductions due to carbon finance and ODA.

Many of the problems associated with “background” additionality are related to difficulties involved in observing the existing carbon price signal. An analogy may help: if the current CDM counterfactual regulatory approach is a magnifying glass, regulators actually need a microscope to observe the weak price signal. The counterfactual baseline approach used in the CDM would have been sufficient had the carbon price signal been larger. But at current prices, a more robust approach is needed. Because the engagement of the private sector is vital to the success of promoting low-carbon development, I also identify two strategies for improving the precision of observing carbon price signals at current levels, addressing issues affecting financial and “background” additionality.

7.2.2. Latent Organizational Capacity for Implementation

Under low carbon prices, additionality is best promoted when the project developer is an organization capable of maintaining a latent organizational capacity for implementation. The state is more capable of maintaining latent organizational capacity for implementation as opposed to the private sector or NGOs because the state can undertake projects that are not in themselves financially attractive but sought for political reasons quite removed from any direct financial benefit. Of the seven carbon finance projects investigated in detail in this dissertation, only three were found to generate genuine carbon credits: the CDM afforestation projects in Moldova and Uganda as well as the Plan Vivo reforestation project in Uganda. While the Plan Vivo project persevered on the basis of carbon finance, the other NGO-led project investigated,
the Tanzania CDM cookstove project, had collapsed when carbon finance was removed. Relative to the private sector and NGOs, I argue that state agencies have the advantage of possessing a greater latent organizational capacity for project implementation.

Often with little other competition, state agencies can reduce project costs by cutting back on personnel while still maintaining organizational capacity in the form of equipment and information. This benefits additionality in two ways. First, it allows the agency to avoid recourse to external, non-carbon revenue streams that can lead to violations of project finance and background additionality. Second, with such latent organizational capacity in place, carbon finance can be combined with an agency’s existing efforts in a way that enables genuinely additional mitigation activities to be implemented. In other words, carbon finance generates genuine emission reductions when projects are aligned with the development priorities identified by the state and to which it is already directing significant resources but for which it does not have sufficient resources to fully implement.

To be sure, the capacity of state agencies varies across states with different administrative capabilities. Such variation helps explain differences in the scale of CDM afforestation projects undertaken in Moldova relative to Uganda. At over 30,000 ha, the two Moldova CDM afforestation projects were fifteen times larger than the Uganda CDM afforestation project. But in terms of the additionality of CDM projects in Uganda and Moldova, differences between state agencies in these two countries are only a difference in degree, not kind.

The private sector has more difficulty in maintaining such latent organizational capacity for implementation because its operations need to be much more efficient with financing available. Maintaining latent organizational capacity is not a viable business strategy: projects that are private sector led need to be viable regardless of the opportunities made available through the CDM. Unlike state agencies, private firms’ organizational capacity is linked to their financial performance. For these reasons, CDM projects that are private sector led tend to be more problematic in terms of additionality. Because of the low price of carbon, the private sector cannot risk reliance on carbon finance alone and tends to embark on projects which it can support through other more traditional channels, including donor financing and market sales.
This leads to violations of the conditions for project finance additionality and background additionality, respectively.

First, the involvement of donor financing typically leads to infringement of project finance additionality—the assurance that financial barriers would have prevented a project from proceeding if not for the support provided by the CDM. The use of international public funds is permitted under the CDM, but only when it is not counted towards rich countries’ ODA commitments. However, in the CDM projects which made use of donor finance, such public funding was always clearly a part of ODA. This includes the Uganda CDM cogeneration project and the Tanzania CDM afforestation project (it was also the case in the Moldova CDM rural energy modernization project, though I argue that this involved a very different set of capacity and interests). Consequently, such projects were not additional in terms of project financing, though the degree of violation varied. If greater coordinating capacity were established amongst implementing organizations, CDM project developers and regulators would be able to parse out emission reductions that are due to carbon finance from those due to ODA, thereby improving the integrity of the mechanism. The only real project where carbon and donor finance was effectively coordinated was in the rather small-scale Plan Vivo reforestation project in Uganda.

Second, recourse to domestic revenue generation, a natural option for private sector project developers, can also lead to violation of the conditions of additionality. Baselines are often subject to changing economic conditions outside the control of project developers, which can lead to violations of background additionality. Additionality is not a black and white issue: while projects might be initiated under conditions where they are highly additional, such conditions may change later because of changes in donor involvement or shifting background incentives, which invalidate the original additionality claim. This was most evident in the Tanzanian CDM afforestation project where district and national incentives for afforestation changed significantly over the project’s implementation period. Many proponents of the CDM have argued that accommodating such changing background conditions is impractical. Baselines should be retained throughout a project’s crediting period, with the possibility of revisiting the baseline when the crediting period is renewed. However, I will argue later that such additionality risks can be accommodated through an additionality buffer system to hedge against unexpected
changes in background conditions affecting baselines. Overall, until the carbon market is more secure, private sector actors will continue to diversify their revenue streams when undertaking carbon finance projects.

Similar to state agencies, NGOs are less motivated by profit and therefore the threshold financing that they need to operate is lower than in the private sector; however, this does not translate into robust organizational capacity for implementation. Part of the viability of the Plan Vivo reforestation project in Uganda was its reliance on villagers to plant and maintain trees, allowing it to implement the project at a relatively low cost. Relatively low financial payments were compensated by the fact that the Plan Vivo project provided non-carbon benefits to villagers, including timber as well as non-timber benefits of tree-planting. A similar self-reinforcing incentive structure was evident in the CDM cookstove project in Tanzania, but the collapse of the cookstove project exposes the main weaknesses of the NGO approach. Like the private sector, NGOs find it difficult to maintain organizational capacity. They might be able to rely entirely on a thin carbon finance layer—thus making projects highly additional—but if carbon finance falls through, so does the capacity to implement projects. However, carbon projects undertaken by state agencies are unlikely to utterly collapse if carbon finance fails, because of in-house government resources that allow them to maintain a latent organizational capacity for project implementation.

These three carbon finance scenarios are modeled in Figure 49 below. This figure also permits a better explanation of the problems encountered in the Moldova CDM rural energy modernization project. Though led by the government’s Moldovan Carbon Finance Unit (MCFU), this department was similar to NGOs in that its resources were almost entirely derived from carbon finance. The MCFU sought to use this $2 million carbon finance layer to influence the implementation of a much larger project, the $30 million Social Investment Fund 2 (SIF2)—also an NGO though one led by the Prime Minster of Moldova. The similarities between SIF2 and a state agency are striking. It is likely that if SIF2 had itself engaged with carbon finance, the CDM project would have been properly coordinated with its activities and therefore more additional. However, specialized climate change bodies such as the MCFU lacked the capacity and authority to effectively coordinate carbon finance with other, more powerful government
bodies. However, this begs the question of why SIF2 did not itself engage with climate finance. For this and explanation of the presence or absence of state agencies in other sectors, we need to consider political economy preferences of states involved in greater detail.

**Figure 49: Modeling the Three Carbon Finance Scenarios**

<table>
<thead>
<tr>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profitability Threshold</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon Finance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-House Resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Agency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Carbon Finance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon Finance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-House Resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private Sector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon Finance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NGO</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**7.2.3. Agencification and Liberal Economic Reforms**

In arguing about the important role of state agencies in low-carbon development, two puzzles need to be explained. First, why did state agencies exist for the CDM afforestation projects in Moldova and Uganda and not in Tanzania? Second, why were state agencies with latent organizational capacity for implementation not observed amongst CDM projects in other sectors, notably the energy sector? The answer to both questions is related to the internal political economy preferences of states investigated. In what follows, I support these claims first through analysis of state organizational capacity in the forestry and energy sectors of Tanzania, Uganda and Moldova in order to point out where state organizational capacity aligns with national development priorities.

For the first question, Uganda and Moldova pursued economic reforms which saw the creation of state agencies in the forest sector, though such reforms have been delayed in Tanzania. Here commitment to liberal economic reform has retained and arguably enhanced state capacity for
implementing afforestation projects. However, such capacity was not retained in the energy sector, which provides the answer to the second question. Liberal economic reform, while enhancing state capacity in the forest sector, actually saw Uganda and Moldova cede capacity for state implementation of energy projects. The Tanzanian government has however retained latent organizational capacity in the energy sector, through the reacquisition of TANESCO, which is consistent with its skepticism of liberal economic reform. However, while Tanzania arguably possesses a latent organizational capacity in the energy sector, its skepticism of liberal economic policy also disposes its government to discount external market opportunities such as the CDM as a viable development strategy. Recall that all CDM projects in Tanzania were led by the private sector or NGOs.

**Forestry: Alignment of State Organizational Capacity with National Development Priorities.**

In Moldova and Uganda, state forest agencies were established as a part of the economic reform process. Significantly, Moldsilva and Uganda’s National Forestry Authority (NFA) had the organizational skills and equipment to undertake tree-planting activities and were mandated to achieve certain tree-planting objectives by government, but neither possessed sufficient resources to reach their government mandates. In contrast, Tanzania possess a low preference for agencification. Only in 2010 did the Tanzanian government establish a forest agency, the Tanzanian Forest Service (TFS)—but this was well after the CDM projects there had been implemented.

Strikingly, variation in state organizational capacity in the forest sector matched the relative scarcity of forest resources in each country. Forestry activities, specifically the planting of trees, was a priority in Moldova and Uganda but not Tanzania. There has thus been an alignment of state organizational capacity in all three states, with Uganda and Moldova allocating considerable resources to forest sector reforms and organizations, while Tanzania doing less so.

**High Preference for Agencification**

**Uganda:** Economic reforms initiated in Uganda to address declining domestic capacity in the forest sector saw Uganda establish a National Forestry Authority (NFA). The NFA was
established to manage government forest reserves, because of the relatively small area of
government forest reserves relative to private lands suitable for afforestation/reforestation, has
been superceded in budget matters by a public-private partnership on individual lands known as
SPGS. Nonetheless, and probably because of competition from SPGS, NFA has been more alert
to international opportunities such as the CDM.

In Uganda, the Forest Sector Umbrella Program (FSUP) of 1999 led to the development of the
2001 Forest Policy, a 2002 National Forest Plan and the 2003 National Forestry and Tree
Planting Act. This resulted in the dissolution of the Forestry Department and creation of three
new institutions: the decentralized District Forestry Service (DFS), the parastatal National
Forestry Authority (NFA) and the Forest Sector Support Department (FSSD) established to
oversee the forestry sector (MWLE, 2002: 103-124). Declining forest cover and plantation
capacity have been linked to Uganda’s former forest sector institutional structure, especially the
now defunct Forestry Department (FAO, 2006: 20; Jagger, 2008; LTS, 2010; Turyahabwe and
Banana, 2008: 651-653).

NFA was established with the primary responsibility of managing Uganda’s Central Forest
Reserves (CFRs), and establishing procedures for the sustainable use of Uganda’s forest
resources (2003 The National Forestry and Tree Planting Act:s.54). There are currently 506
CFRs representing a total of 1.15 million ha administered through nine Forest Management
Areas of the NFA. In terms of revenue, the 2002 National Forest Plan expected that the NFA
would be sustained on revenues from timber sales from CFRs. NFA has actively sought to attract
private sector financing for plantation development by allocating degraded CFR lands to
individuals and companies (local and foreign) for plantation development. To avoid confusion, it
should also be noted that the Uganda Wildlife Authority (UWA) retained its responsibility for
managing forests in protected areas.

While not a government body, the Sawlog Production Grant Scheme (SPGS) has been amongst
the most important organizations created as a result of the forest reforms in Uganda. It is a joint
project of the European Union (EU) and Government of Uganda which gives grants to
individuals and companies (local and foreign) establishing timber plantations. SPGS scheme
works by granting funds to private individuals or companies possessing at least 25 ha in order to subsidize costs for the first two years of plantation establishment (Jakovelli, 2009: 121). Initially housed within the NFA, SPGS moved to MWLE because of a perceived conflict interest in housing the grant scheme at NFA which is also seeking financing for their plantations (Jakovelli, 2009: 121). Notably, SPGS has been more successful in planting on CFRs than NFA. The most recent data indicate that approximately 52,000 ha of timber plantations have been planted in Uganda since 2004, when reforms to its forest sector were implemented (Table 42). While SPGS has been responsible for nearly half of Uganda’s total plantation effort, NFA has been responsible for only about 23%.

Table 42: Tree-planting effort of various organizations in Uganda, 2004-2011

<table>
<thead>
<tr>
<th>Organization</th>
<th>Planting Area (ha)</th>
<th>CFR</th>
<th>Private Land</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFA</td>
<td>12,000</td>
<td>/</td>
<td>12,000</td>
<td>12,000</td>
</tr>
<tr>
<td>SPGS</td>
<td>20,000</td>
<td>5,000</td>
<td>25,000</td>
<td></td>
</tr>
<tr>
<td>Private Investors</td>
<td>7,000</td>
<td>8,000</td>
<td>15,000</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>39,000</strong></td>
<td><strong>13,000</strong></td>
<td><strong>52,000</strong></td>
<td></td>
</tr>
</tbody>
</table>

Sources: Based on numbers presented in Kawooya (2011) and Tugumisirize (2011) and assuming that 80% of SPGS planting has taken place in CFRs, which was the case as recently as 2010 (Jakovelli, 2009: 121).

Reform of the forest sector also led to a number of other changes in Uganda. The District Forest Service (DFS) is responsible for local forest reserves (LFRs), though these total a mere 5,000 ha. More importantly, the DFS is also responsible for the regulation and fee collection for timber and non-timber forest products, particularly charcoal, on private and customary land (MWLE, 2002). More than two-thirds of Uganda’s forests lie outside direct government control as woodland on private and customary land and, therefore, within the regulatory ambit of the DFS. Yet a recent investigation into Uganda’s forest sector concluded that the DFS has made little progress in improving protection and management of LFRs and is ineffective in managing forests on private and customary land (LTS, 2010). Lack of funds has been major constraint to DFS performance and insufficient linkage with the primary agricultural extension service, NAADS (LTS, 2010: 21-22).
Finally, the FSSD is supposed to play a policing role in forest policy, inspecting and monitoring the DFS and NFA. However, it has arguable undergone “mission creep” as a result of access to FIEFOC funds (LTS, 2010: 8-13). This $75 million project was initiated in 2006 by the African Development Bank in order to re-vegetate 9,900 ha of degraded watershed, protect 99,000 ha of natural forests and establish 13,500 ha of plantations (AfDB, 2011). However, a recent analysis concluded: “Most of FSSD’s current work is focused on support to local governments, as funds are available for this activity through the FIEFOC project. The other sector coordination and regulatory functions are either not implemented or are implemented at low levels as funds are not available for those functions (LTS, 2010: 21-22).

The attention that the forest sector has received during the economic reform process is due to the fact that the government has accorded forestry a very high development priority. In Uganda, the 2005 Poverty Eradication Action Plan of Uganda prioritized private and community forestry and also advocated for linkages with the CDM to promote these ends (MoFPED, 2005: 77-78). Subsequent to the CDM implementation phase, Uganda’s 2010 National Development Plan (NDP) committed the country to restoring Uganda’s forest cover to 1990 levels, 4.9 million ha or 24% of the national territory, by 2015 (MoFPED, 2010: 95-96). The goal of restablising forest cover to 4.9 million ha is certainly ambitious, as it would involve the restoration or planting of 1.3 million ha of forest by 2015. The country’s current timber demand is met by timber plantations planted in the 1960s and 1970s which have almost been exhausted (SPGS, 2007: 11) and at least 120,000 ha of plantation forest will be needed by 2020 (SPGS, 2011: 4). Forests cover is currently down to 3.6 million ha or 17.6% of the national territory, largely due to the conversion of 1.2 million ha of woodlands into subsistence croplands and bushland (FAO, 2011; Nakakaawa et al., 2011: 35).

Moldova: While Moldova’s political economy has been marked by considerable ambiguity, in the forest sector it has shown considerable appetite for liberal economic restructuring. The Forest Code adopted established Moldsilva in 1996 as the central forest authority to manage state

384 FIEFOC is an acronym for Farm Income Farm Income Enhancement and Forest Conservation (FIEFOC) programme.
forests and wildlife (Moldsilva, 2010). Significantly, Moldsilva was established as an independent and financially autonomous government agency: partial funding was to be derived from the state but it was also empowered to generate its own income through the district forest enterprises under its authority which operate on revenue generated from timber sales (World Bank, 2007a: 7). In an effort to control illegal logging, the central government also passed legislation in 1996 which transferred the ownership of nearly all village forests (20,320 ha) to Moldsilva, an issue that has remained sensitive in many villages (Gulca, 2010: 84). This has had some effect. Data from the period 1997-2004 and after indicate significantly lower rates of illegal logging (FLEG, 2010). But there have been problems too. In 2010, Moldsilva was found to have mismanaged if not embezzled significant funds (Info-Prim Neo, 2010a).

The reasons government has focused its attention on the forest sector is that forestry has been identified as one way of helping the country address one of its most important development challenges—land degradation. The 2004 PRSP targeted an increase of forest area from 10.3% in 2002 to 13.2% in 2015 (GoM, 2004: 37). The government’s 2003 Strategy for the Sustainable Development of the Forestry Sector (2003-2020) set a goal of expanding forest cover to 15%—approximately 130,000 ha—by 2020 (Gulca, 2006: 126; 2010: 87; ICAS, 2007). Of the goal to increase forest cover by 130,000 ha, nearly three-quarters (95,118 ha) was to be achieved through the 2003 State Program for Afforestation and Regeneration of the Lands of the Forest Estate for the Period of 2003-2020 (FAO, 2007: 4).

**Low Preference for Agencification**

**Tanzania:** The forest sector in Tanzania has been marked by incomplete economic reforms which, while related to the state’s skepticism of liberal economic reforms, is also related to the relative abundance of forest plantations in the country. Following independence, all forests in Tanzanian were nationalized and, until quite recently, managed under the Forest and Beekeeping Division (FBD) at the Ministry of Natural Resources (MNRT, 2010: 1-3). Post-independence plantations and related industries had been managed by the parastatal Tanzania Wood Industries Corporation, which was only privatized in the 1990s (Kihiyo, 1998). In the mid-1990s, structural adjustment reforms sought to realign incentives structures at FBD (World Bank, 2003b: 73). A
forest revenue retention scheme was introduced allowing the MNRT to keep 70% of forest-related royalties while only 30% still need to be submitted to the Treasury. MNRT retains 20% of this for its own administration, and it allocates 80% to the FBD for managing central government forest reserves, including plantations, though the central government still paid salaries of plantation project staff. Yet the World Bank concluded that “Plantation projects are under-funded and cannot fully take care of their management responsibilities such as replanting, thinning and pruning. Investing in the upgrading of machinery or expanding plantations is for the most part out of the question” (p.73).

One reason that the government has been less inclined to invest in the forest sector is that the forestry situation is relatively less acute than in Uganda and land degradation not as pressing a concern as in Moldova. It is estimated that in 2006, Tanzania had 33.4 million ha of forests though the vast majority of Tanzania’s forest area, more than 90%, is relatively unproductive miombo woodlands (Abdallah and Monela, 2007; MNRT, 1998: 8). Few of Tanzania’s forests are used for the industrial production of timber and paper, estimated at approximately 135,000 ha in 2003 (World Bank, 2003b: 3) and likely 165,000 ha today across government forest reserves and private plantations. Forestry is not a development priority in Tanzania. The forest sector is currently not one of the “lead” sectors identified for public investment under the 2005 National Strategy for Growth and Reduction of Poverty (GoT, 2005: Annex 1, page 3).

The relative lack of scarcity of forest plantations in Tanzania has meant that the state has been hesitant to adopt a state agency to the performance of the forest sector. Though recognizing reforms at FBD, there was no forestry agency in Tanzania that would have been able to undertake the CDM afforestation projects there. Only in 2010 did the Tanzanian government establish a forest agency, the Tanzanian Forest Service (TFS), which has divested the FBD of some of its authority for plantation management (MNRT, 2010: 3). The TFS is a state agency with a mandate for the management of national forest reserves and forest resources on general lands while FBD is to retain a role in policy and legislative development and monitoring. The TFS is long overdue, having been introduced as early as the 1998 National Forest Policy and the subject of considerable donor support over the past twelve years (TFCMP, 2005: 2). Overall, the
relative abundance of forest resources in Tanzania has meant that the government is inclined to invest its resources elsewhere.

**Energy: Lack of Alignment of State Organizational Capacity with National Development Priorities**

The development of modern energy services was also a development priority of all three countries, although this did not translate into effective CDM projects (in the case of the Uganda CDM cogeneration or Moldovan rural energy modernization project). This I contend is because the existing energy agencies in Moldova and Uganda have a largely regulatory or financial role bent on incentivizing the private sector and do not possess the organizational capacity to implement projects—they have ceded away any latent organizational capacity for project implementation during the process of economic reform. While no modern energy project was being implemented under the CDM in Tanzania, Tanzania’s government has resisted liberal economic reforms and, arguably, retained a latent organizational capacity for implementation in the energy sector. However, because of a political climate in Tanzania that is more skeptical of liberal economic policy, the state has not pursued CDM projects while the CDM regulatory authorities in Tanzania actually obstructed what CDM projects were being implemented. Below I review the history of economic reforms in the energy sector for each of the three countries. Uganda and Moldova are again distinguished by a high preference for agencification, with Tanzania a considerably lower preference.

**High Preference Agencification**

**Uganda:** Uganda has undergone significant structure adjustment in its energy sector, resulting in two principle electricity agencies with the power to regulate and incite private sector investment in the energy sector, but with insufficient capacity to initiate energy projects themselves. As a consequence, the state possess little organizational capacity for implementing projects on its own in this sector.

Uganda posts some of the lowest electricity usage rates in East Africa which, in 2009, stood at 9% nationally and 2% in rural areas (ERA, 2010a: 6). Reforms to Uganda’s energy sector saw privatization of the Uganda Electricity Board in 1999 and subsequent development of the 2002

Important reforms were made to the regulation of electricity tariffs, through the establishment of the Electricity Regulatory Agency (ERA). All electricity tariffs are set by the ERA with approval of the Ministry of Finance, Planning and Economic Development, MoFPED (UETCL, 2008: 39). ERA has sought to keep consumer tariffs for electricity in a politically acceptable range while incentivizing private sector investment.\(^385\) A first phase renewable energy feed-in-tariffs (REFIT) was released in 2007 by the Ministry of Energy & Mineral Development (see MEMD, 2007: 113), though a more comprehensive second phase REFIT has recently been released (ERA, 2011; Gipe, 2011). Cumulative capacity limits have however been imposed in order to control costs of the REFIT system (see Couture et al., 2010: 90-91; Deutsche Bank, 2009).

Rural electrification received specific attention through a Rural Electrification Strategy and Plan 2001-2010 (MEMD, 2002b) which established the Rural Electrification Agency (REA) and a rural electrification target of 10% by 2010. The strategy was designed to allow investors to bid on a rural electrification projects identified by the REA; if the bid were successful, the investor would be granted a subsidy by the REA (REA, 2006: 31-38). However, the REA has only been marginally effective due to a lack of private sector interest in rural electrification projects. Due to perceived risks and low returns amongst Uganda’s private sector, REA reoriented its programme towards government and donor financing (OAG, 2011: 17-18). Furthermore, funding received stood—which amounted to $106 million over 2006-2009 (more than 60% from donors)—was only 52% of the amount necessary for expanding rural electrification (OAG, 2011: 19). Uganda’s auditor general has concluded that it is unlikely the REA will achieve the 10% rural electrification rate. To subsidize rural electrification projects, the government allocated REA approximately $106 million over 2006-2009—more than 60% from donors (OAG, 2011: 5).

The government initially left renewable energy largely unregulated (MEMD, 2002a: 25). While no project involving biofuels was investigated in Uganda, it is worth mentioning that the

---

\(^{385}\) There are three types of tariffs in Uganda’s electricity generation, all which are regulated: consumer tariffs, bulk supply tariffs and generation tariffs (ERA, 2006: 9-14). Generation tariffs are the most sensitive tariff as prices set here have repercussions for the rest of the system. There are different generation tariffs for different producers: large hydro, thermal electric, microhydro, cogeneration and (more recently) biomass and solar PV. Generation tariffs are also the venue for policy interventions such as REFITs.
government developed the *2007 Renewable Energy Policy for Uganda* and established a Renewable Energy Department within the Ministry of Energy and Mineral Development (MEMD, 2007). MEMD has targeted an increase in Uganda’s modern renewable energy consumption from 4% to 61% by 2017.

**Moldova:** Similar to Uganda, structural adjustment in Moldova saw the state cede power over the energy to private actors, often representing Russian natural gas interests, and largely retaining only a regulatory role. The energy and natural gas sectors in Moldova were subject to economic reforms in 1997-2001, though within considerable geopolitical constraints. During this period, most of Moldova’s main power operators were privatized, including electricity transport central dispatch enterprise, electricity distribution and supply companies, as well as natural gas distribution and supply companies (ANRE, 2009: 4). For example, in 2000, the distribution companies were completely privatized and acquired by a Spanish company (Zadnipru, 2011). However, the majority of Moldova’s power still comes from Cuciurgan thermal power plant located in Transnistria and under the authority of quasi-independent Transnistrian government. It supplies about 50-70% of Moldova’s electricity (enerCEE, 2011).\(^{386}\) While ostensibly subject to privatization, the details of this transaction are obscure and Cuciurgan thermal power plant appears to be now fully owned by a Russia firm and sells a portion of its electricity to Russia. (Popovici, 2007). Similarly, in the natural gas sector, Moldova created Moldovagaz in partnership with Russia’s Gazprom during the privatization process (Zadnipru, 2011).

The main power that Moldova has retained is in the regulation of licenses and tariffs. To regulate the newly privatized entities, the Moldovan government established the National Energy Regulatory Agency (ANRE). Since 2001, ANRE has also taken on the responsibility of regulating prices for natural gas, petrol and electricity (ANRE, 2008: 78-79). Russia has long subsidized energy to Moldova and former Soviet Republics (Brada, 1988; Gelb, 2007; Woehrel, 2009). Notably, ANRE was established in 1997 “as a permanent authority of public administration acting as a legal entity and not subordinated to any other public or private authority” (ANRE, 2011).

\(^{386}\) *Moldova Government Officer, Chisinau, Interview MN5, 26 August 2009.*
ANRE could have improved the attractiveness of the bioenergy component of the CDM rural energy modernization project by regulating the price of natural gas in a manner conducive to bioenergy uptake or by providing additional incentives for bioenergy through a guaranteed price for biomass, akin to a feed-in-tariff. Interviews with ANRE however, reveal the agency was not interested in entering into the CDM bioenergy projects because of the financial risks involved.\(^{387}\) A representative explained that the government would not take responsibility for setting a price on renewable energy when it was more expensive than traditional energy.\(^{388}\) ANRE ability to regulate prices is however limited by the reality that natural gas prices are largely set by Russia.

A move towards renewable energy in Moldova has been officially recognized in the 2007 *Energy Strategy to the Year 2020* (Government of Moldova, 2007) and formalized with the passage of the 2007 *Law on Renewable Energy*. Note that this was subsequent to the implementation period of the Moldova CDM rural energy modernization project and thus not causally related to its effectiveness. The legislation established a National Agency for Energy Efficiency with authority and responsibility to promote and monitor energy efficiency and renewable energy (Article 13). It has also established an independent Energy Efficiency Fund to promote the financing of energy efficiency and renewable use activities (Article 16).\(^{389}\) It remains to be seen whether this new agency will come to possess a latent organizational capacity for project implementation.

**Low Preference for Agencification**

**Tanzania:** In contrast to the other two countries investigated, where liberal economic reform saw considerable privatization of the power sector, the Tanzanian power subsector remains dominated by the public agency TANESCO (Tanzania Electric Supply Company). While other companies are now permitted to produce power independently for sale, TANESCO is responsible for about 60% of the country’s generating capacity; it also owns all the transmission

---

\(^{387}\) Business Owner, Chisinau, Interview MN15, 20 July 2009.

\(^{388}\) Moldova Government Officer, Chisinau, Interview MN5, 26 August 2009.

\(^{389}\) The Fund is guaranteed a minimum of 10% of the “amount necessary to reach the objectives related to energy efficiency and renewable energy indicators” (*Law on Renewable Energy*: Article 17, para.1.a) as well as authorized to receive donations (para.1.b) as well as “loans or other financial instruments from banks or investors employed exclusively for the development of the Fund’s objective (para.1.c). But the disbursement of funds is only to be made if the beneficiaries have met the evaluation and selection requirements approved by the Fund’s Administration Board (para.4).
and distribution services. the electricity generation sector (Msyani, 2013). However, TANESCO has not shown interest in the CDM. Energy-related CDM projects being implemented in Tanzania since fieldwork are, similar to the CDM afforestation project, also led by the private sector (CDM-PDD, 2008a; c; e). It is likely that these projects will have encountered problems of additionality similar to other private sector led projects observed.

Privatization of TANESCO had been anticipated as early as 1999, resulting in the management of TANESCO transferred to a South African utility in 2002 (TANESCO, 2013). However, in 2006 the Tanzanian government decided not to renew the contract because of poor performance: “Tanzania was dissatisfied with the quality of management provided by Net Group Solutions and added that the government was obliged to listen to the views of the public following complaints about the quality of service being offered by TANESCO” (TANESCO, 2013). Notably, at the same time as it reacquired TANESCO, the government established the regulatory agency to oversee the electric tariff system, known as Energy and Water Utilities Regulatory Authority (Ahlborg and Hammar, 2011). The responsibility for rural energy has been transferred from TANESCO to the Rural Energy Agency (REA), which has focused on rural electrification (as opposed to projects involving the efficient use of bioenergy). More recently, in 2008, the government adopted a new Electricity Act which has been expected to attract private sector participation to the power sector.

Developments in the biofuel sector are even more recent. Though a founding member of the FAO’s Global Bioenergy Partnership (GBEP, 2009; Kamanga, 2008), Tanzania is still largely in the process of developing a biofuel policy (Cleaver et al., 2010; Martin et al., 2009: 574-575; Sosovele, 2010; Sulle and Nelson, 2009: 32). Until 2010, which includes the Sun Biofuel project investigated here, biofuel projects in the country had been operating with only existing rules and procedures, though with the Tanzania Investment Centre (TIC) playing a key facilitative role. In April 2006, the government, through the Ministry of Energy and Minerals (MEM), established the National Biofuels Task Force (NBTF) with the responsibility of developing a biofuel policy. The NBTF drafted guidelines on biofuel production in August 2008. In 2009, amidst public controversy surrounding biofuel development, the government suspended further biofuel development while awaiting the guideline’s approval (Mande, 2009). The revised guidelines were
finally approved in late 2009 and a biofuel policy is now being developed by MEM (Cleaver et al., 2010: 33). More recently, in a 2010 official visit to Tanzania, Brazilian President Lula signed a memorandum of understanding with the government of Tanzania on biofuel development (Afronline, 2010). With MEM taking the lead, biofuel policy appears to be considered separate from agriculture development.  

Finally, efforts to improve the efficiency of fuelwood consumption were not a national development priority in Tanzania (nor in Uganda or Moldova, though the use of improved cookstove projects in rural areas was not observed here). While showing interest in improving traditional biomass energy in the post-independence period, Tanzania has since moved to favour modern energy provision. While the 1992 National Energy Policy set the goal of arresting “woodfuel depletion by involving more appropriate land management practices and more efficient woodfuel technologies” (GoT, 1992: 5), the oil and gas sectors absorbed 95% of expenditures (Mwandosya and Luhanga, 1993: 450). Similarly, the 2003 National Energy Policy also mentions biomass (GoT, 2003a), but its focus has been on new institutions for rural electricity generation (Lymio, 2007: 10). However, the only projects that the recently established Rural Energy Agency (REA) is currently supporting are for rural electrification (REA, 2010). There was no state agency capable or interested in implementing the CDM cookstove project in Tanzania. Yet the absence of significant private sector activity in the cookstoves area suggest they are not particularly profitable either. Current support for improved cookstoves comes mainly from donors and the NGO community though the Tanzanian government has very

---

390 The Government of Tanzania launched an Agricultural Sector Development Program in 2005, whose main objective is achieve a sustained agricultural growth rate of 5 percent per annum through the transformation from subsistence to commercial agriculture (GoT, 2005a: 1). The programme involves five Ministries, but not the MEM.

391 Improved cookstoves programmes and other efforts to curb fuelwood demand were only initiated in the mid-1980s. The first stove programme in Tanzania was initiated region in 1985 with support from Norway and was followed by a number of other pilot projects (O’Keefe et al., 1990; Otiti, 1992; Sawe, 2009). Government involvement in afforestation and improved cookstoves was scaled back in the 1990s, in part, because the fuelwood crisis predicted in the 1970s was never fully realized (Hosier et al., 1990; Johnsen, 1999; Mwampamba, 2007).

392 A Tanzanian renewable energy NGO, TaTEDO, claims that over the period 2000-2008, approximately 1.5 million improved cookstoves have been distributed in Tanzania, 92% of which are improved charcoal stoves intended for the urban market (Sawe, 2009: 26). The Programme for Basic Energy Conservation in Southern Africa (ProBEC), supported by SADC and GTZ, was launched in Tanzania in 2005. It cites the government’s focus on rural electrification as a need for intervention.
recently partnered with the UN sponsored Global Alliance for Clean Cookstove in a $100 million public-private partnership (Naleid, 2011).

**7.3. Coherency between the CDM and the Rest of the State Bureaucracy**

I have argued that a stronger commitment to liberal economic reforms in Uganda functions as an animating set of ideas that ensures coherency across the bureaucracy and provides a motivation for engaging international market opportunities such as the CDM. Analysis of the relationship between the DNA and the rest of the bureaucracy demonstrates that the state in Uganda has perceived the CDM as a real development opportunity around which the state apparatus can coherently organize. While still redundant to other government bodies, the CDM regulatory system functioned relatively well in Uganda due to cooperation between the DNA and other regulatory agencies. I explain these results by reference to Uganda’s greater commitment to market-enhancing economic reforms which results in mutual self-alignment of different parts of the state bureaucracy towards international economic opportunities, such as the CDM, in a more coherent way than in Tanzania and Moldova. In states that are less favourably inclined to liberal economic reform, such as Tanzania and Moldova, the current organization of the DNA invites greater inefficiencies if not corruption. In Tanzania, such inefficiencies are heightened by the unclear lines of authority of the DNA. See Figure 50 below for a matrix mapping cooperation between the CDM authority and rest of the bureaucracy while Table 43 provides a summary evaluation of the DNA in each of the countries investigated which is explored in more detail in the sections below.

I base my assessment of the coherency of the CDM with the rest of the state bureaucracy on two bodies of evidence. First, is the relationship of the DNA and the rest of the bureaucracy. Second is a comparison of the regulatory criteria of the DNA relative to those of other important regulatory bodies related to international investment projects including those for environmental impact assessment (EIA) and foreign investments. Only in Tanzania and Uganda did the government clearly describe sustainable development criteria by which it would screen CDM projects; Moldova did not have such criteria (see Appendix 1).
Figure 50: Matrix of cooperation between Designated National Authority (DNA) and investment/environmental agencies

<table>
<thead>
<tr>
<th>Cooperation with DNA</th>
<th>Investment Agency</th>
<th>Environmental Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Uganda</td>
<td>Uganda</td>
</tr>
<tr>
<td>Low</td>
<td>Moldova</td>
<td>Moldova</td>
</tr>
<tr>
<td></td>
<td>Tanzania</td>
<td>Tanzania</td>
</tr>
</tbody>
</table>

Table 43: DNA summary evaluation across Tanzania, Uganda and Moldova

<table>
<thead>
<tr>
<th>Country</th>
<th>Evaluation</th>
</tr>
</thead>
</table>
| Uganda  | • Relatively precise DNA criteria for the evaluation of CDM sustainable development  
• Slight overlap with NEMA and EIA evaluation criteria  
• Slight overlap with UI A and investment screening criteria  
• Unclear lines of authority for DNA  
• Vague DNA criteria for the evaluation of CDM sustainable development  
• Significant overlap with NEMC and EIA evaluation criteria  
• Significant overlap with TIC and investment screening criteria  |
| Tanzania | • Lack of DNA criteria for CDM sustainable development  
• No overlap with State Environment Inspectorate and EIA procedure  
• Weak investment agency |
| Moldova | • Lack of DNA criteria for CDM sustainable development  
• No overlap with State Environment Inspectorate and EIA procedure  |

7.3.1. Situation of the DNA in the Government Bureaucracy

While across all three countries the DNA was similar in that it reviewed projects through a series of committees involving other government bodies, there were considerable differences regarding its placement within the bureaucracy. The DNA in Uganda and Moldova is housed within the Ministry of Environment, while in Tanzania it is housed under the Division of Environment in the Vice-President’s Office (VPO). The location of the DNA in Tanzania at the VPO would suggest that the CDM, and other environmental matters are given high priority. However, unclear lines of authority and considerable overlap with the jurisdiction of other government agencies undermine the DNA’s effectiveness in Tanzania relative to those in Uganda and Moldova. In Tanzania, the Division of Environment was responsible for all climate change...
matters including the DNA, the promotion of CDM opportunities to investors as well as representing Tanzania at international climate change negotiations (Table 44). In Uganda and Moldova, these roles were spread across different state agencies. I explore the situation of the DNA in more detail below.

**Table 44: Summary of Climate Change Regulation across Tanzania, Uganda and Moldova**

<table>
<thead>
<tr>
<th></th>
<th>Tanzania</th>
<th>Uganda</th>
<th>Moldova</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDM Regulation</td>
<td>DoE</td>
<td>CCU and Minister</td>
<td>National Commission and Minister</td>
</tr>
<tr>
<td>CDM Promotion</td>
<td>DoE</td>
<td>UIA</td>
<td>MCFU</td>
</tr>
<tr>
<td>Representation at Climate Change Negotiations</td>
<td>DoE</td>
<td>CCU</td>
<td>CCO</td>
</tr>
</tbody>
</table>

**Situation of the DNA in Tanzania**

The situation of the Tanzanian DNA under the Division of Environment in the Vice President’s Office would suggest that the mechanism was granted high authority; however, empirical investigation demonstrate unclear lines of authority and a lack of cooperation with other relevant government bodies.

The Vice-President is described as the principal assistant to the President, and is elected as the running mate of the President (Shivji et al., 2004: 57 & 67). The VPO’s mission is “To be highly efficient and effective in harmonizing and strengthening union and non union matters; and coordinating environmental management for the improvement of the welfare of Tanzanians” (VPO, 2010b). The Division of Environment was first established in 1991 under Ministry of Natural Resources and Tourism but was transferred to the VPO in 1995 in order “to give high priority to the environmental agenda” (VPO, 2010a). Pallangyo argues that the DoE’s location in the Vice President’s Office offers it “strategic functions” for effective inter-ministerial cooperation and coordination (Pallangyo, 2007). The Division of Environment describes itself as being “responsible for the overall environmental policy and regulation, formulation, coordination and monitoring of environment policy implementation in the country” (Ibid.). It is comprised of
three sections: pollution, biodiversity and environmental impact assessment (EIA). Climate change affairs are handled under the latter section.\textsuperscript{393}

Despite the description above, the responsibilities of the Division of Environment are unclear. The VPO is also the institutional home to two cross-cutting ministries: the Ministry of State for Union Matters and the Ministry of State for the Environment. However, the Division of Environment is distinct from the Minister of State for Environment, who also reports directly to the Vice-President (VPO, 2007). Furthermore, there is some ambiguity over the legal status of the DoE, which leaves considerable room for discretion. Indeed, the 2004 \textit{Environmental Management Act} (s.16) does not make any reference to a Division of Environment, but only a \textit{Director of Environment} (s.14). The Director of Environment is to “coordinate various environment management activities…and promote the integration of environment considerations into development policies…and undertake strategic environmental assessment” and also “advise the Government on…the implementation of relevant international agreements in the field of environment” (2004 EMA: s.15(a)&(b)). Arguably with such a broad ambit, the Division of Environment has been able to assume responsibility for the DNA but also represent Tanzania at UN international climate change negotiations. Finally, the DNA in Tanzania claims to have also taken on the additional roles of awareness raising on CDM project activities, coordination of national agencies/stakeholders and provision of procedures for registering and monitoring of CDM projects (DoE, 2007: 4).

The Tanzanian DNA has produced a handbook to inform CDM project developers about the CDM approval process as well as to communicate the sustainable development criteria by which CDM projects are assessed (DoE, 2007). After receiving a project submission, the Tanzanian DNA reportedly convenes a meeting of an ad-hoc CDM Technical Committee to review the project and provide recommendations to the DNA regarding the project (DoE, 2007: 9). The CDM Technical Committee is composed of about twenty members chaired by the DNA, the membership of which depends on the type of project.\textsuperscript{394} Additionally, CDM afforestation

\textsuperscript{393} Tanzania Government Officer, Arusha, Interview TN9, 1 October 2011.
\textsuperscript{394} Tanzania Government Officer, Dar es Salaam, Interview TN5, 2 February 2009.
projects require special approval from a Afforestation/Reforestation Task Force under the Forest and Beekeeping Division of MNRT whose “aim is to ensure that [afforestation / reforestation] projects indeed benefit the local community and the country generally” (DoE, 2007: 13). Figure 51 below shows a schematic diagram of the DNA, drawn from Tanzania’s CDM Handbook. It shows the DNA, at least in the eyes of the Division of Environment, at the centre of a large administrative structure to which other government ministries and bodies such as the TIC are peripheral.

**Figure 51: Structure of Tanzania’s DNA**

![Diagram of Tanzania’s DNA]

*Source: DoE (2007: 18)*

**Situation of the DNA in Uganda**

In contrast to the situation in Tanzania, the authority of the Uganda DNA is more clearly established at the ministerial level with technical sub-offices only playing a supporting role. The DNA in Uganda is the Minister of Water and Environment (MWE), with a Secretariat known as the Climate Change Unit (CCU), which took over from a previous National Climate
Change Steering Committee (Kasimbazi, 2005).\footnote{Ugandan Government Officer, Kampala, Interview UN14, 8 May 2009.} A technical committee, known as the Climate Change Policy Committee, advises the Minister about technical issues such as the approval of CDM projects. It undertakes the actual technical review of CDM project documents, aiming to have the project review completed within one month. As Ugandan official made clear during an interview in 2009 that the government of Uganda did not yet have a comprehensive climate change policy and thus the institutional framework that had been developed was not necessarily mature.\footnote{Ugandan Government Officer, Kampala, Interview UN14, 8 May 2009.} However, the Minister is responsible for CDM approval and therefore signing any letters of approval. Furthermore, in contrast to the situation in Tanzania and Moldova, the promotion of CDM activities in Uganda is led by the Uganda Investment Agency (UIA). However, in a significant departure from the situation in Tanzania, the UIA is engaged with the CDM process and it maintains a list of CDM projects available for investment (UIA, 2011b).

The CCU itself had only been established in 2008 with support from the Danish government and was working to establish itself in legal form.\footnote{Ugandan Government Officer, Kampala, Interview UN14, 8 May 2009.} The CCU is akin to a division or section at MWE yet directly under the permanent secretary of MWE, the most senior civil servant in the Ministry.\footnote{Ugandan Government Officer, Kampala, Interview UN1, 12 May 2009.} While housed in the Department of Meteorology, the CCU was granted a certain degree of autonomy. Future plans included establishing contact points with relevant persons in other Ministries, in the hope of avoiding bureaucratic bottlenecks.\footnote{Ugandan Government Officer, Kampala, Interview UN1, 12 May 2009.} The CCU also charges a fee for assessing an application of a CDM project against the DNA’s sustainable development criteria.\footnote{Ugandan Government Officer, Kampala, Interview UN1, 12 May 2009.}
Situation of the DNA in Moldova

Moldova’s DNA was clearly established at the ministerial level but there was no evidence of significant interaction with other government bodies responsible for investment and environmental impact assessment.

Moldova’s DNA is an inter-departmental authority headed by the Minister of Ecology & Natural Resources (MENR). Known as The National Commission for the Implementation of the UN Climate Change Convention and the Kyoto Protocol, it comprises eighteen members from various ministries, NGOs and the private sector. The National Commission appoints two experts to undertake a technical evaluation of any CDM project submitted. The DNAs’ performances in Tanzania and Uganda contrasted with that in Moldova. Here the DNA had twice rejected an afforestation project before accepting it on the third application, though accepting a biomass energy project directly. Yet lacking sustainable development criteria, the grounds of approval are unclear.

The DNA is not the sole agency responsible for climate change affairs in Moldova, however. There is also the Climate Change Office as well as the Moldovan Carbon Finance Unit (MCFU), both housed in MENR. The Climate Change Office is responsible for representing Moldova during international climate change negotiations and providing related documentation and serves as secretary of the National Commission (UNDP, 2006: 33). The primary role of the MCFU is facilitation of CDM projects in Moldova, including preparing projects and entering into business arrangements (Gobjila, 2007). Capacity for both the Climate Change Office and MCFU is supported by the EU (Anonymous, 2010), while the MCFU has also received support from Japan (Gobjila, 2007). Such support is vital because these two offices are provided only minimal support by MENR and are largely responsible for securing their own financing.

---

401 Moldova Government Officer, Chisinau, Interview MN1, 10 July 2009.
402 Moldova Government Officer, Chisinau, Interview MN1, 10 July 2009.
403 Moldova Government Officer, Chisinau, Interview MN1, 10 July 2009.
404 NGO Officer, Chisinau, Interview MN16, 7 July 2009.
405 NGO Officer, Chisinau, Interview MN16, 7 July 2009.
7.3.2. **Relationship of DNA to investment and environmental agencies**

More importantly for the current study, the UIA maintains a list of CDM projects available for investment (UIA, 2011b) — such cooperation was not found in neither Tanzania nor Moldova. Uganda’s investment agency regarded the CDM as a genuine investment opportunity and actively cooperated with Uganda’s DNA in promoting CDM projects. Finally, as a result of the territorialism of the DNA, in conjunction with the perception that the CDM did not represent a genuine investment opportunity, meant that Tanzania’s investment agency did not actively engage with the CDM.

**Uganda: Strong Cooperation between DNA and Investment/Environmental Agencies**

The sustainable development indicators of the Uganda DNA complimented the regulatory criteria of the UIA and NEMA. They appear as a more detailed version of the UIA’s investment criteria. In Uganda, UIA is required under law to carry out an appraisal of the proposed business in terms of criteria set out in Section 12 of the *Investment Code Act* when issuing investment licenses (see Appendix 1). The Uganda DNA however has included more detailed social criteria for evaluation and also added a few additional economic ones. It can be concluded that the DNA hopes to promote projects with a more positive social impact than that considered by the UIA. More importantly for the current study, the UIA maintains a list of CDM projects available for investment (UIA, 2011b) — such cooperation was not found in neither Tanzania nor Moldova. Uganda’s investment agency regarded the CDM as a genuine investment opportunity and actively cooperated with Uganda’s DNA in promoting CDM projects.

The DNA has been established independent of the National Environmental Management Authority (NEMA) that is responsible for the EIA process. NEMA was established under the

---

406 These are: (i) enhancing community access to essential social services; (ii) community participation in project design, implementation, monitoring and evaluation; and (iii) gender balance and promoting participation of disadvantage groups.

407 These are: (i) contribution to increased production of marketable goods and services; (ii) mutual economic benefits accruing from project activities; (iii) contribution to increased demand for services; and (iv) Contribution to redistribution of development to address area imbalances in development.
1995 National Environmental Act as the principal agency for “the management of the environment and shall coordinate, monitor and supervise all activities in the field of environment” (s.5). The Act recognizes three levels of EIA: an environmental impact review for small-scale activities that may have significant impact; environmental impact evaluation for activities likely to have significant impacts; and an environmental impact study for activities that will have significant impacts (s.19(5)). The decision of whether a project falls into the latter category is determined by the appropriate sector ministry in consultation with NEMA (s.19(6)).

General EIA guidelines in Uganda have been in place since 1994 (see Kakuru et al., 2001; NEMA, 1997), based on World Bank guidelines for environmental assessment and closely in line with the World Bank’s Social and Environmental Management Framework (ECON, 2005: 12). In reality, sector specific guidelines are still under development and the EIA process in Uganda has relied on framework guidelines thus far (UNDP, 2012). These guidelines help determine if an EIA is necessary by providing a checklist where environmental factors potentially affected are listed. Notably, only the Uganda EIA regulations set out specific issues to be considered in the EIA, comparable to evaluation criteria, including ecological, social, landscape and land-use considerations. Projects for which an EIA is mandatory are listed under the Third Schedule of the National Environmental Act.

Interviews with project developers and members of the Uganda bureaucracy suggested significant coherence between the DNA and the rest of the government. To begin with, the Uganda DNA was favourable to carbon markets: “we feel that the country could tap some opportunities in either the voluntary carbon markets or regulated carbon markets, including the complicated CDM.”408 Instead of marking distinctions between Uganda and donor priorities, the DNA spoke favourably of donor support for the CDM and capacity building.409 This was matched by a UIA that actively cooperated with the DNA to promote CDM projects. Recall that the UIA maintains a list of CDM projects available for investment on its website (UIA, 2011b).

---

408 Ugandan Government Officer, Kampala, Interview UN14, 8 May 2009.
409 Ugandan Government Officer, Kampala, Interview UN14, 8 May 2009.
Nonetheless, the Uganda DNA was also hesitant to transfer authority over the climate change file to another government body:

_We have [...] accepted that the Minister of Water and Environment will take the role of coordinating the issues of climate change in Uganda; although, of course, there are other arguments that well, coordination is done under the office of the Prime Minister, why don't we have this unit under the office of the Prime Minister? And while the argument is valid, I think that to a large extent, shifting institutions and relocating them has a disadvantage. Because you are going to a new structure, you're going to a new environment, it will take time for people to understand the importance of what is already understood in the present Ministry._

Overall, these findings indicate that the CDM was considered a genuine investment opportunity in Uganda, around which other state bodies could coherently coordinate. Nonetheless, CDM regulation offered through the DNA was still redundant to screening conducted by NEMA and the UIA.

**Tanzania: Absence of Cooperation between DNA and Rest of the Bureaucracy**

In contrast to the situation in Uganda, in Tanzania, the DNA appeared at odds with the Tanzania Investment Center (TIC), which was itself skeptical of the carbon market, and imposed sustainable development criteria that were not only vague but also not aligned with its EIA assessment. This was again reflected in the analysis of the Tanzanian DNA’s sustainable development criteria and interviews. Finally, as a result of the territorialism of the DNA, in conjunction with the perception that the CDM did not represent a genuine investment opportunity, meant that Tanzania’s investment agency did not actively engage with the CDM.

One of the TIC’s primary activities is to screen investment projects on their economic development benefits and conduct a social cost-benefit analysis of individual projects to ensure they meet Tanzania’s development objectives (TIC, 2008: 45-50). In comparison to the TIC’s screening criteria, the DNA’s screening criteria for sustainable development are rather vague. The DNA’s criteria require that a project conform to Tanzania’s *National Strategy for Reduction of Poverty and Vision 2025* but give few concrete criteria for its measurement. Other DNA criteria overlap with that of the TIC. For example, the DNA criteria for technology transfer overlaps with the TIC’s, though with the additional request that the technology be “environmentally benign”—a term which remains undefined. Two of the DNA’s criteria stand

---

410 Ugandan Government Officer, Kampala, Interview UN1, 12 May 2009.
out: energy projects in rural areas are accorded the highest priority while the DNA request that A/R projects be undertaken in semi-arid and arid areas. While these criteria appear aimed to incentivize specific activities, it is unclear what benefits conferring them priority status would grant them in the regulatory process. Such vague criteria invite considerable discretion on the part of the DNA in evaluating projects. In contrast, the TIC’s criteria go further than the DNA’s by considering not just benefits of projects, but also associated economic, environmental and social costs. ⁴¹¹

Similarly, the criteria for EIA in Tanzania are considerably more objective and precise than those offered by the DNA. The Tanzanian EIA process has relatively transparent procedures for the identification of projects for which an EIA is required as well as screening criteria to be used. EIA regulations distinguish between projects that are likely to have significant adverse environmental impacts and must undertake a full EIA and those for which a lighter process called Preliminary Environmental Assessment is required (EIA and Audit Regulations, First Schedule). Projects for which a full EIA is included most of the CDM projects investigated. There are two sets of evaluation criteria set out in the EIA and Audit Regulations: Review Criteria (s.24) and Project Screening Criteria (s.5-11, Second Schedule). Review Criteria are more comprehensive evaluation criteria against which EIAs for specific projects are scored. Project Screening Criteria are less specific and are intended to be used at an initial stage to determine if a full EIA is necessary. Notably the Review Criteria are currently in the process of being updated (VPO, No Date), which draws on an earlier draft by NEMC (2002).

The Division of Environment, where the DNA is housed, needs to be distinguished from the National Environmental Management Council (NEMC) which is responsible for the EIA process. Tanzania was an early mover in the environmental arena, establishing NEMC under the 1983 National Environmental Management Act. However, NEMC actually predates the EIA process; the government later granted NEMC authority over the EIA process through the 2004 Environmental Management Act and subsequent 2005 EIA and Audit Regulations (Nugent, 2009:

⁴¹¹ The TIC uses COMFAR software for social benefit-cost analysis of foreign investment projects, as provided by UNIDO (TIC, 2008).
On one hand, the 2004 Environmental Management Act states that the NEMC is “to undertake enforcement, compliance, review and monitoring of environmental impact assessment” and reports to the Minister of State for Environment (Environment Management Act: s.17). This suggests that the Division of Environment develops environmental policy while NEMC is responsible for technical matters of enforcement and monitoring. However, in the administration of the CDM, the DNA has taken a more hands-on approach by reviewing projects as head of the CDM Technical Committee.

Overlapping mandates between Tanzania DNA and investment agency and environmental agency reflect deeper political obstacles to the implementation of CDM projects identified in interviews. One project developer explained that the DNA had little time to attend to the administration of CDM projects:

[The DNA is] not cooperative. We have been sending [a] request for letter of no objection for this CDM project. [In over a year’s time], [we] have still not heard anything about it. So we tried to remind [the DNA], and [the DNA] said [the DNA] has never received anything from us. [The DNA claims they don’t] know anything about our project and that's not true.412

An individual of another government agency seeking to cultivate CDM projects described an uncooperative atmosphere that permeated relations with the DNA:

We went to the DNA’s office and we asked for us to work together. Because we are all government agencies, we can just work with them and see how we can push up these projects together. But I don’t know if this works out…..everyone has been disappointed by the [DoE at the] VPO’s office. 413

But perhaps the most vehement critique came from an individual in the donor community. As he explained, problems with the DNA came down to one individual “[He] is not only the bottleneck, but I mean, he's the cork in the bottleneck. Seriously. And we seriously don't understand why that is. We cannot find out.” 414 A number of individuals indicated that corruption was a factor in the poor performance of the DNA in Tanzania. Respondents in Tanzania offered many explanations for the DNA’s lack of cooperation. First was a lack of interest in the CDM on the part of the DNA. While the Tanzanian DNA was responsible for administering the CDM, the same people at the DoE were also responsible for leading Tanzania

412 NGO Officer, Karatu Town, Interview TD3, 4 April 2009.
413 Tanzania Government Officer, Dar es Salaam, Interview TN7, 28 April 2009.
at international climate change negotiations. As a project developer explained: [The DNA] seems to be more interested in doing all these [international] things than promoting CDM in Tanzania.  

While it was not possible to interview key officials of the Tanzanian DNA, it seems plausible that with limited resources, the DNA decided to put more of its efforts into international climate change negotiations in order to advocate for adaptation financing, an alternative source of financing in international climate change policy. One junior officer at the DNA explained that Tanzania’s priority was adaptation while international donors focused on mitigation through the CDM. Yet, if this were the case, it begs the question as to why the DNA did not transfer such authority to another ministry or government agency, such as NEMC or the TIC. This would have made the CDM approval process much more efficient.

Another possible explanation is distrust for the carbon market and foreign investment in general on the part of the Tanzanian DNA. As an official at the TIC explained:

The priority [for the DNA] is environment and that was it. Forget investment. [They] never saw that. And if you talk to them now, CDM is more or less about climate. Policy-makers don't see it from investment angle. And they're not very pro-active in terms of investment. That's why you have seen that Tanzania has very few projects in terms of CDM despite there being potential…We are stuck somewhere.

At the same time interviews suggest that the TIC did not want to involve itself because it did not consider the carbon market to be mature enough to be attracting significant amounts of investment. Under these circumstances, the TIC has been willing to let the DoE manage the CDM portfolio despite concerns that the DoE was not effectively promoting CDM investments. The DoE had proven itself very protective of its authority over all aspect of the climate change file in Tanzania. For example, in the context of REDD+, the Tanzanian DNA had taken the Forest and Beekeeping Division to court and won. Consequently, the DNA’s position on the CDM remained unchallenged by agencies such as the TIC: “they [the DoE] tend to keep [the CDM] their private show…that's where the real constraint comes and that's why [the TIC is] not

415 NGO Officer, Karatu Town, Interview TD3, 4 April 2009.  
416 Tanzania Government Officer, Dar es Salaam, Interview TN5, 2 February 2009.  
417 Tanzania Government Officer, Dar es Salaam, Interview TN8, 30 May 2010.  
418 Tanzania Government Officer, Dar es Salaam, Interview TN6, 30 March 2009.
in the process.” Overall, the DNA in Tanzania was given almost free reign over the CDM process because the rest of the government apparatus did not perceive it as a genuine development opportunity.

**Moldova: Lack of Strong Agencies for CDM, Investment and Environmental Impact Assessment**

There are no specific criteria for the assessment of the sustainable development impact of CDM projects. However, it was explained that the CDM project should conform to development priorities indicated in Moldova’s *National Development Strategy 2008-2011*.  

In Moldova, EIA is the jurisdiction of the State Environmental Inspectorate, a state agency under the Ministry of Environment (INSECO, 2012; Mediu, 2010). The EIA process continues to adhere to the Soviet system of the State Ecological Expertise (SEE) (Ivanov, 2009:267-269; World Bank, 2003a: 8-9). The SEE process involves the review of proposed activities from the point of view of their correspondence to the national environmental legislation and sector specific standards following a procedure set out in the *1996 Law on State Ecological Expertise (SEE) and Environmental Impact Assessment (EIA)* (Article 7.2). But in the eyes of Western experts, the SEE process fails to take into account indirect impacts and their significance in its evaluation of the effectiveness of mitigation measures (Cherpa 346-347). Notably the SEE process is not required of all development projects. For example, CDM afforestation projects in Moldova were exempt from the EIA process (CDM-PDD, 2008d: 97; World Bank, 2003a: 9). Nonetheless, an EIA for the CDM afforestation project was required by the World Bank in order for it to receive funding.

The investment agency MIEPO has few powers to incentivize foreign investments, as discussed above. Consequently, only in Moldova was a specialized government body for the implementation of carbon finance projects established at the Ministry of Environment—the

---

419 Ugandan Government Officer, Kampala, Interview UN14, 8 May 2009.  
420 Moldova Government Officer, Chisinau, Interview MN2, 10 July 2009.  
421 A list of thirty two activities to be considered is listed in an annex to the *1996 Law on SEE and EIA* (World Bank, 2003a: 8-9).
Moldova Carbon Finance Unit (MFCU). The need to establish a specialized government body to catalyse CDM investments suggests that carbon finance opportunities are not perceived by government, at least outside MENR and Moldsilva, as a serious investment opportunities.

Reliance on the World Bank for carbon financing suggests the carbon market remains more an innovative development scheme rather than a real source of green investment in Moldova. Recall also that while there is an EIA process in Moldova, it was not required for the afforestation nor bioenergy projects (though the World Bank imposed its own for the afforestation project).

The DNA could have improved on Moldova’s more lax EIA and foreign investment screening. But a lack of transparency on how the DNA reached its decisions, particularly the absence of sustainable development screening criteria, have rendered this a missed opportunity. Thus while the DNA satisfies the international community’s aspiration for country ownership of the CDM regulatory process, in reality the DNA only adds another uncertain regulatory layer.

7.4. Conclusion

In this chapter I have sought to explain observed variation in the effectiveness of individual CDM projects in terms of two dimensions of state power for development. I have demonstrated that an important part of the variation in the sustainable development impact of carbon finance projects is explained by differences in the way that the state in Tanzania, Uganda and Moldova has allocated the risks involved in rural economic development and accommodates historical land governance practices through its land tenure and investment regime. The way risks in rural economic development are allocated is ultimately a result of state preferences for liberal economic reforms. Sustainability for CDM A/R and bioenergy project is best ensured by a system of rules that offers opportunities for smallholders to engage directly with the carbon markets, creates incentives for domestic investors in the forest and bioenergy sector and avoids the risks of large-scale land transactions—an institutional framework most closely approximated in Uganda. However, CNC costs are minimized by a land tenure regime that accommodates historical land governance failures that manifest themselves as encroachment in Uganda and a lack of public participation in Moldova. Such findings are important because the UN climate change regime has granted host countries limited “after-the-fact” administrative controls for the
CDM, in the form of the DNA, though my results indicate that “before-the-fact” arrangements of institutional capacity are more effective.

The evidence presented suggests that additionality is assured when the project developer is an organization possessing a latent organizational capacity for project implementation which, amongst the projects investigated in this dissertation, was furnished by semi-autonomous state agencies, themselves the by-products of economic restructuring away from state owned enterprises. In the absence of such organizations, the CDM is reliant for its implementation on the private sector, NGOs or specialized government climate change units—all of which have been found lacking with regard to ensuring additionality. With international carbon prices low, project developers cannot rely on carbon finance to implement CDM projects and actively seek out other financing—unless they possess latent organizational capacity for project implementation. For historical political reasons, such organizations have been more slowly adopted in Tanzania than Uganda and Moldova. However, latent organizational capacity appears to be feasible only in relatively low-tech sectors such as forestry, where the state in developing countries retains sufficient power to implement projects. Overall my results challenge the conventional critique of the carbon market which has largely been informed by assumptions about how market actors would behave in the carbon market. With the global price of carbon low and the carbon market insecure, the private sector cannot rely on carbon finance alone, but private firms are not the only type of project developers involved.

A word of caution is however necessary. The causal pathway leading to sustainable and unsustainable outcomes is complex and not all factors are within the powers of the state to control. Similarly, state agencies are only a sufficient condition for ensuring additionality under current carbon market conditions. If possessing a latent organizational capacity for project implementation, other types of project developers, particularly NGOs, can also implement carbon finance projects that result in genuine emission reductions. However, given global prices, the latent organizational capacity for project implementation possessed by state agencies may be necessary to see nearly completely additional projects implemented. Testing this hypothesis in other countries would be required in order to confirm if the factors influencing additionality in Tanzania, Uganda and Moldova are maintained elsewhere. However, recognizing the important
role of the private sector in carbon finance, in the conclusion I describe two remedies for improving methods for monitoring additionality in order to reduce the risk of bogus credits entering the system.
8. Conclusions and Implications

There is considerable variation in the effectiveness of the carbon finance projects investigated in terms of their contribution to sustainable development and the generation of genuine carbon credits. Significantly, effective projects were found across the three countries in terms of sustainable development (both in terms of strong sustainability and weak sustainability) but only in Moldova and Uganda were projects found that were truly additional. A third project, the CDM cookstove project in Tanzania, would likely have been additional but it proved unviable when carbon finance was removed. The fact that a CDM project that would have effectively reduced emissions could not be implemented points to tension between the CDM’s twin goals of sustainable development and additionality. Projects that are additional are also at risk of not being implemented at all, which is unsustainable—albeit not in a way that is easily captured by strong or weak sustainability. But projects that contribute to sustainable development might not be additional because people generally want to undertake sustainable development “anyway”. The challenge of carbon finance is aligning additionality and sustainable development such that additional projects face less volatility in terms of their financial sustainability without violating strong or weak sustainability conditions.

8.1. Summary of the Main Argument

My research into the effectiveness of carbon finance projects across Tanzania, Uganda and Moldova makes a unique contribution to research on climate change and development by showing that the state matters. My research has shown that it is the power of the state to bring its administrative capacities into alignment with national development objectives that translates into effective carbon finance projects amongst Tanzania, Uganda and Moldova.

I have demonstrated that an important part of the variation in the sustainable development impact of carbon finance projects is explained by differences in the way that the state in Tanzania, Uganda and Moldova has allocated the risks involved in rural economic development and accommodates historical land governance practices through its land tenure and investment regime. The way risks in rural economic development are allocated is ultimately a result of state preferences for liberal economic reforms. Sustainability for CDM A/R and bioenergy project is best ensured by a system of rules that offers opportunities for smallholders to engage directly.
with the carbon markets, creates incentives for domestic investors in the forest and bioenergy sector and avoids the risks of large-scale land transactions. However, CNC costs are minimized by a land tenure regime that accommodates historical land governance failures that manifest themselves as encroachment in Uganda and a lack of public participation in Moldova.

At current carbon prices, CDM projects lead to genuine emission reductions when the state is able and willing to play an active, developmental role. This was the situation in Uganda and, to a lesser extent, Moldova where commitment to liberal economic reforms has functioned, paradoxically, as an animating set of ideas, promoting intergovernmental coherence that generates power for development in a manner analogous to the developmental state. But sectors where liberal economic reforms might have such a salutary effect is limited to relatively low-tech sectors such as forestry where the state in developing countries might possess sufficient capacity for a degree of implement.

Importantly, the types of institutions and organizations that I have found important to effective carbon finance projects are different from those that have been promoted by the international community. The CDM has promoted largely ineffective “after-the-fact” regulatory tools to separate the wheat from the chaff. Sustainable development was to be regulated by host countries via the DNA; additionality was to be regulated by third-party auditors. The failure of the CDM to distinguish good from bad projects is not so much due to misaligned interests as it is to difficulty in obtaining sufficient information on which to base decisions. A different approach to the regulation of low-carbon development is necessary: one based on positive incentives to shunt development onto a sustainable, low-emissions pathway. A set of institutional incentives and appropriate organizations designed to support engagement with international markets is conducive to an effective carbon market.

Overall, the criticisms of the sustainable development impact of CDM projects appear misguided. Of the eleven cases where I considered the sustainable development impact of carbon finance projects in detail, projects were clearly sustainable in eight. Given this number, charges of “CO₂-lonialism” made against the CDM and similar carbon finance initiatives (see Forsyth and Young, 2007) are hyperbolic. When sustainability was violated, this was typically found to be a consequence of factors within the control of the state: rules surrounding compensation for land
acquisitions in Tanzania, evictions on public lands in Uganda and lack of public participation in Moldova. Many of the charges made against the CDM on sustainability grounds appear to be as much due to biases of ideology as methodology—in fact, the two go together. In the future, the climate change policy community should insist on greater rigour in research methods in order to determine when and where sustainability is violated.

My results also point to different ways in which land tenure and investment regimes in the three countries might be improved in order to promote sustainability. Tanzania’s land tenure system should be reformed in order to clarify the definition of General Land and compensation procedures for communal Village Land as well as to provide legal recourse for villagers should the project for which lands were acquired fail. In Uganda, the land tenure system would be improved by building greater flexibility into the state’s management of public lands, particularly given the country’s volatile history where encroachment was the norm. It would also be important for the government to be more transparent in the manner by which special exemptions are made towards foreign investment involving land. Finally, in Moldova, land tenure might be improved by further liberalizing rules surrounding the use of land to allow for villagers to engage in afforestation or specialized bioenergy crops. Most important though is to continue to build towards a more participatory political culture, particularly for the management of lands at the local level.

My findings also shed light on additionality and efforts to actually reduce emissions. My main conclusion has been that carbon finance projects generate real carbon credits when they are implemented as part of national development strategies where the key organizations for implementation are state agencies. Critiques of the CDM additionality have largely been informed by assumptions about how market actors would behave in a carbon market. But private firms are not the only type of project developers involved. Results presented here indicate that state agencies and to a lesser extent NGOs are also key players who operate according to a different set of interests than purely financial ones.

To the degree that an enhanced role for state agencies diverges from neoliberal policy, the costs of potential corruption and inefficiency due to state involvement in low-carbon development need to be weighed against the performance of state agencies as innovative, business-like
organizations. However, with the price of carbon low (and falling), the promotion of low-carbon development may not be feasible through the private sector alone. The main problem with the carbon market has been that the price of carbon has never really risen to a point where it triggers changes in economic decision-making that could be effectively measured by the CDM’s administration with information available. But carbon finance projects can still be effectively implemented if they are undertaken in alignment with the development priorities of governments hosting them.

Launched in 1997 during what cannot but be seen now as the high-water mark of Western confidence in the neoliberal economic system, the CDM sought transformation of the developing country economies with little attention to their domestic development priorities and on the assumption that a larger and larger share of foreign direct investment would flow through the CDM, compelling governments in the developing world to reorient their development aspirations with the international climate change regime. As a result, the CDM has constituted a set of institutions that operate in parallel to the dominant institutions and organizations for foreign investment in the countries which it targets.

8.2. Implications for International Development Theory

The conclusion that a state’s preference for liberal economic reforms can function as an animating set of ideas that allows the state apparatus to work in a more purposeful manner and establish institutions and organizations that permit the state to bring carbon finance projects into alignment with its development priorities may strike many observers of international development theory as counterintuitive. Liberal economic reform had the objective of rolling back the state, particularly in sub-Saharan Africa and the Former Soviet Union, not of creating bodies with a developmental objective. Indeed, the development state literature is often considered as an alternative to liberal economic reforms and structural adjustment policy.

First, the distinction between liberal economic reforms and those associated with the developmental state might be less significant than commonly believed. The reason is that liberal economic reforms have not really eliminated the state. Recalling Polanyi’s famously assertion that “Laissez-faire was planned; planning was not” (Polanyi, 2001 [1944]: 147), just the opposite may be true—a liberal market economy requires intervention. So the assumption that the state
has been reduced to an inconsequential role in economic policy development is at odds with empirical reality. What has occurred through structural adjustment has been a restructuring of existing institutions and organizations in order to be more supportive of markets—not the elimination of the state. For example, in Uganda and Moldova, the state did not surrender the forest sector to market forces. Rather, it restructured existing government departments to be more responsive to market conditions while still retaining an active role in the sector. Such reforms were clearly part of structural adjustment reforms yet also retained considerable power for the state. A similar case could be made for the type of land tenure systems introduced within the three countries investigated. An individualized land tenure system, such as that in Uganda, appears part of the country’s development objectives of promoting economic development amongst smallholders. While land conflicts in Uganda surrounding state interventions such as in Mabira Central Forest Reserve often make international headlines, such large-scale land acquisitions are far more prevalent in Tanzania given its lack of individual land rights.

Such a theory has a certain support in the literature on the political economy of economic reforms in sub-Saharan Africa. For example, revenue agencies in sub-Saharan Africa have been almost entirely dependent on government for their budgets (with little opportunity to raise their own revenue), their members are appointed by the President or Minister of Finance, and their personnel have not been subject to rigorous meritocratic selection procedures (Fjeldstad and Moore, 2009: 6-9). The neoliberal explanation for the adoption of such agencies—that such revenue authorities were adopted by governments to signal to their constituencies that taxes would be collected for legitimate reasons (Taliercio, 2004a; b)—appears as a secondary purpose.

My research extends such findings to other elements of the bureaucracy.

Second, the state may aspire to norms championed through liberal economic reforms because they are associated with more business-like, result-based management techniques but also serve as an animating set of ideas around which to base government policy. Certainly, improved performance and efficiency, purported goals of liberal economic reforms, would resonate with the state leadership in many countries. Managing by results produces information that the state can use to judge whether policy is effective or not. While it should not be assumed that economic policy is only implemented based on economic grounds, neither should the aspirations of state leaders in LDCs be crudely dismissed as an objective beyond their grasp. Indeed, the analytical
utility of neo-patrimonialism as an explanatory factor of political economy challenges in LDCs is increasingly being questioned (Mkandawire, 2001). To the extent that a commitment to liberal economic reforms helps state leaders provide direction to the bureaucracy, it may again play a more developmental role than commonly anticipated.

However this second point identifies an important limitation of my argument: the role played by liberal economic reforms may only function as an animating set of ideas amongst the three countries investigated. It would be premature to extend this argument to other countries, particularly emerging economies. In China, for example, communist ideology may serve as an animating set of ideas that assures the coherency across the bureaucracy and between state and bureaucracy. In other words, key for low-carbon development is the animating, directive and purposeful ideology that provides a basis for proactive state action, though not necessarily one informed by liberal economic ideas.

This in turn raises the question of why I have found a (paradoxical) association between liberal economic reforms and developmentalism in the three countries investigated. Drawing on Kohli’s (2004) insight that historical conditions have set the trajectory for state power for development in the developing world, particularly colonialism, I posit that liberal economic reforms have the opportunity to play the role of an animating set of ideas in LDCs moreso than elsewhere in the developing world. History plays a role. Because LDCs were relatively powerless in the face of international organizations such as the IMF and World Bank, many of the opportunities for LDCs to find occasions for steering the economy towards developmental ends were only to be found in the institutions and organizations allowed under structural adjustment. Skillful states have been able to combine their developmental aspirations with such liberal economic bodies in a manner that was unintended by the international community.

8.3. Implications for the Climate Change Regime

It is risky to generalize from an investigation of only nine carbon finance projects across three countries and draw conclusions for the climate change regime complex (sensu Keohane and Victor, 2011). Certainly not all variation in state power for development is captured in the three countries investigated, which are more characteristic of LDCs. Emerging economies like China, India and Brazil are not included. It is well known that these emerging economies have captured
the largest share of the current CDM market (UNFCCC Secretariat, 2008). Critiques of the CDM have been most vociferous of projects in China, where the state is already heavily involved in the economy (He and Morse, 2008; Wara, 2008; Wara and Victor, 2008). But as I have pointed out in Box 3-1 earlier, these critiques appear unwarranted because the base of the comparisons used is inappropriate.\footnote{While Wara and Victor claim that the CDM was being cited for all new power plants built in China, it was actually only associated with a small fraction of them—advanced natural gas fired plants. Hardly any advanced natural gas fired power plants were being built outside of the CDM. If they were, this would really be evidence that there were sufficient incentives to build natural gas projects in the absence of the CDM.} A more sophisticated analysis of CDM projects in emerging economies using the comparative baseline approach I have developed in this dissertation would help resolve these debates. Nonetheless, below, I venture some implications of my research for the climate change regime complex.

First, my results bode relatively well for the CDM as a tool for reducing emissions because they help identify and then puncture an assumption upon which much of the criticism of the carbon market has been based—that the carbon market is populated by private sector actors motivated by financial incentives. The reality is that private firms co-exist with other project developers such as state agencies and NGOs who are motivated by a different set of objectives. Research findings suggest that in order to promote low-carbon development, it will be necessary that the organization implementing emissions mitigation projects shares an interest in national development objectives. Despite the inherent risks with state involvement in the economy, state agencies appear amongst the best vehicles for low-carbon development.

Until the price of carbon rises significantly, my findings suggest that promoting low-emission development in LDCs will require bringing carbon finance and state incentives into alignment, rather than simply devising elaborate measurement, reporting and verification systems. Issues of state administrative capacity and political economy will remain challenges for low-carbon development despite tweaking the institutional design of carbon finance instruments at the international level. As a point of reference in the vast literature on the political economy of development, I recommend greater investment and capacity-building in state power for low-carbon development in a manner analogous to the developmental state. Such a conclusion is important as the international community moves away from project-based mechanisms such as the CDM and considers broader strategies for incentivizing low-carbon development strategies in
the developing world which anticipate a larger role of the state (Clapp et al., 2010; de Gouvello et al., 2008; South Pole Carbon, 2011; UNDP, 2011). It also speaks to the renewed debate on the “developmental state” and “industrial policy” in LDCs (Altenburg, 2011; Chang, 2012; Edigheji, 2010; Lin and Chang, 2009; Rodrik, 2008; Wade, 2009).

Notably, there are signs that the UNFCCC and multilateral development agencies are giving serious consideration to improved coordination of the carbon market and national development priorities. Here the CDM may be transforming into what are being called NAMAs—nationally appropriate mitigation actions (Mason-Case, 2011: 2; Okubo et al., 2011; South Pole Carbon, 2011). The gist of NAMAs is that they are actions identified by governments in developing countries, thus ostensibly ensuring that mitigation activities align with a state’s development priorities. In a departure from the CDM, NAMAs are also expected to allow the combination of private and public financing. Approaches to reducing deforestation (known as reducing emissions from deforestation and forest degradation, REDD) are also moving to greater engagement with government, through so-called “jurisdictional” approaches that contrast with the project-based approach of the CDM (VCS, 2012). However, the CDM is also evolving toward “sectoral” approaches that will target wide swaths of the economy for mitigation action (CDM EB, 2011a). In all these approaches, the coordination of a multitude of actors is expected to require the state playing a more important role.

Second, my results suggest that regardless of the future form of the international climate change mitigation mechanism, it will need to build more robust institutions and organizations for administering and executing carbon finance projects. I conclude from this that developing countries would implement emission reduction projects or policies if responsibility for administering carbon finance were transferred to a government investment agency. There is little value in retaining a specialized carbon finance agency such as the DNA that is tucked away in the Ministry of Environment without sufficient capacity, interest or authority to attract carbon finance and see that it used effectively. In other words, institutions and organizations for carbon finance cannot be specific to carbon finance but must have a more general applicability in order to streamline green investments from a wide variety of sources. The best analogy for such an orientation of a state’s administrative capacities towards a particular type of development is the “developmental state”. Is a greening of the developmental state possible?
There are reasons to doubt that conditions are ripe for a developmental state in any of the three countries investigated in this dissertation. Nationalism—that key political characteristic that conditions bureaucracies to put aside personal and ethnic politics for the national interest—is lacking in Tanzania, Uganda and Moldova. Nonetheless, in Uganda a strong commitment to liberal economic reform appears to have resulted in a relatively coherent set of institutions and organizations with the common goal of promoting economic development—conditions which my results indicate are conducive to sustainable and low-carbon development.

Finally, and perhaps most importantly, the variation in the CDM’s ability to contribute to sustainable development and generate genuine carbon credits observed across Tanzania, Uganda and Moldova challenges the emphasis the climate change policy community has placed on the design of the international climate change regime. If policy is found not to work in one country, there has been too quick a leap to a conclusion that fundamental restructuring across the climate policy landscape is necessary. But this is unwarranted and risks miring climate change negotiations in the endless task of creating a single climate change policy that works everywhere. Climate policies not working in one country may be working in another—instead of rethinking the entire system it is better to identify where current climate policy is working and create alternative policies where it is not. Unfortunately, figuring out if climate policy is actually working is a hard slog, requiring meticulous research within a variety of countries where climate policy is active. But it is the only real antidote to the piles of questionable research currently on offer, which too often make gross generalizations from a very limited research effort. In this dissertation I have highlighted comparative methods, both within and across countries, in order to demonstrate the variation in the performance of carbon finance projects.

8.4. Remedies for Monitoring Additionality under Current Carbon Prices

With the price of carbon low, the simple counterfactual baseline regulatory approach currently used for the CDM has been found to be problematic. Carbon finance projects implemented by private firms are more vulnerable to violations of financial and background additionality. Additionality can change over a project’s crediting window: a project that is at first additional may not always be so if baselines change. At the same time, rare are the circumstances where a CDM project aligns with development priorities to which it is already devoting considerable
resources—conditions which proved to generate highly additional projects. In this section I identify two remedies that can help improve the monitoring of additionality: an ODA Baseline and a Moving Baseline. These will take considerably more resources. If the CDM counterfactual regulatory approach is a magnifying glass, the remedies I suggest constitute a microscope to observe an even smaller price signal.

8.4.1. Improving Coordination of ODA and CDM Financing through ODA Baselines

While ODA is ostensibly permitted towards CDM projects, private firms did not report ODA funding and their financial baselines were based on the premise that no funding—including ODA funding—would materialize over the CDM’s crediting period. I conclude that 76% of the carbon credits associated with the Uganda CDM cogeneration project violated financial additionality and nearly all of the carbon credits associated with Moldova CDM rural energy modernization project. Carbon credits issued from the Tanzania CDM afforestation projects after 2010 would be considered bogus because of the significant ODA financing received in the form of a $25 million loan; however, the changing development context in 2005-2006 renders this violation of financial additionality unimportant. It can be concluded that instead of aligning interests of public and private financing sources, the current CDM rules actually promote competition, obfuscation and false reporting. There is a temptation to criticize the private firms behind the Tanzania and Uganda projects for their attempts to obtain CDM financing while also seeking donor financing. But this rather points to a fundamental problem with the CDM’s design: the lack of clarity on how to combine ODA and CDM financing actually encourages such behaviour through the requirement that international development financing not be diverted towards CDM projects.

Nonetheless, analysis of additionality undertaken in this dissertation indicates that it is possible to combine carbon finance and ODA while also parsing out emissions reductions due to each. For example, the successful combination of carbon and donor financing in the Ugandan Plan Vivo reforestation project questions the rather rigid distinction between carbon and donor finance required in the CDM. In this project, ODA supported start up costs and, when allocated at a steady rate over the course of the project, it helped meet minimum operation costs as carbon
finance was scaled up. Similarly, in the case of the Uganda CDM cogeneration project, despite the violations of additionality above about 31% of carbon credits issued were still genuine.

I recommend that the donors be involved in the modeling of ODA-baselines against which emission reductions associated with CDM are compared. Reliable information on ODA disbursements to projects was available with the donors, yet overlooked by third party auditors for these projects. For example, in the Uganda CDM cogeneration project the 5-7 MW electricity grid export capacity made possible by World Bank loans prior to the CDM and additional 3 MW capacity facilitated by GEF in 2010 was the appropriate ODA-baseline rather than the 0 MW claimed in the project documents. To resolve this, third-party auditors might be required to confirm with donors if significant ODA had been allocated to projects. Or more simply, donors might take on a larger role in auditing CDM projects, rather than outsourcing this important governance role to the private sector. Such an approach makes sense since donors already have a presence in most CDM hosting countries and understand each country’s development context well in contrast to most third-party auditors who are only parachuted in from headquarters in developed countries to assess a CDM project.

8.4.2. Additionality Risk Buffer Tool

The second remedy stemming from my research is how to better manage changes in background socioeconomic conditions which affect additionality. There has really been little attention granted to the temporal nature of baselines. Interestingly, a similar problem with the temporal fluctuations in the value of commodities was a cause of the 2008 global financial crisis (also see FASB, 2007; Sorkin, 2009: 103-104). Most banks valued their real estate or mortgages simply at the price paid for them, rather than venturing to estimate what they might be worth on any given day. An accounting rule to capture this change in value was not implemented. This is not to say that technical accounting procedures were the only factor leading to the financial crisis. Arguably, the real problem was a lack of transparency in the underlying value of investments.

423 Some recent departures in the academic include Liu (2008: 292) who describes a method for using national economic output to estimate emissions over time by assessing the probability of national economic output given a certain technological infrastructure in the country. Similarly, Strachan (2011) describes a need for a both a no-policy reference baseline, the current approach to the CDM, and a second baseline based on intended effects of policy prescriptions to reduce emissions.
that led to inaccurate risk ratings in conjunction with a lack of accountability amongst secondary and tertiary market actors to more accurately report value.

Can dynamic accounting be injected into carbon finance before it is too late? One idea worth exploring is a tool for managing additionality risk, which might draw inspiration from a system to manage the non-permanence of carbon credits issuing from forest and agriculture projects on the voluntary carbon markets (Diaz, 2010; VCS, 2011). Here a risk analysis is undertaken to determine the non-permanence risk rating for a specific project, which is then used to determine the number of buffer credits that a project is required to deposit into a non-permanence pooled buffer account. Meyers describes a comparable system for additionality (Meyers, 1999). Here results from an additionality risk analysis could be used to assign the project an additionality risk score which would indicate the amount of carbon credits that need to be deposited in a pooled additionality buffer account.

### 8.5. Final Word

At the close of this dissertation, I hope to have convinced the reader that research undertaken here is able to make a valuable contribution to the often polarizing debate surrounding the carbon market. Of course, as a study limited to LDCs and the land-use sector, it would be important to verify if conclusions reached here are valid in emerging economies and other sectors, particularly energy to which my research only considers to a limited degree. Nonetheless, the identification of state power for development as an explanatory variable in conjunction with the robust, comparative methods I have used to assess CDM project effectiveness offer a template that can be used to investigate other policies in other countries.

Overall, it is true that the CDM is not working as well as it needs to in order to generate confidence that carbon credits are real, but it is a starting point from which more robust carbon finance instruments can be drawn. To enhance the effectiveness of such instruments, the international community needs to better accommodate state administrative capacity and political economy preferences in order to tap state power for low-carbon development. My read of the international climate change regime is that the need to tailor climate change efforts to individual

---

424 Forests and agriculture projects are at risk of non-permanence because emissions sequestered might be released through fire or other disturbance.
states or groups of states is beginning to be recognized. To move this forward, we need to train climate policy experts knowledgeable not just about how the international climate change regime operates but also how it operates under different country circumstances. In this dissertation, I hope to have made a modest contribution towards this end.
Appendices

Appendix 1: Project Evaluation Criteria used by DNA, Environmental Impact Assessment and Foreign Investment Screening

Tanzania

Tanzania’s CDM Sustainable Development Criteria

- The CDM project activity should be consistent with National Strategy for Growth and Reduction of Poverty 2005 and that it should aim at poverty alleviation by generating additional employment and improving standard of life.
- The CDM project activity should bring in additional financial flows through investment and should be consistent with the Vision 2025 and Vision 2020 for Tanzania mainland and Zanzibar respectively.
- The project activity should be consistent with the Environmental Management Act, 2004 and its Environmental Impact Assessment and Audit Regulations, 2005. The project should reflect resource sustainability and resource degradation if any, impact on biodiversity, human health and other environmental issues.
- The CDM project activity should lead to transfer of environmentally benign and sound technologies to Tanzania.
- Congruence with the national environmental policy and related action plans and strategies;
- Energy projects particularly in rural areas are accorded the highest priority;
- There should be a partnership between investor country company or institution and the host country local private company, NGO, Research /Academic Institutions or government department (Unilateral projects are encouraged) where no additional technology or finance is not requested.
- In Tanzania, priority for undertaking A/R projects is given to semi-arid and arid areas.


---

This final point is not listed under the eligibility criteria but in the section for AR projects. Given its resemblance to a criteria, I have included it here.
Tanzania’s EIA Review Criteria and Screening Criteria

EIA Review Criteria

Review Area 1: Description of the Development, the Local Environment and the Baseline Conditions

1. Description of the development and the purpose(s) of the development is adequately described as well as its physical characteristics, scale and design. Quantities of material needed during construction and operation are included and, where appropriate, description of the production processes.

1.1 The purposes and objectives of the development are adequately explained.

1.1.1 The design, size or scale of the development, and the nature and duration of construction and operation activities, are adequately described. Diagrams, plans, charts and/or maps are used effectively for this purpose.

1.1.2 Important design features, especially those for environmental planning and socioeconomic management (e.g. pollution control, waste management, erosion control, handling of toxic or hazardous materials, worker services) are highlighted.

1.1.3 There is an adequate indication of the physical presence or appearance of the completed development within the receiving environment.

1.1.4 The numbers of workers involved with the project during both construction and operation are estimated.

1.2 Site description: the one-site land requirements of the development are described, as well as the duration of each land use.

1.2.1 The land area taken up by the development site is well defined and its location clearly shown on a map.

1.2.2 Where alternate plans, designs or sites are being considered each is adequately discussed according to Criteria 1.2.1 and 1.2.2.

1.3 Residuals: the types and quantities of residual and/or waste matter and energy created are adequately estimated, the expected rate of production given, and the proposed disposal routes to the environment identified.

1.3.1 The types and quantities of waste matter, energy and residual materials and the rate at which these will be produced, are adequately estimated. Uncertainties are acknowledged and ranges or confidence limits given where possible.

1.3.2 The ways in which it is proposed to handle and/or treat these wastes and rating residuals is indicated, together with the routes by which they will eventually be disposed of to the environment.

1.4 Bounding the study: appropriate boundaries to the study area and time horizon are identified.

1.4.1 The environment expected to be affected by the development is delimited with the aid of suitable scale map(s).

1.4.2 The time horizon of the study is long enough to account for delayed effects.

1.5 Baseline condition: an adequate description of the affected environment as it is currently, and as it could be expected to develop if the project were not to proceed, is presented.

1.5.1 The important components of the affected environments are adequately identified and described. The methods and investigation undertaken for this purpose are discussed and are appropriate to the size and complexity of the assessment task. An appropriate amount of field work was done. Uncertainties are indicated.

1.5.2 Existing data sources were searched and, where relevant, used. These include local authority records and studies carried out by, or on behalf of, government and private sector organisations.

1.5.3 Local land use and development plans were consulted and other data collected as necessary to assist in the determination of the probable future state of the environment, in the absence of the project, taking into account natural fluctuations and human activities.

Review Area 2: Identification, Analysis and Assessment of Impacts

2. Identification of impacts: all potentially significant impacts are identified. Key impact are also identified and the main investigation centred on these.

2.1. All important issues identified in the EIA terms of reference are included in the report. Deviations and exclusions are adequately accounted for.

2.1.1. Direct and indirect impacts are identified using a systematic methodology such as project-specific...
checklists, matrices, impact networks, expert judgment, extensive consultations. A brief description of the impact identification methods is given along with the rational for using them.

2.1.3 Due attention is paid to environmentally sensitive areas, time delayed or recurring (e.g. seasonal) impacts and to cumulative or systematic effects with existing and participated developments.

2.1.4 Consideration is not limited to effects which will occur under design operating conditions. Where appropriate, impacts which might arise from non-standard operating conditions, or due to accidents, are also include.

2.1.5 All phases of the project are considered e.g. pre-construction, construction, operation and decommissioning.

2.1.6 Key impacts were identified and selected for more intense investigation. The scoping methods are described and their use justified.

2.2 Analysis of impact severity: the likely impacts of the development on the environment are analysed and described in as precise terms as possible

2.2.1 Impacts are analysed as the deviation from baseline conditions, i.e. the difference between environmental conditions expected if the development were not to proceed and those expected as a consequence of it.

2.2.2 The data used to estimate the severity of impacts is sufficient for the task and clearly described. Any gaps in the required data are indicated and accounted for.

2.2.3 The methods used to predict impact severity are described and are appropriate to the size and importance of the projected disturbance. The assumption and limitations of the methods are explicitly discussed.

2.2.4 Descriptions of impact severity encompass the appropriate characteristics of impact (e.g. magnitude, areas extent, duration, frequency, reversibility, likelihood of occurrence).

2.2.5 Where possible, estimates of impacts are recorded in measurable quantities with ranges and or confidence limits as appropriate. Qualitative descriptions, where necessary, are as fully defined as possible such as minor means not perceptible from more than 100m distance.

2.3 Assessment of Impact significance: the expected significance that the project Impacts will have for society are adequately assessed. The sources of quality standards plus the rationale, assumptions and value judgements used in assessing significance are fully described.

2.3.1 The significance of all impacts which will remain after mitigation are described and clearly distinguished from impact verity.

2.3.2 The significance of Impacts is assessed using appropriate national and international quality standards where available. Explicit account is taken of the values placed on affected environmental features locally, nationally and (where appropriate) internationally.

2.3.3 The choice of standards, assumption and value systems used to assess significance are justified and the existence of opposing or contrary opinions.

2.3.4 Wherever possible, economic values are attributed to environmental costs and benefits.

2.3.5 Individuals, groups, communities and government agencies affected by the project are clearly identified.

Review Area 3: Alternatives and Mitigation

3.1 Alternatives: project alternatives are considered. These are outlined, the environmental Implications of each presented and the reasons for their adoption or rejection briefly discussed.

3.1.1 Alternative sites, processes, designs and operating conditions are considered where these are practicable and available to the developer. The main environmental advantages and disadvantages of these are discussed and the reasons for the final choice given.

3.1.2 Where possible, alternative construction strategies (e.g. timing, local versus imported labour) are considered and assessed for their environmental and socio-economic implications.

3.1.3 For public sector proposals, alternative means of achieving project goals are considered (e.g. energy efficiency investments versus dams for energy supply). If not, the report discusses why this was not done.

3.2 Scope and effectiveness of mitigation measures: all significant adverse impacts are considered for mitigation.

3.2.1 Concerned stakeholders (e.g. individuals, groups, communities, government agencies) have been adequately consulted and their views accounted for in the development of mitigation measures.

3.2.2 The mitigation of all significant adverse impacts is considered. Wherever possible, specific mitigation measures are defined in practical terms such as costs.

3.2.3 Any residual or un mitigated impacts are discussed and justification offered as to why these impacts should not or cannot be mitigated.

3.2.4 It is clear to what extent the mitigation methods will be effective. Where effectiveness is uncertain or depends on assumptions about operating procedures, climatic conditions, etc. data is introduced to justify the acceptance of these assumptions.

3.2.5 An effective environmental monitoring and management plan is presented to deal with expected;
3.3 Commitment to mitigation: the project proponent clearly expresses a commitment to, and capability of, carrying out the mitigation measures.

Review Area 4: Public Involvement and Communication

4.1 There were genuine and adequate consultations with concerned project stakeholders to appraise them of the project and its implications and to obtain their views on key issues to be investigated and managed. The scope and results of the public involvement program are adequately documented in the report.

4.2 The layout of the report enables the reader to find and assimilate information easily and quickly. External data sources are acknowledged.

4.2.1 There is an introduction briefly describing the project, the aims of the environmental assessment and how these aims are to be achieved.

4.2.2 Information’s logically arranged inspections or chapters and the whereabouts of important data is indicated in a table of contents or index. Terms of reference and data used in the assessment are included in appendices. The consulting team members are identified.

4.2.3 When data, conclusions or quality standards from external source are introduced, the original source is acknowledged at that point in the text. A full reference is included in a footnote or in a list of references.

4.3 Presentation: Care is taken in the presentation of information to make sure that it is accessible to the non-specialist.

4.3.1 Information is comprehensible to the non-specialist. Tables, graphs and other graphics are used as appropriate. Unnecessarily technical or obscure language is avoided. Technical terms, acronymic and initials are defined, either when first introduced in the text or in a glossary.

4.3.2 The report is presented as an integrated whole. Data presented in appendices is fully discussed in the main body of the text.

4.4 Emphasis: Information presented without bias and receives the emphasis appropriate to the importance in the context of the project.

4.4.1 Prominence and emphasis is given to potentially significant impacts, both adverse and beneficial, in a balanced manner.

4.4.2 The statements is unbiased and does not lobby for any particular point of view.

4.5 Non-technical summary: There is an adequate non-technical summary outlining the main conclusions and how they were reached.

4.5.1 There is an adequate non-technical summary of the analysis and main finding of the study. Technical terms, lists of data and detailed explanations of scientific reasoning are avoided.

4.5.2 The summary is comprehensive, containing at least a brief description of the project and the environment, and account of the main impacts and mitigation measures to be undertaken by the developer, and a description of any remaining or residual impacts. A brief explanation of the methods by which information and data were obtained and an indication of the confidence that can be placed in them is also included.

Source: VPO (No Date: 86-95)
**EIA Screening Criteria**

1. The project will not substantially use a natural resource in a way that pre-empts the use, or potential use, of that resource for any other purpose.
2. Potential residual impacts on the environment are likely to be minor, of little significance and easily mitigated.
3. The type of project, its environmental impacts and measures for managing them are well understood in Tanzania.
4. Reliable means exist for ensuring that impact management measures can and will be adequately planned and implemented.
5. The project will not displace significant numbers of people, families or communities.
6. The project is not located in, and will not affect, any environmentally sensitive areas such as:
   - (a) national parks;
   - (b) wetlands;
   - (c) productive agricultural land;
   - (d) important archaeological, historical and cultural sites;
   - (e) areas protected under legislation;
   - (f) areas containing rare or endangered flora or fauna;
   - (g) areas containing unique or outstanding scenery;
   - (h) mountains or developments on or near steep hill-slopes;
   - (i) dry tropical forests (e.g. Brachystegia woodlands);
   - (j) development near Lakes or its beaches;
   - (k) development providing important resources for vulnerable groups such as fishing communities along the lake-shore;
   - (l) development near high population concentrations or industrial activities where further development could create significant environmental problems; and
   - (m) prime ground-water re-charge areas or areas of importance for surface run off of water.
7. The project type will not result in:
   - (a) policy initiatives which may affect the environment such as changes in agricultural pricing subsidies or the tobacco liberation;
   - (b) major changes in land tenure; or
   - (c) changes in water use though irrigation, drainage promotion or dams, changes in fishing practices.
8. The project will not cause:
   - (a) adverse socio economic impact;
   - (b) land degradation water pollution;
   - (c) water pollution;
   - (d) air pollution;
   - (e) damage to wildlife and habitat;
   - (f) adverse impact on climate and hydrological cycle;
   - (g) air pollution; and
   - (h) creation of by-products, residual or waster materials which require handling and disposal in a manner that is not regulated by existing authorities.
9. The project will not cause significant public concern because of potential environmental changes. The following are guiding principles:
   - (a) is the impact positive, mainly begin or harmful;
   - (b) what is the scale of the impact in terms of area affected numbers of people or wildlife;
   - (c) what is the intensity of the impact;
   - (d) what will be the duration of the impact;
   - (e) will there be cumulative effects from the impact;
   - (f) are the effects politically controversial;
   - (g) have the main economic, ecological and social costs been quantified;
   - (h) will the impact vary by social group or gender; and
   - (i) is there any international impact due to the proposal projects.
10. The project will not necessitate further development which is likely to have a significant impact on the environment.

*Source: 2004 EIA and Audit Regulations, Second Schedule “Project Screening Criteria”*
Tanzania Investment Centre’s Social Cost-Benefit Measurement

Social Benefit Measures

1. **Employment Creation**. Will proposed investment create jobs, both directly and indirectly?

2. **Technology, Knowledge and Skills Transfer**. One important measure for evaluating investment is whether the proposed project has a chance of enhancing technology, knowledge and skills transfer. Often FDI can bring into the country both hard technology (e.g. equipment, industrial processes) and soft technology (e.g. knowledge, information, expertise, organisational skills, management, marketing and technical know-how). Sometimes some investments are also associated with growth of research and development (R&D) thus increasing the country’s technological capacity. All these are important measures in evaluating investment applications.

3. **Promotion of the country’s exports, competitiveness and markets**. Transnational companies can help boost the country’s exports through their foreign affiliates. In general, Foreign Direct Investment (FDI) can be an important intermediary between Tanzanian domestic producers and markets abroad. Foreign investors engaged in export-oriented primary manufacturing and service activities can be particularly useful in enhancing the county’s export competitiveness – in part because of their technological superiority and quality consciousness.

4. **Linkages with sectors of the economy**. Is the investment likely to source inputs in the local market? Will the investment improve the supply chain of goods and services? Will the investment add value to domestic resources. These and other considerations that foster linkages within the economy are important for accelerating economic growth.

5. **Improvement in the country’s financial inflows and balance of payments**. Foreign direct investment can inject substantial financial resources into the country beyond those referred to in the statutory requirements. Such resources if channelled to new investments (Greenfield-type investments) or infrastructure (e.g. electricity, telecom, water and sanitation, roads (build-operate principles) can make marked contribution to national development. Under social benefit-cost analysis, investment inflows have to exceed outflows in terms of profit and other remittances).

---

Social Cost Measures

1. **Crowding out local investors**. Due partly to technological superiority, some FDI investments have squeezed out local producers. For example, a large garment manufacturer that supplies cheap clothes to the domestic market can easily kill local small-scale garment manufacturers. Large foreign banks are known to “crowd out” local banks and due to automation reduce labour considerably.

2. **Holding back local skills development and reducing entrepreneurial growth**. If an investment application demands the use of many expatriate managers and professionals, whose skills are domestically available, this could be regarded as holding back local skills development. Similarly, if FDI investors prefer to use foreign suppliers, this can be taken as reducing entrepreneurial development. In the financial sector, excessive automation by both foreign and local banks has resulted in to reduced employment and lost opportunities for further learning. In situations where investors cut off an existing domestic supply chain due to sourcing abroad (e.g. TBL import of barley from South Africa), this action could be result in killing local entrepreneurial linkages.

3. **Environmental Damage**. Some investments may have negative effects on the environment although the project may be financially profitable. A typical example is the pollution of air or water by industrial plants. The discharge is a by-product of the industrial process that results in net disbenefits to the surrounding population. For such projects an Environmental Impact Assessment (EIA) is mandatory. However, for TIC purposes, it is a good idea to include environmental concerns as one of the measures for investment evaluation.

4. **Social costs related to systemic risk**. Sometimes an economy can be exposed to significant instability due partly to structural and institutional weaknesses of the economy. For example, the entry of foreign financial institutions might undermine the ability of the Bank of Tanzania to exercise control over international capital movements into and out of the country – despite the existence of good regulations.

---

Source: TIC (2008: 47-49)
**Uganda**

**Uganda’s CDM Sustainable Development Criteria**

1. **Introduction**
   The Clean Development Mechanism (CDM) defined under Article 12 of the Kyoto Protocol has two main primary objectives:
   - Assist non-Annex I parties to achieve sustainable development; and
   - Assist Annex I Parties to meet part of their commitments under Article 3 of the Kyoto Protocol through implementation of project activities that lead to greenhouse gas emission reduction/uptake.

   The CDM Executive Board regulates greenhouse gas emission reduction while a participating Party regulates the sustainable development aspects according to its development priority. This criterion is developed to serve this purpose for Uganda.

   Uganda adopted the Bruntland definition of sustainable development: “development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs”. Uganda’s sustainable development criterion is based on environmental, social, economic and technology transfer. The National Environment Management Authority (NEMA) is responsible for enforcing compliance with environmental legislation in close collaboration with other law re-enforcement agencies. It therefore clears projects, including evaluation and approval of environmental impact assessment, where applicable. The guidelines are simple to use and therefore project developers should be able to rate their projects prior to submission to the DNA.

   These elements of the criteria are sub-divided into sub-elements and each is given a maximum score against which the project is evaluated.

2. **The Criterion**
   The criterion comprises of environmental, social, economic and technology elements and monitoring indicators. The elements are subdivided into sub-elements. Project developers are expected to provide baselines for each sub-element and a monitoring plan.

   2.1 **Environmental**
   Clearance from NEMA is a pre-requisite for submission of CDM projects to Designated National Authority (DNA).
   Some projects mandatorily require environmental impact assessment (EIA) while others do not. The level of EIA varies with size of projects. EIA must be carried out in accordance with the NEMA guidelines. The EIA guidelines emphasize public participation in the entire EIA process, as a way of ensuring public input into the designing of projects. The EIA guidelines does provide for remedial actions for adverse effects of project activities. Project proponents must include a clear description of actions to be taken to address negative effects on the environment and corresponding monitoring plans. The criterion therefore focuses on social, economic and technology aspects of sustainable development.

   2.2 **Social Criteria**
   The criterion emphasizes social benefits in line with Uganda’s policy of reducing poverty among its people and therefore this component carries a total score of 40 points. The social criterion is further subdivided into:
   - Enhancing community access to essential social services (18 points);
   - Community participation in project design, implementation, monitoring and evaluation (15); and
   - Gender balance and promoting participation of disadvantage groups (7).

   2.3 **Economic Criterion**
   Economic contribution is viewed as equally important but rated slightly lower than social and has therefore been allocated a total score of 35 points. The criterion is further subdivided into six sub-elements:
   - Contribution to employment generation (8);
   - Contribution to saving and generation of foreign exchange (7);
   - Contribution to increased production of marketable goods and services (6);
   - Mutual economic benefits accruing from project activities (5);
   - Contribution to increased demand for services (5);
   - Contribution to redistribution of development to address area imbalances in development (4).

   In ii above any project that promotes use of local resources (raw materials and human resources) would get a higher score.

   2.4 **Technology**
   Technology transfer has been allocated a total score of 25 points and is further subdivided into four sub-elements:
   - Environmentally friendly technologies (10);
ii. Technology transfer (7);  
iii. Efficiency of technology (4); and  
iv. Acceptability of technology by local community (4).

Technology transfer embraces equipment and imparting of skills required to fully operate the technology. In addition to a technology reducing greenhouse gas emissions it must not caused negative effects on the environment.

3. Application of the Criterion

The general principles for application of the criteria are the following:

i. The project must have got approval of its EIA from the National Environment Management Authority (NEMA);

ii. A higher score is given to a project contributes to more than item in a given aspect of the criterion. For example a project that contributes to enhancing community access to energy, safe water and sanitation and health services would get a higher score than if it contributed to only two items in the list).

iii. The project developer must establish a baseline for each criteria and clear monitoring plan for evaluation of the performance of the criteria.

iv. For a project to be selected, it must score an overall minimum score pass of 50% in addition to scoring at least 50% in each aspect of the criterion.

v. The project developer should be able to score the project based on the SD criteria;

vi. Where any sub-element of the criteria does not apply to a project by its nature, for example, if the project does not at all have any element of community participation, the project scores zero on this sub-element of the social aspect.

vii. A positive score implies contribution to any aspect of the criteria, while a negative score implies adverse effects of the project on that aspect.

Source: Uganda Climate Change Unit, Ministry of Water, Land and Environment (pers. comm., 2009).
Uganda Issues to Be Considered in Undertaking an EIA

Section 14. Contents of the Environmental Impact Statement
(1) Without prejudice to the generality of the terms of reference specified under regulation 10, the environmental impact statement shall provide a description of -
   (a) the project and of the activities it is likely to generate;
   (b) the proposed site and reasons for rejecting alternative sites;
   (c) a description of the potentially affected environment including specific information necessary for identifying and assessing the environmental effects of the project;
   (d) the material in-puts into the project and their potential environmental effects;
   (e) an economic analysis of the project;
   (f) the technology and processes that shall be used, and a description of alternative technologies and processes, and the reasons for not selecting them;
   (g) the products and by-products of the project;
   (h) the environmental effects of the project including the direct, indirect, cumulative, short-term and long-term effects and possible alternatives;
   (i) the measures proposed for eliminating, minimising, or mitigating adverse impacts;
   (j) an identification of gaps in knowledge and uncertainties which were encountered in compiling the required information;
   (k) an indication of whether the environment of any other State is likely to be affected and the available alternatives and mitigating measures;
   (l) of how the information provided for in this regulation has been generated;
   (m) such other matters as the Executive Director may consider necessary.

First Schedule
The following issues may, among others, be considered in the making of environmental impact assessments.

1. Ecological Considerations:
   (a) Biological diversity including:
      i) effect of proposal on number, diversity, breeding habits, etc. of wild animals and vegetation.
      ii) gene pool of domesticated plants and animals e.g. monoculture as opposed to wild types.
   (b) Sustainable use including:
      i) effect of proposal on soil fertility.
      ii) breeding populations of fish and game or wild animals.
      iii) Natural regeneration of woodland and sustainable yield.
      iv) Wetland resource degradation or wise use of wetlands.
   (c) Ecosystem maintenance including:
      i) effect of proposal on food chains.
      ii) Nutrient cycles.
      iii) Aquifer recharge, water run-off rates etc.
      iv) Areal extent of habitants.
      v) Fragile ecosystems.

2. Social considerations including:
   i) effects of proposal on generation or reduction of employment in the area.
   ii) social cohesion or disruption.
   iii) effect on human health.
   iv) immigration or emigration.
   v) communication - roads opened up, closed, re-routed.
   vi) local economy.
   vii) effects on culture and objects of cultural value.

3. Landscape:
   i) views opened up or closed.
   ii) visual impacts (features, removal of vegetation, etc.)
   iii) compatibility with surrounding area.
   iv) amenity opened up or closed, e.g. recreation possibilities.

4. Land Uses:
   i) effects of proposal on current land uses and land use potentials in the project area.
   ii) possibility of multiple use.
   iii) effects of proposal on surrounding land uses and land use potentials.

Source: 1998 The Environmental Impact Assessment Regulation, Section 14 and First Schedule.
Uganda Investment Authority’s Investment Appraisal Criteria

| (a) Generation of new earnings or savings of foreign exchange through exports, resource-based import substitution or service activities; |
| (b) Utilization of local materials, supplies and services; |
| (c) Creation of employment opportunities; |
| (d) Introduction of advanced technology or upgrading of indigenous technology; |
| (e) Contribution to locally or regionally balanced socioeconomic development; or |
| (f) Any other objectives that the UIA considers relevant. |

Appendix 2: CDM Project Cycle

The first step in the CDM project cycle is (1) Project Design, which entails the development of a document known as project idea note (PIN) prior to the development of the more detailed Project Design Document (PDD). The PDD needs to be based on an approved CDM baseline and monitoring methodology. A methodology for the environmental and socio-economic assessment of a CDM project’s impact is not prescribed in the approved methodologies. Rather, these issues are to be addressed on a case by case basis in the PDD, where it is required as Section E-Environmental Impacts, Section F-Socio-Economic Impacts (CDM afforestation and reforestation projects only) and Section G-Stakeholder Comments, and as per the approval process by the host country’s Designated National Authority (DNA).

Upon completion, the draft PDD is sent to the host country’s DNA for (2) National Approval. This entails a preliminary evaluation of whether a project will mitigate emissions and whether the proposed project meets criteria for sustainable development and confirms whether an EIA, if necessary, has been successfully carried-out. National approval comes in the form of a Letter of Approval being granted by the DNA. Also at this stage project proponents are required to seek stakeholder comments, which are incorporated into the finalized PDD. If approved by the DNA, the finalized PDD, including the DNA’s Letter of Approval and the stakeholder comments, is passed on for (3) Validation.

Validation is performed independently by a third-party Designated Operational Entity (DOE) in order to assess if all the components of the PDD are satisfactory, including the Letter of Approval from the DNA. The DOE is required to make the validated project available for stakeholder comments for a 30-day period on the UNFCCC website. If successful, the project is then passed on to the CDM Executive Board for (4) Registration. To do so, the CDM Executive Board appoints a Registration and Issuance Team to appraise the request for registration. This appraisal should be achieved within eight weeks, after which time the project is deemed registered on the UNFCCC website.

With the PDD registered, a CDM project can then be officially implemented. In order to ensure the project meets the conditions of the PDD, it requires (5) Monitoring. This entails the systematic review of net GHG removals achieved during the course of the project.
results are inspected periodically by a second DOE during the course of the CDM project’s crediting period: (6) Verification. It should be noted that for normal CDM projects, a second DOE—a different DOE than the one that validated the project—is required for verification. The next step is (7) Certification, when the DOE submits a formal written confirmation that the emission reductions set out in the verification report were actually achieved, constituting a request for (8) Issuance of the carbon credits (Certified Emission Reductions, CERs) by the CDM EB. Up until this point, the actual carbon credits—CERs—do not exist; they are a commodity that is issued only by the CDM Executive Board. There may be more or fewer carbon credits issued than originally envisioned in the PDD: the number of CERs issued is dependent on actual project performance, as captured by the monitoring and verification regime. The last step is (9) Forwarding, when the CDM registry administrator transfers CERs from the CDM Executive Board’s pending account into the accounts of the project participants.

Figure 52: CDM Project Cycle
## Appendix 3: Economic, social and development indicators

Table 45: Economic, social and development indicators in Tanzania, Uganda and Moldova

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>UNITS</th>
<th>TANZANIA</th>
<th>UGANDA</th>
<th>MOLDOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ECONOMIC INDICATORS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP per capita, Atlas method (current USD)</td>
<td>USD</td>
<td>500</td>
<td>470</td>
<td>1,570</td>
</tr>
<tr>
<td>GDP growth rate 1998-2008</td>
<td>%</td>
<td>7.0</td>
<td>5.2</td>
<td>6.9</td>
</tr>
<tr>
<td>Foreign Direct Investment % GDP (2009)</td>
<td>%</td>
<td>1.9</td>
<td>5.3</td>
<td>2.7</td>
</tr>
<tr>
<td>Net ODA Received % GDP (2009)</td>
<td>%</td>
<td>13.8</td>
<td>11.5</td>
<td>4.2</td>
</tr>
<tr>
<td>Total debt service (% of GNI)</td>
<td>%</td>
<td>0.8</td>
<td>0.5</td>
<td>6.8</td>
</tr>
<tr>
<td>Services % of GDP (2009)</td>
<td>%</td>
<td>46.9</td>
<td>49.5</td>
<td>77.0</td>
</tr>
<tr>
<td>Agriculture % GDP (2009)</td>
<td>%</td>
<td>28.8</td>
<td>24.7</td>
<td>10.0</td>
</tr>
<tr>
<td>Remittances % GDP (2009)</td>
<td>%</td>
<td>0.1</td>
<td>5.0</td>
<td>31.3</td>
</tr>
<tr>
<td>Exports % GDP (2009)</td>
<td>%</td>
<td>23.2</td>
<td>23.7</td>
<td>36.9</td>
</tr>
<tr>
<td>Tax Revenue % GDP (2008)</td>
<td>%</td>
<td>0.15</td>
<td>0.13</td>
<td>0.20</td>
</tr>
<tr>
<td>Poverty gap at $2 a day (PPP) (%) (2007)</td>
<td>%</td>
<td>47.5</td>
<td>33.7</td>
<td>1.3</td>
</tr>
<tr>
<td>Population Density (2009)</td>
<td>pop per km²</td>
<td>49.1</td>
<td>162.0</td>
<td>124.1</td>
</tr>
<tr>
<td>Rural Population Density (2009)</td>
<td>rural pop per km²</td>
<td>322.1</td>
<td>426.0</td>
<td>114.8</td>
</tr>
<tr>
<td>Growth rate 1998-2008</td>
<td>%</td>
<td>2.9</td>
<td>3.3</td>
<td>-0.1</td>
</tr>
<tr>
<td>% Rural Populations</td>
<td>%</td>
<td>74.0</td>
<td>86.9</td>
<td>58.5</td>
</tr>
<tr>
<td>Total Population</td>
<td>million</td>
<td>45.0</td>
<td>33.8</td>
<td>3.6</td>
</tr>
<tr>
<td><strong>SOCIAL INDICATORS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life expectancy (2009)</td>
<td>years</td>
<td>56.3</td>
<td>53.4</td>
<td>68.6</td>
</tr>
<tr>
<td>Infant mortality(2009)</td>
<td>per '000</td>
<td>68.4</td>
<td>79.4</td>
<td>14.6</td>
</tr>
<tr>
<td>Adult literacy (2009)</td>
<td>%</td>
<td>72.9</td>
<td>73.2</td>
<td>98.5</td>
</tr>
<tr>
<td><strong>DEVELOPMENT INDICATORS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Development Index (2010)†</td>
<td>index (rank)</td>
<td>0.398 (148)</td>
<td>0.422 (143)</td>
<td>0.623 (99)</td>
</tr>
<tr>
<td>Country Policy and Institutional AssessmentΩ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Economic Management (2010)</td>
<td>index</td>
<td>4.2</td>
<td>4.3</td>
<td>3.7</td>
</tr>
<tr>
<td>-Structural Policies (2010)</td>
<td>index</td>
<td>3.8</td>
<td>3.8</td>
<td>3.8</td>
</tr>
<tr>
<td>-Policies for Social Inclusion/Equity (2010)</td>
<td>index</td>
<td>3.7</td>
<td>3.7</td>
<td>4.0</td>
</tr>
<tr>
<td>-Public Sector Management Institutions (2010)</td>
<td>index</td>
<td>3.3</td>
<td>3.2</td>
<td>3.4</td>
</tr>
<tr>
<td>Worldwide Governance Indicators (2009)†</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Voice &amp; Accountability</td>
<td>index</td>
<td>43.1</td>
<td>32.7</td>
<td>38.9</td>
</tr>
<tr>
<td>-Political Stability/No Violence</td>
<td>index</td>
<td>47.6</td>
<td>15.1</td>
<td>27.8</td>
</tr>
<tr>
<td>-Government Effectiveness</td>
<td>index</td>
<td>39.0</td>
<td>33.8</td>
<td>35.7</td>
</tr>
<tr>
<td>-Regulator Quality</td>
<td>index</td>
<td>38.1</td>
<td>46.7</td>
<td>48.1</td>
</tr>
<tr>
<td>-Rule of Law</td>
<td>index</td>
<td>40.1</td>
<td>40.6</td>
<td>39.2</td>
</tr>
<tr>
<td>-Control of Corruption</td>
<td>index</td>
<td>40.5</td>
<td>21.4</td>
<td>26.2</td>
</tr>
<tr>
<td>International Property Rights Index (2011)‖</td>
<td>index</td>
<td>5.1</td>
<td>4.6</td>
<td>3.9</td>
</tr>
<tr>
<td>Corruption Perceptions Index (2010)***</td>
<td>index</td>
<td>2.7</td>
<td>2.5</td>
<td>2.9</td>
</tr>
<tr>
<td>Democracy Index (2010)†</td>
<td>index</td>
<td>5.6</td>
<td>5.1</td>
<td>6.3</td>
</tr>
<tr>
<td>BTI Political Transformation Index (2012)‡‡</td>
<td>index</td>
<td>6.30</td>
<td>6.70</td>
<td>7.05</td>
</tr>
<tr>
<td>BTI Economic Transformation Index (2012)‡‡</td>
<td>index</td>
<td>4.89</td>
<td>5.79</td>
<td>5.43</td>
</tr>
<tr>
<td>BTI Management Index (2012)‡‡</td>
<td>index</td>
<td>5.38</td>
<td>5.82</td>
<td>5.39</td>
</tr>
</tbody>
</table>

Figure 53: Comparative Economic Trends

C) Tax Revenue as % GDP

D) GDP per capita (current US$)

E) FDI net inflows (% of GDP)

F) Poverty gap at $2 a day (PPP) (%)

G) Exports of goods and services (% of GDP)

H) Agriculture, value added (% GDP)

I) Total debt service (% of GNI)

J) Net ODA received (% of GNI)

Source for all figures: World Bank (2011)
Appendix 4: Household and Village Surveys

Household Survey

Household Questionnaire No:

Region_________________ District_________ Ward________ Village________ Su

Interviewer ___________________________________ Code _________ Checked by

____________________

JFM / CBFM / CDM Project nearby? Start time: _____:_____ Date: ____/____/____

Good morning/afternoon, my name is ...... and I am from the Makerere University where I am working with Mark Purdon of the University of Toronto, Canada. We are conducting a survey to better understand rural development in your area. We would like to administer this survey to an adult in your household who participates in the household’s decision-making. Are you someone with this role in your household? [IF ANSWER IS NO, ASK FOR SOMEONE WHO DOES PARTICIPATE IN THE HOUSEHOLD’S DECISION-MAKING]

We are conducting this survey for research purposes only and all information will be retained by Mark Purdon at the University of Toronto, Canada. All information will be kept strictly confidential. Most of your responses will be written down on paper, but some parts of the discussion will be recorded. Are you comfortable with this format?

SECTION 1: BASIC HOUSEHOLD INFORMATION

First we would like to ask you some basic questions about your household.

1. Name of Interviewee?____________________________________________________________________________


3. Can I ask your age? ________years

4. What is your marital status? _______________________

5. How many people live in your house? By this we mean, how many people eat and sleep in this household regularly?

_____________ people

6. How many of these people in your household are male/female and whether children, working age adults, or elderly/retired? [INTERVIEWER: THE NUMBER OF PEOPLE IN THE TABLE MUST EQUAL THE RESPONSE FOR QUESTION 6]

<table>
<thead>
<tr>
<th></th>
<th>Children 0-6 years</th>
<th>Schooling age 7-18 years</th>
<th>Working age adults 19-60</th>
<th>Elderly/Retired 65-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men/boys</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women/ girls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. How many of the persons above are attending school? [INDICATE IN THE BOX ABOVE NEXT TO THE HOUSEHOLD ROSTER]

8. Over the past 12 months, how much have you spent on education for members of your household?
   a. ________________ Ush   / Refuses to answer [92] / Doesn’t know [91]
SECTION 2: EMPLOYMENT

9. What is the main occupation for your household. If you were to describe the way your household earns its living, what would it be?
   a. Main occupation ____________________________________________
   b. Secondary Occupation _______________________________________

10. Have you looked for additional paid work during the past 7 days? Yes [1]  No [0]

11. If No, why not? _______________________________________________________________________________________

Now I’d like to ask you about your main occupation:

12. For whom do you work? _____________________________________________________________________________________

13. How far from your dwelling do you need to travel for your main occupation? _______ km / min / hour

14. For how many days over the past 7 days did you work at your main occupation? _____ days

15. For how many months over the past 12 months did you work at your main occupation? _____ months

16. Is this work seasonal? Yes [1]  No [0]  

17. Does someone pay you for this work? Yes [1]  No [0]

18. How often are you paid? _______ months / weeks

19. How much was your last pay? _______ Ush

20. Are taxes deducted from the payment you receive? _____________________________________________________________________________________

21. When you started this work, did you sign a formal contract? _____________________________________________________________________________________

22. Have you received payment in the form of goods or services instead of money? Yes [1]  No [0]

23. Which goods or services? _____________________________________________________________________________________

24. Have you used tools or equipment of your own for this work? If Yes, then describe: _____________________________________________________________________________________

25. If you wanted to sell these tools or equipment today, how much would you get for them? _______ Ush

Now I’d like to ask you about your secondary occupation:

26. For whom do you work? _____________________________________________________________________________________

27. How far from your dwelling do you need to travel for your secondary occupation? _______ km / min / hour

28. For how many days over the past 7 days did you work at your secondary occupation? _____ days

29. For how many months over the past 12 months did you work at your secondary occupation? _____ months

30. Do you work on your secondary occupation at the same time as your main occupation? Yes / Often / Sometimes / No

31. Is this work seasonal? Yes [1]  No [0]

32. Does someone pay you for this work? Yes [1]  No [0]

33. How often are you paid? _______ months / weeks

34. How much was your last pay? _______ Ush

35. Are taxes deducted from the payment you receive? _____________________________________________________________________________________
36. When you started this work, did you sign a formal contract? ______________________________________________________

37. Have you received payment in the form of goods or services instead of money? Yes [1] No [0]

38. Which goods or services? __________________________________________________________

39. Have you used tools or equipment of your own for this work? If Yes, then describe __________________________________________________________

40. If you wanted to sell these tools or equipment today, how much would you get for them? _____ Ush

SECTION 3: LAND

41. What is your land tenure system?

_______________________________________________________________________________

42. How much agricultural land do you control? This is land you and your family can use forever and decide what crops are planted. __________ hectares

43. Do you measure your land in hectares (ha) or acres? __________

44. How many hectares are agricultural land? __________ ha

45. How many hectares are fallow? __________ ha
   a. How long is your fallow period? __________ years
   b. Why have you left this land fallow? ____________________________________________

46. How many hectares are uncultivated land? __________ ha
   a. In what condition is this uncultivated land in? grassland / wetland / dryland /

47. How many hectares are forested? __________ ha

48. What is the tenure status of your land? ____________________________

49. Do you OWN the land or are you a TENANT? Own [1] Tenant [0]

50. How did you first acquire your land?

51. Do you have any documentation that can prove that you are OWNER/TENANT of your land? Yes [1] No [0]
   a. If Yes, what type of document is it?

   b. If No,
      i. Why do you not have such documentation?

      ii. Would you like to get such documentation?

If TENANT:

52. Do you pay rent to a landlord? Yes [1] No [0]
   a. If Yes
      i. How much rent do you pay? __________ Ush per month/year
      ii. Who is your landlord?

      iii. Where does your landlord live?
53. Are you seeking to gain your own title and become owner of the land you are using?  
Yes [1]  No [0]  
   a. If Yes, how much would you be willing to pay __________ Ush

If OWNER:

54. Do members of your household have the right to sell land being used by your household?  
Yes [1]  No [0]

55. Have you sold any land over the past 12 months?  
   a. If Yes:  
      i. How much land did they sell? __________ ha  
      ii. What type of land did the sell? ________________________________  
      iii. How much did they receive? ________ Ush  
   b. If No: if you did want to sell, how much would you be able to receive if you sold one hectare of:  
      i. Farmland_________Ush  
      ii. Fallowland_________Ush  
      iii. Uncultivated Land_________Ush  
      iv. Forest Land_________Ush

56. Do you have any tenants on your land?  
   a. If Yes:  
      i. How much land is used by tenants?_______ha  
      ii. How many tenants?______________  
      iii. Do they pay any rent? If so, how much?______Ush

For either TENANT/OWNER:

57. Has any member of your household GIVEN land to anyone who is not a member of your household as a gift over the past 12 months?  
Yes [1]  No [0]

58. Has any member of your household RECEIVED land from someone who is not a member of your household as a gift over the past 12 months?  
Yes [1]  No [0]

59. Have you had any disputes with others regarding your land over the past 12 months?  
Yes [1]  No [0]  
   a. What type of dispute?  
      • Inheritance  
      • Boundaries  
      • Land Sales  
      • Trespass  
      • Other  
      • Encroachment  
      • User Rights  
      • Illegal Settlement  
      • Evictions  

60. Where do you go to have such disputes settled?________________________________________________________

61. Are there any current disputes with neighbouring villages? If so, what are these about?__________________________

______________
SECTION 4: AGRICULTURAL ACTIVITIES

62. What are the main crops of your most recent harvest?
   a. ______________  c. ______________
   b. ______________  d. ______________

63. What is the unit of measurement used for crops? 1 ___________ = ___________ kg

64. With regard to the main crops of your last harvest…

<table>
<thead>
<tr>
<th>Crop A</th>
<th>Crop B</th>
<th>Crop C</th>
<th>Crop D</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. How many hectares of [crop] were harvested in the most recent harvest?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. How many kilos/sacks of [crop] were harvested?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. How much of [crop] of the last harvest were kept for household consumption?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. How many kilos/sacks of [crop] were sold from the last harvest?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. What price did you receive for a sack of [crop] after the most recent harvest?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. How much could you sell a sack of [crop] at the previous harvest?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. How have the prices for [crop] been changing between harvests?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. Did you give away part of the harvest of [crop] as a gift?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Did you grow any other crops on the same field as [crop]?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>j. Did you grow any trees in the same field as [crop]?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>k. Which trees?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>l. Do you pay any tax on [crop]?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>m. How much is the tax that you paid on [crop] from your last harvest?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

65. If you have planted trees elsewhere on your land:
   a. Over how many hectares have you planted trees? ________________________________
   b. How many years ago were most of the trees planted? ________________________________
   c. Why type of trees? ____________________________________________________________

66. What are the most important benefits you get from trees planted on your own land? For example, do you use the forest to collect wood, animal fodder, medical plants, etc.

   a. __________________
   b. __________________
   c. __________________
   d. __________________

369
67. With regard to agricultural inputs and associated costs…

<table>
<thead>
<tr>
<th>Seeds Or Plantings</th>
<th>Chemical Fertilizer</th>
<th>Insecticide</th>
<th>Organic Manure</th>
<th>Hired Labour</th>
<th>Transport</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Did you use [input]?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. For which crops?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. How much did you spend (12 months)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Did you have to buy this [input]?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Did you get the [input] on credit?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Do you pay any tax on [input]?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. How much is the tax?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

68. Please indicate the number of various types of animals you own:

<table>
<thead>
<tr>
<th>Animal</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Cattle/cows</td>
<td></td>
</tr>
<tr>
<td>b. Pigs</td>
<td></td>
</tr>
<tr>
<td>c. Chickens</td>
<td></td>
</tr>
<tr>
<td>d. Goats or sheep</td>
<td></td>
</tr>
<tr>
<td>e. Donkeys</td>
<td></td>
</tr>
<tr>
<td>f. Horses</td>
<td></td>
</tr>
<tr>
<td>g. Ducks</td>
<td></td>
</tr>
<tr>
<td>h. Guinea fowl</td>
<td></td>
</tr>
<tr>
<td>i. Oxen</td>
<td></td>
</tr>
<tr>
<td>j. Other (specify)</td>
<td></td>
</tr>
</tbody>
</table>

69. Does your household have electricity? Yes [1] No [0]
   a. If Yes, how much did you pay for electricity last month? _______ Ush
70. Do you have a generator or solar power? Yes [1] No [0] If Yes, may I ask:
   a. What capacity is the generator/solar? _______ kWe
   b. How much fuel did it use over the past 7 days? _______ liters
   c. What type of fuel does it use? Petrol / Diesel / Other
   d. How much did you spend on fuel for the generator over the past 7 days? _______ Ush
   e. For how many hours do you use your generator per day? _______ hours
   f. For how many days did you use your generator over the past week? _______ days
71. Does anyone in your household have a vehicle? [CIRCLE AS MAY WHICH APPLY]: car / motorcycle / bicycle / tractor
72. If you were to go this week to the market, how long would it take you to get there?
Please estimate the quantities of these different FUELS that your household used over the past 7 days:

<table>
<thead>
<tr>
<th>Fuel</th>
<th>(a) Did you use this fuel in the past one week?</th>
<th>(b) About how much fuel did you use in the past one week?</th>
<th>(c) Did you: (1) Collect fuel from farm? (2) Collect fuel from fallow? (3) Collect from uncultivated land? (4) Collect fuel from forest? (5) Purchase fuel (Ush)?</th>
<th>(d) If you collected, how much would it have cost to purchase the same amount?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[SPECIFY UNITS]</td>
<td></td>
<td>[MULTIPLE ANSWERS OK]</td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>Fuelwood: living trees</td>
<td>Kg/ headloads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>Fuelwood: Dead branches &amp; logs on the ground</td>
<td>Kg/ headloads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>Charcoal</td>
<td>Kg/ bags</td>
<td>* How much does a bag weigh? _________________</td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>Dung</td>
<td>Kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td>Crop residues</td>
<td>Kg/ headloads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f)</td>
<td>Natural Gas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g)</td>
<td>Kerosene</td>
<td>Liters</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Where do you obtain your drinking water?
[Indoor Plumbing] [Pump] [Well] [River or Lake]

Is your house owned or rented?
[Owned] [Rented] [Other __________] ____________

  a. If Owned:
     a. How much money would you receive if you sold your house? ________Ush per

  b. If Rented:
     a. How much do you pay in rent? ________Ush per___________ month/year
     b. To whom do you pay the rent? ________________________________________________________________________

During an average month, about how much do you spend (in your household)?
Ush/month / Refuses to answer [92] / Doesn’t know [91]

During an average month, about how much do you spend on food?
Ush/month / Refuses to answer [92] / Doesn’t know [91]

How is your household food security situation?

  a. How often in a year are you short on food?

  b. Do you have any security foods?
____________________________________________________________________________________________
SECTION 6: OTHER INCOME

79. Does your household operate a business?  
Yes [1]  No [0]

80. What is the type of business that your household runs?  
___________________________________________________

81. For how many months over the past year has this business operated?  
________ months

82. Over the past 7 days, how much has this business received from sales?  
________ Ush

83. What were your main expenditures over the past week?
   a. ______________________________________________________
   b. ______________________________________________________

84. Does your business pay taxes?  
Yes [1]  No [0]
   a. If Yes, over the past 12 months, how much have you paid in taxes?  
________ Ush

85. Does your business own any of the following?
   a. Buildings?  
   b. Land?  
   c. Vehicles?  
   d. Tools and Equipment?  
   e. Other Assets?

86. Over the past year, has any member of your household RECEIVED money from others living elsewhere?  
Yes [1]  No [0]
   a. If Yes, how much?  
________ Ush

87. Over the past 12 months, has any member of your household SENT money from others living elsewhere?  
Yes [1]  No [0]
   a. If Yes, how much?  
________ Ush

88. Do you have any other additional sources of income which we haven’t covered?
   a. If Yes,
      i. What is additional source?  
      ii. How much income did you derive from this source over the past 12 months?  
________ Ush

89. What was your total household income last year? You can give us a range.
   a. __________ Ush / [Refuses to answer] / [Doesn’t know]

SECTION 7: FINANCE

90. From whom are you able to borrow money? [CIRCLE ALL THAT APPLY]
   • Bank
   • Cooperative
   • Relative Outside of Household
   • Other
   • Micro-Finance/NGO
   • Other Business
   • Friend Outside of Household
   • Individuals

91. If you were to borrow 10,000 shillings, how much would you have to repay in total, and after how long?
   a. __________ Total amount of Ush that would have to be repaid  
   [Refuses to answer] [Doesn’t Know]
b. ___________ Number of months after which total amount is repaid  [Refuses to answer]  [Doesn’t Know]

92. Are you required to give any security before getting the money?
   a. If YES, What type of security is required?  [Land]  [Household property]  [Written Agreement]  [Other______]

93. Have you been successful in obtaining such a loan? Why or why not?________________________________________________________

SECTION 8: NETWORKING

94. Are you member of an agricultural cooperative?  Yes [1]  No [0]
   a. How much agricultural land does the cooperative manage?______ha

95. Are you member of a forest cooperative?  Yes [1]  No [0]
   a. How large is the community forest?______ha

96. Are you member of any other social group such as a church, community group, NGO, sports team, club, etc.?  Yes [0]  No [1]
   a. If Yes, which one(s)
      i. Name:___________________  -->  Activity____________________________
      ii. Name:___________________  -->  Activity____________________________
      iii. Name:___________________  -->  Activity____________________________

97. How often do you travel to neighbouring villages?

98. How often do you travel to the town where the District Office is located?

99. How often do you travel to the city where the Regional Office is located?

SECTION 9: INFORMATION ON [CDM] PROJECT

Now we would ask you to think about the specific project near your village. This part of the survey will be held more as a discussion. Is it OK that my colleague records this part of the interview on his device? All information collected here will be kept strictly confidential:

100. How are land use decisions made in your community? What is the process?

101. Have you heard of anyone selling land in your community to someone outside of the community?

102. How secure is your village in your land tenure? Can someone from government or a private company come and acquire your lands? What is the land acquisition process?


104. Where did you hear about the Land Act?
   Radio
   Notice Board
   Other

105. What specific things do you know about the Land Act, 1998?
106. Overall, in your opinion, has the [CDM] project been a success or not?
   a. Why did you give this answer?
107. Is the project contributing to sustainable development of your village?
108. Do you know who is promoting the project?
109. [For CDM] Were you explained about the carbon market by the CDM project proponent?
110. Can you tell us about the process by which land was acquired for the project?
111. Do you have any of the minutes from the meetings with the project developer? Can we have a copy?
112. Was the land acquisition process fair and transparent?
113. Did you have the right to say “No” to the project? What would have happened if you said “No”?
114. Were people displaced from their land for this project?
115. Do you know if the people who were displaced were adequately compensated?
116. Do you know how much the project developer paid to obtain the land for the project? Yes [1]
   No [0]
   a. If Yes, how much? _______ Ush
117. Do you know how the price paid for the land was determined?
118. In your opinion, how have the following changed since the project began?
   a. Village livelihoods in general
   b. Your household livelihood in particular
   c. Your households agricultural productivity
   d. Your household’s access to forest resources
   e. Quality of other forests around the village
   f. Social relations in the village
   g. Conflict over land within the village

374
h. Conflict over land between yours and another village
i. The frequency of illegal activities and crime in your village

119. Do you have an influence on policies for deciding how people can use land in the project area?

120. Do you help decide who the managers are of the project area?

121. How are the managers of the project chosen? Is this process democratic?

122. Are the managers of the project forest effective in controlling access and managing the project area?

123. Is there careful monitoring of the project area?

124. Are there any restrictions on use of the land in the project area?

SECTION 10: FINAL QUESTIONS

125. What is the highest level of education achieved by a member of your household [CIRCLE ONE]?

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>At least some primary</td>
<td>1</td>
</tr>
<tr>
<td>At least some secondary</td>
<td>2</td>
</tr>
<tr>
<td>At least some high school</td>
<td>3</td>
</tr>
<tr>
<td>Tertiary Diploma</td>
<td>4</td>
</tr>
<tr>
<td>Completed university</td>
<td>5</td>
</tr>
<tr>
<td>Master’s or Ph.D. degree</td>
<td>6</td>
</tr>
</tbody>
</table>

126. Have you had other technical or vocational training?

127. Have you ever operated a computer?

   a. If Yes, do you know how to use the Internet?
   b. If Yes, do you use email?
   c. If Yes, have you ever used a spreadsheet?

128. How long have you and your family and ancestors (e.g. mother, grandmother, great grandmother, father, grandfather, great grandfather) lived in this village? _______________________________ Years

129. May I ask in what region/district were you born? _______________________________

130. Have you lived anywhere else?

131. Do you or does anyone in your family hold any position in the community

   Village government (leader, chairman, secretary, ten cell leader etc) [1]
   Member of village environmental committee [2]
   Political party leader [3]
   Religious leader [4]
   Other (specify) _______________________________ [5]

"THANK YOU VERY MUCH FOR YOUR PARTICIPATION. YOUR COOPERATION WAS GREATLY APPRECIATED! DO YOU HAVE ANY QUESTIONS FOR US?"

SECTION 12: HOUSEHOLD PHYSICAL STATUS

132. Main construction material of outside walls? _____________
133. Main flooring material? _______________________
134. Main roofing material? _______________________
135. What are the windows fitted with? _____________
ENUMERATOR PLEASE COMPLETE

Time interview ended: ______________________
Household ID: ______ Village: _____________ Date: ___/___/____

Was the person nervous or irritated during the interview? Yes □ No □ Don't know □

Do you think the person made an effort to tell the truth? Yes □ No □ Don’t know □

Overall, how would you rate the quality of the interview? Very Good □ Good □ Fair □ Poor □ Don’t know □

Thank you for your cooperation!

Mark Purdon
PhD Candidate
mark.purdon@utoronto.ca
Village Survey

VILLAGE Questionnaire No

Region ___________________ District __________ Ward __________ Village ______________ Su

Interviewer ___________________________________________ Code __________ Checked by

__________________________

Start time: _____:_____ Date: ___/___/____

Good morning/afternoon, my name is ...... and I am from the Makerere University where I am working with Mark Purdon of the University of Toronto, Canada. We are conducting a survey to better understand how rural development in your area.

We are conducting this survey for research purposes only and all information will be retained by Mark Purdon at the University of Toronto, Canada. All information will be kept strictly confidential. Most of your responses will be written down on paper, but some parts of the discussion will be recorded. Are you comfortable with this format?

SECTION 1 : VILLAGE GENERAL CHARACTERISTICS

136. Village population?
   a. Number of individuals: ____________
   b. Number of individuals of working age: ____________
   c. Number of households: ____________
   d. Number of hamlets/subvillages ____________

137. Since 2005, have more new households moved to your village, or have there been more households that moved away? ______

138. What are the main economic activities in this village?

____________________________________________________________________________________

139. Which ethnic groups are present in the village?

____________________________________________________________________________________

140. Does your village have a Land Use Plan?

____________________________________________________________________________________

141. Is there a CDM Project/Any Large Land-Holder involving this community?

____________________________________________________________________________________

SECTION 2 : INFRASTRUCTURE

142. Is the road that comes to this village impassable at certain times of the year? At which times?

________________________
143. Do any of the households in this village have their own electricity? How many?

144. Is there a village generator? Or do the households who have electricity have their own generator?

145. Is there a post-office in this village?

146. Is there a dispensary or health clinic in the village?

147. Is there a PRIMARY school in this village? In what condition is it/are they in?

148. Is there a SECONDARY school in this village? In what condition is it/are they in?

149. What are the most serious schooling problems from the point of view of the people in this village?

SECTION 3: ECONOMY

150. What are the major crops planted by people in this village?
   a.  
   b.  
   c.  
   d.  

151. How have the prices for these crops fluctuated over the past year?

152. Is there any government program to control the price of agricultural commodities such as a marketing board?

153. How many farmers are using fertilizer, insecticide and purchased seeds?

154. Is there any government program to control the price of chemical fertilizer, insecticide and purchased seeds?
155. Are there any other government programs to promote rural development, either in the agricultural and non-agricultural sectors?

156. Are there any NGOs active in the village to promote rural development?

157. Is there a tractor in this village?

158. Is there a crop processing machine in this village?

159. Are there irrigated fields in this village?

160. Is there an AGRICULTURAL field officer in this village?
   a. If No, how often is the village visited by an AGRICULTURAL field officer?

161. Is there an FOREST field officer in this village?
   a. If No, how often is the village visited by an FOREST field officer?

162. How many markets are there around the village that are used by villagers?

163. How far are these markets from the village? \( \text{km / minutes / hours} \)

164. Which of the markets are most important for buying and selling:
   a. Agricultural products?
   b. Forest products?
   c. Buying household items?

165. Do any of the people in this village leave temporarily during certain times of the year to look for work elsewhere? If so, where?

SECTION 4: GOVERNANCE

166. Which government officials visit your community regularly?
   a. \( \text{How often?} \)
   b. \( \text{How often?} \)
   c. \( \text{How often?} \)

167. How is your community represented at the District Office?
168. **How are disputes resolved in the village?**

169. **What types of disputes cannot be resolved in the village and require intervention from the District Office?**

170. **How are these types of disputes normally usually resolved?**

171. **When you seek information or have a concern with a decision made at the DISTRICT level, who do you speak to?**

172. **Are there any current disputes with neighbouring villages?**

---

**SECTION 3: INFORMATION ON CDM PROJECT**

173. **How are land use decisions made in your community? What is the process?**

174. **Have you heard of anyone selling land in your community to someone outside of the community?**

175. **How secure is your village in your land tenure? Can someone from government or a private company come and acquire your lands? What is the land acquisition process?**

176. **Have you ever heard of the Land Act, 1998?**  
   Yes [1]  No [0]

177. **Where did you hear about the Land Act?**
   - Radio
   - Local Officials
   - Notice Board
   - Friends & Relatives
   - Other
   - Other Village Communication

178. **What specific things do you know about the Land Act, 1998?**
   a. ____________________________________________________________________________
   b. ____________________________________________________________________________
   c. ____________________________________________________________________________

179. **Overall, in your opinion, has the project been a success or not?**
   d. ____________________________________________________________________________

180. **Is the project contributing to sustainable development of your village?**
181. Do you know who is promoting the project?

182. [For CDM] Were you explained about the carbon market by the CDM project proponent?

183. Can you tell us about the process by which village land was acquired for the project?

184. Do you have any of the minutes from the meetings with the project developer? Can we have a copy?

185. Was the land acquisition process fair and transparent?

186. Did you have the right to say “No” to the project? What would have happened if you said “No”?

187. Were people displaced from their land for this project?

188. Do you know if the people who were displaced were adequately compensated?

189. Do you know how much the project developer paid to obtain the land for the project? Yes [1] No [0]
e. If Yes, how much? _______ Ush

190. Do you know how the price paid for the land was determined?

191. In your opinion, how have the following changed since the project began?
   f. Village livelihoods in general
   g. Your household livelihood in particular
   h. Your households agricultural productivity
   i. Your household’s access to forest resources
   j. Quality of other forests around the village
   k. Social relations in the village
   l. Conflict over land within the village
   m. Conflict over land between yours and another village
   n. The frequency of illegal activities and crime in your village

192. Do you have an influence on policies for deciding how people can use land in the project area?

193. Do you help decide who the managers are of the project area?
194. How are the managers of the project chosen? Is this process democratic?

195. Are the managers of the project forest effective in controlling access and managing the project area?

196. Is there careful monitoring of the project area?

197. Are there any restrictions on use of the land in the project area?

"THANK YOU VERY MUCH FOR YOUR PARTICIPATION. YOUR COOPERATION WAS GREATLY APPRECIATED! DO YOU HAVE ANY QUESTIONS FOR US?"

---

**ENUMERATOR PLEASE COMPLETE**

Time interview ended: ______________________

Village: ______________ Date: _____/____/____

Was the group nervous or irritated during the interview? Yes □ No □ Don't know □

Do you think the group made an effort to tell the truth? Yes □ No □ Don't know □

Overall, how would you rate the quality of the interview? Very Good □ Good □ Fair □ Poor □ Don't know □
## Appendix 5: Field Effort

### Table 46: Summary table of local level field effort

<table>
<thead>
<tr>
<th>Country</th>
<th>Village</th>
<th>Village Surveys</th>
<th>Household Surveys</th>
<th>Individual Interviews</th>
<th>Focus Groups</th>
<th>DatesVisited</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Local Govt</td>
<td>Private NGO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Private NGO</td>
<td>NGO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TANZANIA</td>
<td>Luhunga</td>
<td>1</td>
<td>26</td>
<td>12</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Mapanda</td>
<td>1</td>
<td>22</td>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Idete</td>
<td>1</td>
<td>25</td>
<td>10</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Ilpilimo</td>
<td>1</td>
<td>24</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Makunga</td>
<td>1</td>
<td>17</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Mtamba</td>
<td>1</td>
<td>24</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Magaruwe</td>
<td>1</td>
<td>24</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Endabash</td>
<td>1</td>
<td>24</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Bassodawish</td>
<td>1</td>
<td>27</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UGANDA</td>
<td>Kirungu</td>
<td>1</td>
<td>27</td>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Rwoho/RECPA</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Riverazi</td>
<td>1</td>
<td>29</td>
<td>12</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Biteroko Subcounty</td>
<td>1</td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>-Plan Vivo HHS</td>
<td>31</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Non-Plan Vivo HHS</td>
<td>30</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kagogwa</td>
<td>1</td>
<td>29</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOLDOVA</td>
<td>Sâlji</td>
<td>1</td>
<td>30</td>
<td>12</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Tocuz</td>
<td>1</td>
<td>29</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Ursale</td>
<td>1</td>
<td></td>
<td></td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Bursuceni</td>
<td>1</td>
<td>30</td>
<td>17</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Chiscareni</td>
<td>1</td>
<td>30</td>
<td>17</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Cotijenii-Mici</td>
<td>1</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prepelita</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>21</td>
<td>454</td>
<td>120</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
<td>4</td>
</tr>
</tbody>
</table>
Table 47: Summary table of district and national level key informant interviews

<table>
<thead>
<tr>
<th>DISTRICT/REGION</th>
<th>NGO</th>
<th>Govt</th>
<th>Private</th>
<th>NATIONAL</th>
<th>NGO</th>
<th>Govt</th>
<th>Donor</th>
<th>Private</th>
<th>Research</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>TANZANIA</td>
<td>4</td>
<td>10</td>
<td>6</td>
<td></td>
<td>6</td>
<td>7</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>39</td>
</tr>
<tr>
<td>UGANDA</td>
<td>1</td>
<td>8</td>
<td>3</td>
<td></td>
<td>3</td>
<td>10</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>34</td>
</tr>
<tr>
<td>MOLDOVA</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td>3</td>
<td>9</td>
<td>3</td>
<td>1</td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5</td>
<td>21</td>
<td>12</td>
<td></td>
<td>12</td>
<td>26</td>
<td>8</td>
<td>5</td>
<td>6</td>
<td>95</td>
</tr>
</tbody>
</table>

Table 48: Key Informant Interview Questions

**District-level**
- How are lands administered at the district level?
- How would you characterize the status of forests and bioenergy in the district? Are there many projects to address these issues?
- How successful has CDM project implementation been?
- How, if at all, was the CDM project administered at the district level?
- How has the CDM project affected the village and/or district economy?
- How would you characterize regional development in the district and district relations with the central government?

**National-level**
- What are the main priorities for climate change policy?
- Are Moldova’s priorities different from the donors?
- How is donor support for climate change coordinated?
- How far can Moldova proceed with its national adaptation programme without donor support?
- How is adaptation different from sustainable development?
- What are the implication of the global financial crisis for climate change mitigation? For adaptation?
- Will CDM additionality ever be resolved?
- Would we see greater action, domestically, on climate change mitigation on the part of industrialized countries if the CDM did not exist?
- How would you characterize the performance of the CDM? Are recent criticisms justified?
- What are the most serious bottlenecks in the CDM administrative process?
- How is the CDM coordinated with other government policies, particularly in the financial, energy and natural resource ministries?
- Is it possible that the CDM addresses adaptation as well as mitigation?
- Are there specific concerns with forest projects and other projects involving land?
- How can the concerns of local people be better incorporated into the CDM?
Appendix 6: Supplementary Socioeconomic Research Findings

Table 49: Average household land holding and land use across villages investigated in Tanzania, Uganda and Moldova

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>PROJECT</th>
<th>VILLAGE</th>
<th>n</th>
<th>SIZE LAND HOLDING**</th>
<th>DISTRIBUTION OF HOUSEHOLD LAND USE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Farm (ha)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(ha)</td>
</tr>
<tr>
<td>Tanzania</td>
<td>CDM Afforestation</td>
<td>Mapanda</td>
<td>22</td>
<td>3.2</td>
<td>54.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Luhunga (c)</td>
<td>24</td>
<td>7.0</td>
<td>38.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Idete</td>
<td>23</td>
<td>3.5</td>
<td>57.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ipiimo (c)</td>
<td>24</td>
<td>3.7</td>
<td>59.7</td>
</tr>
<tr>
<td></td>
<td>Biofuel</td>
<td>Mtamba</td>
<td>15</td>
<td>3.7</td>
<td>41.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Magarwe (c)</td>
<td>24</td>
<td>2.6</td>
<td>65.6</td>
</tr>
<tr>
<td></td>
<td>CDM</td>
<td>Endabash</td>
<td>24</td>
<td>1.5</td>
<td>77.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bassadawish (c)</td>
<td>27</td>
<td>3.2</td>
<td>76.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.4</td>
</tr>
<tr>
<td>Uganda</td>
<td>CDM Afforestation</td>
<td>Kirungu</td>
<td>27</td>
<td>1.0</td>
<td>91.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rwerazi (c)</td>
<td>29</td>
<td>2.0</td>
<td>92.0</td>
</tr>
<tr>
<td></td>
<td>Plan Vivo</td>
<td>Plan Vivo HHs</td>
<td>29</td>
<td>6.2</td>
<td>64.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control HHs (c)</td>
<td>30</td>
<td>2.1</td>
<td>90.5</td>
</tr>
<tr>
<td></td>
<td>CDM Bagasse</td>
<td>Kagogwa</td>
<td>25</td>
<td>0.6</td>
<td>70.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Tenant</td>
<td>11</td>
<td>0.3</td>
<td>80.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Owner</td>
<td>12</td>
<td>1.0</td>
<td>65.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.4</td>
</tr>
<tr>
<td>Moldova</td>
<td>CDM Afforestation</td>
<td>Săiţi</td>
<td>30</td>
<td>3.2†</td>
<td>93.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tocuz</td>
<td>29</td>
<td>1.8†</td>
<td>72.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bursuceni</td>
<td>30</td>
<td>3.2</td>
<td>69.4</td>
</tr>
<tr>
<td></td>
<td>CDM Afforestation &amp;</td>
<td>Chiscareni</td>
<td>30</td>
<td>1.2</td>
<td>93.8</td>
</tr>
<tr>
<td></td>
<td>Bioenergy Pilot</td>
<td></td>
<td></td>
<td></td>
<td>2.4</td>
</tr>
</tbody>
</table>

† Pine tree planting  
†† Eucalyptus tree planting  
* Omitting Agricultural Leaders (370 ha and 300 ha in Săiţi and Tocuz, respectively)  
** Independent samples t-test between each village pairings found no significant differences in mean land holding: Mapanda/Luhunga: t(29.8) = -1.66, p = 0.108; Idete/Ipiimo: t(45) = 0.158, p = 0.875; Mtamba/Magarwe: t(37) = 1.12, p = 0.272. An additional independent samples t-test to account for unequal sample sizes between Mtamba and Magarwe also found no significant difference in mean land holding (Mtamba/Magarwe: t(28) = 0.783, p = 0.440). Finally, independent samples t-test did not find mean land holding significantly different between the four villages investigated in the context of the afforestation projects significantly higher than in the two biofuel villages, though there was a trend towards larger landholdings amongst the afforestation projects (MAforest = 4.5 ha/HH, MBiofuel 3.0 ha/HH, t(129.9) = 1.75, p =0.083)
Table 50: Agricultural productivity and input use across across villages investigated in Tanzania, Uganda and Moldova

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>PROJECT</th>
<th>VILLAGE</th>
<th>LAND HOLDING</th>
<th>AGRICULTURAL PRODUCTIVITY</th>
<th>INPUT USE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>ha</td>
<td>kg/ha</td>
<td>Seeds</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maize†</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cassava††</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Banana††</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wheat</td>
<td>%</td>
</tr>
</tbody>
</table>

| Tanzania | CDM Aforestation | Mapanda  | 7.0           | 823                        | 41        | 23                  | 82          | 32            | 50          | 5        |
|          |                  | Luhunga  | 3.2           | 913                        | 31        | 46                  | 73          | 27            | 23          | 27       |
|          |                  | Idete    | 3.5           | 1,329                      | 30        | /                   | /           | /             | 35          | /        |
|          |                  | Ipilimo  | 3.7           | 1,185                      | 58        | 29                  | 71          | 58            | 54          | 54       |
|          | CDM Biofuel      | Mtamba   | 3.7           | 645                        | 6         | /                   | /           | /             | 13          | /        |
|          |                  | Magaruwe | 2.6           | 438                        | 42        | /                   | /           | /             | 13          | /        |
|          |                  | Endabash | 1.5           | 1,422†                     | 92        | 4                   | 21          | 79            | 50          | 25       |
|          |                  | Bassodawish | 3.2         | 46                         | 56        | /                   | 7           | 56            | 22          | 4        |
| Uganda   | CDM Aforestation | Kirungu  | 1.0           | 918                        | 48        | /                   | 4           | 8             | 40          | /        |
|          |                  | Rwerazi  | 2.0           | 687                        | 10        | /                   | /           | /             | 28          | /        |
|          | CDM Biofuel      | Plan Vivo| 6.2           | 1102                       | 30        | 10                  | 7           | /             | 27          | /        |
|          |                  | PV Control| 2.1           | 973                        | 33        | /                   | 3           | 3             | 20          | /        |
|          | CDM Bagasse      | Kagogwa  | 0.6           | 1,018                      | 69        | 3                   | 17          | 7             | /           | /        |
| Moldova  | CDM              | Săiți     | 3.2           | 4,000                      | 92        | 92                  | 77          | /             | 85          | 88       |
|          | Aforestation     | - Agri Leader | /              | 2,700                      | /         | /                   | /           | /             | /           | /        |
|          |                  | - Tocuz   | 1.8           | 2,339                      | /         | /                   | /           | /             | /           | /        |
|          |                  | - Bursuceni| 3.2           | 2,367                      | /         | /                   | /           | /             | /           | /        |
|          | CDM Biofuel      | - Agri Leader | /              | 4,000                      | /         | /                   | /           | /             | /           | /        |

*Independent samples t-tests between each village pairing found no significant differences in mean maize productivity: Mapanda/Luhunga: t(34.2) = -0.607, p = 0.548; Idete/Ipilimo: t(44) = 0.430, p = 0.669; Mtamba/Magaruwe: t(16) = 0.65, p = 0.525. An additional independent samples t-test to account for unequal sample sizes between Mtamba and Magaruwe also found no significant difference (Mtamba/Magaruwe = 15: t(12) = 0.088, p = 0.931). However, independent samples t-test found mean maize productivity between the four villages investigated in the context of the afforestation projects significantly higher than in the two biofuel villages (MAfforestation = 1067 kg/ha, MBiofuel = 541 kg/ha, t(106) = 2.36, p = 0.020).††* Independent samples t-test between Mtamba and Magaruwe found no significant differences in mean cassava productivity: t(7.2) = 1.71, p = 0.106. An additional independent samples t-test to account for unequal sample sizes between Mtamba and Magaruwe also found no significant difference in mean cassava productivity (Mtamba/Magaruwe = 15: t(25) = 1.31, p = 0.201).†††Annual banana productivity was estimated from monthly bunch production, multiplied by 12 months and assuming that 1 bunch = 10 kg. Wairegi et al. (Wairegi et al., 2007) observed average bunch weights to fall within 9.8 to 11 kg. in southern Uganda. *Crop productivity in Endabash does not reflect the effects of drought in late 2008 and early 2009. Agricultural productivity in Endabash likely reflects harvests made prior to the drought of later 2008/2009; otherwise, they would have been expected to be similar to agricultural productivity in Bassodawish where data was gathered in August 2009 when the effect of the drought was observable.
Table 51: Household economic characteristics across villages in Tanzania, Uganda and Moldova

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>PROJECT</th>
<th>VILLAGE</th>
<th>HOUSEHOLD FINANCES</th>
<th>LIVESTOCK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Monthly</td>
<td>Cattle*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Expenditures</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>% Expend on Food</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>USD</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>%</td>
<td>USD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>CDM</td>
<td>Mapanda</td>
<td>$46 USD</td>
<td>67%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Luhunga</td>
<td>$50 USD</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Idete</td>
<td>$26 USD</td>
<td>38%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Iplimo</td>
<td>$29 USD</td>
<td>59%</td>
</tr>
<tr>
<td></td>
<td>Biofuel</td>
<td>Mtamba</td>
<td>$147 USD</td>
<td>68%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Magarwae</td>
<td>$72 USD</td>
<td>46%</td>
</tr>
<tr>
<td></td>
<td>CDM</td>
<td>Endebash</td>
<td>$46 USD</td>
<td>51%</td>
</tr>
<tr>
<td></td>
<td>Cookstove</td>
<td>Bassodawish</td>
<td>$92 USD</td>
<td>57%</td>
</tr>
<tr>
<td>Uganda</td>
<td>CDM</td>
<td>Kirungu</td>
<td>$16 USD</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>Afforestation</td>
<td>Rwerazi</td>
<td>$26 USD</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>Plan Vivo</td>
<td>Plan Vivo Participants</td>
<td>$45 USD</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PV Control</td>
<td>$18 USD</td>
<td>71%</td>
</tr>
<tr>
<td></td>
<td>CDM Bagasse</td>
<td>Kagogwa</td>
<td>$64 USD</td>
<td>54%</td>
</tr>
<tr>
<td></td>
<td>Cogeneration</td>
<td>- Tenant</td>
<td>$33 USD</td>
<td>77%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Owner</td>
<td>$84 USD</td>
<td>46%</td>
</tr>
<tr>
<td>Moldova</td>
<td>CDM</td>
<td>Sâiți</td>
<td>$2,527 USD</td>
<td>31%</td>
</tr>
<tr>
<td></td>
<td>Afforestation</td>
<td>Tocuz</td>
<td>$2,045 USD</td>
<td>57%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bursuceni</td>
<td>$2,934 USD</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>CDM Afforestation &amp; Bioenergy Pilot</td>
<td>Chiscareni</td>
<td>$2,327 USD</td>
<td>40%</td>
</tr>
</tbody>
</table>

† Household expenditures and income in Moldova include households receiving remittances from abroad.

* Independent samples t-test between each village pairing found no significant differences in mean cattle possession: Mapanda/Luhunga: t(46) = 0.562, p = 0.577; Idete/Iplimo: t(40.7) = -1.63, p = 0.111. Mean cattle possession was significantly higher amongst afforestation villages than biofuel villages (results not shown).

** Independent samples t-test between each village pairing found no significant differences in mean pig possession between Mapanda/Luhunga (t(46) = -0.420, p = 0.676). Mean pig possession was significantly higher in Iplimo compared to Idete (t(25.3) = -3.07, p = 0.005) and amongst afforestation villages relative to biofuel villages(results not shown).

*** Independent samples t-test between each village pairing found no significant differences in mean goat/sheep possession: Mapanda/Luhunga: t(25.5) = -1.05, p = 0.306; Idete/Iplimo: t(31.8) = -1.32, p = 0.198; Mtamba/Magaruwe: t(32) = 0.536, p = 0.596. Mean sheep/goat possession was significantly higher amongst afforestation villages than biofuel villages (results not shown).
### Table 52: Village land use designation across four villages in Moldova

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>VILLAGE</th>
<th>VILLAGE LAND USE (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total Lands</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation</td>
<td>Săiți</td>
<td>2,933</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tocuz</td>
<td>3,820</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bursuceni</td>
<td>2,733</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDM Afforestation &amp; Bioenergy Pilot</td>
<td>Chiscareni</td>
<td>5,970</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moldova CDM</td>
<td>Ursoaie</td>
<td>2,860</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cargo</td>
<td>2,600</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Of the 150 ha of afforested lands in Bursuceni, approximately 90-120 ha afforested for the CDM project.
Figure 54: Occupation across villages investigated in Tanzania, Uganda and Moldova

A) Occupations across four villages investigated for Tanzania CDM afforestation project

B) Occupations across two villages investigated for Tanzania biofuel project

C) Occupations across two villages investigated for Tanzania CDM cookstove project

D) Occupations across two villages investigated for Uganda CDM afforestation project
E) Occupations across Uganda Plan Vivo participants and control group in Bitereko subcounty

F) Occupations in Kagogwa village investigated for Uganda CDM cogeneration project

G) Occupations across four villages in Moldova
Appendix 7: 2008 Contract Between Green Resources and Idete village in Tanzania CDM Afforestation Project

– GREEN RESOURCES LTD –

Agreement on Project Participation in Idete Reforestation Project between

GREEN RESOURCES LIMITED, GREEN RESOURCES AS OF NORWAY

AND

IDETE VILLAGE OF MUFINDI DISTRICT, IRINGA REGION

In support of Tanzania development goals enshrined in the national strategy for growth and poverty reduction (MKUKUTA), the property and business formalization programme (MKURABITA), the millennium development goals and other government development policies, Green Resources Limited undertakes to partner with Idete Village to develop a CDM project with the Idete Forest Project on the following terms and conditions:

1) Green Resources Ltd has developed a carbon credit project based on Clean Development Mechanism methodology (CDM) within the UNFCCC framework. The project located within the Idete Forest Project aims at reducing threats due to climate change by establishing a sustainably managed forest that will capture CO₂ from the atmosphere.

2) The carbon credits will be generated from the 11,000 ha Idete Reforestation Project located in Kiyowela and Mukungu Ward, of which 6,495 ha of the land is plantable.

3) While Idete Village will be a participant in the project, Green Resources Limited will take full responsibility for the development, communication and all costs related to the carbon credit project.

4) Idete Village as a participant in the project will benefit from capacity building in the establishment of farm forests and towards that end will receive technical support and seedlings for planting on individually owned plots.

5) The village will receive 10% of the gross revenues generated from sale of carbon credits from the project less withholding tax and any other fees and levies that may be imposed by the government. The project will also create employment opportunities for the village.

6) The carbon revenues due to Idete Village shall in particular benefit the village but also other villages located around the project. The funds shall be used for community projects and social infrastructure such as school buildings, dispensaries, village offices, road, bridges and provision of clean drinking water.

7) The village government shall provide to the management of Green Resources Ltd a list of prioritized development projects to be undertaken using revenues from sale of carbon credits. Green Resources Ltd shall distribute funds directly to the project suppliers and contractors within the approved budgets and present audited accounts at the completion of each project.

8) Separately, Green Resources AS undertakes to re-invest all the revenues generated from sale of carbon credits within Tanzania and in particular the region around the project.

9) In return, Idete Village shall be expected to support the CDM project in all reasonable ways including protection of for forest and especially fighting grass and forest fires that may threaten the project and obtaining the required regulatory approvals of the project.
10) There shall be quarterly meetings between Idete Reforestation Project and Idete Village Government to discuss important issues related to the development of the project.

11) Green Resources Ltd shall provide an annual report to the village, ward and district representatives covering project development and carbon credit revenues for the year. This report will be presented within three months of the close of every calendar year. The village government shall in the same meeting present their prioritized list of activities and the funds shall be distributed over the following nine months.

12) It is estimated that 161,000 tons of carbon credits will be generated by 2012 and that two million tons of carbon credits will be generated by 2025. Green Resources has indications that if the projects is approved as a CDM project by the UNFCCC Executive Board and the Tanzanian Designated National Authority, the project can obtain revenues of 4 Euro per ton. Based on this, the villages with the reforestation project should be in a position to receive more than Tsh 1 billion for community projects over the 17 years life of the project. It is to be noted however that no sales of carbon credits will be made before 2012 and sales will be dependent on certification of emission reductions under the CDM rule as well as the development of a future international emissions reductions agreement to replace the Kyoto Protocol post-2012.

13) Any disagreements about the interpretations of this agreement shall be resolve by arbitration conducted by three arbitrators, one appointed by the District Commissioner Mufindi, one by the Norwegian Embassy in Dar es Salaam and the third one jointly agreed by the two arbitrators.

Signed this 21 day of November 2008

Managing Director, Green Resources Ltd

Development Director, Green Resources AS

Chairman, Idete Village

District Executive Director, Mufindi District

CC: District Commissioner, Mufindi District

---

Note: a copy of this agreement was only delivered to Idete Village Council in February 2009.
Appendix 8: Supplementary Data for Uganda CDM Cogeneration Project

Financial Additionality Information

Total ex-ante emission reductions over the CDM crediting period of 2008-2014 as presented in the CDM project document estimate 378,793 tCO₂e of carbon credits (CDM-PDD, 2007b: 24-25). This is based on the export of 12-14 MW to Uganda’s national grid per year. The historical financial emissions baseline of 5-7 MW exported to the national grid per year was estimated at half the claimed emission reductions per year over the 2008-2014 (5-7 MW ≈ half of 12-14 MW): 189,396 tCO₂e. Version 1 of the dynamic financial baseline assumed 3 MW of additional cogeneration capacity coming online in 2010. As 3 MW ≈ one-quarter of 12-14 MW, one-quarter of the annual emission reductions of the 12-14 MW annual emissions reductions (14,337 tCO₂e) was added to the historical emissions baseline from 2010-2014. This gives a total of 261,082 tCO₂e and reduces the amount of genuine carbon credits to 117,711 tCO₂e. If the 32 MW of additional export capacity does come online as planned in 2012 according to Version 2 of the dynamic financial baseline, this will achieve approximately three times the emissions reductions of the 12-14 MW (32 MW ≈ three times 12-14 MW), 172,045 tCO₂e per year, and surpass all those currently claimed by the CDM from 2012-2014. The dynamic version 2 financial baseline generates 304,094 in emission reductions, reducing the amount of genuine carbon credits to 74,699 tCO₂e.

Table 53: Calculation of genuine carbon credits after financial additionality assessment

<table>
<thead>
<tr>
<th>Year</th>
<th>Original CERs</th>
<th>Historical Baseline</th>
<th>Dynamic Version 1</th>
<th>Dynamic Version 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>tCO₂e</td>
<td>tCO₂e</td>
<td>tCO₂e</td>
<td>tCO₂e</td>
</tr>
<tr>
<td>2010</td>
<td>57,349</td>
<td>28,674</td>
<td>43,011</td>
<td>43,011</td>
</tr>
<tr>
<td>2011</td>
<td>57,349</td>
<td>28,674</td>
<td>43,011</td>
<td>43,011</td>
</tr>
<tr>
<td>2012</td>
<td>57,349</td>
<td>28,674</td>
<td>43,011</td>
<td>57,349</td>
</tr>
<tr>
<td>2013</td>
<td>57,349</td>
<td>28,674</td>
<td>43,011</td>
<td>57,349</td>
</tr>
<tr>
<td>2014</td>
<td>57,349</td>
<td>28,674</td>
<td>43,011</td>
<td>57,349</td>
</tr>
<tr>
<td>Total</td>
<td>378,793</td>
<td>189,396</td>
<td>261,082</td>
<td>304,094</td>
</tr>
<tr>
<td></td>
<td>Genuine Carbon Credits</td>
<td>378,793</td>
<td>117,711</td>
<td>74,699</td>
</tr>
</tbody>
</table>
Supplementary Baseline Additionality Information

Ex-ante Emission Reductions 2008-2014 as presented in the CDM project document (CDM-PDD, 2007b: 24-25) were modified to account for the dynamic grid emissions factor (Table 54). This was decomposed into historical and dynamic financial baselines (Versions 1 and 2), as described above. Results are presented in Table 54 below.

Table 54: Calculation of genuine carbon credits after combined financial and emissions additionality assessment

<table>
<thead>
<tr>
<th>Year</th>
<th>CERs Dynamic Grid Expansion Factor tCO₂e</th>
<th>Financial Baseline</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Historic tCO₂e</td>
<td>Dynamic Version 1 tCO₂e</td>
<td>Dynamic Version 2 tCO₂e</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>26,282</td>
<td>13,141</td>
<td>13,141</td>
<td>13,141</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>80,614</td>
<td>40,307</td>
<td>40,307</td>
<td>40,307</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>66,879</td>
<td>33,440</td>
<td>50,160</td>
<td>50,160</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>77,908</td>
<td>38,954</td>
<td>58,431</td>
<td>58,431</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>37,517</td>
<td>18,758</td>
<td>28,138</td>
<td>37,517</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>35,918</td>
<td>17,959</td>
<td>26,938</td>
<td>35,918</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>34,911</td>
<td>17,456</td>
<td>26,184</td>
<td>34,911</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>360,029</td>
<td>180,015</td>
<td>243,298</td>
<td>270,384</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Genuine Carbon Credits</td>
<td>360,029</td>
<td>180,015</td>
<td>116,731</td>
<td>89,645</td>
</tr>
</tbody>
</table>
Table 55: Power generation in Uganda: installed (2001-2010) and planned (2011-2014)

<table>
<thead>
<tr>
<th>Year</th>
<th>Large Hydro</th>
<th>Mini Hydro</th>
<th>Bagasse Cogeneration</th>
<th>Thermal Diesel</th>
<th>Thermal HFO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Name</td>
<td>MW</td>
<td>GWh</td>
<td>Name</td>
<td>MW</td>
</tr>
<tr>
<td>1954</td>
<td>Nalubaale</td>
<td>180</td>
<td>na</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>Kiira</td>
<td>300</td>
<td>na</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>300</td>
<td>na</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>300</td>
<td>na</td>
<td></td>
<td>KCCL</td>
<td>10</td>
</tr>
<tr>
<td>2004</td>
<td>300</td>
<td>na</td>
<td></td>
<td>KML</td>
<td>15</td>
</tr>
<tr>
<td>2005</td>
<td>300</td>
<td>1699</td>
<td>15</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>300</td>
<td>1060</td>
<td>15</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>300</td>
<td>1264</td>
<td>15</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>300</td>
<td>1355</td>
<td>15</td>
<td>31</td>
<td>KSW1</td>
</tr>
<tr>
<td>2009</td>
<td>300</td>
<td>1235</td>
<td>20</td>
<td>30</td>
<td>Tronder</td>
</tr>
<tr>
<td>2010</td>
<td>300</td>
<td>1256</td>
<td>20</td>
<td>26</td>
<td>KSW2/Kinyara</td>
</tr>
<tr>
<td>2011</td>
<td>350</td>
<td>1530</td>
<td>20</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>Bujagali 1</td>
<td>550</td>
<td>2404</td>
<td>54</td>
<td>88</td>
</tr>
<tr>
<td>2013</td>
<td>Bujagali 2</td>
<td>550</td>
<td>2404</td>
<td>54</td>
<td>88</td>
</tr>
<tr>
<td>2014</td>
<td>550</td>
<td>2404</td>
<td>54</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>550</td>
<td>2404</td>
<td>54</td>
<td>88</td>
<td></td>
</tr>
</tbody>
</table>

Appendix 9: Kakira Sugar Works – Outgrowers’ Cane Supply Agreement (Aided Farmers)
(c) The suitability of the soil for cane cultivation.
(b) The layout for cane planting, including requirements of accessibility, drainage, firebreaks, etc. considering slope, depth of soil etc.
(c) The work to be done by the Outgrower for development and clearing the Cane Area prior to planting, and the date by which this development and clearing is to be done.
(d) The variety of cane that shall be planted by the Outgrower.
(e) The time period of planting by the Outgrower, considering:
   (i) the agricultural operations to be carried out prior to planting,
   (ii) climatic conditions,
   (iii) the cane supply requirements of KSW’s factory, and
   (iv) other relevant factors.
(f) The methods of cane cultivation and maintenance (including fertilizer applications, weeding, pest and disease control, irrigation, etc.) in order to assist the Outgrower in maximising cane yield.

7. Where requested by the Outgrower, KSW shall provide the services of suitable agricultural equipment to carry out any or all of the following operations related to land preparation / development and planting for the Cane Area of the Outgrower:

   (a) Clearing of heavy bush (where necessary) and preparation of access tracks, drains, etc.
   (b) Ploughing
   (c) Harrowing
   (d) Furrowing

Agricultural equipment shall be provided by KSW only on the following conditions:

   (i) The equipment shall be operated only by trained employees of KSW.
   (ii) The Outgrower shall provide free parking space for KSW equipment when requested by KSW and shall be responsible for the safe storage of such equipment when not in use by KSW personnel.
   (iii) The equipment shall be provided by KSW at a time convenient to KSW subject to the availability of equipment and considering the time schedule of operations, and KSW shall be solely responsible for deciding on priorities of allocation of agricultural equipment.
   (iv) The Outgrower shall bear the cost of the services of agricultural equipment provided by KSW, which shall be computed by KSW on a machine-hour basis (which shall include the related cost of KSW’s employees) as shall be declared by KSW from time to time.

KSW shall provide credit to the Outgrower for this purpose, and shall recover its charges in instalments in the manner specified in Clause 16.(a) hereof.

8. KSW shall provide good quality seed cane of the desired variety to the Outgrower on the basis of 7.5 tons seed cane per Hectare of fresh planting on the Cane Area approved by KSW’s survey. The price of the seed cane shall be 1.5 times the prevailing price payable by KSW for commercial cane supplied to KSW at the time of planting. Charges for (a) the seed cane and (b) its transport to the Cane Area by KSW shall be debited to the Outgrower’s account with KSW and shall be recovered by KSW in installments in the manner specified in Clause 16.(a) hereof.

9. KSW shall advise the Outgrower on the type, dosage and method of application of fertilizer and any other agro-chemicals that would be required to improve the yield and quality of the Cane Area. Subject to the agreement of the Outgrower and the availability of the material, KSW shall provide the required quantity of fertilizer and any other agro-chemicals to the Outgrower on credit basis. The charges for (a) the fertilizer and any other agro-chemicals and (b) their transport to the Cane Area by KSW (based
on KSW’s costs and the transport distance) shall be debited to the Outgrower’s account with KSW and shall be recovered by KSW in the manner specified in Clause 16. (b) hereof.

10. KSW shall ensure that the staff of its Outgrowers Department visit the Cane Area periodically to examine the condition of the Outgrower’s sugarcane crop and to advise the Outgrower regarding the agricultural practices that should be followed by the Outgrower for proper maintenance and optimised yield.

11. If the Outgrower fails to maintain his sugarcane crop on the Cane Area in accordance with the provisions of this Agreement to the necessary standards set by KSW, or fails to deliver sugarcane to KSW despite repeated advice by KSW, then KSW shall be empowered and entitled to take over the management, maintenance, harvesting and/or delivery to KSW of the sugar cane of the Cane Area at the Outgrower’s cost - the decision to take over being solely and exclusively at KSW’s discretion. All charges for services, labour, materials, inputs, etc. provided by KSW in this regard shall be debited to the Outgrower’s account with KSW and shall be recovered by KSW in the manner specified in Clause 16.(b) hereof.

12. When the Outgrower’s cane nears maturity, KSW shall arrange for samples of sugarcane to be taken from the Cane Area and for testing of the same at KSW’s laboratory. When the tests show that the Outgrower’s cane has matured, KSW shall issue to the Outgrower a Cane Harvesting permit which will entitle the Outgrower to harvest mature green cane during a period specified by KSW from the block approved by KSW and deliver it to the KSW factory in accordance with the Regulations for Supply of Sugarcane specified in Schedule 4 hereof.

13. Where requested by the Outgrower, KSW shall consider providing the Outgrower an advance for Cane Harvesting Payment to the Outgrower’s workers. The amount of the Cane Harvesting advance shall be determined on the basis of the number of tons of cane harvested and delivered to KSW in accordance with the Cane Harvesting Permit, the Cane Weighment Report, and at the prevailing wage rate payable by KSW to its own harvesting labour. Any Cane Harvesting Payment given to the Outgrower by KSW shall be debited to the Outgrower’s account with KSW and shall be fully recovered by KSW from the amount payable to the Outgrower for the cane supplied by him to KSW as specified in Clause 16.(b) hereof.

14. KSW shall only accept green (i.e. unburnt) cane supply from the Outgrower.

15. KSW shall maintain a detailed account for all transactions related to the Outgrower. The charges for all equipment, services, special technical advisory services, materials, inputs, cash payments, etc. provided by KSW to the Outgrower shall be debited to the Outgrower’s account on a day-to-day basis. Interest on the outstanding debit balance at 1% (one percent) per annum over and above the prevailing highest lending interest rate charged by the commercial banks from whom KSW borrows money shall be debited to the Outgrower’s account on a quarterly basis.

16. KSW shall recover its charges from the Outgrower from the amounts to be paid by KSW to the Outgrower for cane supplied by the Outgrower to KSW as follows:

(a) KSW’s charges for all agricultural equipment, services, materials, seed cane and transport provided to the Outgrower for land preparation and planting will be recovered as follows:

(i) 40% from the amount payable by KSW to the Outgrower for supply of plant crop from the specified Cane Area.

(ii) 30% from the amount payable by KSW to the Outgrower for supply of first ratoon crop from the specified Cane Area.
(iii) The balance 30% from the amount payable by KSW to the Outgrower for supply of second ratoon crop from the specified Cane Area.

(b) All other charges of KSW for agricultural equipment services, special technical advisory services, materials, inputs, transport, cash payments, interest, KSW Service Charge, etc. will be fully (100%) recovered from the amount payable by KSW to the Outgrower for the first cane supply by the Outgrower to KSW after the debit of the charge to the Outgrower’s account.

(c) Standardised interest for the amounts due under Clauses 16.(a) and 16.(b) shall be computed by KSW considering the rate of interest as per Clause 15 above and periods of indebtedness equal to the standard age of 20 months for plant sugarcane crop and 18 months for each ratoon sugarcane crop. KSW will determine the interest and advise the Outgrower of the amount payable quarterly.

(d) In the unlikely event that the total amount recoverable under Clauses 16.(a) and 16.(b) exceeds the amount payable by KSW to the Outgrower, then KSW shall be entitled to recover the balance outstanding from the Outgrower by any legal means.

At KSW’s sole discretion, KSW may choose to recover the balance outstanding (i.e. the unrecovered balance) from the Outgrower from the amount payable by KSW to the Outgrower for the first subsequent cane supply by the Outgrower to KSW in the following order:

(i) first - amounts due from the Outgrower under Clause 16.(b) above,
(ii) then - amounts due under Clause 16.(a)(i) above,
(iii) then - amounts due under Clause 16.(a)(ii) above,
(iv) then - amounts due under Clause 16.(a)(iii) above,
and in the event that any amount still remains outstanding, such balance amount being recovered by KSW from the next subsequent cane supply by the Outgrower to KSW in the same order.

(e) In case of the Outgrower choosing to make part or full payments to KSW by cheque or in cash prior to the date when such payment would normally be recovered as per Clauses 16.(a) and 16.(b) above, KSW shall credit the amount received to the Outgrower’s account and the interest charge to the Outgrower as per Clause 16.(c) shall be accordingly reduced - with the payment received being allocated in the following order:

(i) first - amounts due from the Outgrower under Clause 16.(b) above,
(ii) then - amounts due under Clause 16.(a)(i) above,
(iii) then - amounts due under Clause 16.(a)(ii) above,
(iv) then - amounts due under Clause 16.(a)(iii) above.

17. KSW shall purchase all the cane supplied by the Outgrower provided that such cane supply is in accordance with the terms and conditions of this Agreement and the Regulations for Supply of Sugarcane specified in Schedule 4 hereof and further provided that the time period of supply of the Outgrower’s cane shall be that specified by KSW at KSW’s sole discretion.

18. KSW shall pay the Outgrower for cane supplied at the prevailing price at the time of supply as per the existing formula (determined by the World Bank/African Development Bank) which shall be 35% (thirty five percent) of the sales realization for the extracted sugar content of the cane based on the weighted average ex-factory sugar price realized by KSW during the relevant financial year subject to a minimum sugar recovery of 9% (nine percent).

i.e. Outgrower Cane Price = 35% x SP x R
where SP = KSW’s weighted average ex-factory sugar price
R  =  KSW’s actual sugar/cane recovery rate (subject to a minimum of 9%).

19. KSW shall pay the Outgrower for sugar/cane supplied to the KSW factory in two installments:

(a) The first installment shall be computed as the number of tons of cane supplied multiplied by the Interim Cane Price which shall be 90% (ninety percent) of the Final Cane Price paid by KSW for the previous crop at 9% (nine percent) recovery. This first installment shall be paid four (4) weeks after completing supply of cane from the approved block and after signing all relevant documents and after deduction by KSW of the appropriate amounts to be recovered in accordance with Clause 16 hereof. KSW shall announce the Interim Cane Price at the start of each crop year.

(b) The second installment, being the balance / arrears, shall be computed as the number of tons of cane supplied multiplied by the difference between the Final Cane Price and the Interim Cane Price. This second installment shall be paid when the computation of KSW’s weighted average ex-factory sugar price for the year is completed and audited to arrive at the Final Cane Price based on the formula specified in Clause 18 above. This payment will be made usually after August in the following crop year.

OUTGROWER’S UNDERTAKINGS & COVENANTS

20. The Outgrower shall accompany and assist KSW as required in carrying out the survey of the Cane Area required under Clause 3 hereof, and shall accept as final KSW’s selection and measurements of the Cane Area.

21. The Outgrower shall be responsible for development and clearing (as per KSW’s work-plan of Clause 6.(c) hereof) of the Cane Area approved by KSW, using his own workers for this purpose; and this manual development and clearing shall be as complete as possible so as to expose and clearly mark any rocks and tree stumps which cannot be removed so as to avoid damage to KSW’s tractors or implements. The cost of any damage to KSW’s equipment caused by obstructions which the Outgrower had failed to mark shall be charged to the Outgrower’s account with KSW and shall be recovered by KSW in the manner specified in Clause 16 hereof.

22. The Outgrower shall be responsible for providing and maintaining appropriate access tracks within his land area. If the Outgrower does not provide or properly maintain suitable access tracks on his land, KSW shall not be liable for compensation to the Outgrower for any damage to any of the Outgrower’s crops or facilities that may be caused by KSW’s equipment because of non-availability or lack of maintenance of such suitable access tracks.

23. If the Outgrower chooses to make his own arrangement for mechanised clearing, ploughing, harrowing and furrowing, the Outgrower shall ensure that these operations are carried out in accordance with the layout agreed with KSW as per Clause 6.(b) hereof and to the standards recommended by KSW and are completed in time for planting as specified by KSW as per Clause 6.(c) hereof.

24. For fresh planting on the Cane Area, the Outgrower shall only use seedcane provided by KSW as per Clause 8 hereof. The Outgrower shall not use any other seedcane from any other source, unless prior approval has been obtained from KSW in writing.

25. The Outgrower shall be responsible for the planting of seedcane, using his own labour to do the planting at the time specified by KSW as per Clause 6.(e) hereof.

26. The Outgrower or his authorized representative shall remain present on the field in the Cane Area whenever any services are being provided there by KSW. In the absence of such arrangements, KSW’s work reports shall be accepted by and shall be binding on the Outgrower.
27. The Outgrower shall be responsible for proper maintenance of the cane crop on the Cane Area using the agronomic methods recommended by KSW to the necessary standard set by KSW, using his own labour for this purpose.

28. KSW shall not be responsible if any disease occurs in the Outgrower’s cane. If any disease/pest is found in the Outgrower’s cane and if the Ministry of Agriculture and KSW agree that it is necessary to destroy the diseased/infested cane to prevent spread of the disease/pest to the adjacent cane fields, the Outgrower shall immediately make the necessary arrangements to destroy such diseased/infested cane at his own cost; failing which KSW shall do the needful on behalf of the Outgrower, who shall bear KSW’s cost incurred in this regard, which shall be debited to the Outgrower’s account with KSW and shall be recovered by KSW in the manner specified in Clause 16.(b) hereof.

29. Once the Outgrower’s plant cane is six months old, the Outgrower shall engage full-time watchmen to protect his crop against fire, theft, etc. failing which KSW shall be empowered and entitled at its own discretion, to make appropriate security arrangements at the Outgrower’s cost, the charges for which will be debited on the Outgrower’s account with KSW and shall be recovered by KSW in the manner specified in Clause 16.(b) hereof.

30. The Outgrower shall ensure that for all operations required for the sugarcane crop including development and clearing, planting, weeding and harvesting, he will engage only adult workers and under no circumstances should he recruit children below 18 years of age. The Outgrower shall comply with all employment laws, rules and regulations of Uganda, including Decree 4 of the Employment Decree, 1975 Part IV - Employment of young persons, section 49.

31. When the Outgrower’s cane nears maturity or matures, the Outgrower shall request KSW to take and test his cane samples. When KSW’s laboratory tests confirm that the Outgrower’s cane is mature, the Outgrower shall make his own arrangements for harvesting of the mature green cane from the block approved by KSW and transport the same to KSW’s factory within the period specified by KSW in its Cane Harvesting Permit, in accordance with the Regulations for Supply of Sugarcane specified in Schedule 3 hereof.

32. The Outgrower shall ensure that his workers cut mature green cane from the block approved by KSW as close to the ground as possible and thereafter cut off cane stalk tops and remove trash, soil, roots, etc. to the extent possible. KSW shall deduct 5% (five percent) from the Gross Cane Weight of the cane supplied (as defined in Schedule 4) towards binding material and extraneous matter that comes along with the cane.

33. The Outgrower shall make his own arrangements for transport of the harvested cane, using hired transport where necessary (such party being referred to herein as “the Transporter”). KSW shall not be responsible for making transport arrangements for the Outgrower’s cane; but shall, where requested under special circumstances, assist the Outgrower to the extent possible in arranging transport at prevailing market rates (where third party arrangements are made) or at the actual machine-hour cost to KSW (where KSW equipment is available and is used), the charges for which will be debited to the Outgrower’s account with KSW and shall be recovered by KSW in the manner specified in Clause 16.(b) hereof.

34. The Outgrower shall ensure that any vehicles that carry the Outgrower’s sugarcane to Kakiri Sugar Works Mills have proper and valid documents i.e. roadworthiness certificate, road licence sticker, registration book, third party insurance, driving permit etc. The Outgrower shall deposit copies of these documents in the Outgrowers Manager’s office and register the vehicle for carrying sugarcane to KSW.

35. All cane supplied by the Outgrower shall be weighed at KSW’s weigh-bridge, and this weight (determined as per Schedule 4 hereof) shall be taken as final and shall be used for all accounting purposes.
36. The Outgrower shall pay KSW for services, materials, inputs, cash payments provided by KSW to the Outgrower and for interest and KSW Service Charges debited to the Outgrower in accordance with Clause 16 hereof.

37. The Outgrower shall supply his sugarcane solely and exclusively to KSW, and under no circumstances shall the Outgrower sell, supply or provide cane to any third party, or buy sugarcane from any third party and sell this to KSW as though his own sugarcane.

38. The Outgrower shall maintain his cane on the Cane Area for the full cycle of crops - i.e. plant and two ratoon crops, and under no circumstances shall the Outgrower uproot cane planted unless this is required under Clause 29 hereof.

39. The Outgrower shall not sell, transfer or assign the Cane Area or any part thereof without the prior written consent of KSW, which consent shall not be unreasonably withheld by KSW always provided that the new owner, transferee or assignee accepts this Agreement in toto and signs the same and confirms in writing that all liabilities of the former Outgrower to KSW under this Agreement shall be transferred to the new owner, transferee or assignee. Consequently the Outgrower shall pledge all his ownership rights of the Cane Area to KSW for the duration of this Agreement. If the Outgrower has a Land Title for the Cane Area, he shall present the same to KSW who shall retain the said Title for so long as the Outgrower has any liability to KSW.

40. In the event of any irregularities committed by the Outgrower during the supply of the cane to KSW in cane weightment, supply of cane from an unauthorized block, etc., KSW shall reserve the right to suspend/stop the Outgrower's cane supply and withhold the cane payment for the cane supplied until such a time as the verification of details are completed and the irregularities are resolved to the satisfaction of KSW. KSW also reserves the right to withdraw the Outgrower from the KSW outgrowers scheme and stop future cane supply from the Outgrower to KSW if he is found guilty of any irregularities.

41. The Outgrower shall supply the full quantity of cane as shown in Schedule 2.1 to KSW and KSW will have a right to take legal action if there is an intentional failure to supply the said quantity of cane and non-payment by the Outgrower of any dues to KSW.

42. Neither party will be responsible for non-supply of cane by the Outgrower or non-acceptance of cane by KSW due to natural calamities or force majeure circumstances beyond the control of either party.

**TERM OF THIS AGREEMENT**

43. The term of this Agreement shall be a full crop cycle of three crops covering plant and two ratoon crops. KSW shall have a right to terminate this Agreement at the end of each such crop cycle (i.e. after complete harvesting of all second ratoon cane on the Outgrower's Cane Area). The Outgrower shall have the same right to terminate the Agreement at the end of each such crop cycle provided that the Outgrower has fully repaid all amounts payable by him to KSW under the terms of this Agreement.

**INTERPRETATION**

44. This Agreement shall be governed by and construed in accordance with the Laws of Uganda.

45. Words denoting the singular number only shall include the plural and vice-versa. Words denoting the masculine gender shall include the feminine. The headings in this Agreement are inserted for convenience only and shall not affect the construction and interpretation hereof.
46. Notices by either party shall, unless notified in writing by the party concerned, be addressed to:

(a) The Outgrower as follows:

(b) KSW as follows:

The General Manager
Kakira Sugar Works (1985) Limited
P. O. Box 121
JINJA.

IN WITNESS WHEREOF the parties hereto have executed this Agreement on the date first above written.

Signed by:

The Outgrower:

Name: ...........................................................

Designation: .................................................

In the presence of:

(1) ............................................................

Name: ........................................................

Occupation: ..................................................

Address: ......................................................

(2) ............................................................

Name: ........................................................

Occupation: ..................................................

Address: ......................................................

For and on behalf of
Kakira Sugar Works (1985) Ltd

Name: ........................................................

Designation: .................................................

In the presence of:

(1) ............................................................

Name: ........................................................

Occupation: ..................................................

Address: ......................................................
**SCHEDULE 1**

**LAND OWNED/LEASED BY THE OUTGROWER**

<table>
<thead>
<tr>
<th>S.NO</th>
<th>VILLAGE</th>
<th>AREA (HA)</th>
<th>REMARKS</th>
<th>S.NO</th>
<th>VILLAGE</th>
<th>AREA (HA)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SCHEDULE 2.A**

**OUTGROWERS REGISTERED CANE CULTIVATION AREA ("the CANE AREA") AND THE ESTIMATED YIELD**

<table>
<thead>
<tr>
<th>BLOCK NO.</th>
<th>VILLAGE</th>
<th>AREA (HA)</th>
<th>APPROX. TONNAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>P</td>
<td>R1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ROUGH SKETCH OF LAND IN SCHEDULE 2.A

<table>
<thead>
<tr>
<th>S.NO</th>
<th>VILLAGE</th>
<th>AREA (HA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
REGULATIONS FOR SUPPLY OF SUGARCANE BY THE OUTGROWER.

1. The Outgrower shall report to KSW's Outgrower Section Office with his Registration Certificate, and shall fill in the Cane Sampling and Quality Analysis Request.

2. KSW shall make arrangements for taking cane samples of mature cane from the Outgrower's field at a time convenient to KSW, and shall test these samples at KSW’s laboratory to establish cane maturity.

3. Once KSW’s laboratory approves the samples, KSW shall issue the Outgrower a Cane Harvesting Permit specifying the approved block number and expected tonnage of cane and the time period within which the cane must be delivered by the Outgrower to KSW’s factory.

4. The Outgrower shall then make his own arrangements for harvesting and transport of green cane in the manner required by KSW and also as specified in Clauses 33 and 34 of the Agreement.

5. As soon as the transport arrangements are finalized, the Outgrower and the Transporter shall together report to KSW's Outgrowers Section Office and inform KSW of the arrangements made and sign all necessary documents as required.

6. The Outgrower shall ensure that the Transporter delivers green sugarcane that is fresh, mature, whole and clean. KSW shall not accept cane that is burnt, stale or immature. If the Outgrower’s cane is not clean and contains abnormal quantities of soil, roots, trash, cane tops, binding materials, etc., KSW may, at its own discretion, completely reject the cane or deduct a percentage (the percentage of which shall be determined solely by KSW) from the Gross Cane Weight in addition to the standard deduction of 3% of Gross Cane Weight as specified in Clause 32 of the Agreement.

7. KSW shall not accept burnt cane supplied by the Outgrower.

8. The Outgrower shall harvest and deliver sugarcane only from the specified plot and only of the specified variety mentioned in the Cane Harvesting Permit. KSW shall not accept delivery of any other cane delivered by the Outgrower.

9. KSW shall ensure that an adequate amount of time is specified in the Cane Harvesting Permit for the Outgrower to harvest and deliver the specified quantity of cane from the approved field to the KSW factory. KSW shall not accept any Outgrower’s cane that is not delivered within the specified time period and shall not be responsible for any Outgrower’s cane that may consequently be left out in the field.

10. The Transporter delivering cane on behalf of the Outgrower shall first go to the KSW weigh-bridge with the Outgrower’s original Cane Harvesting Permit. The gross weight of the cane-supply vehicle that is carrying the cane shall be determined using the KSW weigh-bridge and KSW staff shall note this on the cane weighment receipt. The vehicle shall then proceed directly to the cane carrier/cane collecting yard for unloading and then return to KSW's weigh-bridge where it will be weighed again to determine the tare weight, which shall also be noted on the cane weighment receipt by KSW staff. The Gross Cane Weight of sugarcane delivered shall be the gross weight of the cane-supply vehicle less the tare weight of the same vehicle. The Transporter shall be given a copy of the cane weighment receipt to be delivered to the Outgrower. The Outgrower shall instruct his Transporter to ensure that the Transporter follows all instructions given by KSW whilst the Transporter’s vehicles are passing through KSW’s factory area.

11. In case of any breakdown in the factory, KSW shall not be responsible for any delays in unloading the sugarcane from the Transporter’s vehicles.
12. In case of a major factory breakdown or unforeseen circumstances or force majeure situation under which KSW may not be able to buy the Outgrower's cane, KSW shall inform the Outgrower of the circumstances as soon as possible and all unutilized Cane Harvesting Permits issued shall be cancelled forthwith. KSW shall reschedule cane purchase in accordance with the circumstances prevailing and shall thereafter issue fresh Cane Harvesting Permits. KSW shall purchase any cane that had been harvested by the Outgrower before he was informed of the circumstances resulting in suspension of cane purchases by KSW and the consequent cancellation of Cane Harvesting Permits by KSW.

13. KSW shall pay the Outgrower the first installment of the cane purchase consideration four (4) weeks after completing supply of cane from the approved block after making appropriate deductions in accordance with Clause 16 of the Agreement. At the time of receiving payments, the Outgrower shall produce his KSW Registration Certificate, his KSW Identity Card, his Cane Harvesting Permit, and his copy of the Weighment Report.

14. If the Outgrower does not abide by any of the above Regulations or any of the terms and conditions of the Agreement, KSW shall not be responsible for purchasing the Outgrower's sugar cane.

Signed in confirmation of the above:

The Outgrower

For and on behalf of

Name:........................................

Name:........................................

Designation:........................................
10. References


Altenburg T (2011) Industrial Policy in Developing Countries: overview and lessons learned from seven country cases, German Development Institute, Bonn.


Carrington D, Paul J, Maurayi R and Sprenger R (2011) 'Sun Biofuels have left us in a helpless situation. They have taken our land' – video, in *The Guardian*, 9 November 2011,


CDM-PDD (2007a) Afforestation in Grassland Areas of Uchindile, Kilombero, Tanzania & Mapanda, Mufindi, Tanzania (v. 01), in *CDM Project Design Document Form for Afforestation and Reforestation Project Activities (v 03)*, UNFCCC, Bonn.


CDM-PDD (2007c) Moldova Soil Conservation Project (v. 04), UNFCCC, Bonn.

CDM-PDD (2008b) Bagasse Cogeneration Project Kinyara Sugar Limited (KSL) – Uganda (v.01), in *Clean Development Mechanism Project Design Document Form (v 03)*, UNFCCC, Bonn.

CDM-PDD (2008c) LUIGA Hydropower Project in Mufindi District, Tanzania, in *CDM Project Design Document Form (v 03)*, UNFCCC, Bonn.


CDM-PDD (2008f) Reforestation at the Idete Forest Project in the Southern Highlands of Tanzania, in *CDM Project Design Document Form for Afforestation and Reforestation Project Activities (v 04)*, UNFCCC, Bonn.


EcoTrust (No Date) EcoTrust, The Environmental Conservation Trust of Uganda, Kampala.


FASB (2007) Summary of Statement No. 157, Financial Accounting Standards Board, Norwalk, CT


Hirschman AO (1967) *Development Projects Observed*, Brookings Institute, Washington, DC.


IPPG (2010) Beyond Institutions: Institutions and organizations in the politics and economics of poverty reduction – a thematic synthesis of research evidence, Research Programme Consortium on Improving Institutions for Pro-Poor Growth (IPPG), Manchester.


King C (2000) The Moldovans: Romania, Russia, and the politics of culture, Hoover Institution Press, Stanford, CA.


Mason-Case S (2011) *The Cancun Agreements and Legal Preparedness for Climate Change in Developing Countries*, IDLO, Rome.


Meckstroth TW (1975) 'Most-different systems' and 'most-similar systems': a study in the logic of comparative inquiry. *Comparative Political Studies* 8:132-157.


Plan Vivo (No Date) *Technical specification for smallholder carbon management project, Bushenyi Uganda*, Plan Vivo, Edinburgh.


Rosendorff BP and Milner HV (2001) The optimal design of international trade institutions: Uncertainty and escape. *International Organization* **55**:829-+


The Economist (2008) Make-or-break for an idea that is meant to help the poor grow and be green. The Economist May 15, 2008.


Thomas GL (1977) Baseline information and situational overview requisite to the design of integrated rural development projects in Mbulu district, Tanzania, USAID Tanzania, Dar es Salaam.


UFRIC (1999) *Chirungu Settlement and Rwoho Forest Reserve: a site report*, Ugand Forestry Resources and Institutions Centre (UFRIC), Makerere University, Kampala.


UIA (2011a) *Forestry Sector Profile*, Uganda Investment Authority (UIA), Kampala.

UIA (2011b) *Uganda: List of CDM Projects*, Uganda Investment Authority (UIA), Website (accessed 10 September 2011):


UNFCCC (2001) Decision 17/CP.7 "Modalities and procedures for a clean development mechanism as defined in Article 12 of the Kyoto Protocol", UNFCCC, Bonn.

UNFCCC (2005a) Decision 3/CMP.1, Annex: Modalities and procedures for a clean development mechanism, UNFCCC, Bonn.

UNFCCC (2005b) Decision 7/CMP.1 "Simplified modalities and procedures for small-scale afforestation and reforestation project activities under the clean development mechanism in the first commitment period of the Kyoto Protocol and measures to facilitate their implementation" (FCCC/KP/CMP/2005/8/Add.1), UNFCCC, Bonn.

UNFCCC (2010a) CDM Methodology Booklet, UNFCCC, Bonn.

UNFCCC (2010b) Standardized baselines under the clean development mechanism - Technical paper (FCCC/TP/2010/4), UNFCCC, Bonn.

UNFCCC Secretariat (2008) Compilation and analysis of available information on ways and means to enhance equitable regional and subregional distribution of projects under the clean development mechanism, UNFCCC, Bonn.


USCTA (2010) *Uganda sugar production and consumption prediction* Uganda Sugar Cane Technologists’ Association (USCTA), Kampala.


VPO (No Date) *Draft - Environmental Impact Assessment Guidelines and Procedures*, United Republic of Tanzania, Vice-President's Office, Dar es Salaam.


World Bank (2009a) *Implementation Completion and Results Report on a Credit in the Amount of US$49.15 Million and a GEF Grant in the Amount of US$12.12 Million to the*
World Bank (2011c) *Project Appraisal Document on a Proposed Credit in the Amount of SDR 74.1 Million (US $120 Million) to the Republic of Uganda for an Electricity Sector Development Project*, World Bank, Washington, DC.


