Anomalous biotechnologies: Re-examining the case of Genetic Use Restriction Technologies, GURTs

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Code Number: PY02001


Genetic use restriction technologies (GURTs) represent an unparalleled biotechnology with little known, yet potentially tremendous technical, policy and social impacts on biodiversity, sustainable agricultural development, and farmers' access to and use of genetic resources. GURTs comprise a range of biotechnologies that, when applied to a living organism, restrict the use of specific genetic traits or the whole genome of a variety. In the former case, chemical inducers activate or deactivate genes and hence the expression of particular phenotypic aspects. In the latter case, genetic manipulation aims at the sterility of a particular variety or genepool. In essence, GURTs are biotechnologies that restrict (sic) the use of, and access to genetic resources.
GURTs entail three main distinctive functions and goals: (a) technological protection over genetic resources and innovations; (b) a means of preventing undesired flow of genes from transgenic organisms; and (c) provision of certain agricultural production benefits. The first case is the most common application of GURTs, which at the same time causes heated controversies and growing social resistance. The second case appears as an environmentally-friendly biotechnological mechanism to contain transgenic organisms, but it essentially reinforces and expands the scale of genetic engineering, therefore augmenting the potential risks and impacts. The third case, which is marginal compared to the other GURT applications, could provide some benefits to farmers, and may thus deserve a separated regulatory framework for its adequate consideration.

GURTs have an intricate emergence. In particular, they have been conceived on strict agro-industrial grounds as a new instrument for agricultural advancement, but they are receiving increasing controversy and opposition world-wide, from civil society movements in the North to indigenous organisations in the South. The application of most GURT cases poses very problematic effects on sustainable agriculture and on equitable rural development, potentially undermining ongoing efforts of the international community and national governments towards the protection of biodiversity and crop genetic resources, towards enhancing indigenous and traditional farming systems, and towards the implementation of Farmers' Rights. Accordingly, the analysis of GURT cases requires careful consideration of the following aspects, inter alia:

1.- Primary intention and goal. GURT cases represent a set of different biotechnologies that are designed and deployed to a variety of goals. GURT cases may serve industrial, property, environmental, research, or agricultural production purposes. Accordingly, the impact on indigenous and rural communities will differ, as well as the potential implications for Farmers' Rights and for the international policy and institutional framework (e.g. International Treaty on Plant Genetic Resources, Biosafety Protocol, and the specific arena of the World Intellectual Property Organisation). Careful analysis of the different functions, and regulation in the light of this analysis is thus required. In particular, every GURT case needs to be evaluated before questions about why and who, as follows: Why is a GURT designed and deployed? Who benefits primarily from GURT cases? These questions will help understanding which are the underlying intentions and who are the primary beneficiaries, hence determining adequate policy responses in accordance to agreed environmental, social and developmental criteria.

2.- Local agro-biodiversity dynamics. GURT cases represent a biotechnology form that intrinsically restricts access to, and use of genetic resources. In consequence, GURT cases constrain or even dislocate agro-biodiversity dynamics among indigenous and small-scale farmers, because such dynamics are based on open and incessant flows of genetic resources. The deployment of crops and varieties resulting from GURT cases will severely constrain and disrupt practices such as informal crop genetic improvement, participatory plant breeding, and the coevolution of crops at the farmer level. The objectives of on-farm,
farmed-based and farmer-led agro-biodiversity conservation, exchange and improvement are thus likely to become constrained, displaced and even eroded by GURTs. In addition, GURTs tend to concentrate breeding efforts and options, rather than widening them as required to stimulate participatory crop breeding and to broaden the genetic base of crops, which are principles identified and agreed as important for sustainable agricultural development in the Global Plan of Action for the Conservation and Sustainable Utilisation of Plant Genetic Resources for Food and Agriculture.

3.- Technological enforcement of intellectual property. Openly, or as a hidden agenda, the most common objective of GURTs is to give biotechnological inventors a technological mechanism to protect genetic resources and innovations without the need of conforming to the intellectual property regulatory framework and other related juridical systems, either local, national or international. In essence, GURTs enforces intellectual property outside a legal framework. Consequently, GURTs undermines efforts by rural grassroots organisations, individual governments and the international community to develop intellectual property systems and alternatives that democratically harmonise the interests and needs of the different stakeholders involved, including indigenous and local communities. They also damage the efforts of indigenous and traditional farmers to institutionalise and enhance customary resource and knowledge right regimes in their lands and territories. GURTs could also erode Farmers' Rights by imposing a self-ruling mode of access to and use of genetic resources, including innovations derived from genetic resources that have been conserved and developed by indigenous and local communities themselves.

4.- The International Treaty on Plant Genetic Resources. GURTs facilitate the drainage of genetic resources from the juridical realm that was recently established by the international community in the International Treaty on Plant Genetic Resources for Food and Agriculture. The very functional technological protection mechanism of GURTs sets genetic resources aside of this Treaty, particularly as it matters article 9, on Farmers' Rights, and article 10, on the multilateral system of access and benefit-sharing of plant genetic resources. Some GURTs applications would deliberately limit the rights of farmers to effectively save, use, exchange and sell farm-saved seed and propagating material (article 9.3), when not causing the same effect under other supposed purposes. At the same time, GURTs would circumvent the international agreement on a multilateral system to facilitate access and promote equitable benefit-sharing around the use of plant genetic resources for food and agriculture (article 10), hence bypassing the sovereignty of governments and the supremacy of international legislation.

5.- Farmer seed autonomy. GURTs is likely to increase the seed dependence of small-scale farmers, instead of enhancing their seed autonomy. GURTs do not only ignore the expanding seed access problems among poor farmers in the South, but may even aggravate their pressing situation. Farmers adopting GURTs would enter a downward cycle of seed dependence, whilst becoming further disabled to effectively maintain their seed diversity
systems. Even farmers not adopting or rejecting GURTs may find their own seeds ruined due to gene flows from GURT-affected crops and varieties that were released. Overall GURTs may disrupt local seed systems, aggravate seed access problems, increase livelihood vulnerability, and impair the maintenance of local agro-biodiversity among poor small-scale farmers.

6.- *Dead seeds*. The most criticised among GURT applications are those that interfere with the reproductive capacity of plants, rendering sterile seeds. The deployment of biotechnologies that deliberately cause the infertility of seeds is an unprecedented practice in the millenarian history of world agriculture. The fertility potential of seeds or reproductive propagating material is at the roots of agricultural systems, feeding both the material and the symbolic cultures of agricultural societies. The fertility of seeds entails the production and reproduction of food, and hence represent the permanence of human life. The interruption of this biological and agricultural dynamic violates many legitimate cultural, moral and spiritual modes, particularly among indigenous and rural communities world-wide.

7.- **The global agro-food system.** GURT, if ever implemented, are certain to increase the concentration of corporate power over the global agro-food system. In particular, many GURT applications are likely to enforce corporate control over the use of genetic resources, to enhance the capacity of biotechnological companies to determine agricultural practices, and to boost monopolies in agricultural research and development. In addition, as most current genetic engineering technologies, GURT require high capital investments that demand aggressive implementation strategies, which often distort the global agro-food system.

8.- **Public-private sector anomalies.** GURT, as most genetic manipulation technologies, are capital intensive and strongly connected to the private sector. GURT will be of little benefit, if not detrimental at all, to millions of poor farmers world-wide. Therefore, the focus on GURT questions the claims of the private sector as a vital force for development, unveiling the dominant profit-oriented aspirations of most genetic engineering endeavours nowadays. At the same time, the focus on biotechnology trends like GURT displaces other biotechnology options that would be more beneficial to small-scale farmers and more affordable to developing countries, aside from having less environmental risks and social impacts. Hence, the focus of the private sector on GURT does not help the public sector to address the most pressing needs in agricultural and rural development, such as strengthening small-scale farming systems, precisely at a time when public sector agricultural research and extension schemes seem to decline. In addition, GURT may impair and disaccredit joint public-private cooperation efforts on agricultural research and development.

9.- **Global development asymmetries and inequalities.** GURT represent an asymmetric and unequal biotechnology application in the sense that it clearly empowers the powerful
whilst having little benefit, if not negative impacts, on poor and vulnerable farmers. It also entails serious concerns for biodiversity conservation, sustainable agriculture, and the respect for the international policy framework on plant genetic resources. GURTs are thus likely to increase dramatically the growing social resistance to the entire field of modern biotechnology, washing away options for biotechnological progress that could truly contribute to the agricultural development needs of millions small-scale farmers.

Summary

In summary, the mentioned issues dispute the proclaimed values and benefits of GURTs, whilst raising serious concerns on equitable and sustainable agricultural development. Where there are real production values to a GURT application, these should be considered separately, and they should not be used to create a new appropriation mechanism. The international community is hence challenged to explore and deploy adequate responses to both prevent the ecological and social impacts of GURTs and create a wider space to address the priority development concerns of the poorest indigenous and local communities. At present moment, there are very few GURTs applications with tangible environmental or agricultural production benefits, whilst most applications entail severe concerns on sustainable agricultural development, realisation of Farmers' Rights, promotion of local seed autonomy, enhancement of indigenous and traditional farming systems, biosafety considerations, fulfilment of intellectual property regulation, appropriateness of research investments, and the precautionary principle, among others.

Beyond plain polarised approaches to biotechnology, it is critically important to unveil and fully analyse the functioning and potential impacts of GURTs. That is particularly relevant in the context of indigenous and local communities, since they require priority development support, yet they suffer enormous vulnerability to new biotechnological and corporate endeavours, such as particularly GURTs. In addition, it is necessary not only to identify the threats and impacts, but also to prevent that problematic and doubtful biotechnologies like most GURTs applications discredit other biotechnology options that have potential roles to play on biodiversity conservation, on the realisation of Farmers' Rights, on supporting indigenous and rural development, and on addressing the most pressing needs of the poorest and most food insecure people of our planet. In essence, GURTs represent a kind of biotechnological application that ignores, constrains and displaces the agricultural technologies, practices and cultures of indigenous and traditional farmers. This unbalance is clearly a threat to integral and sustainable development efforts. It equally despises the rights, needs and potential of small-scale farmers, those who precisely dwell where biodiversity flourishes.

The scale of biotechnological development, as the potential impacts of GURTs illustrate, requires the international community to explore and implement tailored regulatory responses with significant doses of public decision-making. It is equally important that indigenous and small-scale farmers are fully listened and respected in matters related to
biotechnology and biodiversity, as they deserve priority attention in agricultural and rural development, they are custodians to enormous genetic resource diversity, and they are the most vulnerable sector to the impacts of biotechnology and agricultural globalisation.

**Note:** The ideas expressed in this communication are those of the author and do not necessarily reflect the views of the Food and Agriculture Organisation of the United Nations (FAO).

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Published by Biostrategy Associates

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