AFRICAN INDIGENOUS FOOD CROPS: THEIR ROLES IN COMBATTING CHRONIC DISEASES IN GHANA

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Abstract

African Indigenous Food Crops (AIFCs) face eminent extinction due to negative perceptions about them (Voster et al., 2007a). The decline in consumption of AIFCs has been implicated in the emergence and spread of chronic diseases in Africa (Rasche et al., 2007). In view of this, the objectives of this thesis are to establish the links among food, culture and politics, to determine the consequences of changing food habits in indigenous communities in Ghana, and also to examine the potential of AIFCs to address chronic diseases in Ghana. Using the theoretical prism of Indigenous knowledge, this thesis employs the methodology of document analysis. The findings of this thesis include the presence of numerous AIFCs and food habits that could be harnessed to address chronic diseases in Ghana. The study recommends education and promotion of AIFCs in Ghana, and further studies to investigate toxic metabolites that may be hidden in uncommon AIFCs to ensure safe consumption.
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List of Abbreviations

AIDS  Acquired Immunodeficiency syndrome
AIFs  African Indigenous Foods
AIFCs African Indigenous Food Crops
AOA  Agreement on Agriculture
BIG  Broad Income Group
CDs  Communicable Diseases
CNDs Chronic Non-Communicable Diseases
CSIR  Council for Scientific and Industrial Research
CSRPM Center for Scientific Research into Plant Medicine
CVDs  Cardiovascular Diseases
FAO  Food and Agriculture Organization
GM Genetically Modified
GMOs Genetically Modified Organisms
GSS  Ghana Statistical Service
HIV  Human Immunodeficiency Virus
IGLV Indigenous Green leafy Vegetables
IK  Indigenous Knowledge
IKS  Indigenous Knowledge System
IMF  International Monetary Fund
MOFA Ministry of Food and Agriculture
MOH  Ministry of Health
NCDCP Non-Communicable Disease Control Program
NDs  Non-Communicable Diseases
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
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<tr>
<td>NHIS</td>
<td>National Health Insurance Scheme</td>
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<tr>
<td>NHM</td>
<td>Natural History Museum</td>
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<tr>
<td>NHS</td>
<td>National Health Service</td>
</tr>
<tr>
<td>PROTA</td>
<td>Plant Resource of Tropical Origin</td>
</tr>
<tr>
<td>RHNP</td>
<td>Regenerative Health and Nutrition Program</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<td>WTO</td>
<td>World Trade Organization</td>
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Chapter 1

1.0 Introduction

1.1 Background to the Study

Food is anything that is eaten or taken to satisfy hunger, obtain nourishment, cure sickness or ensure good health. Food provides comfort and relief from boredom, anxiety and depression; in addition, food is used to perform various rites and rituals (Oniang, Mutuku, & Malaba, 2003). The concept of food can be extended to include various alcoholic and non-alcoholic beverages. The inclusion of alcoholic beverages is a result of a revelation by ethnographic studies, which indicate that in some societies people receive a substantial amount of nutrition and as much as one-third of their calorie intake from beer (Platt, 1964; Steinkraus, 1995). However, this study did not consider alcoholic beverages as food due to their health implications when consumed in excess, and also due to age restrictions on the consumption of alcoholic beverages. Food and dietary habits form an essential part of African culture. The broader African culture includes: language, belief systems, traditions, music and dance, religion, values, food preferences, eating habits and others. The significance of food to humans has been highlighted by scholars (e.g., Probyn, 2000; Whatmore, 2002). Food, in whatever form, actively shapes life spatiality and temporally, bringing humans together, separating them, and imbricating them fully and irreversibly in a profusion of nonhuman worlds (Probyn, 2000; Whatmore, 2002).

Historical accounts have shown that long experimentation with what was in human beings’ immediate surroundings, as well as intuition and revelations from God,
gods and ancestors, determined what could be regarded as food (Logan, 2012). Therefore, the categorization of plants into food and medicine came with great sacrifices; human ancestors experimented with their lives to isolate crops into food and medicine. Historically, human ancestors consumed various leaves, roots, stems and fruits of plants, starting with one person. If she/he survived, then the plant was considered as food. Through these historical encounters came the food cultures that are unique to particular groups of people, depending on their geographical location. In Africa, food is connected to every aspect of African culture and local spirituality. Hence, any attempt to divorce food and culture from the people would result in the loss of identity and sense of ownership to ancestral land. Blair (1966) established the link between food and the culture of African people, when he asserted that:

Food habits are a basic part of every African culture. They have developed over a long period in response to a number of primary factors. The foods eaten are determined by environment, culture contact and migration, barter, and trade. (p. 53)

The process of acquiring food in Africa is enshrouded in spiritual and physical considerations that ensured the continuous existence of peace, harmony and sanctity in nature. Wangoola (2000) explained the spiritual aspect of African food acquisition when he wrote:

At the center of African spirituality was the unshakable belief that humans were but a weak link in the vast chain of nature, which encompassed the many animals, plants, birds, insects and worms and indeed inanimate thing such as stone and rocks… killing of animals was prohibited except in self-defense or to provide food for immediate sustenance or as sacrifice. Even then, rituals had to be performed to appease the animal family and the gods’ permission was sought for their blessings. (p. 265)

Further, sustainability of the environment was one of the critical issues in food production and consumption. This is associated with the African belief that humans are linked to the earth, hence their continued existence depends on the amount of respect
accorded the earth. Such a belief also admonished locals to make peace with plants, animals (both domesticated and wild), and stones and other inanimate objects. Good neighborliness was therefore extended to the earth. The soil, which is the medium for food production, was believed to be a deposit account from which the account holders (people) drew only part of the accrued interest without ever touching the principal (Wangoola, 2000).

The relevance of food to human survival has necessitated global efforts to ensure adequate food in all parts of the world to address the problem of malnutrition. Ironically, as the human population keeps increasing, the genetic diversities of crops and animal species that constitute food for humans keeps decreasing (FAO, 2008). The conscious efforts of selection and promotion of particular crops and animal species as the authentic human food has contributed to the marginalization of indigenous crops and the resultant food insecurity in the developing countries where these crops were a means of sustenance. African Indigenous food crops are crops that have their origin in Africa and are well adapted to the climatic conditions\(^1\). These include: cereals such as millet, sorghum, African rice; tubers such as a wide variety of yams; oil plants such as oil palm, shea-butter; and an array of African Indigenous Leafy Vegetables (AILVs) such as amaranths, African night shade, spider plant, jute mallow, pumpkin, etc. With the advent of modern agriculture, most of the AILVs were considered to be weeds, hence their elimination and depletion (Abukutsa-Onyango, 2003). The marginalization of African indigenous food crops has eroded most of what I consider as first generational foods of Africans. The subsequent globalization of the world food system has seen the

\(^1\) See a further explanation of African Indigenous food crops and chronic diseases in Sections 1.8.1 and 1.8.2, respectively.
disintegration, adoption and assimilation of second generational foods. The decline in consumption of African indigenous food crops has been implicated in the rising cases of chronic diseases which are alien to Africans, and of which they have limited knowledge with respect to treatments in traditional settings.

Chronic diseases are prolonged illnesses that are usually managed, rather than completely cured. Chronic diseases last or are expected to last for a year, causing functional limitations or the need to continually seek medical care, and could be extended to include disability (Shi et al., 2010). Chronic diseases, including cardiovascular diseases (CVDs), cancers, obesity and type 2 diabetes mellitus, are the leading cause of death among people worldwide, raising serious concerns across the public health sectors (Kankeu et al., 2013; WHO, 2012). Four factors have been identified as being responsible for this phenomenon: poor diet, lack of exercise, and tobacco and alcohol use (WHO, 2005). Key among them is poor diet. The prevalence of diet-related diseases among the Indigenous people of Africa have been associated with the Westernization of eating habits (Barnard, Nicholson & Howard; 1995; Hu et al., 2000), including the replacement of traditional foods that are rich in fruit and vegetables with high calorie foods that are high in fat and sugar and low in complex carbohydrates (Lock et al., 2005). The thesis seeks to contribute to global efforts in finding solutions to the spread of chronic diseases, particularly in Africa.

1.2 Problem Statement

African Indigenous food crops, particularly indigenous leafy vegetables and staples, face eminent extinction due to negative perceptions associated with them that are not linked to nutrition (Darkoh, 2003; Voster et al., 2007a). Some of these negative
perceptions include being considered as poor people’s food or famine food, and being subject to backward knowledge (Darkwa & Darkwa, 2013; Voster et al., 2007a). However, African Indigenous food crops have cultural significance. In addition to these cultural values, African Indigenous foods are also medicinal in nature, which requires Africans to preserve them for posterity. The marginalization and subsequent decline in consumption of African indigenous food crops have been implicated in the emergence and spread of chronic diseases in Africa, posing serious health and economic burdens to people and governments (Kankeu et al., 2013; Rasche et al., 2007).

Globally, moving away from traditional foods to more refined Western diets has been linked to increases in the prevalence of chronic non-communicable diseases (Lock et al., 2005). Global statistics on chronic diseases such as type 2 diabetes, hypertension, cancers, cardiovascular diseases and obesity raise serious concerns (Airhenbuwa & Iwelunmor, 2012). The global estimate for people living with diabetes in 2011 was 366 million, and this figure is expected to increase by 42% (to 522 million people) by 2030 (Whiting et al., 2011). The incidence of hypertension exceeds 600 million people (Sacco et al., 2011) and is projected to increase to a total of 1.56 billion people by 2025 (Lago, Singh, & Nesto, 2007). According to the WHO, human deaths attributed to chronic diseases and their risk factors in 2008 alone was 36 million, and the majority of these deaths (80%) occurred in low and middle income countries (WHO, 2011b).

In Africa, cases of chronic diseases are increasing rapidly at a time when the fight against communicable disease is still ongoing. It is projected that chronic diseases will outpace the reduction in infectious diseases, culminating in the rise of a “double-burden” of disease. A study conducted by WHO (1999) discovered that cardiovascular diseases
were the second major cause of death in Africa, accounting for almost 11% of total
deaths. In 2005, the WHO estimated that approximately 361,000 people died of
ischaemic heart disease in Africa, and this figure is expected to double by 2030 (Mensah,
2008; WHO, 2008). According to Pisa, Vorster and Nishida (2011), the burden of
cardiovascular diseases faced by African countries is most likely to double by 2020 due
to the accelerated pace of nutritional transition. Stroke was estimated to cause 3% of all
deaths and 52% of vascular deaths in Africa in 2004 (Connor et al., 2007). The
prevalence of diabetes mellitus in Africa is predicted to increase by 80% in 20 years
(International Diabetes Foundation, 2009). One in five deaths from chronic diseases in
adults over 45 years in Africa was estimated to be caused by cancer (Parkin et al., 2008).
Available statistics also indicate that about 715,000 new cancer cases and 542,000 cancer
deaths occurred in Africa in 2008 (Ferlay, 2008).

Ghana is battling with the chronic disease burden in Africa. Despite the increasing
cases of chronic diseases in Ghana, little attention is given to chronic non-communicable
diseases compared to the communicable or infectious diseases such as HIV/AIDS and
tuberculosis (de-Graft Aikins, 2007; Dua et al., 2013). The diseases which hitherto were
considered the diseases of affluence are now common among the poor, who suffer the
most severe consequences due to their inability to afford the cost of managing chronic
illness. Diseases such as hypertension, stroke, diabetes and cancer, which are all partly
diet-related, have become major health concerns in Ghana (Bosu, 2007; Ministry of
Health Ghana, 2001). Various studies conducted in Ghana have revealed annual increases
in new cases of chronic diseases (Addo et al., 2012; de-Graft Aikins, 2007; Dua et al.,
2013).
A survey conducted by the Diabetes Association of Ghana in the 1990s revealed a prevalence rate of 2-3% in urban centers and by the late 1990s the figure had almost tripled to 6.4% (Amoah, 2003). In 1998, a national survey of non-communicable diseases revealed a 27.8% prevalence rate of hypertension (Bosu, 2007). Subsequent surveys have revealed higher figures across different regions in Ghana: 28.7% in Kumasi, Asante Region, 32% in Bawku/Zebilla, Upper East Region; 36.9% in Keta Dzelukope, Volta Region and 47% among a cohort of women in Accra (Cappuccio et al., 2004; Hill et al., 2005; Pobee, 2006). Hence, the nationwide cases of hypertension from 1989 to 1998 rose by 67%, and from 1998 to 2005 the outpatient reported cases increased by 155% (Bosu, 2007).

In addition, the rate of obesity among children in Ghana has almost quadrupled, from 0.5% in 1988 to 1.9% in 1993/94 (Ebbeling, 2002). Ghana Demographic and Health Surveys (DHS) revealed that the prevalence of overweight or obesity among non-pregnant women nationwide increased 2.5-fold from 10% in 1993 to 25.3% in 2003 (Ghana Statistical Service, 2004). The inquisitorial aspect of these statistics is that both the WHO-sponsored national obesity survey and the Ghana Demographic Health Survey showed higher obesity rates in Southern Ghana, which is more urbanized than the Northern Regions (Biritwum, Gyapong & Mensah, 2005). The results of the two surveys thus confirmed the claims that diet-related diseases were prevalent in the urban population, which had changed its dietary patterns from traditional foods to Western processed foods (Barnard et al., 1995; Hu, 2011; Hu et al., 2000).

In Ghana, Westernization of eating habits due to urbanization, increased income, and an increase in the numbers of salaried workers, among other factors, was implicated
in the rise of chronic diseases (de Graft Aikins, 2007). Studies (e.g., Simipoulos, 2002; Simopolous et al., 1999) have revealed that the presence of omega-6/omega-3 ratio > 4/1, commonly found in most Western diets, was linked to the increased risk of chronic diseases such as CVDs, breast cancer, and inflammatory and autoimmune diseases. What makes the situation in Africa more complex is the fact that changing food habits are associated with urbanization, modernization and affluence (Agyemang et al., 2012; de-Graft Aikins, 2007). These influences are too seductive, drawing many people, especially the Indigenous groups and the poor, into this nutritional quagmire. It is therefore not surprising when Fall (2001) revealed that epidemics of obesity were higher among the higher income population in urban areas in developing countries, while the opposite was observed in developed countries where the poor were the most affected.

With growing urbanization in most parts of Africa, the tendency for diet-related illnesses to become epidemic is high. With Ghana’s rapid urban population growth from 23.3% in 1960 to 51.5% in 2010 (Ghana Statistical Service [GSS], 2012), the consequences of chronic illnesses will be devastating without adequate measures to control the situation. Numerous studies (e.g., Addo et al., 2012; Agyemang et al., 2012; Amoah, 2003; Bosu, 2007, 2010) conducted on chronic diseases in Ghana have focused on biomedicine and not much has been done to explore the potential of African Indigenous food crops in addressing the chronic disease burden. Due to the above stated problems, this thesis sought to address the following major research questions:

1.2.1. Major Research Questions

1. Why is culture relevant in understanding food habits, food politics and the consequences of changing food habits in Indigenous communities?
2. What role can African Indigenous food crops play in addressing the chronic disease burden in Ghana?

3. What are the prospects and constraints in promoting African Indigenous food crops in Ghana?

1.3 Aims and Objectives

To understand the Indigenous food habits, the following specific objectives guided the conduct of this study:

1. To establish the link between food, culture and politics and determine the consequences of changing food habits in indigenous communities in Ghana.

2. To examine the potentials of Indigenous African food crops in addressing chronic disease in Ghana.

3. To determine the prospects and constraints facing the promotion of African indigenous food crops in Ghana.

1.4 Justification

The continent of Africa is bedeviled with many challenges, most of which are human induced. From economic hardship to climate change, Africa has always been viewed as the Dark Continent by the Western world, though most of the problems facing Africa today can be partly traced to colonization and failed policies of global capitalism spearheaded by the World Bank, International Monetary Fund (IMF) and World Trade Organization (WTO). Despite the fact that most international policies and agreements (enacted at higher governmental levels) exclude the local people, the ordinary people could help to mitigate the hardships by patronizing Indigenous African food, local goods
and resources for day to day life activities. Patriotism is a crucial tool that can be used to ensure accelerated development in Africa, since most foreign policies are inimical to the ordinary citizens. For instance, the Agreement on Agriculture (AOA) being implemented by the WTO has turned Africa into a dumping ground for most Western frozen and processed foods, which are high in energy, fat and sugar.

The AOA allows global Northern farmers to enjoy subsidies but denies the same rights to the global Southern farmers, resulting in farmers in the global South being less competitive and making imported food cheaper compared to that produced locally (Bernstein, 2013). Appiah (2006) cited an observation made by former World Bank president, James Wolffensohn, in his book *Cosmopolitanism: Ethics in the world of strangers*, which suggests that on average, a European cow lives on a $2.50 a-day subsidy when three billion people in developing countries live on less than $2 a day. The overall effects of these WTO policies are manifested in the way most African countries, and for the purpose of this thesis, Ghana, have become net importers of food (see Ashiety & Rondon, 2012). Ghana spent one billion US dollars to import food products (rice, cooking oil, wheat, canned foods, processed meats, etc.) and exported only 100 million dollars’ worth of food in 2011 (Ashiety & Rondon, 2012).

The desire of many Africans to consume imported foods, commensurate with their ‘modern’ status, has also resulted in the loss of identity or dilution of most African culinary cultures. There is high demand for imported foods in Ghana, and this demand continues to increase annually (Ashiety & Rondon, 2012). There is also a rapid change of eating habits among Africans, especially youth, to Western processed food, as they consider Indigenous foods to be outdated (Pisa, Vorster & Nishida, 2011; Vorster et al,
Africa, and for that matter Ghana, cannot afford the devastation of diet-related diseases, especially when the cost of managing these diseases is beyond the salaries of average workers. de-Graft Aikins (2007) demonstrated that the monthly cost of managing diabetes in Ghana is three times the minimum wage. The economic implications of chronic diseases could be worsened, since a majority of the Ghanaian working population operates in the informal sector; hence, an attack of chronic diseases would mean no business and consequently, no income.

This study’s goal was to create awareness in Ghanaians of the need to reconsider their relationship with Indigenous African foods, and to explore the potential they hold to address health challenges and reduce poverty. It also aimed to provide insights to policy makers on how to incorporate African Indigenous foods in their health programmes and policies. It is offered as a contribution to the ongoing debate on the chronic disease burden in Ghana in particular, and in Africa in general.

1.5 Personal Location

In writing a critical work such as this, glorifying objectivity and rejecting subjectivity is a misplaced priority. I am a male Ghanaian and an international student in Canada. As a young person I lived with my grandmother, who was a traditional birth attendant in our community in Ghana. As one of her favourite grandsons, I had the privilege to assist in the preparation of food in our home and I was introduced to a variety of African Indigenous vegetables and herbs that were not available in the local markets. I also learnt that sometimes foods are prepared to meet the physiological needs of people. Hence, if someone is sick he/she is not supposed to eat certain foods. Again, the food for expectant mothers or nursing mothers was made differently to meet their physiological
needs, such as the production of breast milk for the newborn baby, and also for faster healing of wounds sustained during childbirth. There were specific African Indigenous leafy vegetables such as nettle weed (local name in Akan: bhonho and scientific name *Fleurya aestivalis*)\(^2\) (see also Dokosi, 1998) and Indigenous spices such as grain of paradise (*Aframomum melegueta*), Negro pepper (*Xylopia aethiopica*), and calabash nutmeg (*Monodora myristica*) among others used for that purpose.

Typical examples were the occasions when my aunties came to our home to give birth instead going to the hospitals in the cities. My grandmother would prepare special food using a mixture of local leaves with “nuunum” by the Akan being the most popular one I can remember. Though the food was meant for the new mother, as children we had the opportunity to taste it, and on countless occasions we were glad we did for it was very good and spicy. Again, on occasions when a woman had complications in delivering a baby, my grandmother would give the woman in labour some local herbs to eat and within a few minutes the baby would be delivered without any further complications. My grandmother used these plants to deliver several babies and on not a single occasion was a baby lost in delivery.

I grew up with the understanding that food is eaten to satisfy hunger or heal people from sickness. However, my experience in the Eurocentric boarding (residential) school structured by the British was different. Food was eaten by the clock of time, following established routines and protocols, and it did not matter whether one was hungry or not. The foods we were exposed to or fed were the ones sanctioned by the board of directors of the school as a balanced diet; Indigenous grains, including peal

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\(^2\) All names in italics are scientific names. Pictures of all the Indigenous foods are in Appendices I and II.
millet, finger millet and sorghum were considered of less value and were therefore eliminated from our menu. The decisions as to what we ate were entirely in the hands of the school authorities and our input was not sought. Although some religious practices prohibited individuals from eating certain foods, for instance Muslims do not eat pork and some traditionalists do not eat animals or plants that symbolize their totem, school authorities considered some of the beliefs and practices as primitive and unacceptable.

Eating with the hands was considered archaic, hence the need for authorities to orientate us by taking us through lessons to mimic the Western way of eating: how to hold, and place, a fork, knife and spoon whilst dining and how to sit at the dining table, among others things, were the pre-occupation of our matron and kitchen staff who themselves had become “a commodity of western ideology” (Wane, 2008, p. 187). Those who were inclined to their Indigenous upbringing and had difficulties in catching up quickly with the westernization were laughed at and labeled village folk, as if it was a crime to live in a village. Our communal way of eating was broken and individualism and self-centeredness were encouraged. Each student had his/her unique cup, plate, spoon, fork, etc., which were not transferable in most instances.

At the end of my boarding school experience, the authorities succeeded in westernizing me and other students. My eating habits and food preferences completely changed. Food is like music: the more you are exposed to it, the more you become accustomed to it. My desire for Western foods over traditional foods increased. To compliment my new-found diets, I began listening to country music, blues and foreign gospels. Local foods and music became outdated for me and I began questioning the Indigenous way of life. I had no desire to eat in a group, as was the norm before going to
secondary school. I began asking for my separate bowl of food, which was detested by my grandparents, aunties, siblings and uncles as it was seen as a sign of division, breaking the bond that existed in the family.

Reflecting back on the values and practices that governed eating in groups, I could now understand why my grandparents insisted on the communal way of eating in the family. Eating in groups provided an avenue for inculcating in us (children in my family) the sense of responsibility and respect. I can remember that the children of my age group (boys and girls ate in separate groups) were usually served at the center of the family house to enable adults monitor us while eating. Eating followed certain routines to ensure that every member of the group assumed a key role and responsibility. The routine started with the eldest child among us ensuring that everybody washed his hands with soap before dinner commenced. When I was the youngest in the group, the next younger child and I held the bowl containing the food firmly with our left hand to keep the food stable at dinner. As a sign of respect, the eldest child was supposed to take the first bite, followed by the next according to age until it was my turn, the youngest of the children. My responsibility as the youngest child was to respect my elders during and after dinner and in return I got gifts and protection from being bullied.

To ensure equity, the youngest in the group shared the fish but the eldest was the first to pick, and this followed according to age down to the youngest. The responsibility of sharing fish/meat rested on my shoulders as the youngest child and oftentimes I made a conscious effort to ensure meat/fish were shared equitably to avoid being disadvantaged. This was because I was the last to pick meat/fish. Talking while eating was prohibited to prevent choking or spilling saliva into the food; the onus lay on the
eldest child among us to enforce this value. When the eating was about to finish, the
eldest child of the group was the first to rise up, followed by the next in age until the
youngest child. I was always the last to rise up, even when I was full before the rest, as a
sign of respect and also to ensure the bowls were washed. For instance, if an older child
consistently competed with a younger child for the last piece of food or fish, this was
considered bad behaviour and the older child could not be trusted with the responsibility
of taking care of younger siblings or family members. Hence eating in a group not only
fostered family ties, but also provided the opportunity for adults to identify children who
could be assigned responsibilities and leadership roles in the future. Children were also
reminded on a daily basis to respect their elders and to take responsibility for others. My
experience at boarding school was completely different from eating practices at home. As
a child, I found individualism and my right to a separate bowl of food more attractive
than my duties of responsibility and respect of others. This created internal conflict
within me and for a whole year at home, waiting to enter university, I had to adjust in
order to fit into the family.

Finally I gained my “freedom” when I entered university. Now I decided what I
would eat and became attached to more refined Western foods. I only became aware of
the dangers of my eating habits when I felt sick and was advised by a physician to avoid
certain foods that I considered healthy and modern. Then I began to appreciate what my
grandmother used to prepare for us. I vividly remember my grandmother preparing a
meal consisting of a leaf, called “Zoogala gandi” in the Hausa language, mixed with
“gari” and oil which, according to her, she inherited from her great-grandparents. After
boiling the leaf, she sieved the leaf to separate the solid part from the liquid. As children,
we sipped the leftover liquid, an action that received no reprimands from my grandmother because she knew its medicinal value. About ten years later, after I had graduated from university and was teaching in the city, I heard of a wonder plant called “moringa”, which according to scientists cures several diseases. The leaves are dried and ground and the powdered form sold to schools, corporate organizations and individuals in Ghana to incorporate into their food. Our school decided to purchase the seedlings to plant on our school compound. To my utmost surprise, the wonder plant was none other than “Zoogala gandi”, which we were exposed to years earlier. I wondered how my great-grandparents had such knowledge even before scientists could attest to the potency of that plant.

The connection between people and food was demonstrated by Prof Wane during one of her classes for the ‘Cultural Knowledges, Representation and Colonial Education’ course offered at the Ontario Institute for Studies in Education, University of Toronto in the fall of 2013. As part of a presentation, my group decided to do an exhibition to conceptualize our topic “Museumization and showcasing of cultures”. A colleague brought specie of pepper from Chile which is also common in most parts of Africa and Caribbean. At the end of our presentation, we asked people to comment or ask questions regarding our presentation. Surprisingly, among the entire exhibits, the one that caught the attention of most students who originated from Caribbean and Africa was the pepper. Most of the “after presentation” discussions centered on the pepper. Many students showed how the pepper had re-connected them to their ancestral home and brought back some memories which go to show the relevance of food to our culture.
Finally, my last connection to this topic was the experience I had in my high school days. I sat in an agricultural class where I was taught the origin of almost all the major food crops that we consume today in Ghana. According to the textbooks, these food crops either originated from Europe or the Americas. As young students our point of interest was how to memorize the botanical (scientific) names of these crops to prove to our colleagues doing non-science courses that we were of a different breed. The dexterity with which we mentioned the scientific names in a European accent was admired by our non-science colleagues. But what never occurred to us was to ask the question, if all these food crops originated from Europe or the Americas, what did our forefathers eat before coming into contact with Europeans in 1400?

The argument that perhaps they were eating from the wild does not hold, because indigenous groups like the Akans, prior to their encounter with Europeans, had the names of the months depicting the various cropping seasons. Again many Ghanaian festivals, which existed prior to the coming of the Europeans, are observed to commemorate food harvesting; for instance the “Akumaase” and “Damba” festivals usher in the harvest of yam. “Homowo” (meaning hooting at hunger) of the Ga tribe was another that established the value of Indigenous crops (millet). These examples are ample evidence that they were cultivating food crops before coming into contact with the Europeans. Thus the question is: What were they cultivating? How reliable were those foods? The silencing and non-promotion of indigenous crops is the legacy of the colonizer/colonized relationship established by the British, in which the colonial masters saw everything Indigenous as inferior and needing to be replaced. By our African tradition and culture, a
foreigner or a visitor is supposed to eat what he/she is given by the local people and not to impose his/her food and culture on the locals.

1.6 Limitations of the Study

The study drew largely on secondary source data from peer reviewed documents and studies. Secondly, in tracing the origin of major foods in Africa, the study focused on crops rather than animals for two main reasons: first, crops are more widely consumed in Africa than animal products, and secondly, there is a more substantial availability of credible documents on the introduction of crops into Africa compared to the scanty documentation available on animals. The food crops considered in the study are mainly cereal grains, legumes, roots and tubers and vegetables. Fruits are not considered in order to have a specific focus on staples and vegetables, which are the major food items in Ghana. Secondly, consumption of fruits is very low in Ghana and many policies aimed at increasing fruit consumption have yielded no positive results due to exorbitant prices of fruit in Ghana (de-Graft Aikins, Boynton, & Atanga, 2010).

1.7 Organization of the Study

This thesis is organized into five main chapters. Chapter one is sub-divided into eight sections, with the first section giving the background of the study. Section two highlights the problems under investigation; section three provides the aims and objectives that guide the conduct of this study and section four justifies the relevance of this study to policy makers and individuals. Section five, which looks at personal location, explains what motivated or brought the author to the topic. Section six looks at the limitations of the study by defining scope of the study – what is covered and what is not covered. Section seven highlights the structure of the study, and finally section eight,
which concludes Chapter One, explains the key phrases or terminologies used in the study. Chapter Two of this thesis reviews relevant literature linked to the specific objectives of the study, including the historical origin of major staples in Africa, ethical considerations in tradition food production, changing food habits in Africa and Ghana, and others. Chapter Three provides the theoretical framework of the study and discusses the methodology used to accomplish this research. Chapter Four draws on the documents reviewed to discuss the findings of this study and lastly, Chapter Five draws conclusions and recommendations based on the findings of this study.

1.8 Definitions and operationalization of key phrases

The key phrases or terminologies in this study are: “African Indigenous food crop”, “chronic diseases” and “westernization of eating habits”. Their meanings as used in the context of this thesis are discussed below.

1.8.1 African Indigenous Food Crops

The phrase Indigenous food crops is used to refer to food crops that are indigenous to a particular region or introduced to the region from another geographical area, but have been used over a long period of time (Engle, Shanmugasundaran, & Hanson, 2003). African Indigenous food crops are sometimes referred to as traditional food crops or vegetables. Smith and Eyzaguirre (2007) distinguished Indigenous food crops from Traditional food crops of Africa. They explained that Indigenous food crops are those that have their natural habitat in Sub-Saharan Africa, while traditional food crops were introduced over centuries ago and due to long use, have become part of the food culture in the sub-continent (Smith and Eyzaguirre, 2007). Some of the
characteristics of Indigenous or tradition food crops include: grown locally on small scale, often resistant to local diseases and pests, withstand environmental stress and well adapted to the local climate.

Based on the definitions of Indigenous and traditional food crops of Africa, as borrowed from Smith and Eyzaquire (2007), we can classify African crops such as millet, sorghum, African rice, yam (several species), black eyed beans, sesame, okra, Bambara groundnut, oil palm, as well as several species of African green leafy vegetables (both wild and cultivated) as Indigenous crops. Other crops that were introduced over centuries and adapted to the local climate such as cassava, maize, sweet potatoes, tomatoes, onion, pepper and others can be classified as traditional crops. Crops such as carrot, cabbage, cauliflower, lettuce, spinach, and radish, are among those called exotic crop; they were introduced recently and are not well adapted to the African climate. For example, crops that cannot produce seeds in a tropical climate can be classified as exotic crops. However, in this thesis the term “Indigenous food crop” is used to refer to crops of African origin that are undergoing extinction. Nevertheless, the phrase “Indigenous foods” or “Indigenous food crop” and “traditional foods” or “traditional food crops” will be used interchangeably to mean endangered crops of Africa.

1.8.2 Chronic Diseases

According to the Government of Australia (2012), chronic diseases are ailments with a prolonged duration, do not occur spontaneously, and are rarely cured completely. Chronic diseases are complex and varied in terms of their nature, causes and impacts on individuals and communities. The common examples of chronic diseases are non-communicable diseases (NCDs). Globally, the phrase non-communicable diseases is
“used in opposition to ‘infectious’ or communicable diseases (CDs)” (Whyte, 2012, p. 65). The prototypes of NCDs are cardiovascular conditions (heart disease, hypertension, and stroke), cancers, chronic respiratory conditions and type 2 diabetes (Daar et al., 2007). Other chronic diseases include epilepsy and sickle cell anemia. The health implications of chronic diseases are twofold: while some chronic diseases are responsible for premature death, others result in permanent disability (Whyte, 2012). However, in this thesis, chronic diseases refer to diet-related non-communicable diseases that are known as 'life diseases' and associated with eating habits and a sedentary lifestyle, including CVDs, cancers, osteoporosis and diabetes.

1.8.3 Westernization of Eating Habits

Throughout history and in contemporary times people adopt different food items, modes of food preparation, and ways of serving and eating particular foods, which were previously not part of their food culture. The change in tastes and food preferences is influenced by cultural contacts through migration, urbanization, trade, change in religious membership or beliefs – a pork eater converts to Islam or Judaism, and/or a person becomes a vegetarian – and others. Adoption and diffusion of food has occurred in every part of the world. For example, food items such as coffee from Africa and tea from Asia contributed significantly to the development of the Western world through making the West and the North the industrial hub of the world (Claxon, n.d.). For instance, beer, the chief beverage in pre-industrial Europe, created a tradition of heavy drinking resulting in very low productivity.

However, when the industrial revolution began in Europe in the 19th century, they needed an alternative beverage to replace beer and keep the labour force active and
productive. Coffee from Ethiopia and tea from China, which became available in Europe in the 17th century, were promoted by a social movement dubbed “temperance campaigners” who support abstinence from alcoholic beverages (Grigg, 2003, p. 283). Both coffee and tea contain caffeine, which stimulates the central nervous system, reduces sleepiness and increases vigilance; this is the opposite of the effects of beer. Coffee and tea therefore provide an important focus for European social life. Potato from America (specifically Peru) was introduced into Europe and became the chief food in Europe. In the 19th century (between 1845 and 1852), the potato crop failure in Ireland resulted in the death of about one million Irish people and the mass migration of another million Irish people to various part of the world (Rose, 2002).

Colonization of African saw the introduction of crops such as maize and cassava, which later became the chief foods in Africa. Colonization and occupation of the Americas also brought farm animals such as cattle, sheep and goats into a continent where these animals were extinct after the retreat of the glaciers (Brands et al., 2011). Adoption and diffusion of food have therefore been part of human history; however, they become problematic when characterized in terms of coercion, exploitation and health complications.

All in all, the Westernization of eating habits is essentially refers to a high intake of food additives such as salt and sugar, high consumption of meat and meat products, and a low consumption of plant based foods, with an excess consumption of canned and fast foods (processed foods). It also includes a high intake of alcoholic beverages such as beer, whisky and wine, which became part of the food culture of Europe during the second agricultural revolution in the late 18th century (Trowell, 1981). Therefore in this
thesis, Westernization of eating habits is used to mean excessive intake of food that contains high amounts of salt, sugar and fat, along with alcoholic beverages associated with modernization and civilization and a low intake of the plant based food that formed traditional eating habits
Chapter 2

Literature Review

2.1 Africa and Columbian Exchange

On the evening of October 11, 1492, Christopher Columbus on board Santa Maria in the Atlantic Ocean thought he saw a tiny light far in the distance. A few hours later, Rodrigo Triana, lookout on the Pinta’s forecastle, sighted land. In the morning a party went ashore. Columbus had reached Bahamas… The two worlds, which God has cast asunder, were re-united and the two worlds which were so very different, begun on that day to become alike. That trend towards biological homogeneity is one of the important aspects of the history of life on this planet since the retreat of the continental glacier. (Cosby, 2003, p. 3)

The above encounter is dubbed Columbus’s discovery of America, an issue which is highly contested. The concern raised with regard to this ‘discovery of America’ was that the land was occupied by Native Americans for millennia before Christopher Columbus was born; hence he cannot be accredited for the discovery of a land full of people. This notwithstanding, the encounter of 1492 by Columbus changed the world ecology and Africans had their fair share of what historian Alfred Cosby described as “Columbia exchange” (Cosby, 2003). To bridge the ecological gap between the old world and the new world, many plants, animals and pathogens as well as diseases were exchanged, but Africans were always on the receiving end. McNeil acknowledged Cosby’s silence on Africa in his book *Columbian Exchange: The Biological and Cultural Consequences of 1492*” which, according to Cosby, was due to inadequate information at his disposal at the time he wrote the book. McNeil wrote in his foreword:

Though they came in chains part of their fauna and flora came with them including African rice, okra, yams, black eyed peas, millets, sorghum, sesame and the pathogens

The above quote highlights the value Indigenous Africans’ attachment to their foods and culinary cultures, to the extent of taking their crops with them to the new world, even in chains. This is a form of resistance to food politics exhibited by the enslaved Africans. However, Diamond (1997) in his book *Guns, Germs and Steel: A Short History of Everybody for the Last 13,000 Years* contended that Africans were not blessed with the most promising domesticable food plants and animals in global terms; as a result, few crops and animal species were exported from the continent. In contrast to Diamond’s (1997) assertion, Africans were in fact blessed with foods that suited their environment and also prevented them from developing strange illnesses, as most of the indigenous crops in Africa are medicinal by their nature. Recent studies have provided ample evidence to suggest that African Indigenous foods are best in terms of their efficacy in controlling disease (Bangana et al., 2005; Raschke et al., 2007). They are also suited to the African climate, with the ability to withstand drought (Culwick & Culwick, 1941). In fact these foods could be explored as a means of solving food insecurity in Africa.

It is worth acknowledging that out of the 150 plant-based foods used by humans, 115 originated from Africa and the world’s major regions of crop diversity, including the Ethiopian highlands, the Sahelian transitional zone, the delta of the Niger River and the humid forest zone of West and Central Africa (Kiambi et al., 2003). The term “endemism”, which refers to the proportion of species not found anywhere else in the world, is high in Africa (Kiambi et al., 2003). It is estimated that 45% of crop species are

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3 Note: coffee was taken from Africa to Europe by Arab merchants and from there it spread to America (see Grigg, 2003).
endemic to tropical Africa (Sayer, Harcourt & Collins, 1992). One phenomenon that has contributed to the underutilization of African crops is the globalization of the world food system by the capitalist economy, resulting in many government based research institutions paying little or no attention to African Indigenous crop species and their potential for local crop improvement (Adebooye, Ogbe & Bamidele, 2003; Adebooye & Opabode, 2005). The simple reason for the underutilization of Indigenous African crops is that most government research institutions are funded by overseas partners who set the priorities for research based on what they consider relevant. In such cases, Indigenous crops that have little international appeal or do not promote global trade are considered irrelevant.

The concept of food in global terms is erroneously grounded in the narrow sense of what the Western world validates and promotes as proper food. Davis (2000) revealed how the differential allocation of food constituted a gross injustice of European hegemony. His assertion was supported by an emerging encounter between postcolonial theory and food studies that demonstrated how this hegemony permeates the imagination of humans (Roy, 2010; Tompkins, 2012). The wrongs of industrial capitalism are manifested in the ways food is grown and distributed, from seed (Kloppenburg, 2009) to retail (Spurlock, 2005) and waste (Royte, 2008). The Western hegemony in the categorization of plants and animals as food in global terms was challenged by Sahlins (1976) when he stated that “the exploitation of American environment, the mode of relation to the landscape, depends upon the models of a meal that includes a central meat element with periphery support of carbohydrate and vegetables” (p. 176).
Sahlins (1976) further argued that the world would have witnessed an entirely different structure of agricultural production and articulation to the world market if, for instance, Western countries and in particular, “Americans,” ate dogs and horses, both of which are edible in some parts of the world. Therefore, food production is governed by the cultural construction of consumption along with symbolic taboos and valuation (Dietler, 2007). Hence, focusing on consumption offers a vital premise with which to understand the social and cultural relevance of food and its role in colonialism (Dietler, 2007). Diamond was not the only dominant writer who propagated the concept of Africa lacking suitable crops and animal species. Alfred Cosby (2003) echoed Diamond’s (1998) argument and elaborated it further in a statement which, by inference, suggests Africans were saved by the introduction of foreign crops. He wrote:

[...] the importance of American foods in Africa is more obvious than in any other continent of the Old World, for in no other continent, except the Americas themselves, is so great a proportion of the population dependent on American foods. Very few of man’s cultivated plants originated in Africa...and so Africa has had to import its chief food plants from Asia and America...As for the influence of these crops before 1850, we might hypothesize that the increased food production enabled the slave trade to go on as long as it did without pumping the black well of Africa dry. (pp. 185, 188)

This argument raises critical issues that are worth commenting on, especially when it seeks to suggest that the introduction of American foods was intended to induce a rapid reproduction among Africans to sustain slave trade. Furthermore, the claim that “very few of man’s cultivated plants originated in Africa” is highly problematic. Apart from it being sexist, it also brings into question which “man” is being referred to here by Alfred Cosby? Is he referring to the “White man”, “Westerners” or the entire human race? The fact that some crops were not exported to or from Europe or the Americas does not mean they were not consumed elsewhere in the world. How did Cosby account for the
numerous crops that were consumed by Indigenous Africans but are not on the world market? Or is he saying Indigenous Africans are not part of the “man” (human race - if that is what he means by “man”) being referred to in this context? Unfortunately, the argument that Africa lacks desirable crops represents the view of many dominant writers. The first is the Malthusian assumption that new crops stimulated rapid population growth during the post-Columbus era to replace population losses suffered through slavery – hence an exchange of a sort (Alpern, 1992). Contrary to this assertion, Rodney (1982) had earlier argued that population growth in Africa was stagnant between the period of 1600 – 1900 compared to growth rates in other continents, the period in which most of the crops were introduced to Africa.

Rodney’s (1982) argument has been corroborated by recent studies (Carney & Rosomoff, 2010; Inikori, 1994) suggesting how the slave trade drastically reduced the population of Africa and deprived some areas of exuberant agricultural labourers at their peak age, a condition that might have facilitated the adoption of early maturing crops like maize rather than millet and sorghum, or less labour-intensive crops like cassava rather than yam. It is worth emphasizing that African Indigenous farmers place a high priority on the selection of risk-averse crops (crops that withstand environmental shocks) rather than high yield crops (Longman, 2012). Hence there is an inbuilt mechanism in Indigenous African farming systems to ensure crop diversification; one such farming system is the practice of polyculture (growing different types of crops on the same piece of land), which contrast with mono culture (growing a single crop on a piece of land, which is the focus of Western agriculture). Polyculture guards against total crop failure in
the event of disaster such as drought, flood or bush fire, since different crops respond to these disasters differently.

The second assumption is that Indigenous African grains (sorghum, pearl millet, African rice, black-eyed beans, finger millet, etc.) and tubers (varieties of wild and cultivated yams) were incapable of meeting local demand for foodstuffs (Diamond, 1997). This assumption is also not satisfactory, due to the lack of evidence of hunger during the period in which foreign crops were introduced into Africa. What could have occurred were seasonal variations in food supply due to changes in rainfall patterns. Notwithstanding this shortfall, there were Indigenous farming strategies such as timing of planting to coincide with the onset of rain, land fallowing, mixed cropping, crop rotation, mulching (heaping dry matter around the base of a plant to conserve soil moisture), and raising mounds and ridges, among others, to mitigate these challenges.

Logan (2012) explained that the intermittent food supply deficits could be described as a persistent feature of the limitations of farming practices and the environments, which are normal happenings in most parts of the world where farming is dependent on natural rainfall. In addition, the crops that were introduced into Africa in the 16th century, such as maize and cassava, were not as high-yielding as the ones that engulfed Africa in the 20th century. The foreign crops were transformed through breeding processes, which could also have been used to experiment with indigenous African crops like pearl millet, sorghum, or rice to enhance their productivity and reduce their maturity duration. To acknowledge how, for instance, maize was transformed, James McCann (2001) stated that “modern genetic alchemy has transformed maize’s personality from an obligingly adaptive vegetable crop into a hegemonic leviathan that dominates regional
diets and international grain markets” (p. 250). It is therefore valid to argue that if the African Indigenous grains – millets and sorghum – received the same attention, especially when they are richer in nutrients compared to maize (McCann, 2001; Raschke et al., 2007), they would have enjoyed the same patronage as maize and rice on the world market.

The third assumption suggests that since the introduced American crops (maize, cassava, tomatoes, chili peppers, etc.) came from the tropical parts of America, they adapted well to tropical African environments, thus their adoption was swift and fundamentally transformed African food and agricultural practices. However, the available evidence does not support the arguments that the introduced American crops adapted to the African climate, or that they were swiftly adopted by Africans without resistance. For instance, compared with African grains such as pearl millet and sorghum, maize was reported to be highly sensitive to drought, sunlight and nitrogen and rot easily in tropical storage (McCann, 2001). Inadequate rainfall at the time of tasseling could result in total crop failure. This assumption can be further challenged by the statement of James McCann (2001), which suggested that maize was not as well adapted to the African climate as opined. He noted that “Modern human management has thus produced a plant [maize] that anticipates a predictable ambience, with only a limited ability to conform to the soils and climate of diverse local landscape” (Italics mine, p. 250). Hence the various sources of evidence do not support touted accolade given to the introduced crops to justify the neglect of the African Indigenous crops. The next section traces the historical origin of most dominant crops in Africa, and specifically Ghana, to assert that their introduction was not based on food insecurity, health or nutritional grounds.
2.1.1 Historical Origin of Major Staples in African and Ghana

The objective of this section is not to elevate certain categories of foods and reject others, but to bring to the fore the silent voices or what Adam Smith, in *An Inquiry into the Nature and the Wealth of Nations* described as “invisible hands” (Smith, 1904). The section intends to enrich the debate by proposing that several factors contributed to the present nutritional transition. To quote an African adage that says “until the lions begin to tell their own stories; the tales of hunting will always glorify the hunters”. To this effect, this section intends to give the other arguments to make a whole story. The Nigerian writer Chimamanda Adichie (2009) cautioned us about “the danger of single story”. She said: “the single story creates stereotypes, and the problem with stereotypes is not that they are untrue but that they are incomplete; they make one story become the only story” (p.4).

No one can deny the contribution of foreign crops to the African food system. However, that being said, it should also not deny us the opportunity to know the history and motives behind their introduction into Africa, especially when there is a single story that suggests Africans were helpless prior to the introduction of foreign crops. Again, I intend to highlight the inherent power dynamics as well as capitalist intentions that come into play in determining what constitutes food. George (1976) revealed this perspective over three decades ago when she wrote:

This is what food has become: a source of profit; a tool of economic and political control; a means of ensuring effective dominance over the world at large and especially over the ‘wretched of the earth.’ (cited in Raschke & Cheema, 2007, p. 663)

Hence, arguing that the introduction of foreign crops provided a lifeline for Africa is a half story, and we need to interrogate further to make a whole story. Dietler (2007)
established a connection among food, identity formation and politics, and argued that food served as a mechanism of enactment of colonialism when he wrote:

The intimate links between food practices and the embodiment of identity and between commensality and politics make the domain of food an important arena for the working out of colonial struggle over the colonization of consciousness and strategies of appropriation and resistance. Indeed, it is reasonable to assert both that contemporary food ways and identities around the world are in large measure the product of long history of colonial encounters and that, reciprocally, food has been a consistently prominent material medium for the enactment of colonialism. (p. 218-219)

The quote from Dietler (2007) leads us to the discussion of the introduction of foreign crops into Africa. At the peak of colonization and slavery in Africa, a contingent of American crops, notably maize, cassava or manioc, potatoes, many beans, tomatoes, chili, tobacco, cocoa, prickly pear, agave, and avocado, among others, were brought to Africa in what Alfred Cosby (2003) described as a ‘Colombia exchange’. The rationale behind the introduction of these crops to Africans is still shrouded in myth. We can deduce from some arguments that it was intended to induce rapid human population growth in Africa to supply slaves to the new world (Cosby, 2003). To others, for instance in the case of cassava, it was introduced to promote laziness, soil depletion and malnutrition (Carter, Fresco, Jones, & Fairbain, 1997). However, it is certain that the introduction of these crops re-invented African food supply systems as well as those in other parts of the world and formed the foundation for neo-liberal agricultural policies.

Foreign crops, particularly those from America, arrived at different locations in Africa at different points in time. However, this thesis limits itself to tracing the genealogy of the two most dominant crops making big waves in Africa (i.e., maize and cassava). The intention is not to discourage people from eating foods made of maize or cassava, but to echo the silent voices concerning the history surrounding the reasons for
the introduction of these crops. When President Obama visited Ghana in 2009 to meet with the late president of Ghana, Professor J. E. A. Mills, he was served porridge at breakfast and kenkey and fish at lunch, which is different from the English breakfast and lunch normally given to a foreign guest. This made big headlines across the state-owned and private media in Ghana the following morning: “Obama ate African food”. The reason for serving him “local dishes” instead of the usual Western cuisine was also a point of interest, perhaps to demonstrate that he has come into his own; but ironically, he was served American food with an “African personality” (McCann, 2001, p. 246).

### 2.1.2 Arrival of Cassava to Africa

Cassava or manioc (*Manihot esculenta*) is believed to have originated in South America, specifically West-Central Brazil. Historical accounts indicate that the Portuguese first brought cassava to Africa in the form of flour or ‘farinha’. The Tupinamba’ Indians of Eastern Brazil taught the Portuguese techniques for the production and processing of cassava, and the Portuguese became accustomed to various processed forms of cassava (Carter et al., 1997). Cassava flour was used as a provision for ships plying African, Europe and Brazil. However, the actual cultivation of cassava on African soil dated back to 1558 (Carter et al., 1997). The initial purpose of the cultivation was solely to provide food for slave ships to feed the slaves, who were denied the privilege of deciding their food preferences. Then, 42 years later (1600 AD), the Europeans started to integrate cassava into Africa food culture.

The crop spread through Africa by various means; notably among them were the initial contacts with the Portuguese- Brazilian culture, which made cassava popular through trading activities, and mass migration (Prioul, 1957; Wood, 1985). Cassava
reached various parts of Africa at different times, depending on the nature of the contact with the Portuguese. For instance, cassava cultivation was first reported in 1611 in Central Africa and by 1620, Bras Correa witnessed massive cultivation by the Portuguese settlers at Mpinda at the mouth of the Congo River (Carter et al., 1997). In 1640, Dutch explorers cited the pressure of the Portuguese on the Natives in Luanda (Angola) to cultivate cassava to boost food supply in the town (Carter et al., 1997). The coercion of the Natives to cultivate cassava raises a critical question as to whose interests the Portuguese were serving – was it the Natives’ or their own parochial interest? What was the point in forcing people to produce food for their own sustenance?

In West Africa, cassava was introduced in the 17th century along the coast, but unlike the Central Africa its spread was slow. The first report of cassava cultivation in Gold Coast (present day Ghana) took place around the Accra plains in 1785 (Carter et al., 1997). The consumption of cassava was popularized by the freed Brazilian slaves in West Africa in 1800 (Carter et al., 1997). It is most probable that Africans learned how to process cassava into “gari” from the freed slaves. In the late 18th century, Henry Barhem (1794, p. 34, as cited in Natural History Museum, NHM, 2010) described how cassava was processed by slaves in America, using the same method as that used for processing cassava into “gari” in Africa. He wrote:

The root of this plant makes a very good and wholesome bread, notwithstanding the juice is a deadly poison, called mainpuera, wherefore great care is taken to press out all its juice; and then dried in the sun, beat, and finely sifted and baked upon a flat broad round iron. (NHM, 2010 p. 10)

Though the Africans learned the processing and consumption of cassava from the Native Americans, the consumption of cassava leaves as a vegetable was invented by African slaves in America. Long (as cited in Lunan, 1814) described this invention when he
wrote; “the negroes boil and eat the leaves as a green” (p. 163). The consumption habits and preferences of Brazilian settlers and freed slaves were revealed in their knowledge of cultivation and processing of cassava. This led to the spread of cassava through West Africa. The urban lifestyles and growth of the working class in Lagos (Nigeria) and other cities in West Africa increased demand for the crop. Local people copied the eating habits of the Afro-Brazilians, as is happening now with Western processed foods.

Overall, cassava in Africa gained popularity during the late 19th and 20th centuries when colonial administrations promoted its production (Carter et al., 1997). Carter and colleagues contended that the promotion of cassava cultivation occurred in manner insensitive to the applicability of the crop to local farming systems and food habits of Africans. This implied the people were coerced into cultivation of cassava at the expense of their Indigenous food, and eventually cassava became the main food for human sustenance. It is therefore intriguing to question the motive behind the interest of the colonial administration in the promotion of cassava. In their assertion, Carter et al. (1997) opined that even though cassava was believed to serve as an anti-famine or anti-locus crop, the underlying reason was to promote laziness, soil depletion and malnutrition among the Indigenous Africans. This was evident when the promotion of cassava occurred without adequate knowledge of its preparation; hence, Indigenous Africans had to apply the African way of preparing yam to cassava.

Cassava is poisonous when eaten fresh, due to a high concentration of cyanide (toxic substance in the white cassava juice; Aworh, 2008). Therefore, the Native American method of squeezing the liquid from the crop and frying it made the food safe for human consumption. This demonstrates the great Indigenous knowledge that
Indigenous Americans possessed about the crops that are native to their environment. The African invention of pounding cassava into “fufu” is another way of making cassava safe for consumption, and also adds to the relevance of Indigenous knowledge in food preparation. There are several cultivars of cassava with different concentrations of cyanide, ranging from 10-50mgHCN/kg of root depending on the variety (Aworh, 2008). Some varieties can have a cyanide concentration level up to 1000mg/kg of root in unusual cases (Aworh, 2008), which are beyond tolerable level for human consumption and therefore only good for the production of starch. Others can be made safe for human consumption through food processing or preparation to reduce the cyanide level to 10ppm, which meets the safe standards as recommended by the WHO (1991). Boiling cassava reduces the cyanide level by half and pounding it into ‘fufu’ further reduces the cyanide level by half, making it safe for human consumption depending on the cultivar or variety. Inadequate knowledge of cassava preparation created major health problems for Africans. Among the symptoms of cyanide poisoning from consumption of cassava with high levels of cyanogens, as reported in African, include: vomiting, stomach ache, dizziness, headaches, weakness and diarrhea (Akintowa, Tunwashe & Onifade, 1994). Extreme cases of chronic cyanide toxicity have resulted in irreversible paralysis of the legs, as reported in Eastern, Central and South Africa (Howlett, 1994), and tropical ataxic neuropathy – another complications associated with cassava that was reported in West Africa (Osuntokun, 1994). Tropical ataxic neuropathy is also characterized by lesions of the skin, mucous membrane, optic and auditory nerve, spinal cord and peripheral nerves, along with other symptoms (Osuntokun, 1994). The next section traces the origins of maize from America to Africa.
2.1.3 Arrival of Maize to Africa

The Indigenous Americans referred to corn as maize (*Zea mays*). Maize originated in South America, specifically Mexico. Cultivation of maize started close to 5,000 years BCE and rapidly spread from Mexico throughout the Americas to become a staple for the Mayan, Aztec and Incan civilizations (Hawke & Davis, 1992). The name “maize” was accredited to the Aztec and Mayans; it literally means “that which sustain life” and the Indigenous Americans claimed that the crop is life and blood (McCann, 2001). The earlier Spanish colonizers who arrived in the Caribbean saw the cereal (corn) growing universally, but it was not known in Europe, Asia and Africa (Hawke & Davis, 1992). Hence, the Europeans were the key architects who ensured that maize spread from the Americas to the rest of the world.

There various narratives regarding when maize first arrived in Africa. According to Santos and Torrado (1998, as cited in Alpern, 2008), maize arrived on the island of Sao Tome by AD 1537. A Portuguese pilot in the mid-sixteen century reported that the island’s slave traders fed their captives on “zaburro”, which is referred to as maize in the Western islands and is similar to chickpeas (Jeffrey, 1963, p. 121). In her narration, Dominique Juhé-Beaulaton, a French scholar, also gave a vivid description of how maize spread to West Africa in the 20th century. She noted that by the late 17th century, the cultivation of both millet and sorghum, which are the Indigenous grains, declined drastically compared to maize. Her accounts suggest by the 18th century maize was the principal *céréale cultivée* in most parts of Africa, with the exception of only two regions. These were the Volta River delta and coastal Axim (in present day Ghana), where rice dominated as the principal cereal (Juhé-Beaulaton, 1990). From the early 1930s, Africans
shifted their seasonal tastes, textures and colors to reflect the spread maize (McCann, 2001). The spread of maize reached its peak in the last decade of the 20th century and ousted the African Indigenous cereals. The next section discusses the reception and naming of maize among Indigenous communities in Africa.

### 2.1.4 Reception and Naming of Maize by Indigenous Africans

The introduction of American crops was initially met with resistance from Indigenous peoples, according to some narratives (Beinart, 2000). This was inherent in the names given to maize by the first Indigenous people, who received maize in the early stages. For instance, Chiang (1997) gave an account of how maize was named among the various ethnic groups in Africa. First, at the mouth of the Congo River in the mid-16th century, local Kikongo speakers called maize *maza mamputo* (“[grain of] the white man”); Mande speakers in Senegambia called it *tuba-nyo* (“white man’s grain”), a similar connotation. From Egypt and along the trade route south to Lake Chad, the local name for maize, especially in Hausa and dialects of Fula, was *masa* (meaning Egypt), indicating they first got maize from Egypt. Similarly, in the Hausa language that originated in Nigeria but is spoken across West Africa, maize is called *masara*, indicating its point of contact from Masar (Egypt). Among the Bemba group, maize is called *maka* (meaning Saudi Arabia) or *kaba* (signifying the black stone in Saudi Arabia), terminologies that suggest maize was introduced to them by pilgrims who returned from Saudi Arabia (Chiang, 1997).

The only two locations where the name of maize tried to mimic its original name in Portuguese, *Milho Zaburro*, are El Mina (est. 1482) in Ghana (then Gold Coast) and Mozambique (McCann, 2001). The Mozambicans called maize ‘zaburro’, the same as
Portuguese. Among the Akans, the largest ethnic group in Ghana, the local name for maize is *aburro*, a derivative of its original name in Portuguese (McCann, 2001). In addition, Akans call overseas countries *aburokyire*, literally meaning “[countries] where maize comes from” and the Whites (the English), the colonial masters, are *abrofo*, literally meaning owners of maize (McCann, 2001). Other names indicate where maize was first received. In Malawi, speakers of Chichewa christened maize as *chimanga* (literally meaning “from the coast”); in the East African coast, the Kiswahili referred to maize as *muhindi* – literally meaning ‘the grain of India’ (Chiang, 1997). Until the 20th century, maize was not considered a major food among the Indigenous people of Africa, or at least was considered as a vegetable. Even at the end of the 19th century, White farmers in Southern Africa still doubted the commercial value of maize and considered it as “kaffir” – a derogatory Arabic term to mean “infidel” (McCann, 2001). The non-recognition of maize as food was evident when an old man registered his frustration for been consistently fed on a maize diet in urban centers where he came do menial jobs.

Richard (1939) wrote:

> Bemba, after leaving their country to work in urban areas in the south, say they find it difficult to adjust themselves to the maize flour “mealie meal” they are given there. One old man probably too fixed in his gastric habits to become adapted to town life said, “Yes, first I ate through one bag of [maize] flour and then a second. Then at last I said, ‘Well, there it is! There is no food to be found among the Europeans.’” (p. 46)

The narration from Audrey Richard contrasts with the life saviour role given to maize by dominant writers. It gives an indication that maize was consumed, in some instances, when people had no choice but to eat in order to survive. In her personal observation, Audrey Richard recounted an instance where even after consumption of maize, Indigenous Africans claimed not to have eaten. This is captured in her account:
Beinart (2000) described instances where colonial authorities enforced the growing of particular seeds or crops by African communities, resulting in violent confrontations and resistance. However, Beinart concluded that by and large Africans adopted the new species voluntary. It is essential to emphasize that the adoption of cassava and maize was partly due to economic incentives. Cassava and maize were the major food crops that the Europeans bought to feed their slave captives; hence their ready market played a role in wider cultivation. Drawing from the various arguments, we can postulate that the main objective for the introduction of cassava and maize to Africa by the Europeans was to obtain cheaper sources of energy to feed slave captives; the other merits that came along were accidental. This could be explained further by the way the foreign crops were hastily introduced into African without the requisite knowledge the Native Americas had about processing or preparing them into food, either to improve their nutritional properties or reduce their poisonous substances.

For instance, maize is rich in carbohydrate and several vitamins and minerals, but low in protein; excessive consumption of maize could lead to niacin deficiency (vitamin B3), which causes pellagra (i.e., dermatitis, diarrhea and dementia; Natural History Museum, 2010; Robertson, Flinders & Godfrey, 1976). Native Americans, the original owners of maize, mixed it with ashes or lime when cooking it to release the niacin (Kiple & Ornelas, 2000). Lack of this knowledge of maize preparation led to a high incidence of
pellagra among the Black Africans and Europeans who depended on maize as food (Carney, 2001). This was revealed by Kiple and Ornelas (2000) when they wrote:

The Native American customs of preparing maize grain in alkali solutions and frequently consuming the grain in combination with leguminous vegetables tended to increase both the niacin availability and the protein quality of the maize, thus greatly improving its nutritional value. But when the maize was adopted as a staple food by Old World populations, and Nonnatives (blacks and whites) in North America, these customs failed to accompany it, with pellagra the result.” (p. 1805-1806)

In another narration by Bodirsky and Johnson (2008), an elder, Janice Longboat, of the Turtle clan of the Mohawk nation, who worked as a traditional herbalist and researcher into nutrition and First Nations health revealed how the Mohawks prepared maize that made it safe for consumption without health restrictions. They wrote:

She puzzled over the fact that corn, though a long time dietary staple of her people is restricted in diets for those with diabetes because of its negative effects on blood sugar levels. Through years of observation, discussion, and research, Longboat realized that the traditional corn eaten by the Mohawk people was prepared with a specific type of lye. This lye, when applied to corn as a preservative and drying agent, also affected the sugar content and slowed its absorption. Longboat concluded that this process renders corn safe to consume for those with diabetes. (p. 3)

The above quotes demonstrate how it was possible to avoid or at least minimize the incidence of certain diet-related diseases by just being humble and learning from the Indigenous peoples the ways and the rationale behind their food processing and preparation. It also shows how the all-knowing attitude and supposed superiority exhibited by humans could result in several consequences, which in the long run betray human ignorance. This is by no means a tacit endorsement of all aspect of Indigenous methods of food processing, preservation and preparation, as they may have had areas that need improvement; however, neglecting them entirely as has been the norm in the contemporary world is not a good option. Further studies could have been done to ascertain both their potential and setbacks, as well as the philosophical underpinnings
guiding the Indigenous methods of food preparation of each adopted crop. If due processes had been followed, this nutritional quagmire that humans have plunged themselves into, creating unbearable health and economic consequences, could have been averted. The next section addresses the key considerations in Indigenous methods of food production.

2.2 Traditional Food Ways: Key Considerations

Production and consumption of indigenous foods has always been done with ethical considerations governed by norms, values, and taboos born out of customs, cultures and spirituality. These were instituted to ensure sustainability of the environment, mother earth and all that live within her. Food dynamics within the African continent and other colonized countries underwent a drastic change when they came into contact with the Europeans. European agriculture manipulated the environment of most colonized areas, especially Africa and the Americas, to meet the food and other resource needs of the settlers’ communities (see M’bayo, 2003). Colonization therefore altered the fauna and flora of most colonized regions in the world. As M’bayo put it:

Domesticated animals from Europe arrived, thrived, and multiplied into enormous herds. Their eating habits, trampling hooves, and droppings and the seeds of weeds they brought left a deep impact on the environments that became their new homes. In the end, colonialism changed and reshaped the world because most continents lost countless natural plants and animals due to the human introduction of overpowering species. And in many instances, colonized regions were adversely affected by the introduction of animals, diseases, and plants from another environment, which dominated the existing indigenous flora and fauna. (p. 191)

Altering the ecology created injustice across the globe which resulted in several challenges. Sadly, Indigenous communities that have maintained their responsible roles with respect to nature suffer the most severe consequences of the destruction of the climate. James McCann, in his article “Maize and Grace: History Corn, and Africa’s New
Landscape, 1500 – 1999, argued that “maize and cassava together were the nutritional wedge of a human assault on the forest landscape, intended to convert the forest’s biomass and energy into useable carbohydrate” (p. 258). This is evident in Africa and particularly Ghana, where most forest reserves are eroded annually and, as some current studies have shown, wildlife species face imminent extinction (Attuquayefio & Fobil, 2005; Wiafe 2013). Slocum and Saldanha (2013) also contended that the conservation practices of Indigenous people were misconstrued as their inability to exploit the natural resources. They wrote: “Cultivation is strongly coded masculine labour; landscapes are called wild or virgin, awaiting the white man to penetrate, survey, and subdue them. A field, like a woman, becomes barren” (p. 6). The notion that, for example, African soils were poor or “barren” but its forests reserved or wild and good enough for exploitation was described by Slocum and Saldanha (2013) as “productivism” and was criticized for its sexism (Trauger, 2004) as well as its whiteness (Anderson, 2003).

Contrary to the Western Christian gospel that asserts that God gave humans dominion over the rest of creation and instructed them to subdue and rule over the earth, the Creator spirit of indigenous people gave no such right to humans (Bodirsky & Johnson, 2008; Callicott & Ames, 1989; Engel & Engel, 1990). For instance, from Africa to North America to Oceania, many Indigenous cultures disapprove of the commoditization of land. To Indigenous people across the globe, humans are bestowed with the right to use land resources but not to own land because land is everlasting and can only belong to a supreme being, not mortals (Berkes, 1989). In the Indigenous worldview, humans are the most vulnerable and weakest link in the vast chain of nature (Wangoola, 2000). The world was not for them to conquer but to live with in peace,
harmony and respect (Wangoola, 2000). In many Indigenous stories, “the Creator instead instructs the plants and animals to have pity on their younger siblings, the humans, and to teach them how to live successfully with the rest of creation” (Bodirsky & Johnson, 2008, p. 2). To demonstrate the Indigenous worldview of interrelationships among humans, the earth, the plants and the animals, an old Kenyan woman, Warukiri, shows how they reciprocate the benevolence of the earth as captured in her words to Wane (2002) during her research on African women’s environmental knowledge:

Carry some seeds with you. If you get to the farm before me, scatter the seeds before you start your harvest. When you do that you are giving back to the land. Give thanks to the Creator for providing for us, then you can start your harvest. If you do not give back, next year I will have no food and you will be far away to feel the effects of failing to observe one of our basic principles of life. (p. 90)

The above quote shows how Indigenous people humanize the earth and show gratitude not only to the earth but to all living and non-living things (plants, ants, insects, worms, termites, stones, rocks, etc.). By throwing part of the previous harvest onto the ground, the ants, termites, insects, birds and all other animals were fed, and those that enter the soil either germinate or turn into manure to feed the plants. This kind gesture ensures that the cycle of sustainability and reciprocity is not broken. In contrast to Indigenous beliefs and agronomic practices, Western agronomists fetishize practices such as what was revealed by Warukiri. Acknowledging the role of the Creator in providing for humans, as she emphasized, is worth commendation. There is over-entrenchment of an individual’s right at the expense of social responsibility in Western discourse. It is true that one has the right over what he/she laboured for, but we should not also forget the fact that our products are a result of the collective contribution of the people around us and nature – the land/soil, the rain, the air and soil organisms. So the question is what responsibilities do we owe to these key players? Another elderly woman of Kenyan
descent opined about how unethical conventional agriculture subjects the earth and the environment. She said:

What happens when you till the land over and over again? It shows you have no respect for the land. If you have no respect for the land, would you have respect for what grows on the land or people? I believe whatever education they are giving you is good education, but it is not complete education. You need to question the validity of what you are learning in relation not only to you, but also to your people, to us, to the land, to the plants and to the soil you are standing on. When you do that, that will be complete education . . . maybe from that knowledge, you might find a way of bringing some equilibrium between the environment, people, Creator and the universe. (Nathani, 1996, p. 138)

The above quote offers suggestions about our responsibility to the environment – that is, respect for living and non-living things in our surroundings. This woman might not have studied agriculture or environmental science through the formal school system, but her knowledge of the soil and the environment is comprehensive and cogent. The concerns she raised are valid, showing how mechanization disrupted the ecosystem and displaced most living organisms that inhabited the soil. These organisms play a critical role in soil aeration and fertility; at the end, their loss had an impact on productivity and food security. This type of knowledge is what modern agriculture lacks, culminating in the disequilibrium in the ecosystem. Indigenous mechanisms for managing critical resources were characterized as unscientific and accidental, and it was argued that conservation was not their priority. However, these knowledges had been acquired through intimate contact with the environment for millennia.

In contrast to the ethical considerations in food production by indigenous farming, conventional agriculture is driven by the profit motive without due regard to ethical, health and religious considerations of consumers. The ‘egotism of modernity’ is
demonstrated by modern agriculture in which genetic compositions of organism are altered to satisfy human interest. Grenier (1998) demonstrated this when he wrote:

There are now many transgenic organisms: rat genes have been transferred to pigs in an attempt to increase the pigs’ reproductive capacity; a human gene has been transferred to bulls to see if next-generation cows produce human milk proteins (Davidman, 1996); pig and chicken genes have been moved into plants (SWGGS, 1995). There are some concerns that transferred genes might carry with them the potential to cause allergic reactions or a resistance to antibiotics. With food items, the fear is that such resistance could be transferred to human beings (Davidman, 1996). Labeling is not yet required on these products; thus, health, religious edicts, and food preferences such as vegetarianism may be compromised (SWGGS, 1995). (Grenier, 1998, p. 13)

Humans have arrogated to themselves the title of ‘creator’, recreating organisms to meet their profit motives in violation of people’s religious and health rights, as well as animal rights. If religious taboos regarding foods have a bearing on the genetic composition of organisms, then individuals are forced to constantly violate these taboos unknowingly because we cannot guarantee the authenticity of the food we buy from markets, since there are no tags on genetically modified (GM) products. For instance, some may assume they are vegetarian, yet animal genes are present in crops, compromising their beliefs. This also shows how human health is compromised. The poor are those who suffer in most cases, since the rich can strictly depend on organic foods. Certainly those involved in this genetic engineering are beyond the poverty bracket, hence not obliged to eat what they produce.

Historian Michelle Murphy (2008), in her article “Chemical Regime of Living” has demonstrated how ethics are compromised in modern methods of food production, and argued that in the 21st century “humans are chemically transformed beings” (Murphy 2008, p. 696). Elaborating on her argument, she wrote:
The intensification of production and consumption in recent decades has yielded a chemically recomposed planetary atmosphere to alarming future effect, while it has penetrated the air, water, and soil to accumulate into the very flesh of organisms, from plankton to humans. Not only are we experiencing new forms of chemical embodiments that molecularly tie us to local and transnational economies, but so too processed food, hormonally altered meat, and pesticide-dependent crops become the material sustenance of humanity’s molecular composition. (Murphy 2008, p. 696)

Murphy’s concern was the way chemicals seem to regulate our very existence, to the detriment of future generations. To that effect we have compromised the quality of air, water and soil, as well as fauna and flora of the ecosystem. If the prediction of an increased population in the future is to be taken seriously, which from all indications is true, then future generations would have serious environmental, health and economic problems to contend with. Our area of concern should include, what social capital are we building for the future generations to ensure they have better life or at least a safer earth than we came to inhabit? The quote also emphasizes that food in contemporary times is produced through chemicals that facilitate addiction to particular food crops or animal products, thereby tying humans to transnational corporations or profit-oriented food companies. The argument that “humans are chemically transformed” calls for critical research into the academic discipline of behavioural sciences to determine the effects of chemically produced foods on human behaviour; perhaps it could explain the rise in crime rates in our world rather than identify a particular phenotype as the repository of crimes.

2.3 Food, Culture, and Dietary Patterns

Food, dietary habits and culture are intertwining concepts. Food habits of a group of people constitute their culture, while the cultural beliefs of specific group of people inform their food choices, particularly in traditional societies. Hence, in Indigenous communities, the beliefs and cultural and social mores attached to food extend the value
of the food from mere provision of nutrient to more complex issues such as spirituality and identity formation. French scientist Anthelme Brillat-Savarin, in his book *La physiologie du goût* (translated as *The Physiology of Taste*) stated: “tell me what you eat and I will tell you who you are.” This is one of the philosophical sayings imbued with multiple interpretations. Key among the interpretations is the link between food, culture and identity formation.

As a key component of culture, food is also pivotal to our sense of identity and belongingness (Fischler, 1988). People take different identities, defining who they are and how they live their lives, making them unique from others. Identities are therefore social constructs and the construction of identities is not limited to the choices of the bearers; rather, they are subjected to the social and historical conditions that create and define these identities and their social limits (Koc & Welsh, 2002). Cultural identity is expressed in various ways, including religious practices, language, ways of talking, mannerisms, rites of passage, leisure activities, dress, arts, music and dance, food habits and others. As we acquire knowledge of our specific food habits – what to eat, how to eat, when to eat, with whom to eat – we learn “our” culture, “our” mores, “our” norms and ultimately we learn who “we” are and who we are not as people.

Food habit is the first cultural practice a child experiences in his/her life. The first taste, flavour and texture of food a child experiences in his/her life comes from the food that is eaten by the ethnic group to which he/she belongs. There is a popular saying in Africa which literally means “a food that you never found in your mother’s cooking pot may as well be your taboo.” This adage stresses the fact that children are fed from what is culturally and socially acceptable to their communities. Eating habits are cultivated early
in an individual’s life and may be maintained or varied later in life, depending on the individual’s exposures.

Food choices are closely linked to complex cultural practices such as religion, belief and spirituality, which are unique to a particular group of people. For example, Islamic faith forbids the consumption of pork; religious and philosophical ideologies of Hindus in India enforce strict vegetarianism among members. In some traditional African communities, people are restrained from consuming plants or animals that signify their totems. These beliefs reveal a web of complex understanding of food, its relevance and implications for different categories of people that must be respected. From a cultural perspective, no particular plant or animal can be absolutely classified as “authentic” human food. What constitutes a food for one group of people may represent an object of worship, a pet, or a taboo creature to others. Hence, food should be defined in relation to a specific group of people.

Usually, people who eat different types of foods, or eat the same types food but in different ways, are assumed to be different. The type of food people eat, the way and manner they eat their food and the people they eat with constitute food habits. Sidney Mintz (1996) summed up the link between food habits and culture when he wrote:

Food habits can serve as vehicles of deep emotion. They are normally learned early and well and are mostly inculcated by affectively significant adults; hence they can acquire enduring sentimental power. One does not become an adult in the abstract; it must

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4 For example, cattle are food for many but considered sacred animals for Hindus in India; cats, dogs and some species of snakes are pets to some people, particularly Europeans and Americans, but are considered food to some tribes in Africa and other parts of the world. In my mother’s tribe (small ethnic Fulanis), crocodiles (alligators) are our totems so it is a taboo to eat the meat of crocodiles or even to cross the water that was used to wash the meat of a crocodile and poured on the ground. However, crocodile meat is a delicacy for some tribes in Ghana. If a member of my family eats crocodile meat unknowingly, he/she will develop rashes or scales on the skin as a notification for pacification. Eating it knowingly could result in serious consequences.
happen in terms of some particular, substantive body of cultural material. Food and eating are positioned near the core of such materials because of their life giving and essential (though usually routine and spuriously perfunctory) nature. As such, they are repetitively constitutive of one’s culturally specific humanity. Children are trained accordingly. The learning of personal fastidiousness, manual dexterity, cooperation and sharing, restraint and reciprocity are commonly linked to the consumption of food by children. Indeed getting to eat with adults as an adult, rather than as a child, may be one of the major hurdles of growing up in some cultures. (p. 69-70)

The quote from Mintz (1996) highlights the fact that through food and eating habits, the cultural virtues of responsibility, caring for one another through sharing, restraint of desires and skills acquisition are inculcated in individuals directly from childhood; these cultural virtues later form part of their lives in adulthood. The role each member of a family plays in making food available – parents contributing money, time and cooking skills while children assist in chopping, grinding and washing dishes – remind people of their responsibilities on daily basis. In some cultures, to graduate from dining with children to dining with adults as a stage of development is a privilege. Such privileges do come with great deal of responsibility and comportment. Eating is therefore an act governed by certain customs and traditions in Indigenous communities. These customs and traditions are not static; they change in response to the changing needs and aspirations of traditional societies.

In view of the link between food and culture, it is valid to argue that changing food habits amount to acculturation, since food habits are not value free. Dietler (2007), on the other hand, has argued that mere presence or consumption of a particular food is not enough to conclude that there was acculturation; rather, it is crucial to understand the specific contexts and cultural significance of the introduced food. Adopting foreign foods does not connote wrongdoing because diversity is the spice of life. It only becomes problematic when certain food habits are superimposed on others as the standard way of
life and used as a tool for cultural, social and political dominance. In contemporary times, food and dietary patterns have become a medium by which people express their status against certain socially constructed criteria – age, gender, class, and social and economic status. For instance, there is a belief that women prefer foods that are sweet while men prefer bitter foods.

The act of taking sour or bitter food (e.g., an orange) transcend from mere nutrition to an act of bravery. American history professor Jennifer Wallach (2012) demonstrated how food and eating habits are used to express racial, ethnic, and regional backgrounds, class positions and aspirations, and political and religious ideologies in the United States. She explained that Americans with a working class background can elevate their status to middle class by substituting the consumption of boiled vegetables with steamed vegetables, replacing beer with wine, and eating sushi instead of catfish. She further added that environmentalists and animal rights advocates advance their politics by refusing to consume meat. The kitchen has metamorphosed into a battlefield for the contestation of values, political ideologies, racial dominance and knowledge production.

Broaching a discussion of food and culture through a sociological lens, the pattern of change and resistance in food choices provides us with insight about the tendencies for acculturation, adaptation, assimilation, integration and the resultant improvements or risks to quality of life (Koc & Welsh, 2002). The quality of life of people in developing countries would improve if people understood the politics of food and how to play the politics to their advantage. For instance, many economic challenges in developing countries could be minimized by reducing the volume of food imports and promoting the Indigenous foods so that they are at par with imported foods. Several benefits could be
realized from such an initiative, including creating jobs for local farmers and generating income; stabilizing the economy against the “dollarization” or “Euro-rization” currently sinking the economy of most developing countries; and also making funds available to tackle other developmental issues such as clean water, schools, roads and other amenities in developing countries. Food expenditure forms largest the part of household budgets in many developing countries. It is an established economic fact that poor households spend as much as 50 to 80 percent of their income on food (Brinkman et al., 2010). Due to the large number of poor and rural citizens in many developing countries, reduced food prices will increase the real income of many households and improve the standard of living.

2.4 Genesis of Changing Eating Habits

Rodriguez (2009) described eating habits as why and how people eat, the types of food they eat, with whom they eat and the ways and manner people acquire, store, use, and discard food. Globally, colonization, trade and migration saw the introduction of many crops and animals into new environments, which changed the culinary cultures of most societies. These foreign crops and animals displaced the Indigenous crops and animals due to their delicate nature, which required the elimination of the Indigenous species in order to give their optimum yield. With time, these foreign crops and animals were adopted and assimilated into the Indigenous food system amidst resistance from Indigenous people (Beinart, 2000). However, the current changing food habits that have raised a lot of health concerns, especially relating to chronic diseases, can be traced to the second agricultural revolution (Trowell, 1981).
The emergence of the second agricultural revolution in Europe in the late 18th century (Cipillo, 1977, as cited in Trowell, 1981) marked the beginning of current food habits across the globe. Agricultural revolution resulted in an increase in the world food supply and an increased in animal products in the diet. Meat, milk and butter became available all year round and created hegemony in food acquisition, which always favoured the rich (Trowell, 1981). The intake levels of sugar, salt and alcoholic beverages began to increase. In a strict nutritional sense, sugar is unnecessary to human diets, and even becomes harmful when taken in excess (Schlosser, 2002). It is also addictive but was prized for its medicinal use in making herbal concoctions easy to take (Schlosser, 2002). However, sugar promotion was boosted with the introduction of the industrial revolution.

The industrial revolution followed the agricultural revolution in the 19th century; it spread through Europe, North America, and other continents (Trowell, 1981). The proliferation of farm machinery, mills, and factories in towns and cities culminated in major changes in production, storage and processing of food. As a result, sugar, salt and fat were manufactured in larger quantities and incorporated in many foods, snacks, and drinks (Trowell, 19981). These measures increased palatability and encouraged the consumption of energy-giving foods. Ironically, as the energy intake increased, physical activities decreased drastically due to the replacement of human effort by machines. Physical activity is believed to reduce the risk of heart disease, stroke, type 2 diabetes, osteoporosis, colon cancer, hypertension and other degenerative diseases. In fact, physical activity is found to be beneficial not only for chronic diseases but also for the
treatment of mental health problems such as depression and anxiety (Byrne & Byrne, 1993).

The industrial revolution became a tool for its proponents to further syphon the resources of colonies to their benefit. For instance, the Western world became the major beneficiaries of the industrial boom whilst the developing countries endured the negative externalities. Wolfe (2006) traced the imbalances in allocation of benefits of the industrial revolution in North America when he wrote:

[T]he industrial revolution, misleadingly as figuring in popular consciousness as an autochthonous metropolitan phenomenon, required the colonial land and labour to produce its raw materials just as centrally as it required metropolitan factories and an industrial proletariat to process them, whereupon the colonies were again required as market. (p. 394)

The above quote by Wolfe (2006) shows how resources were taken cheaply from the colonies, sent to the metropolis, mainly in Europe, turned into finished products and finally brought back to the colonies at a higher cost. In whichever way, the economic benefits disproportionately went to the Western world. However, the industrial revolution succeeded in changing the food habits of most societies.

Changes in food habits were further heightened by the “green revolution” that began in 1960 with the introduction of high-yielding crops such as rice, corn, wheat and others (Ackermann et al., 2008). The industrial revolution doubled the production of crops such as rice between 1967 and 1992 on the world market (Ackermann et al., 2008). Unfortunately, this initiative came with serious ecological and human consequences. Some anthropologists argued that smaller and more environmentally friendly technology would have yielded that same result at lower human, ecological and economic costs (Wittman, 2010). Grenier (1998) argued that green-revolution technology resulted in
“ecological deterioration, economic decline (at the local level), and poorer diets and nutritional losses resulting from the eradication of traditional foods or from their substitution by nontraditional foods” (p. 8). What could have been described as an agricultural breakthrough at the time resulted in a wide range of easily available and inexpensive frozen foods. This provided convenience to the Western world, which eagerly fed “fast food” to their families (Ackermann et al., 2008). The wealthier around the world, especially Africans, followed and adopted the Western eating styles and increased their consumption of fast food, as well as soft drinks and alcoholic beverages among others. Africans’ food habits began changing from traditional diets to Western processed foods.

For example, Blair (1966) noted the changing consumption pattern of Africans from local foods to Western processed foods and attributed that to the attainment of higher education when he argued that: “the educated African wage earner is beginning to supplement his diet with processed and more expensive types of food” (p. 58). He also considered urbanization and higher incomes as contributing factors by saying: “in changing urban Africa, consumption of processed foods of Western manufacture is rising in proportion to increases in personal incomes and new aspirations” (p. 58). Eating Western food was coded as modernity and civilization at the time. These connotations have been the bane of humanity, especially for the indigenous people.

Paradoxically, when the health implications of luxurious eating habits began to manifest in Europe, the middle and the upper classes began to advocate for organic foods and for eating locally grown products that were closer to nature. These were the very products that were considered primitive, unproductive and uncivilized. The popularity of
organic foods among the rich caused a price upsurge. As a result, foods produced organically are exorbitant – sometimes twice the price of foods produced through conventional agriculture. It is therefore not surprising that Fall (2001) noted that epidemics of obesity are higher among the higher income population in urban areas of developing countries, while the opposite is the case for developed countries where the poor are the most affected. The question is why are humans so eager to pay for sickness rather than to save for health? This is what I have described as “nutritional suicide,” which needs urgent attention and a solution. The next section narrows the discussion on changing eating habits to Ghana.

2.4.1 Changing Food Habits in Ghana

The changing food habits of Ghanaians are partly tied to the historical influence of colonization, and have followed a pattern that is similar to most African countries. The decline in consumption of indigenous foods in Ghana was partly due to the policies of colonial administration which emphasized the cultivation of export crops at the expense of domestic food crops, resulting in the loss of most Indigenous crop species. The overconcentration on export crops such as cocoa and coffee led to improvements in road networks, schools, hospitals, cocoa shells and other systems in Southern Ghana where the forest vegetation supported their cultivation (Boateng, 1967). The infrastructure in Southern Ghana was developed to facilitate easy access to the cocoa growing areas, as well as to motivate farmers to produce more cocoa for export. In contrast, the infrastructure deficit in Northern Ghana and the booming cocoa business in the South encouraged migration of labour from the Northern regions of Ghana to the South, and subsequently promoted urbanization in the South (Nyatankyi-Frempong, 2013).
One other factor that contributed to making indigenous crops less popular was the introduction and imposition of a poll tax of one shilling, payable for every man, woman and child resident under British protection in Gold Coast (now Ghana) in 1852 (Asuming-Brempong, 2003). The imposition of this tax forced many farmers, especially males, to abandon farming and find wage labour in towns and cities in order to pay it (Nyantakyi-Frimpong, 2013). The migrant labourers, having no families in the towns and cities, had to depend on imported foods from the urban markets or those that were provided by their employers against a deduction from their salaries. This resulted in an overdependence on imported foods in urban areas. Solomon and Gross (1995) reported that the dispersion of family members during dinner time promoted unhealthy eating habits. The colonial policies therefore paved the way for the promotion of foreign crops in Ghana and other African countries.

For example, these policies were evident in the way foreign rice was introduced into Senegal and ousted the Indigenous cereals such as millets and sorghum. The Portuguese brought groundnuts\(^5\) into Senegal in the 15\(^{th}\) century and promoted its cultivation at the expense of the Indigenous grains like millets and sorghum, which had enabled the local farmers to be self-sufficient in food (Ndoye, 1987). To address the food deficit created by the overconcentration on the cultivation of groundnuts, the colonial authorities imported cheap broken rice from Indochina into Senegal, where it perfectly fit the colonial market economy (Ndoye, 1987). In effect, the local farmers had to produce groundnut, sell it to the colonial authorities and use the income realized to purchase rice. There was a change in the situation at the middle of the 20\(^{th}\) century, where consumption

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\(^5\) Groundnut was another food that formed a main component of the diet of Africans onboard the slave ships (see NHM, 2010, p.5).
of rice became prominent in urban areas while rural farmers depended on Indigenous cereals such as millets and sorghum.

However, unlike Senegal where there was a sharp difference between consumption patterns in rural and urban areas, Ghana’s case was fairly stable. Pales (1954) found that in Dakar, Senegal, the urban labour consumed mainly imported rice while a few miles from the city, in their home villages, millets and sorghum were the dominant foods. In contrast, Poleman (1961) found that urban dwellers in Ghana ate essentially the same types of food as the rural population, with slightly wider variety of food. For instance sugar, milk, cheese, bread and butter were considered as food for the city folks, but the major staples such as plantain, cassava, yam and maize were the same both in urban and rural Ghana.

den Hartog (1972) noted that sorghum and millet, once major staples for Gas (an ethnic group in Ghana), were replaced by maize and cassava in the mid-20th century. Field (1973) observed that in old Tema fishing village (a suburb of Accra, Ghana) millet cultivation was limited to ceremonial activities. In Ghana, this change in food habits varied across the country. Regional and zonal variations in consumption patterns were noted in some studies. On the coastal areas of Ghana, the main staple foods are maize and cassava, and diets also include fish from surrounding fishing villages. However, in the forest communities, the main staples are plantain, cassava and cocoyam and major sources of protein are bush meat and fish (Demi & Kuwornu, 2013; den Hartog, 1972). The consumption patterns depend mainly on availability and affordability. For instance in the forest areas where people consume more plantain than other staples, their consumption patterns change during the dry season when plantains become scarce, to
wild indigenous species such as varieties of wild yam, fruits and indigenous leafy vegetables.

An important source of protein during the dry season is game meat because the dried vegetation makes it easier to hunt for game. Also in dry seasons, the scarcity of water as a result of drying ponds, streams and small rivers in the forest forces the game to come closer to the major rivers that fall within the catchment areas of surrounding villages for water; these areas then serve as perfect hunting grounds. One study has revealed that game meat contributes US $275 million to the annual Ghanaian economy (Roe et al., 2002). Although game meat provides a major protein requirement for people living in the forest communities, a substantial quantity is sold to urban dwellers. Game meats are a major delicacy in urban areas of Ghana, and in most cases only a few urban rich can afford to buy game meat due to its exorbitant prices. The growing awareness of the low fat content of game meat, which is good for health reasons, and the consumption patterns of the urban rich, who project game meat as the meat for the upper class, have accounted for the popularity of game meat in urban areas.

Game meat is uncommon in the three Northern Regions (Upper West, Upper East and Northern Region). Instead, the rearing of livestock, particularly ruminants, is high in the three Northern Regions of Ghana due to a suitable environment. This environment includes grassland vegetation and dry conditions, which check pests and disease infestations. In addition, the growing of Indigenous cereals such as millet and sorghum is mainly done in the three Northern Regions. Hence, on regional basis, the three Northern Regions of Ghana consume more indigenous cereals such as millet and sorghum compared to the Southern part of Ghana, where consumption of millet is limited to
porridge and fura/fula “da nono” (a millet meal mixed with cloves, ginger, peppercorn and rolled in millet flour into a ball. It is usually mashed and fresh cow milk is added – called “nono” in the Hausa language).

Opare-Obisaw, Fianu, and Awadzi (2000) conducted a study to determine the effects of migration on changes in food habits among 50 rural families who moved to the capital city of Ghana, Accra. The results revealed two factors – time and money – as the key drivers of change in contemporary food habits of Ghanaian families. The study further revealed striking changes in the sources of food procurement, the number of meals prepared at home, and the relative frequencies with which certain staple foods were consumed. Again, taste was the key factor in selecting food items, while nutritional values were less often considered. According to the study, the consumption of traditional or indigenous foods was reduced due to cost and limited time available for cooking. On the other hand, the consumption of processed food high in sugar, fat and milk increased among rural migrants to meet the newly assumed status as city folks. Contrary to the assertion that food taboos in African are negative and affect the nutritional status of the people (Blair 1966), Opare-Obisaw and others (2000) revealed that food taboos in Accra are positive, since most of the food avoided often tends to aggravate nutritional problems. Further, the study results contradicted the popular suggestion that as people move to urban areas their nutritional status improves (Solomons & Gross, 1995).

Adamu, Adjei and Kubugu (2012) studied the impact of dietary patterns on the nutritional status of pupils in the upper primary school in the Tamale Metropolis of the Northern Region of Ghana. Using a structured questionnaire, they collected data from a sample of 100 pupils. The results of the study revealed that the proportion of underweight
pupils was low (10%) compared to other countries in Sub-Saharan Africa. A sizeable number of the pupils (13%) were found to be either at risk of becoming obese or were already obese. The students’ consumption patterns revealed that the foods consumed were basically local staples, in contrast to the findings of Opare-Obisaw et al. (2000) in Accra. The study confirmed the assertion that the people in Northern Ghana consume more traditional foods compared to the people in the South (Abbey et al., 2006). Consumption of animal protein such as meat and eggs was found to be low among the respondents (selected pupils of the Northern region of Ghana; Adamu et al., 2012). The study also revealed that snacking (eating between meals) and sedentary life styles were high among the respondents who were obese or at risk of becoming obese. Adamu et al. concluded that socioeconomic status of parents was the key determinant of food choices, whilst advertisement, religion and peer pressure also served as contributing factors.

2.5 Chronic Disease Burden: Models, Policies and Practice

The continent of Africa is currently experiencing an upsurge of chronic diseases; however, little attention is given to these diseases compared to infectious diseases (WHO 2005). The upsurge in chronic diseases is augmented by structural factors such as urbanization, industrialization, economic development and increasing globalization of the world food market (WHO, 2005; WHO/FAO, 2003). Researchers (Applin et al, 1999; Omran, 1971) have postulated that countries undergoing urbanization and economic development experience epidemiological transition. Hence Omran (1971) proposed a model that involves three stages of epidemiological transition. The first stage is known as the Age of Pestilence and Famine, which was characterized by a demographic regime of high and fluctuating birth and death rates that reflected pristine epidemics of infections
and famine. Population growth at this stage stagnated due to high death rates. The second stage, according to Omran (1971), was the Age of Receding Pandemics, in which epidemics became less frequent and the impact of infectious diseases on the death rate waned. The third stage of the transition involved the Age of Degenerative and Man-made Diseases. This stage of transition was mainly driven by social and environmental factors such as lifestyle, diet, occupation and income. Omran therefore contended that as parasitic and infectious diseases are subdued, a series of chronic degenerative diseases connected to an ageing population such as CVDs, diabetes, stroke and cancers would become the new causes of fatalities.

Applin et al. (1999) built upon the model of Omran and added two additional stages, to increase the stages of epidemiological transitions from three to five. The fourth stage, according Applin and colleagues constitutes the Age of Delayed Degenerative Diseases, where degenerative diseases such as cardiovascular disease and cancers still remain dominant causes of death. However, improvement in medical technology prolongs the life expectancy of old people living with chronic degenerative diseases. The fifth and final stage is the Age of Remerging Infectious Disease and characterized by the recurrence of infectious diseases. The models proposed by Omran (1971) and Applin et al. (1999) were adopted and used in some studies until it was realized that there were some deficiencies with the models, particularly with the emergence of “double burden of diseases,” especially in Africa.

Hence, the previous assumptions that epidemiological transition would divert the major causes of death from communicable diseases to chronic non-communicable diseases were substituted with “double burden of disease” (Whyte, 2012). The concept of
“double burden of disease” was argued in the case of Africa, where the fight against malaria, tuberculosis and HIV is continuing alongside the emergence of chronic diseases such as diabetes, cardiovascular diseases, and cancers (Marshall, 2004). Recent studies have established a positive relationship between communicable disease and chronic non-communicable diseases (Young et al., 2009) in contrast to the inverse relationship proposed by earlier studies (Applin et al., 1999; Omran, 1971). For instance, the WHO (2011a) discovered that many cancers were caused by infections. Also, treatment of HIV was implicated in the cause of diabetes (Brown et al., 2005).

With this background of “double burden of diseases,” Unwin et al. (2001) have proposed a three-tiered approach to combating chronic diseases, viz: (I) epidemiological surveillance; (II) primary prevention (preventing disease in healthy populations); and (II) secondary prevention (preventing complications and improving quality of life in affected communities). Some African countries such as Mauritius, Tanzania and South Africa have formulated chronic diseases policy targeting primary and secondary prevention (Nissinen et al., 2001; Rossouw et al., 1993). Ghana and other African countries lack policies aimed specifically at chronic diseases (de-Graft Aikins et al., 2010). Primary prevention of chronic diseases has proved effective in many instances. For example, empirical studies have suggested that by changing to a healthier diet, increasing physical activity and avoiding tobacco intake, people could reduce coronary heart diseases by 80%, type 2 diabetes by 90% and one-third of cancers cases could be avoided (Mente et al., 2009; WHO, 2005).

Another aspect of a healthier diet includes the reduction in salt and sugar intakes. According to Charlton et al. (2001), a diet containing a high concentration of salt
increases the risk of developing hypertension in susceptible persons. According to research jointly conducted by the Food and Agricultural Organization (FAO) and Word Health Organization (WHO) of the United Nations, a universal reduction of about 3g of salt a day could lead to a 50% reduction in the number of people requiring treatment for hypertension, a 22% drop in the number of deaths occurring from strokes, and a 16% drop in the number of deaths from coronary heart disease (WHO/FAO, 2003). Hence, reducing salt intake among the population of Africa could be a first step towards combating chronic diseases. Reducing salt intake in Africa is relevant in the light of research such as the study by Steyn and Fourine (1991) that revealed Africans have a genetic predisposition for salt retention; this may be compounded in urban African communities where salt intake is generally high, causing an increase in the prevalence of hypertension. A survey conducted in the Ashanti Region of Ghana showed 98% of the participants admitted using salt for cooking, 52% of the rural population admitted using Margi (bouillon cubes) for cooking and 56% of the peri-urban population reported using Margi for cooking (Kerry, Emmett & Micah, 2005). The major active ingredients of Margi (bouillon cubes) are salt and monosodium glutamate, which are implicated in the rising cases of hypertension.

A practical demonstration of how programmes aimed at dietary change could reduce the incidence of chronic diseases has been reported in several studies (Dobson, Gibberd & Wheeler, 1981; Gillum, Blackburn & Feinleib, 1982; Pisa & Uemura, 1982). A typical example was the community-based cardiovascular control programme initiated in 1972 in North Karelia, Finland. This initiative helped reduced coronary mortality in the region by 24% in women and 51% in men between 1969 and 1979 (Salonen, Puska &
Kottke, 1983). The key components of the programme were an emphasis on the consumption of fruits, vegetables, whole cereal and legume grains, and physical exercise. The health benefits of an increased consumption of fruits, vegetables, legumes, and whole-grain cereals have been reported in various studies (Lock et al., 2005; Mente et al., 2009). Low intake of fruit, for instance, is reported to account for a 20% increase in cases of CVDs worldwide (WHO/FAO, 2003). These findings suggest that preventive measures are effective in combating chronic diseases, and could be considered and modeled in Ghana.

2.6 Chronic Diseases and Their Risk Factors

This section presents a brief discussion of common chronic diseases, especially those that are directly or partly associated with diet and its risk factors. These include cancer, hypertension, diabetes and stroke, which are briefly discussed below.

**Cancer** is one of the major health concerns confronting the world in recent times. An estimated 14.1 million new cancer cases, 8.2 million cancer deaths and 32.6 million people living with cancer were reported worldwide in 2012 (International Agency for Research on Cancer [IARC], 2012). There are several types of cancer but the top ten leading causes of deaths as at 2012 in order of importance were lung, prostrate, colorectum (intestine), stomach, liver, oesophagus, bladder, non-Hodgkin lymphoma and kidney cancers (IARC, 2012). The report further stated that the overall incidence of cancer is almost 25% higher in men than women. According to Ferlay and others (2013), Armenia has the highest cancer mortality rate in males (201 per 100,000), while Zimbabwe topped the cancer mortality rate in females (146 per 100,000) in 2012. Tobacco is considered the single most important risk factor for cancer cases worldwide,
causing 22% of cancer deaths (1.7 million in 2008) and 71% of lung cancer deaths in 2008 (Eriksen, 2012).

Globally, reproductive behaviour, the use of exogenous hormones, excessive weight and physical inactivity, diet (especially consumption of red and processed meat), and alcohol consumption are believed to be responsible for the risk of breast and colorectal cancers (WHO, 2012a). There is little known about risk factors for prostate cancers beside genetic or hereditary factors. Other significant risk factors for other types of cancers include obesity, excessive sunlight exposure and hazardous occupational exposures to radiation (Cogliano et al., 2011). Infections of various forms have also been implicated in causing cancers. According to the WHO (2012b) report, 16.1% of new cancer cases in 2008 were attributed to infections. It further stated that the fraction is greater in less developed countries (22.9%) compared to developed countries (7.4%).

**Hypertension,** also known as high blood pressure, is the force of blood against the artery walls as it circulates through the body. Essentially, hypertension is a result of the extra effort needed to circulate blood due to fat or plaque buildup in the veins. The risk of developing hypertension increases with age, high intake of salt (sodium) and lower intake of potassium (from fruits and vegetables), sedentary life style, hereditary factors, stress, alcoholism and smoking (WHO, 2011). Poor eating habits can lead to obesity, which is also a risk factor for hypertension. Other chronic disease such as diabetes are also implicated as a cause of hypertension. Generally, the situation gets more complicated when the heredity factor is combined with an unhealthy lifestyle, such as poor eating habits and physical inactivity. Usually, hypertension does not show symptoms except in severe cases, where an individual experiences nausea, anxiety, chest
pain, tiredness and muscle tremor. One of the adverse health effects of hypertension includes heart failure – a condition that occurs when the heart cannot pump enough blood and oxygen to other organs. Another health effect of hypertension is heart attack – a condition that occurs when the blood supply to the heart is blocked and heart muscle cells die from lack of oxygen. A study has revealed that infants and teenagers who are obese have a higher risk of developing hypertension later in adulthood (Stabouli et al., 2005).

Control of hypertension therefore has to do with healthy eating habits, increased physical activity and avoidance of problem behaviors such as alcoholism (Barnard et al., 2009).

**Diabetes** is a chronic disease that occurs as a result of high blood glucose (sugar) levels, either due to the inability of the pancreas to produce enough insulin to neutralize the glucose or the body’s inability to make use of the insulin produced, or both. There are two main types of diabetes, viz: type 1 diabetes (also known as insulin dependent diabetes) and type 2 diabetes (also known as diabetes mellitus), which is the commonest type of diabetes and diet-related. Type 1 diabetes occurs at the infant stage when the immune system attacks insulin-producing cells in the pancreas, involuntarily causing permanent damage to the cells (Charvatova, n.d.).

The common symptoms of type 1 diabetes include excessive excretion of urine, tiredness, frequent hunger and vision impairment, among others. Type 2 diabetes, on the other hand, usually occurs later in life and constitutes about 90 percent of all diabetes cases (Diabetes UK, 2010). However, recent studies have discovered that type 2 diabetes is increasing among children and younger people of all ethnicities (National Health Service, UK, 2008). Diabetes studies for one and half decades revealed an annual increasing trend. In 1985, the worldwide estimate for people living with diabetes was 30
million; a decade later the figure rose to 135 million, and by 2000 the reported number of diabetes cases was 171 million people (WHO, 2005). Currently, about 347 million people worldwide are diagnosed as diabetic (Danaei et al., 2011). Like hypertension, the rising number of diabetes cases worldwide have been partly lined to ageing, unhealthy eating habits and lack of exercise. Obesity is considered to be the key risk factor for developing diabetes; as the number of obese people keeps rising annually, it is therefore valid to postulate that the increasing trend in diabetes is likely to continue with the rising incidence of obesity. Snowdon and Philip (1985) discovered that people depending solely on plant-based food reduce their chances of developing diabetes by 45%. Van and colleagues (2008) found that eating meals containing meat once per week could increase the risk of diabetes by 74%. Unlike type 1 diabetes, which is permanent, type 2 diabetes can be managed or reversed by strict adherence to a healthy diet such as a high consumptions of plant-based foods, high intake of water, and a low intake of salt and sugar (American Diabetes Association, 2010; Bernard et al., 1997, 2006, 2009; Liu et al., 2009).

**Stroke** is a condition which occurs when blood flow to a certain region of the brain is impeded, resulting in the death of brain tissue. Ischemic stroke is usually caused by a blood clot in an artery that supplies blood to the brain. Globally, stroke accounts for 5.5 million deaths annually, with 44 million disability-adjusted life-years lost (Debraj & Patil, 2011). A study conducted by Strong and colleagues (2007) revealed that an estimated 16 million people suffered from a first-ever stroke in 2005, with an estimated prevalence of 62 million stroke survivors. The study postulated that if nothing is done to curb the situation, the global estimate could rise to 23 million first-ever strokes, with an
associated 7.8 million deaths, by 2030. The study further revealed an inverse relationship between a country’s income and stroke deaths, with higher income countries recording low stroke death and lower income countries recording high stroke death. O’Donnell and colleagues (2010) conducted the most comprehensive study ever, comprising 22 countries, to ascertain the risk factors of stroke. The study spanned a three-year period and investigated a total of 3000 stroke patients, with an equal number of age- and sex-matched controls. The ten top risk factors of stroke revealed by the study include: smoking, excessive use of alcohol, poor diet, physical inactivity, hypertension, elevated waist-to-hip ratio, diabetes, psychosocial factors such as depression, history of heart disease, and elevated apolipoprotein B to A1 ratios (O’Donnell et al., 2010). However, the two most important risk factors for stroke were identified as hypertension and smoking. For instance, approximately 54% of strokes worldwide were attributed to hypertension, and increasing rates of hypertension were noted particularly in China and Indian (Johnston, Mendis & Mathers, 2009). According to Swierzewski (2010), awareness of how to maintain an individual’s normal blood pressure levels using appropriate diet, increased physical activity, and adherence to medication schedules if necessary can decrease the risk of stroke and associated fatalities.

2.7 Knowledge of Chronic Diseases and their Risk Factors in Ghana

Studies on chronic diseases in Ghana over the years have been monopolized by health experts focusing mainly on clinical aspects of illness and medical adherence (Amoah, 2003; Bosu, 2007, 2010). This trend is shifting gradually with the growing interest of social scientists, particularly in the fields of psychology and anthropology, to complement the efforts of health professionals. The social scientists have focused on
other aspects of chronic disease by investigating knowledge, beliefs, representations and experiences of people living with chronic diseases such as diabetes, hypertension, cancers and epilepsy (Atobrah, 2012; de-Graft Aikins, 2005). Other studies have focused primarily on children living with chronic diseases (Badasu, 2007; Kratzer, 2012). However, one area of concern is that most of these studies were concentrated in urban areas of Southern Ghana, with limited interest in the Northern Regions where significant numbers of people are patients with chronic diseases. Their findings have revealed poor knowledge about chronic diseases in the populace, especially for patients suffering from chronic diseases (Awah, Unwin & Phillimore, 2008; de-Graft Aikins, 2005) and some health professionals in Ghana (de-Graft Aikins et al., 2010).

For instance, some women living with breast cancers report their condition to hospitals only after exhausting other means of treatment including prayer camps and using alternative medicine (Prentice, 2006; WHO/FAO, 2003). This late reporting of breast cancers cases and other chronic diseases has been attributed to inadequate knowledge of chronic diseases in Ghana, a situation which resulted in only a 25% survival rate of diagnosed cases (Clegg-Lamptey & Hodasi, 2007). Other social scientists such as de-Graft Aikins and colleagues have implicated “healer shopping” within the herbal medicine field in Ghana for complicating otherwise avoidable situations, leading to the death of chronic disease patients (de-Graft Aikins et al., 2010).

Herbal medicine, in some instances, has proved potent in managing other chronic diseases in Ghana. For example, scientific evidence from the Centre for Scientific Research into Plant Medicine - Mampong (CSRPM) suggests that effective herbal drugs were available for managing arthritis, asthma, diabetes, hypertension and sickle-cell
disease (Darko, 2009; Sittie, 2007). In this respect, the potency of herbal medicine is not in doubt, but the ability of the practitioner to make an accurate diagnosis of the illness is key in determining what herbal drugs are prescribed to the patients. Another point worth emphasizing is that most of these complications occur when patients patronize the services of untrained herbalists due to poverty. Most trained herbalists refer patients to the hospital if they realized their conditions require medical interventions.

Turning to government intervention in chronic diseases in Ghana, the response to primary and secondary prevention strategies of chronic diseases has focused on policy formulations and, to some degree, engagement with other stakeholders such as industries. The government of Ghana attempted to establish a Non-communicable Disease control (NCD) programme in the 1970s but the plans failed (Bosu, 2007). In the early 1990s, formal discussion of Ghana’s chronic disease burden resumed and diseases such as hypertension and diabetes were placed on the priority health intervention list of the Ministry of Health (MOH), Ghana (1996; 2001). In 1992, the Non-communicable Disease Control Programme (NCDCP) was established and charged with the mandate to improve knowledge and advocacy for CVDs, diabetes, chronic respiratory disease, cancers and sickle cell diseases. However, experts believe that chronic diseases in Ghana do not receive the amount of attention they require, and constitute a low policy priority for the government as well as development partners (Bosu, 2007).

Sedentary lifestyles have been strongly linked to rising chronic diseases in Ghana (Amoah, 2003). This recognition of the health benefits of physical exercise resulted in a sporadic spread of keep-fit clubs and fitness gyms, mainly in the cities, especially district and regional capitals. However, the fitness gyms are more elite and attract a low
patronage among the poor. In 2005 the Ministry of Health (Ghana) launched a programme dubbed the Regenerative Health and Nutrition Programme (RHNP), which aimed to prevent chronic disease (Ministry of Health, Ghana, 2009). This programme was adapted from Dimona, Israel, where it was reported that African Hebrews have lived for four decades without a single reported case of death (Health Foresight, 2007).

These communities were reported to live on vegan diets and consumed more water, fruits and vegetables and took part in physical activities. Hence, the primary objective of the RHNP was to promote healthy lifestyles including eating more fruits and vegetables, reducing consumption of fatty foods and alcohol and increasing physical activities. The RHNP programme was piloted in a few communities in eight out the ten regions in Ghana through participatory education workshops. The programme specifically stressed the drinking of more water, eating more fruits and vegetables and reducing intake of animal products. However, the cost of fruits and vegetables limited the programme to a few elites. The preliminary assessment of the programme by Tagoe and Dake (2011) revealed the following:

- Unlike before the introduction of the RHNP programme, the chances of a Ghanaian adult living a healthier lifestyle increased with an increased level of education.

- An increase in healthy lifestyles was high among females and an increased in risky lifestyles was high among males both before and after the introduction of the RHNP programme.

- The acceptance of the programme depended on the income level of households. The relatively higher income level of professional workers gave them the
advantage of accessing the fruit and vegetables recommended in the programme over the poor and low income households.

### 2.8 Summary

This chapter examined the relevant literature that addresses the introduction of foreign crops into Africa and the power dynamics that play a role in determining what constitutes food. Key considerations of indigenous methods of food production were highlighted and contrasted with conventional means of food production. The causes of changing eating habits globally and in Ghana were discussed. Models, policies and interventions with chronic diseases in Africa and Ghana were highlighted, in addition to the knowledge of chronic diseases in Ghana. The next section discusses the methodology and the theoretical foundation of this thesis.
Chapter 3

3.0 Methodology

This thesis employs document analysis as a method of data collection to address the problem under discussion. Strauss and Corbin (1998) defined the qualitative research method as a “type of research that produces findings not arrived at by statistical procedures or other means of quantification” (p.11). Qualitative research is “concerned with the quality and nature of human experience and what these phenomena mean to individuals…it seeks to understand and explain beliefs and behaviours within the context in which they occur” (Draper, 2004, p. 642). The objective of qualitative research is to observe events in their natural setting, attempting to make sense of, or elucidate, phenomena in terms of the meanings people assign to them (Denkin & Lincoln, 1994), therefore qualitative methods use “a holistic perspective which preserves the complexities of human behaviour” (Black, 1994, p. 1). Critics of qualitative research methods have argued that they are unconfined, use small sample sizes and depend mainly on the values and subjective experience of the researcher and the research (Fritas, Moscarolax, & Jenkins, 1998).

The advocates for qualitative research methods counter-argued that these perceived limitations of qualitative methods were born out of a misunderstanding of the methods, and highlighted the potential of qualitative research methods to explain and help understand complex health and nutritional issues where the use of quantitative methods have proven less effective (Black, 1994; Draper, 2004). Qualitative methods provide a better understanding of complex issues that are not readily quantifiable, and
allow flexibility for modifying the research methods in the course of a study, which further demonstrate the richness and variability of the subject matter (Greenhalgh & Taylor, 1999). Hence, if a researcher intends to explore, interpret or seek deeper understanding of complex social and human relationships that could not be better explained in a numerical context, then qualitative methods are the best research design to employ (Greenhalgh & Taylor, 1997). Drawing from the strength of qualitative research methods in addressing complex issues like how people form their food habits, taking into consideration cultural and religious implications and what impact their food habits, once formed, are likely to have on their health, I chose one aspect of qualitative research method – document analysis – to help address the specific research questions.

Document analysis can occur in two ways: content analysis and lexical analysis. Content analysis, which is the focus of this thesis, was defined by Krippendorff (1969, p.103) as “the use of replicable and valid methods for making specific inferences from text to other state or properties of its source”. Hence, in a broader sense, content analysis involves a complex process of interpreting the existence, meanings and relationship of certain words, themes and/or concepts, either in written or oral text(s), to make deductions from the message being communicated based on the context within which the message or the knowledge was produced. Text, in this sense, includes books, book chapters, articles, essays, interviews, public or private conversations, new papers, periodicals, meeting proceedings, reports, speeches, audio-visual materials, advertisements and flyers, among others. Concisely, qualitative content analysis can be described as a research methodology that involves collecting and analyzing information (oral, written or pictorial), taking into consideration the historical, cultural, political and
social context within which the information was produced and the purpose it was intended to serve.

This research methodology is therefore relevant to assess the role of African Indigenous food crops in combating chronic diseases because food and dietary habits are linked to the culture of the people of Africa. The culture and beliefs attached to a particular food in Africa, and specifically Ghana, could extend the value of food beyond mere nutrition to spirituality, which cannot be quantified or explained through statistical means. Particularly, in Ghana, foods are used to project individual and tribal values. Some foods in Ghana are named after particular tribes, for example, “Fante dokonor” meaning kenkey of the Fantes, and “Nkran dokonor” meaning kenkey of the Gas. Any traditional food in Ghana is connected with particular tribe(s) or particular regions. For example, mention “akyeku” and anybody who is familiar with Ghanaian tradition will direct you to the Nzema people of the Western region; mention “tuu zaafi” (TZ), “shikafa da waakye”, “fura da nono”, etc. and you will be directed to the people of the Northern tribes of Ghana; mention “ampesi” or “fufu” and you will be directed to the Akan communities in Ghana; or mention “yekayeka” or “Akple” and you will be directed to the Ewes in the Volta region of Ghana.

People over the years have developed an intimate relationship with their traditional foods and use their traditional foods to project their cultural and tribal values. Hence, food is a complex arena that requires a holistic understanding of cultural, social, political and religious implications to explain why, in a given circumstance, people will chose one food over the other. Therefore, a qualitative research method is the most appropriate to determine the links among culture, food and health. Draper (2004, p. 642)
outlined three goals of qualitative research that are relevant in seeking understanding of issues related to health and nutrition as follows:

1. To identify and comprehend the patterns of behaviour and how this pattern may influence and interact with health and nutritional status and health-seeking behaviours, including patterns of food consumption.

2. To identify priorities and needs appropriate to specific social and cultural contexts of individuals and/or group(s).

3. To design and implement appropriate interventions within the context of the values of individuals and/or group(s).

The next section discusses procedures for obtaining the various secondary data sources for the study.

3.1 Detailed Description of Sources of Data

This thesis is primarily desk work research and depended heavily on secondary data from peer reviewed articles and book reviews from recognized journals (particularly agricultural, nutrition and health journals), reports and books from recognized publishing companies. The process of the literature search was divided into two sections, with different search engines for convenience and reliability of information. First, the process involved the use of Google and Google Scholar engines to search for information on African Indigenous food crops. The reason for using Google engines was to obtain a wide range of articles, including articles that are not published in the medical journals due to restrictions. The combination of key words and phrases used includes “Indigenous”, “knowledges”, “food”, “vegetables”, “crop” “maize”, “cassava” “origin”, “leafy vegetables”, “Africa”, “Ghana”, “promotion” “production”, “protective properties” and
others. Several thousand papers appeared, including duplicates. After eliminating the duplicates, the titles and abstracts of the papers were reviewed to assess their relevance to the objectives of the study. Only papers written in English were considered for review.

The second section involved the search for information on chronic non-communicable diseases. The PubMed engine was employed, using a combination of key words and phrases including: “chronic illness”, “non-communicable diseases” “cancers” “diabetes” “hypertension”, “obesity”, “cardiovascular diseases”, “prevalence rate” “global”, “Africa” “Ghana”, “economic consequences”, “cost” and others. A total of over 8000 results, including duplicates, were retrieved. The articles were screened using the procedure described above. Over 50 papers were printed, read and some of the references cited in the articles were further obtained in full. Soft copies of articles that were obtained from the cited references were further reviewed in part or full, depending on their relevance to the objectives of the study. For instance, all articles on chronic diseases and Indigenous crops in Ghana were read in full because of the focus of the study.

Additional information from other sources such as MOH, Ghana, as well as my personal knowledge as a trained agronomist and agricultural administrator formed the foundation of this thesis. Most of the articles on Indigenous food crops conducted a chemical analysis to determine the presence of phytochemicals, anti-oxidants and other chemicals that protect humans against chronic diseases. Only articles from peer reviewed journals and books were considered sufficiently accurate for inclusion in the study.
3.2 Theoretical Framework: Indigenous Knowledge, the legitimate way of knowing

Indigenous is a ‘loaded term,’ with its focus intricately linked to colonialism (Wane, 2008), hence a form of resistance against colonialism and the dominance of Western discourse (Dei, 2000a). Indigenous knowledge (IK) is therefore the knowledge of local or Indigenous people acquired from experimentation with local available materials and subsequent consolidation of the outcome of the experimentation as a legitimate way of knowing. IK is dynamic, hence undergoes modifications to respond to changing needs and aspirations of Indigenous people. It is experiential and subjective because it is engrained in personal and direct experience (Dei, 2000b). It is holistic and implicit (Obomsawin, 2001).

Indigenous knowledge is grounded in an Indigenous worldview which, according to Simpson (2000), operates on seven principles. Simpson enumerated the seven principles of Indigenous worldviews as follows: first, the knowledge is holistic, cyclic, and dependent upon relationships and connections to both animate and inanimate beings. Second, there are many truths, and these truths are based on individuals’ experience. Third, everything has life. Fourth, all things are equal. Fifth, the land is sacred. Sixth, the relationship between humans and the spiritual world is relevant. Seventh, human are least significant in the world. These principles differentiate Indigenous Knowledge from other forms of knowledge. The principles are understood within the Indigenous framework; hence, using other worldviews to assess Indigenous knowledge may pose a challenge, making it sound “irrational”, “unscientific” and “accidental”. Misunderstanding of IK based on differences in worldview has resulted in the devaluation of Indigenous knowledge as illegitimate way of knowing for several decades.
Yet after decades of sidelining IK as inferior, backward, savage and a hindrance to development, its potential in addressing human challenges has been recognized. Recent advocates for Indigenous knowledge have highlighted the potential it holds in addressing contemporary glitches such as poverty, hunger, chronic diseases and underdevelopment (Moock & Rhodes 1992; Raschke & Cheema, 2007; Warren et al. 1991). The rising recognition of IK across academic disciplines in the early 1990s was noticed by Warren, Von Liebenstein and Slikkerveer (1993) when they wrote:

Ten years ago, most of the academics working in the area of indigenous knowledge represented anthropology, development sociology, and geography. Today . . . important contributions are also being made in the fields of ecology, soil science, veterinary medicine, forestry, human health, aquatic science, management, botany, zoology, agronomy, agricultural economics, rural sociology, mathematics, . . . fisheries, range management, information science, wildlife management, and water resource management. (p. 2)

The above quote emphasizes the holistic nature of IK, which requires several definitions to accommodate its multidisciplinary and adaptive nature. It further indicates the highly contested nature of the concept. Hence, depending on the context and discipline, Indigenous knowledge can assume different definitions but the common themes that run through all the definitions include emphasis on local knowledge or knowledge of Indigenous people, recognizing multiple ways of knowing, and thinking cyclically. The difference in the definition of the concept is visible in a simple definition, such as IK are “knowledges that have originated locally and naturally” (Altieri, 1995, p. 114). A more complex conceptualization of Indigenous knowledge is argued in Dei (2000), when he defines IK as:

Knowledge associated with long term occupancy of a place. It refers to the traditional norms and social values, as well as mental constructs, which guide, organize and regulate a people’s way of living and making sense of their world. It is the sum experience and
knowledge of a given social group that forms the basis of decision making in the face of familiar and unfamiliar problems and challenges; the concept is highly contested. (p. 6)

Thus indigenous knowledge is holistic in outlook but adaptive in nature, and acquired over generations by knowledge bearers whose livelihoods depend on this information and its use. It is often accumulated incrementally, tested by trial-and-error and transmitted to future generations orally or by shared practical experiences (Ohmagari & Berkes, 1997).

It forms the basis of a livelihood that embraces every facet of human life from agriculture, food preparation, eating habits, health care, education and training, and environmental conservation, among others. Other definitions have focused on the features that distinguish Indigenous knowledge from Western scientific knowledge. Warren (1991) made such a distinction when he presented a paper to the World Bank in the early 1990s and outlined the characteristics of Indigenous knowledge. He wrote:

Indigenous knowledge (IK) is local knowledge – knowledge that is unique to a given culture or society. IK contrasts with the international knowledge system generated by universities, research institutions and private firms. It is the basis for local-level decision making in agriculture, health care, food preparation, education, natural resource management, and a host of other activities in rural communities. Such knowledge is passed down from generation to generation, in many societies by word of mouth. Indigenous knowledge has value not only for the culture in which it evolves, but also for scientists and planners striving to improve conditions in rural localities. (Warren, 1991, p.1)

Warren’s (1991) definition not only contrasts Western scientific knowledge with IK, but also highlights the mode of transmission of IK, how and where it is produced, and its significance to the knowledge bearers, as well as recommending IK to the development agents interested in rural development. Adding to the distinction between Indigenous knowledge and Western scientific knowledge, Dei (1993) argued that IK is “common sense knowledge and ideas of local peoples about the everyday realities of living.” He elaborated on this further when he wrote:
It [indigenous knowledge] includes the cultural traditions, values, beliefs, and worldviews of local peoples as distinguished from Western scientific knowledge. Such local knowledge is the product of indigenous peoples’ direct experience of the workings of nature and its relationship with the social world. It is also a holistic and inclusive form of knowledge. (Dei, 1993, p. 105)

Indigenous knowledge differs from Western scientific knowledge in what Berkes et al. (1995) described as “being moral, ethically-based, spiritual, intuitive, and holistic and has large social context” (p. 283). Agrawal (1995) on the other had argued that creating an Indigenous verses Western scientific knowledge dichotomy is counterproductive, but rather advocated for greater autonomy for Indigenous people. Nevertheless, this distinction is indispensable if the autonomy of Indigenous people is to be achieved, especially in an era where devaluation of Indigenous people’s knowledge systems is the norm. Highlighting the philosophical differences in the two knowledge systems (IK and Western knowledge) is vital for IK’s claim of status as a distinctive body of knowledge that does not require validation from any other body of knowledge.

Cajete (2000) addressed another perspective of Indigenous knowledge by focusing on Indigenous science and highlighted the philosophical difference between Indigenous science and Western science. He defined indigenous science as “a metaphor for a wide range of tribal processes of perceiving, thinking, and ‘coming to know’ that have evolved through human experience with the natural world” (p. 2). He further stressed that Indigenous science evolved from lived experiences and storied participation with the natural landscape. In its core, Indigenous science is based on perceptions acquired from using the entire body of senses in direct response to nature (Cajete, 2000).

Steinhauer (2002) contrasted Indigenous science with Western science by arguing that, in
the Western tradition, there is a separation of science from spirituality, but Indigenous science is spiritual and artistic. She further argued that Western science focuses on the intellect and senses while indigenous science stresses the importance of intuition.

Indigenous knowledge is anchored in traditional teachings, empirical observation and spiritual insight (Milburn, 2004). The empirical observation is grounded in “listening, learning and listening” and spiritual insight is acquired through dreams, visions, and intuitions (Steinhauer, 2002). IK forms the basis for resource use in Indigenous communities.

The relevance of Indigenous knowledge in judicious use of resources has been highlighted for the past three decades. Some of the key arguments advanced in favour of Indigenous knowledge are that it permits the knowledge bearers to exist in ‘harmony’ with nature, allowing for sustainable use, and it is vital in discussions for sustainable use of resources (Compton, 1989; Sen, 1992).

Using Indigenous knowledge as a discursive framework, Dei (2004) argued that:

Indigenous knowledge specifically refers to the epistemic saliency of cultural traditions, values, belief systems, and worldviews that in any indigenous society are imparted to the younger generation by community elders. Such knowledge constitutes an Indigenous informed epistemology. It is a worldview that shapes the community’s relationships with surrounding environments. It is the product of the direct experience of nature and its relationship with the social world. It is knowledge that is crucial for the survival of society. It is knowledge that is based on cognitive understandings and interpretations of the social, physical, and spiritual worlds. It includes concepts, beliefs, and perceptions and experiences of local peoples and their natural and human-built environments. (p.5)

Drawing from Dei’s (2004) definition, Indigenous knowledge predates Western scientific knowledge and has kept human beings and their environment in a close relationship. IK forms the foundation for food production, food preparation and processing, and eating habits that kept humans alive on this planet earth since creation. Entrenched in
Indigenous knowledge of farming are relevant considerations of the sustainability of the environment, health of consumers and a minimum or no focus on profit. Indigenous farmers, or those who are now referred to as organic farmers, are willing to sacrifice yield to maintain sanctity of the environment and human health in contrast to modern farming, which is driven by profit motives.

Concerns were raised about the conventional way of food production, especially on human health (Grenier, 1998) and destruction of the environment (Altieri, 2005). As a result, people are now seeing the health benefits of the Indigenous way of food production, culminating in agitation for organic foods and health products. Sumner (2006) argued that Indigenous knowledge systems emerged from years of practice and critical reflection on how best to farm in Nature’s image, using readily available on-farm resources and avoidance of costly and destructive chemical inputs. Indigenous farming practices comprising “fishing, pastoralism/herding, foraging and forestry are grounded on long proven knowledge and practices that help to ensure food and agricultural diversity, valuable landscape and seascape features, livelihoods and food security” (FAO, 2009, p. 1). Hence, Indigenous knowledge in food gathering, preparation, preservation and consumption help to create a wealth of unique cultural tradition and identities among tribes and individuals. As a result, Indigenous foods and food systems are closely linked with Indigenous knowledge and often extend to belief systems, spirituality and indeed the entire wellbeing of Indigenous people. As Kuhnlein et al. (2009) stated:

The dimensions of nature and culture that define a food system of an indigenous culture contribute to the whole health picture of the individual and the community – not only physical health but also the emotional, mental and spiritual aspects of health, healing and protection from disease. (p.3)
It is therefore valid to postulate that food systems of Indigenous peoples who maintain an intimate connection to their cultures and patterns of living in tradition ecology present a treasure of knowledge that contributes to well-being and health, which could be harnessed for the benefit of all humans (Kuhnlein, 2010). Ironically, the decline in the use of Indigenous knowledge has been noted by many scholars who have attributed the phenomenon to commercialization, change in technology, pressure due to population growth, breakdown of traditional land tenure and marine tenure systems, loss of Indigenous control of areas and resources, and changes in worldview due to factors such as urbanization and loss of intimate contact with land (Berkes, 1985; Rajasekaran, Warren & Babu, 1991; Ruddle, Hviding & Johanes, 1992). Others such as Mutva (1999) argued that since the imperial forces of Europe began expanding their empires through the colonization of sub-Saharan Africa, ancient Indigenous knowledge, including a wealth of knowledge about food habits, health and longevity, has progressively been eroded. Similar concerns were raised in other parts of the world, especially in North America and Australia (Bodirsky & Johnson, 2008; Rowley et al., 2000). Studies have revealed that Indigenous technologies of food processing and distribution were disappearing as more and more Indigenous peoples moved away from their traditional lands, local food, and cultural knowledge (Johns & Kubo, 1988; Kuhnlein & Turner, 1991).

The erosion of Indigenous knowledge in food gathering, production, preparation, preservation, consumption and the whole area of traditional pharmacology and its preventive cures was implicated in the upsurge of chronic diseases among the Indigenous people of sub-Saharan Africa (Raschke & Cheema, 2007) and other Indigenous
communities across the global, particularly among the Native Americans and Australians (Fazzino, 2008; Rowley et al., 2000). The decline in the traditional food system resulted in a sharp rise in diabetes and obesity within Native America communities, which previously recorded a low or no incidence of diabetes as recently as 1912 (Fazzino, 2008).

The high prevalence of chronic disease in Indigenous communities was attributed to the disruption in the cultural identity, spiritual life, environment quality, stability of local economies and political institutions which otherwise, partly, anchored healthy diets in Indigenous communities (Kuhnlein & Receveur, 1996; Livingston et al., 2010). Some studies recommended the revitalization and recreation of sustainable local food systems through the promotion of tradition foods as a panacea to solving the pressing health problems at both the community and individual level (Bernard, 2005).

Within the Indigenous communities, food and medicine are an inseparable concept. The general rule regarding food and medicine is to “let your food be your medicine and your medicine be your food.” Hence, beliefs associated with health benefits of food extend the value of that food, particularly plant-based food, into the realm of traditional medicine (Messer, 1977, 1984). However, many Indigenous people do not isolate plant species into food or medicine because the same plant can serve either as food or medicine or both, depending on the maturity of the plant, the method of preparation, and health status or pathology of the individual (Johns, 1994). Selection of food within the Indigenous communities is influenced by social, cultural, religious and personal considerations, elements such as whether the food is to be shared at social events such as a marriage feast, puberty rites, rite of passage or personal events; and
whether the food is used to express individual, family, and group identity within a culture (Kuhnlein & Receveur, 1996; Vorster et al., 2007). To that effect, food serves as an “ethnicity marker” (Kuhnlein & Receveur, 1996). In addition, food is used to express affection, demonstrate power, or express resistance to subjugation (Axelson, 1986; Bryant, 1985; Chan et al., 1995).

The Indigenous methods of food production, preparation and processing constitute a vital body of knowledge that older generations passed on to the younger ones and parents handed down to children from generation to generation. In this respect, Indigenous methods of food production are location-specific and imbedded in the cultural tradition of Indigenous people of a particular location. Holistic application of Indigenous farming practices to other places with a different soil type, tools, and different social organization may not yield desirable results, since Indigenous farming methods are derived from years of human closeness to the local environment (Altieri, 2005). Despite the complexities of Indigenous methods of food production, they share certain fundamental principles that were outlined by Gliessman (1998) as follows:

- They combine several species and structural diversity in time and place.
- They exploit the full range of microclimate (which differ in terms of soil, water, temperature, altitude, slope, fertility, topography and others) within field or region
- They ensure close cycle of local readily available resources and by-products through effective recycling practice. (e.g. crop waste are used to feed livestock)
- They depend on a complexity of biological independencies, culminating in high levels of biological pest suppression.
They depend on local readily available resources in addition to human and animal energy thereby using low levels of input technology and exhibiting positive energy efficiency ratios.

Key practices underlying Indigenous farming principles were the emphasis on mixed cropping and mixed farming in contrast to the conventional method focused on mono cropping. Mixed cropping involves growing several types of crops on the same piece of land from year to year. Mixed farming, on the other hand, involves growing different types of crops and rearing of farm animals on the same piece of land. These methods are effective in utilization of soil nutrients compared to the conventional system of mono cropping which involves growing one type of crop on the same piece of land from year to year. Mono cropping is associated with depletion of soil nutrients, culminating in the increased demand for artificial fertilizer as well as promotion of pest and disease build up on farms.

On the other hand, mixed cropping ensures total coverage of the surface of the soil, hence reducing the direct impact of sunshine, which helps to retain soil moisture and reduce soil erosion caused by run-off water. Growing of crops as well as rearing farm animals on the same piece of land ensures efficient use of on-farm resources. The crop by-products are used to feed the farm animals while the animal droppings are used as manure to help maintain soil fertility without the health effects associated with the use of synthetic fertilizer. Matowanyika and colleagues (cited in Kunnie, 2000) highlighted the importance of the mixed cropping system. They also noted that despite the proven results of this system, Western agronomists are not convinced that this was a legitimate system of farming. They wrote:
The way that extremely different crops are grown together on the same plot of land [maize, plantain, taro, groundnuts etc.] strike Western agronomists as something deeply primitive and archaic. However, on closer examination one notes that the soil is under permanent cover, thus reducing sun exposure and heating of the surface soil; the variety of different root systems probably ensures a better utilisation of the soil volume; the succession of plant growth cycles means that cover is provided during heavy [and most erosive] rains, when the large leaves [of crops] protect soil; utilisation of solar energy is probably higher; the risks of parasite infections are reduced. (p.35)

A closer look at mixed cropping shows deep Indigenous knowledge in understanding different root system of crops and how they absorb nutrients from the soil. Crops exhibit two root systems: shallow rooted system or deep rooted system. Hence, intercropping shallow rooted crops such as legumes-cowpea, ground nut (peanut), etc. with deep rooted crops like cassava or maize ensured that the soluble nutrients that leached beyond the root zone of the shallow rooted crop was taken by the deep rooted crops and the nutrients on the top soil which were above the root zone of the deep rooted crop were utilized by the shallow rooted crop. The total coverage of the surface of the soil by creeping crops such as legumes suppressed weed growth and acted as a weed control mechanism, which also saved Indigenous farmer from using herbicide. This deep wisdom sustained Indigenous farmers in the production of foods without recourse to the use of man-made chemical input. It also ensured the cosmic balance between humans and the environment as well as production of healthy organic foods for human consumption.

Among the ancient practices of nomadic Fulani tribes of West Africa is the practice of cow milk conversion into local cheese called woagachi (Aworh, 2005). This evolved from their deep knowledge of the milk coagulation properties of juice from the leaves of an Indigenous plant called tapasia in the Hausa language (common name-Sodom apple plant [scientific name- Calotopis procera]). The leaves of the plant are crushed to obtain the juice. Cow’s milk is then poured into an earthen cooking pot and
placed on a fire while being gradually stirred. The juice from the leaves is gently poured into the milk while stirring, until the milk finally coagulated. The loose curd pieces are then poured into small raffia baskets and allowed to cool before draining. Food scientists Aworh (1985) and Ogundiiwin and Oke (1983) compared the Indigenous method of cheese production with the industrial method and concluded that both methods consist of four stages: milk setting, cutting or breaking of curd, cooking of the curd and draining or dipping. However, the Indigenous method can further process the cheese by sundrying or adding edible dye to make it attractive.

The edible dye can be obtained from threshed sorghum ear called, in the local Hausa language, *karan dafi* (kara meaning sugarcane and dafi meaning cooking, so literally meaning cooking sugarcane). The same dye is added to a local food in Ghana called *waakye* (boiled mixture of rice and beans) to give it a reddish brown colour. *Woagachi* serves as a good source of animal protein and is used as a substitute for meat and fish, or used in combination with meat and fish in many local dishes in Ghana and other West African states including Benin, Togo and Nigeria. The low lactose content of *woagachi* makes it suitable for people who experience lactose intolerance, a condition that is linked to the consumption of milk due to a low level of intestinal β-galactosidase (the enzyme that breaks down milk; Aworh, 2008).

Through the process of fermentation, Indigenous people of sub-Saharan Africa produce one of the most important food condiments among the northern tribes of West Africa, called *dawadawa* (Campbell-Platt, 1980). It is made from fermented seeds of the Africa locus bean. These seed were found to contain 39-47% plant fat and 31-40 percent protein, and dawadawa contributes significantly to the energy, protein and vitamins,
particularly riboflavin, in many West African countries (Aworh, 2005). Dawadawa is made by boiling the seeds of the African locus beans for a few minutes (12-15 minutes) to become tender and gently dehull the seeds. The dehulled seeds are then boiled for 1½ to 2 hours, at which point salt petre (sodium sesquicarbonate), known in local parlance as “kau” (in Akan) and ‘kanwa’ (in Hausa), is added as a softening agent. The cooked and tender seeds are then molded into small balls and wrapped with banana leaves. The act of using ‘kau’ as a softening agent is an ancient act of Indigenous people of Africa. The ‘kau’ is made from ashes of specific trees. Another display of Indigenous science is the mechanism to revert the excess salt put in soup (personal observation from Indigenous scientists in Ghana). The process begins by first taking the bowl of soup off the fire, measure the same amount of salt put into the soup in the first instance and placing the soup back on the fire and allowing it to cook for a few minutes. By allowing the soup to cook for a few minutes, the entire soup becomes saltless and new salt is put in to taste.

Indigenous knowledge regarding food production and preparation is an unending concept that cannot be completely discussed, especially in a thesis such as this. However, the thrust of this theoretical framework is to highlight Indigenous knowledge as a legitimate way of knowing. It is a distinctive body of knowledge that does not require validation from Western scientific knowledge, since it predates Western scientific knowledge. That being said, it has its strengths and weaknesses and hence is open to criticism, suggestions and change since it is not static. It undergoes constant modification to respond to changes in times and circumstances. It does not operate with the principle of “one cap fits all” since it does not dwell on the universality of solving problems. Indigenous knowledge is not in competition with Western scientific knowledge, but
rather complements it and provides the basis for scientific inquiry. The theoretical frame seeks to emphasize that both Indigenous and Western scientific knowledge are legitimate ways of knowing, but operate on different worldviews. The glorification or rejection of one or the other is not the relevant issue. In contemporary times, it is worth focusing on how to draw from each other’s strengths and weaknesses to advance the course of humanity rather delegitimize a particular way of knowing and consider the other authentic.
Chapter 4

4.0 Results and Discussion

4.1 Food, Culture and Politics

The review of the literature showed how food relates to people’s culture. The food people eat, how they prepare it, how they eat it and with whom they eat reflect their lifestyle, culture, preferences, beliefs and sometimes their religion. Occasionally, people adopt certain food to establish a relationship with a particular group. In other instances, food introduced from other cultures may be distinguished as foreign to express separation from a group or membership. The feelings of nostalgia, security, love, belongingness and comfort that are brought about when one consumes food that he/she is identified with for the first time in many years underscores the intricate links among food, culture and identity. Conversely, discomfort occurs if one is unacquainted with food manners or rules guiding particular food, and if a person consciously break the rules, he/she may be detested or spurned (Neely, 2007). Food habits, also referred to as food culture or food symbolism, demonstrate a person’s social standing within a group.

Food habits are used as a proxy for economic and social standing; for instance, eating foreign polished “perfumed” rice in Ghana implies wealth, and the reverse is the case for consumption of local or other rice. Consumption of Western processed food implies wealth and African Indigenous foods are linked to low income. This characterization of food is mainly based on price differential and cultural significance of food and it is not always true, even though in most cases it is, that local foods are linked
to poverty. A typical example is the case of a wild yam variety in Ghana called “Asobayere” (literally means ignited yam), which connotes rejuvenated love to some Ghanaians. The scarcity of the yam and its cultural and social significance – serving it to a spouse represents refreshing one’s love relationship – made this yam the food for the upper class in the cities of Ghana. This cultural significance of food represents a glimpse of hope that intervention for promoting Indigenous foods can succeed when the perception of the food is changed in a positive way.

In general, eating with someone connotes social equality with that person. In Ghana, there is an adage which is translated as “if child knows how to wash his/her hands well, she/he dines with adults”. The phrase “washing one’s hands well” is metaphorical to represent comportment, knowing the food cultures, and raising one’s status in thinking and behaviour to that of an adult. In India, people from different social classes did not traditionally eat together, nor were people from an upper class permitted to eat food prepared by a person of a lower class (Kittler, Succher, & Nelms, 2012). Food provides opportunity for knowledge production and transformation of values, contestation and validation of both local and foreign ideas. In traditional Africa, for example, learning to grind millet with the traditional tools and processing the millet into edible food was part of every girl’s introduction to the art of cooking (Ndoye, 1987).

Food, in a broader sense, represents a complex socio-cultural phenomenon apart from its life nourishing functions. These complexities become pronounced when taking into account the beliefs and “superstitions” associated with food. For instance, Greek soldiers carried a piece of bread from home as a good omen to ensure they returned home safe and victorious; English midwives put a loaf of bread near the foot of a new mother to
protect her and the newborn baby from being stolen by evil spirits (Kittler et al., 2012). It was revealed that in Russia, Coca-Cola was used to remove wrinkles; in Haiti, Coca-Cola was believed to revive the dead; and in Barbados it was believed to transform copper into silver (Howes, 1996; Pendergrast, 1993).

In view of the complex nature of food, interventions aimed at addressing the challenges of chronic diseases using diet should be crafted with the cultural significance of food in mind. Fortunately, African food cultures prior to colonization prevented chronic diseases, notwithstanding their own setbacks such as being prone to communicable diseases. Cultural revitalization in food habits is therefore relevant to address chronic disease burdens in African, particularly Ghana. Culture is not static; it changes in response to changing needs of people; to that effect, the changes should advance the course of humanity by ensuring socio-economic development and eliminating negative tendencies. However, when the reverse occurs, then the need for cultural revitalization becomes indispensable. After all, it is said in Akan “sankofa wonnkyer,” meaning going back to the old ideas is not a taboo (or crime).

Another area to consider in designing an intervention for managing the chronic disease burden using diet is food politics. Food and dietary patterns have consistently been used as a mechanism for enacting colonialism and projecting self-values (Dietler, 2007), a means by which Western values and ideals were imposed on others (Dietler, 2007; Salins, 1976). Food and food values have been instruments for exerting political control and dominance over the world and for control of human consciousness (George, 1976). Food and culinary cultures served as an apparatus for marginalized groups to show resistance against devaluation of their cultures and ways of knowing (Chan et al., 1995;
Axelson, 1986) and projecting ethnic values and ideals (Kuhnlein, 1996). Food production and consumption are also influenced by corporate interests and capitalist orchestrations (Murphy, 2008). A clear case of food politics was displayed towards the last quarter of the 20th century, when the United States of America tied their foreign aid to developing countries, particularly in Africa, to the acceptance of US food imports that sought to dump excess production overseas (Ackermann et al., 2008).

These measures by the United States contributed to the increased importation of Western foods into most developing countries. For example, Ghana imported a large volume of US yellow corn to address food shortages caused by the 1983 drought. Coincidentally, it was around the same period that the government of Ghana implemented Economic Recovery Programme, followed by the Structural Adjustment Programme, which ushered in trade liberalization (Tsikata, 1999). Trade liberalization opened Ghana’s market to the importation of Western processed foods and other foreign products. In the mid-2000s, the then president of Ghana, His Excellency J. A. Kuffour, realized that the high importation of poultry and poultry products was killing the Ghanaian poultry industry.

As a measure to check this trend, the government of Ghana announced the imposition of an import tax on poultry products to help boost the local poultry industry. Sadly, the government was forced to withdraw this policy by WTO regulations in the Agreement on Agriculture (AOA), which prohibits member countries from unilateral tax
imposition. The sanctions associated with the violations of these regulations include retaliation from other countries. Hence, though Ghana is a sovereignty country, Ghana does not have absolute control of its food system; substantial power lies on the shoulders of international organizations such as the World Trade Organization (WTO). It is therefore not surprising when a private radio station in Ghana, Joy FM, on June 22, 2014 quoted the president of Ghana, His Excellency John Dramani Mahama, acceding to the fact that challenges facing African agriculture are partly caused by the World Bank and IMF (www.myjoyonline.com).

Bello (2008) demonstrated how developed countries through their adjuncts, the World Bank and IMF, succeeded in creating food crises in most developing countries to the extent that Mexico, a country where maize originated, has been reduced to the net importer of maize and depends on the US for its maize supply. Similar strategies that succeeded in creating challenges in the Latin America food system – that is emphasis on commercial farming at the expense of subsistence farming, which is the way of life of Indigenous farmers – was vigorously experimented with in African. As a result of these polices, Africa, which at the time of decolonization in the 1960s was self-sufficient and a net exporter of food, now imports 25% of its food requirement (Bello, 2008). Due to the harsh economic and food crisis imposed on Africans by these food politics, African Indigenous farmers have moved from sublime compliance to IMF and World Bank directives to defiance (Bello, 2008). The African Indigenous farmers have devised

Note: there was no open admission from the government that they reversed the unilateral tax imposition on poultry due to the WTO agreement, but I made economic deductions based on my knowledge of international trade regulations.
strategies to speak the language of the change officers and go back to their old farming practices.

The power dynamics and politics embedded in food and food habits, as well as the corporate interest in food production and promotion revealed over four decades ago (George, 1976; Salins, 1976), was re-echoed in 2014 (Greger, 2014). A renowned American nutritional expert and medical doctor, Dr. Michael Greger, revealed how politics and corporate interests clouded the American nutritional recommendations in an interview with Craig Gustafson in 2014 when he said:

The whole day testimony was recorded and placed online, so everyone could get a glimpse at the politics behind our federal nutrition recommendations… I would tell stories about this little microcosm of corporate interests and the forces that are shaping our food supply, but it does not have the same impact as actually seeing a representative of McDonald’s saying how much they care about children’s health. (Greger, 2014, p. 22)

So if the United States, the most powerful nation in the world, is faced with the dilemma of making consumer health the priority over corporate interests, then we can postulate that worse is happening in other countries. In this respect, food and food habits have never been a neutral arena and so shall it continue for some time to come. The poor communities should therefore value their own food system rather than follow the dictates of corporate and profit oriented organizations.

4.2 Consequences of Changing Eating Habits for Indigenous People

The Westernization of eating habits has resulted in serious health and economic challenges to most Indigenous communities. Dietary changes in most Indigenous communities in Africa have introduced chronic, or what is referred to as “Western” diseases (Trowell & Burkitt, 1981). The concept of “Western diseases” was first mooted
by British trained medical experts Dennis Burkitt and his colleague Hugh Trowell, who were posted to African during the Second World War. Over decades of medical practice in Africa, they noticed striking geographical differences in the pattern of diseases they diagnosed. For instance they realized that chronic diseases, which were common in Europe, were rare in Africa. As a result, they became convinced that the differences in the dietary patterns between Africa and Western countries accounted for lack of chronic, degenerative diseases in Africa. Trowell and Burkitt (1981) wrote a book titled *Western Diseases, Their Emergence and Prevention*, describing how chronic diseases became a prominent feature in sub-Saharan Africa. Hence, the emergence of alien diseases such as cardiovascular disease, hypertension, diabetes and cancers in African and other Indigenous communities in the Americas were associated with changing food habits from a traditional plant-based diet to Western processed foods (Barnard et al., 1995; Hu et al., 2000; Lock et al., 2005).

Donningson (1937, as cited in Trowell & Burkitt, 1981) in his book *Civilization and Disease* catalogued diseases of civilization as, essentially, hypertension, obesity, ischemic heart disease, cardiovascular diseases, diabetes, dental caries, appendicitis, gallstones, varicose veins, pernicious anaemia, renal calculus, thyrotoxicosis, and toxaemia of pregnancy. All these illnesses are either directly or indirectly bad externalities of becoming more sophisticated and exotic in dietary choice.

In Ghana, chronic diseases have rendered many homes poor because the bulk of the household’s income goes to medication; many children have become orphans because parents who cannot afford medication die and leave their children. As a result, tears and sorrow have become companions of many because of the pain of losing love ones. The
trauma of chronic diseases necessitated the call for Indigenous Ghanaians to revitalize their traditional culinary cultures and reclaim their heritage for posterity. To capture the philosophical underpinnings that govern the moderate eating habits of the Indigenous people, Trowell (1981) stated that:

Strong evolutionary pressures were at work in hunter-gatherers: if a man consistently ate too little he would become weak and unable to hunt; if he consistently ate too much even by only 1 per cent, excessive weight would prevent him from catching his game and his wife from gathering her quota of plant foods. Also a fat man and fat woman would not easily escape the animal and human predators. (p. 15)

This philosophy may look old and “primitive” to some, but its moral lessons are relevant in today’s contemporary world. It could be a guiding principle for all workers: bankers, lecturers, students, artisans, labourers and even those who are not working. For instance, a high prevalence of hypertension and obesity was recorded among the market women in Accra, Ghana (Hill, Anarfi, Darko & Duda, 2005; Pobee, 2006). This is partly due to the nature of their jobs, which required them to leave home at dawn, sit at a particular place serving customers for the whole day, only to return home to sleep without much physical activity. However, the kind of food they eat such as kenkey, banku, fufu, rice and others are high in energy and require some level of physical activity to maintain the energy balance. Beside genetic and other factors, obesity, for instance, is found to occur when energy intake exceeds energy use. The excess energy is converted to fat and stored in muscle tissues; this results in obesity and its associated complications.

Culturally, Africans were not obese except in certain traditions among the nomads where women were fattened for marriage or prestige. The skinny nature of Africans was misconstrued by the Western world as sign of under nutrition (malnourishment). Hence, plumpness was associated with the notion of beauty, affluence, good living, richness, and
peace of mind, which culminated in the increased rate of obesity among Africans, both at home and abroad. The key health implication of ‘modern’ eating habits is the spread of diet related illness: cancers, hypertension, cardiovascular diseases (heart diseases), cerebrovascular disease (e.g., stroke), osteoporosis (bone malfunctioning) and diabetes worldwide, with associated fatalities. The Broad Income Group (BIG, 2001) listed the top ten causes of deaths worldwide as follows: ischemic heart diseases, self-inflicted injuries, road traffic accidents, trachea, bronchus and lung cancers, cerebrovascular disease, cirrhosis of the liver, breast cancers, colon and rectal cancer, diabetes mellitus and stomach cancers. Apart from the self-inflicted injuries, road traffic accident and tracheal cancer, the remaining seven are either directly or indirectly nutritionally related.

In the United States of America, for instance, five of the leading causes of death are directly linked with diet: diabetes, cancer, heart disease, stroke, and kidney disease, with cancer leading the chart (US Centers for Disease Control, 2007). A similar situation was reported in South Africa, where five out of the ten leading cause of deaths are linked to diet, thus: diabetes, hypertension, stroke, diarrhea and heart diseases (Norman, 2011). In Ghana, the rising incidence of chronic disease has shifted the causes of death from solely communicable diseases in the past to a combination of communicable and chronic NCDs (de-Degraft Aikins, 2007). Bosu (2007) conducted a study to ascertain the top ten causes of deaths in 32 hospitals in Ghana and identified malaria, anaemia, pneumonia, stroke, typhoid fever, diarrhea, hypertension, hepatitis, meningitis and sepsis with malaria as the most deadly diseases in Ghana.
Figure 1: Major Causes of Death in Ghana. Source of data: Bous, 2007 (NB: 10 = major cause and 1 = least cause of deaths)

It worth noting that five out of the top ten causes of death in Ghana are connected to diet, viz: anaemia, stroke, typhoid fever, diarrhea and hypertension. Apart from diet, others factors such as genetics and environmental pollution are considered key contributory factors to a person’s susceptibility to chronic diseases. For instance, a concept of “the thrifty gene” was used to explain why some people were more susceptible to chronic disease than others (Neel, 1962). According to the theory, Aboriginal people have, over time, developed an effective mechanism for energy storage; thus, when periods of hunger or famine are replaced with a bumper harvest and continuous supply of food, this survival trait results in detrimental health effects (Neel, 1962). This prompted research into genetic factors affecting the susceptibility of Aboriginal people to chronic diseases.

A study was conducted by Aguilar and others (1999) with the Purepecha community in Mexico to assess the interaction between genes and environment on increased cholesterol level and insulin resistance (associated with type 2 diabetes). The
study concluded that diet and lifestyle factors surpassed the genetic predisposition to higher than normal cholesterol levels associated with increased cardiovascular risk. Chemical pollution to the environment is strongly linked to rising chronic diseases, especially cancers and diabetes (Bartell, 1999; Steingraber, 2010). Humans have been imbibing chemicals through food, water, air and other exposures to the extent that breast milk, once considered the safest food for infants, does not pass the US Food and Drug Authority safety standard due to contamination with poly chlorinated biphenyls (PCBs), (Steingraber, 2010).

4.3 African Indigenous Foods and Chronic Non-communicable Disease in Ghana

The nutritional importance of African Indigenous food crops has never been doubted by the Indigenous people who consume them, though their consumption has declined due to urbanization and globalization of the world food system. While the consumption of Indigenous food has declined in urban areas, African indigenous foods feature prominently in the rural areas of Ghana. The awareness created about the health benefits of some African green leafy vegetables in some African countries has led to research investigating the nutritional composition of more Indigenous vegetables. Several studies have demonstrated the importance of Africa Indigenous foods and vegetables in Ghana, Uganda, Kenya, Nigeria and other countries (Abbey et al., 2006; Adepoju & Oyewole, 2008; Abukutsa-Onyango et al, 2005; Glew et al., 2009; Kwenin, Wolli & Dzomenku, 2011; Raschke et al., 2007).

Dark green leafy vegetables contain high amounts of micro-minerals that are vital in nutrient metabolism, which protects humans against chronic degenerative diseases (Chu, Sun, Wu & Liu, 2002). Green leafy vegetables contain phytochemicals and
antioxidants that fight against several human diseases, particularly the chronic non-communicable diseases. Due to their protective properties (high level of antioxidants), some researchers have recommended copious consumption of vegetable meals to protect humans against colon and stomach cancer (Gropper et al., 2005). Adequate consumption of green leafy vegetables was linked to the treatment of hemorrhoids, gallstones, obesity and constipation (Whitney et al., 2002). Furthermore, the antioxidants in green leafy vegetables reduce the risk of heart diseases and the vitamin K content of dark green leafy vegetables protects bones from osteoporosis and helps to fight against inflammatory diseases (Whitney et al., 2002).

Ghana possesses several species of Indigenous vegetables, grain cereals, roots and tubers, legumes and other medicinal plants. Consumption of Indigenous grain cereals such as millet, sorghum, several varieties of yam, and shea-butter and green leafy vegetables in Ghana was common among the people of Northern descent, compared to Akans and other Southern tribes (Abbey et al., 2006). Traditional foods are low in energy but nutrient dense, which is good for protecting individuals against obesity, a risk factor for other chronic diseases including hypertension and diabetes.

Studies worldwide have demonstrated that chronic diseases can be significantly reduced through adopting healthy eating habits and increasing the rate of physical exercise (Mensink & Katan, 1990; Mente et al., 2009; Reusser, Dirienzo & Miller, 2003). Shifting from traditional prudent dietary patterns and nutrient intakes to the conventional, luxurious diets that are high in saturated fats (Howard et al., 2006; Oh, Hu & Manson, 2005; Oomen et al., 2001; Pisa et al., 2011), salt (Charlton & Jooste, 2001) and excessive intake of alcohol (Di Castelnuovo, Rotondo & Iacoviello, 2002; Gronbaek, Deis &
Sorensen, 1995) were implicated in the rising cases of chronic diseases worldwide. For Africa in particular, the rising cases of chronic diseases have been connected to the increased consumption of animal-based foods, “fast or convenience food,” fried and or packaged foods, foods that contain high amounts of sugar and salt, and an increased intake of alcoholic beverages (Popkin, 2002; Vorster, 2002). As the consumption of animal-based foods has increased, the consumption of plant-based foods including whole-grain cereals, legumes, wild fruits and vegetables, which were the main foods for Africans, declined.

A study conducted by Raschke and associates (2007) demonstrated that Indigenous African foods including a wide array of Indigenous grain cereals, roots and tubers, domesticated and wild fruits and vegetables, spices, animal fats, fish and wild bush meat contain many health benefits. A key health benefit of Indigenous crops is prevention of chronic diseases. Globally, various research studies have confirmed that revitalization of traditional food habits could be a panacea to solving the chronic disease burden. Drawing on the benefits of traditional diets, some researchers have concluded that globalized food culture promotes pathogenic effects (Poulter et al., 1984; Poulter et al., 1990), while Indigenous food habits exert protective effects (Cockerham & Okinawa, 2001; MacLennan & Zhang, 2004; Pauletto et al., 1996; Pavan et al., 1996; Serra-Majem et al., 2006; Trichopoulou & Critselis, 2004; Yamori, Miura & Taira, 2001). I will therefore highlight studies done in Africa, and particularly Ghana, regarding Indigenous African foods, with the intention of revealing their health benefits to the ordinary Ghanaian.
Adepoju and Oyewole (2008) studied two Indigenous leafy vegetables: cocoyam leaf “kontomire” (*Colocassia esculenta*) and basil leaf (*Ocimum gratissimum*), commonly found in West Africa, especially Ghana and Nigeria. Their study revealed the nutritional properties as having low crude protein and lipid, but the values were comparable to baobab and okra leaves. In addition, they are low in carbohydrate and gross energy but high in crude fiber (Adepoju & Oyewole, 2008). These two vegetables are therefore good sources of dietary fiber and low gross energy that provide health benefits when consumed by obese and diabetic people (Adepoju & Oyewole, 2008; Lock et al., 2005). The two vegetables contain low sodium, which is good for consumption by normal and hypertensive patients (Adepoju & Oyewole, 2008). The study further revealed that the vegetables contain high B-carotene and ascorbic acid, which serve as good sources of antioxidants required by the body to prevent cancers. In additional to these nutritional qualities, these vegetables were found to have no negative health effects when consumed in excess due to their low levels of anti-nutritive components such as phylates, oxalates, tannins and saponins (Adepoju & Oyewole, 2008).

Mossanda et al (2005), in their investigation of African diet and beverages with low risk of digestive and liver cancers, found that Bambara groundnut (*Vignea subterranean*), one of the Indigenous Africa legumes, possesses anti-oxidative and anti-mutagenic properties good for cardiovascular diseases and cancers. Bambara groundnut is common in Ghana but enjoys low patronage. It is rarely consumed in Ghana by only a few households who normally put it in the soup. Due to its poor market, cultivation is on a small scale and usually to serve the urban market.
Glew and associates (2009), in the nutritional analysis of three uncultivated leafy vegetables in Ghana, viz: cats whisker (*Cleome gynandra*), nettle weed (*Fleurya aestuans*) and African night shade (*Slolanum nigrum*), revealed that all three vegetables contain high amounts of essential omega 3 fatty acids, low saturated fat and β-Carotene. These nutrients are known to minimize the occurrence of cardiovascular diseases among humans (Glew et al., 2009; Jansen, 2008). However, they recommended further investigation to determine the possibilities of metabolites toxic to humans in the three plant foods, in particular alkaloids and terpenoids. On the individual level, *Slolanum nigrum* was studied and found to be effective against the protozoan gut parasite *Giardia lamblia* (Johns et al., 1995). *Fleurya aestuans* is also found to be effective in the treatment of eye infections, swelling, wounds, burns and gonorrhea (Dokosi, 1998). *Fleurya aestuans* is used in Ghana to prepare soup for women after childbirth to ensure good health (Dokosi, 1998). In Ghana, *Cleome gynandra* is used for the treatment of constipation and ear infections (Glew et al., 2009).

Table 1.

*Indigenous African Green Leafy Vegetables*

<table>
<thead>
<tr>
<th>Indigenous Vegetables</th>
<th>Nutritional Qualities</th>
<th>Health Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cocoyam leaf (<em>Colocassia esculenta</em>)</td>
<td>Low in carbohydrate and energy, high fibre, low sodium</td>
<td>Good for obesity, diabetes &amp; hypertension</td>
</tr>
<tr>
<td>Basil tree leaf (<em>Ocimum gratissimum</em>)</td>
<td></td>
<td>(Adeponu &amp; Oyewole, 2008)</td>
</tr>
<tr>
<td>Bambara ground nut (<em>Vignea subterranean</em>)</td>
<td>Anti-oxidative &amp; anti-mutagenic activities (Mossanda et al., 2005)</td>
<td>Good for CVDs</td>
</tr>
<tr>
<td>Cats whisker (<em>Cleome gynandra</em>)</td>
<td>High omega essential omega 3 fatty acids, low saturated fat &amp; β-Carotene</td>
<td>Good for heart diseases (CVDs)</td>
</tr>
<tr>
<td>Nettle weed (<em>Fleurya aestuans</em>)</td>
<td></td>
<td>(Glew et al., 2009; Jansen, 2008)</td>
</tr>
<tr>
<td>African night shade (<em>Slolanum nigrum</em>)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Okra (<em>Hibiscus sp</em>)</td>
<td>Cholesterol lowering food (Bangana et al., 2005)</td>
<td>Good for CVDs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Raschke et al., 2007)</td>
</tr>
</tbody>
</table>
The cholesterol lowering effects of Okra, a vegetable Indigenous to Africa, which is consumed worldwide, was studied in adult men in Senegal. Results showed the crop has the ability to lower the cholesterol level in humans, particularly men (Bangana et al., 2005). The ability of okra to reduce total cholesterol and low density lipoprotein cholesterol may contribute to the prevention of cardiovascular disease (Raschke et al., 2007).

Prior to the introduction and promotion of foreign crops such as maize and cassava, Indigenous African cereals such as millet and sorghum were the main source of energy; during some period of the year they supplied between 80% and 90% of the dietary protein (Raschke et al., 2007). In addition, they supplied virtually all the vitamin B1, nicotinic acid, vitamin A, calcium and phosphorus. Millet, one of the oldest crops in Africa, matures early when it obtains sufficient rainfall, while Sorghum bicolor is a drought resistant crop (Culwick & Culwick, 1941). Millet and sorghum contain higher amounts of calcium, carotene and protein (Culwick & Culwick, 1941) than maize, the current most dominant cereal in Africa, particularly in Ghana. A recent study done in Burkina Faso revealed that sorghum contains a significant amount of polyphenol and antioxidants (Dicko et al., 2002), which could serve as protective agents against chronic diseases. Nishizawa et al (2002) in their study found that millet has properties that can help to reduce the risk factors for cardiovascular diseases. Their findings were corroborated by Gooneratne et al. (2005).
Table 2.

*Indigenous Africa Grain Cereals*

<table>
<thead>
<tr>
<th>Indigenous Cereals</th>
<th>Nutritional Qualities</th>
<th>Health benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millets (<em>Pennisetum sp</em>)</td>
<td>High protein, Vitamin B1, Nicotic acid, Vitamin A, Calcium, Phosphorus, Carotene</td>
<td>Reduce risk factors for CVDs (Gooneratne et al., 2005; Nishizawa et al., 1996)</td>
</tr>
<tr>
<td>Sorghum (<em>Sorghum sp</em>)</td>
<td>Polyphenols &amp; antioxidants (Dicko et al., 2002)</td>
<td>Reduce risk factors for CVDs (Goneratne et al., 2005; Nishizawa et al., 1996)</td>
</tr>
</tbody>
</table>

*Source:* Author’s compilation from in text reference; note scientific names in parenthesis

**4.4 Challenges in Promoting Indigenous Foods and Vegetables in Ghana**

A research organization, Plant Resource of Tropical Africa, documented at least 275 plant species that are used as vegetables and 528 species used as food, medicine or for ornamental purposes (Grubben & Denton, 2004; PROTA, 2005). The breakdown of the categorization indicates 53 different botanical families, of which more than 60% originated from Africa and are used as vegetables. It indicates that 75 percent of these vegetables are Indigenous to Africa; 16 percent were introduced over centuries ago and are widely adapted to the African climate and only 8% were recently introduced and are regarded as exotic (PROTA, 2005).

Ghana is one of the Africa countries blessed with several species of Indigenous African foods crops and vegetables. However, except for the notable Indigenous vegetables such as cocoyam leaves (kontomire), *Amaranthus sp* (Aleefu), bush okra (ayoyo) and a few others, the consumption of varieties of Indigenous vegetables is not as popularized and well documented in Ghana as in other African countries such as Kenya and South Africa. For instance, three sensitization and promotion workshops were held in Nairobi, Limbe and Maseno in 1995, 1997 and 2003, respectively, in Kenya; they
increased awareness of the health benefits of Indigenous African leafy vegetables as well as their consumption (Abukutsa-Onyango et al., 2003; Guarino, 1997)

Ghana’s food intervention focuses on crop improvement programmes aimed at developing new varieties of roots and tubers, particularly cassava and to a lesser extent yams. The only Indigenous crop that receives serious attention in Ghana is African rice, perhaps due to the large volume of imported of rice having a significant impact on the Ghanaian economy. The various programmes initiated were aimed at promoting the cultivation and consumption of African rice in Ghana. Other Indigenous crops, particularly green leafy vegetables, received little to no attention from government in terms of policy to harness the potential of Indigenous foods to either address food security challenges or curb the upsurge of chronic disease. As a result, several varieties of Indigenous yams, vegetables and wild fruits are going extinct. The consumption of Indigenous grains such as millet and sorghum is limited to porridge and Fura commonly consume by people of Northern descent. However, these grains were the main staple foods for Ghanaians and were used to prepare various types of food during the pre-colonization period. Low patronage of indigenous foods has contributed to the loss of knowledge in meal preparation using Indigenous food crops among the younger generation.

Darkwa and Darkwa (2013), in their survey to assess the use of Indigenous green leafy vegetables (IGLVs) in the preparation of Ghanaian dishes, presented ten IGLVs to the participants for identification. Out of the ten IGLV, only four were correctly recognized by the participants as foods, which highlights the poor knowledge of Indigenous foods in some communities in Ghana. However, this cannot be generalized as
the situation in Ghana because knowledge of Indigenous foods in Ghana varies across regions, ethnic groups and location (whether urban or rural). Furthermore, in some communities, Indigenous grains were substituted for maize in traditional cooking. A typical example is among the Ga communities in Accra, Ghana, where the celebration of the “homowo” festival was used to usher in the harvest and the sharing of millet diets has been replaced with maize in recent times. In contemporary times when food security and rising cases of chronic NCDs have become major issues in Africa, especially in Ghana, complementing African Indigenous food crops with the introduced crop could yield better results than substituting the Indigenous crop for the introduced ones.

The knowledge of Indigenous foods and their consumption is higher in rural areas than in urban communities. Consumption of Indigenous foods and wild fruits increases during lean seasons when food is scarce (Dei, 1989; Demi, 2012). The highest consumption of indigenous foods in Ghana occurred in 1983 when a major drought hit most African countries (Demi, 2012). Indigenous crops such as various varieties of wild yam, and African Indigenous vegetables including water leaf (borkorborkro) and moringa oleifera constituted the major food component of many rural households (Demi, 2012). Since the incidence in 1983, Ghana has been fairly stable in terms of food security, hence the decline in consumption of Indigenous foods. Indigenous foods and vegetables have many advantages, including providing a cheaper source of nutrients; drought resistance; resistance to local pests and disease, hence they do not require chemical input in their production; and being less capital intensive compared to exotic vegetables.

In a nutritional sense, Indigenous vegetables in Ghana are superior to their exotic counterparts (Abbey et al., 2006), are very affordable, or can even be obtained for free in
rural communities, yet people prefer the exotic vegetables (Darkwa & Darkwa, 2013). The exotic vegetables are preferred to the Indigenous vegetables for their prestige, particularly due to exorbitant prices. Several factors account for the marginalization of Indigenous foods in Africa. Shava (2005) identified six key factors responsible for the decline in consumption of Indigenous foods in Zimbabwe, which relates to the situation in Ghana. Factors contributing to low patronage of Indigenous foods include: 1) lack of intergenerational knowledge transfer within communities, 2) impact of Western/formal education, 3) stigmatization of Indigenous foods, 4) impact of modern agriculture, 5) globalization of the world food system and finally 6) changes in lifestyle (Shava, 2005). A Brief discussion of each of these factors is presented below.

**Lack of intergenerational knowledge transfer:** Knowledge of Indigenous foods and their preparation varies within African communities depending on age, gender, location (rural or urban), and occupation. For instance, older people have adequate knowledge of indigenous foods compared to the younger generation. Also, women have adequate knowledge of Indigenous leafy vegetables compared to men due to women’s key role in food preparation. Men possess adequate knowledge of wild fruits compared to women due to their role in hunting and gathering, as well as felling of trees for sculptures, stools and artifacts. Generally, people who live in rural areas are more familiar with Indigenous food than are urban dwellers. The reason for this is that the Indigenous foods that grow in the wild in most rural communities serve as a food reserve that people rely on during food shortages or, to some extent, for their medicinal values. However, there seems to be a disconnect in knowledge transfer across the groups due to the fact that oral knowledge transfer has been replaced by written knowledge (Shava,
2005). Book knowledge is considered superior to oral knowledge, perhaps due to lack of teaching of Indigenous knowledge in schools and colleges. Hence, any knowledge outside the Western scientific basis or proof is considered invalid. Secondly, the younger generation considers the knowledge of the old folks as outmoded. Hence, oral knowledge is regarded as substandard, resulting in the loss of valuable Indigenous knowledge about wild foods and methods of preparation.

**Impact of Western/formal education system:** Formal education is founded on Western values and ideals. The education systems in Ghana focus little on Indigenous knowledge, hence Indigenous foods and their methods of preparation are not priority areas for curriculum planers. The focus of agricultural education in Ghana is to improve the productivities of crops with commercial values through research funded by government and non-governmental organizations (NGOs) to address food security challenges. Despite these interventions, Ghana is only self-sufficient in the production of root and tubers (Ministry of Food and Agriculture, Ghana, 2007).

Self-sufficiency in roots and tubers in Ghana is unpredictable and fluctuates between scarcity and glut, depending on the availability of rainfall and favourable conditions of other environmental factors including pests and diseases. Over-concentration on commercial crops by the current education system has contributed to the marginalization of Indigenous knowledge about wild foods in Ghana. The future of Indigenous crops in Ghana faces complete extinction with the attempt to introduce genetically modified (GM) foods. I followed the various news headlines on the website of a private radio station in Ghana, Joy FM ([www.myjoyonline.com](http://www.myjoyonline.com)) including: “Angry Farmers Hit the Streets Over GMO” and “Speaker of Parliament Suspends GMO
Deliberation” on the 28th January, 2014; “Interesting Debate on GMOs: Dr. Abu Sakara7 Locks Horns with CPP Deputy Youth Organizer” on the 4th February, 2014 and “EPAs Signs of Neocolonialism: farmers cry” on the 19th of May 2014
(www.myjoyonline.com). These were the headlines that captured the demonstrations of the Coalition of Civil Society Groups against the introduction of a “plant breeder’s bill” that will kick start growing of GM foods in Ghana. The placards that were displayed carried interesting inscriptions such as “No GMO! No GMO!, GMO is poison,” etc.
Anti-GMO advocates argued that the introduction of GMOs will impoverish the peasant farmers and create several health problems for Ghanaians. The advocates for GMOs counter argued that GMOs are safe and their benefits supersede their perceived problems. However, what is certain is that the introduction of GMOs in Ghana will accelerate the extinction of African Indigenous crops in Ghana. All of these policies are counterproductive to Indigenous crops in Ghana.

Stigmatization of Indigenous foods: Indigenous foods are besieged with many negative perceptions, mostly born out of myth, across the entire African continent. For instance, in South Africa Indigenous foods are associated with “backward knowledge” (Vorster, 2007), in Ghana they are considered as “famine food” (Dei, 1989; Glew et al., 2009) and in Kenya they are regarded as “poor people’s food (Faber et al., 2010). Shava (2005) observed that in Zimbabwe, consumption of Indigenous foods, particularly millet and sorghum, was linked to those living with HIV/AIDS infection. Linking Indigenous foods to HIV/AIDS patients was a response to the media messages in Zimbabwe that

7 Note: Dr. Abu Sakara was the flag bearer of the Convention People’s Party (CPP) in the 2008 elections in Ghana and a prominent agronomist. The CPP party was founded by the first president of Ghana, Dr. Kwame Nkrumah, a leading PAN Africanist who gained Independence for Ghana from the British on 6 March 1957. Interestingly, while the flag bearer of the CCP argued in favour of GMOs, his immediate former party chairlady, Samia Nkrumah, the daughter of the party founder, called for a ban on GMOs.
advocated for the use of Indigenous foods for HIV/AIDS affected persons (Shava, 2005). The main element inherent in stigmatization of Indigenous food is classism. The wealthy in society purchase the expensive products and the poor use the lifestyle of the rich as a standard without critically analyzing the consequences. Generally, expensive products are considered to have the highest quality and the cheaper ones are considered inferior. However, this is not always the case, at least as demonstrated with Africa Indigenous leafy vegetables. This marginalization contributed immensely to the erosion of African Indigenous foods in Ghana.

**Impact of modern agriculture:** The concept of modern agriculture is grounded in Western agronomic practices, which focus on monoculture (growing of single crop) in contrast to the Indigenous system of polyculture/mixed cropping (growing of multiple crops). Hence, plants that were not familiar to Western agronomists were categorized as weeds. The definition of “weeds” was derived from monoculture practices. A weed, from the concept of modern agriculture, is a plant growing in an unwanted place, which implies that if a cassava plant is found in maize monoculture, the cassava plant qualifies as a weed. Despite the complexities inherent in the definition of a weed, most Indigenous crops were classified as weeds, resulting in their elimination and extinction. To Indigenous people, plants are either food, medicine or both, depending on the usage. An Indigenous woman farmer in India revealed this perspective when she opined “what do you mean by weeds? There is nothing like weed in our agriculture” (Mazhar, Buckles, Satheesh & Akhter, 2007, 18).

Again, the commercial crops are less resistant to competition for nutrients, light, space and water. This requires the elimination of any other crops growing around their
root zone in order to produce their optimum yield, particularly the hybrid crops. For example there are varieties of hybrid maize developed in Ghana called ‘dadaba’ (meaning “father’s child” in Akan) and “mamaba” (meaning “mother’s child” in Akan). These terms – “dadaba” and “mamaba” are local parlance referring to pampered or spoilt children, so in essence what is meant is that these varieties of maize require extra care in terms of weed control, nutrient application, and water supply than ordinary maize plants. Hence, convectional agriculture has played a key role in the loss of Indigenous crop species and the knowledge involved in their cultivation and preparation.

**Globalization of world food system:** Globally, the continual promotion of isolated food crops and animal species as authentic human food created a loss of biodiversity and resulted in the loss of several Indigenous crop species. Over the centuries, human ancestors have identified about 3000 of 250,000 species of flowering plants, and 150 identified crop species have been cultivated on a commercial scale (Tudge, 1988). However, as a result of the globalization of the world food system, only 15 crops species are considered important human food (Wilkes, 1977). These include 5 grasses: rice, wheat, corn (maize), barley and sorghum; 3 leguminous crops: soybeans, common beans, and peanut (groundnut); 2 sugar sources: sugarcane and sugar beet; 2 tropical trees: coconut, banana/plantain; and 3 starchy root crops: potatoes, yams and cassava. The resultant effects of this narrow genetic base of human food has culminated in the intensification of production to meet the over growing population of the world, creating dire environmental and health consequences. Some anthropologists (Wittman, Desmarais & Wiebe, 2010) have advocated for the concept of “food sovereignty” instead
of “food security,” which is the focus of the world leaders. Wittman and her colleagues (2010) define food sovereignty as:

the right of nations and peoples to control their own food systems, including their own markets, production modes, food cultures and environments...as a critical alternative to the dominant neoliberal model for agriculture and trade. (p 2)

Food sovereignty therefore includes the right of Indigenous people to determine what constitutes a food to them, rather than to follow the dictates of the dominant Western hegemonic categorization of plants into foods and weeds. According to Bernstein (2013), the concept of food sovereignty is to challenge the new face of capitalism and its imposition of unfavourable policies to the developing countries, such as trade liberalization, shift in global trade patterns of agricultural commodities, removal of subsidies and other forms of support to small holder farmers of the global South, and increasing concentration of global corporations in both the agro-input and agro-food industries. All these policies contributed to making Indigenous foods unmarketable, resulting in less or no cultivation.

Changes in lifestyle: Urbanization is implicated in the change of eating habits of most people across the globe, particularly in Ghana, where certain foods are linked to urban folks. Hence, when people move from rural to urban areas, they change their eating habits to fit their newly acquired status. For instance, higher consumption of tea, milk, eggs, sugars and many other foreign alcoholic and non-alcoholic beverages are more common in urban areas than rural areas (Opare-Obisaw et al., 2000). One example of negative consequences of high consumption of Western processed foods in Ghana is the large volume of plastic and metal waste choking most gutters in towns and cities. An
urban lifestyle contrasts with the traditional or rural lifestyle where there was a heavy reliance on nature and local food resources. Branding indigenous foods as village foods or outdated foods also discourages youth, particularly those in urban areas, from consuming and learning about Indigenous foods (Modi, Modi & Hendrike, 2006; Vorster et al., 2007). All of these factors are responsible for a decline in consumption of African Indigenous foods in Ghana.
Chapter 5

5.0 Conclusions and Recommendations

5.1 Conclusions

The study explored the potential of Indigenous African food crops in the fight against chronic non-communicable diseases in Ghana, and also determined factors responsible for the low consumption of African Indigenous foods (AIFs) in Ghana. Before I draw conclusions, I would like to highlight the limitations of this study. This study depended solely on secondary data in the form of documentary evidence. Hence, the conclusions and recommendations of the study are based on the findings of documentary evidence and within the timeframe in which the studies were conducted. This study reviewed relevant literature from peer reviewed journals, books, monographs, health documents and personal information to address the major research questions. The study revealed rising cases of chronic diseases in Ghana. Chronic diseases, including hypertension, diabetes, stroke, and cancers put considerable economic and health hardships on individuals living with chronic ailments and their families, particularly those who cannot work due to ill health.

The study revealed the presence of abundant AIFCs, particularly indigenous green leafy vegetables, which contain various nutrients including phytochemicals and antioxidants that are good for preventing as well as minimizing the impact of chronic degenerative diseases in Ghana. However, knowledge of Indigenous African foods is limited, particularly in the urban areas. Also, people of Northern descent patronize more Indigenous African food compared with their counterparts in Southern Ghana. The knowledge of Indigenous African foods depends on the following: location of the
individuals (whether rural or urban areas), age of the person (younger or elderly), gender (male or female) and occupation (on-farm jobs or professional workers). People living in the rural areas possessed more knowledge about AIFCs compared with the urban folks because AIFCs serve as food reserves that rural citizens depend on during lean seasons when foods become scarce. Further, the elderly possessed more knowledge about AIFCs compared to the youth. Women were generally well-versed in Indigenous African green leafy vegetable due to their role in preparing households meals, compared to the men, who were also well versed in identifying African indigenous fruits and tree crops owing to their roles in hunting, tree felling for making sculptures and farming in general (Shava, 2005).

Despite the superiorit of African Indigenous foods in terms of nutrient and in some cases affordability, in comparison to their exotic counterparts, the exotic foods, particularly vegetables, were preferred to the Indigenous ones. The key factors identified as responsible for the low patronage of Africa Indigenous foods include: stigmatization of African indigenous foods, lack of intergeneration knowledge transfer, impact of Western/formal education, impact of modern agriculture, globalization of the world food system, and changes in lifestyle due to urbanization. The success or failure of interventions aimed at promoting healthy eating habits through the use of Africa Indigenous foods will depend largely on the target group and the cultural significance attached to food. For instance, targeting the upper class could have more of an impact, particularly if they accept and change their perceptions about Indigenous Africa foods. It could also trigger acceptance by the middle and lower income groups since the eating
habits of the rich are used as the standard, at least in Ghana. The study therefore made a few recommendations for addressing the problems identified.

5.2 Recommendations

Based on the findings of this study, the following are recommended: The government, through the Ministry of Health (MOH) and Ministry of Food and Agriculture (MOFA), should consider incorporating consumption of African Indigenous foods, particular green leafy vegetables, in their health policies. This could be achieved by unveiling programmes aimed at promotion and sensitization of the public on the nutritional and health benefits of AIFCs in Ghana through schools, churches, mosques, local markets and public spaces. One of the effective ways that AIFCs could be promoted in the urban areas in Ghana is the Easter Margi cooking contest, which is shown live on national television. In addition, seminars, conferences and workshops could be held to engage the academicians, including nutritionists, health practitioners, agronomists and those from other related fields. Consensus reached at the conferences and seminars should trickle down to the local people through educating the people about the benefits of Indigenous crops.

Ghana Education Service should consider reviewing its curricula to stress the teaching of African Indigenous knowledge, particular regarding wild foods and their preparation, in schools and colleges. However, the Indigenous knowledge should be succinctly differentiated from Western scientific knowledge to avoid being co-opted into the mainstream stream of Western scientific knowledge. This should not devalue the relevance of Western scientific knowledge, but both Indigenous and Western scientific knowledge should be considered as legitimate ways of knowing. Instead, Indigenous and
Western scientific knowledge should complement each other and draw from their strengths to support the weakness of the other. The fields of studies where Indigenous knowledge on wild foods could be introduced include: agriculture, home sciences (nutrition), environmental and health sciences, and culture and social studies. For agriculture, Indigenous crops could be introduced and students need to be educated on their production methods, collection of their germplasms, and preservation. The health benefits of Indigenous crops should be highlighted to the students so that they can serve as ambassadors for promoting these crops. For the home sciences or nutritional studies, the health benefits of Indigenous foods should be explained to the students before they are tasked to develop recipes that will make the foods attractive without losing their nutritional qualities. As a way of practicing, students could be made to serve teachers and colleagues the food they prepared to encourage consumption of Indigenous foods in boarding houses and staff common rooms.

For the younger pupils at the primary school level, policy makers can work together with parents to introduce African Indigenous foods to the children. Studies have shown that people get accustomed to foods they were exposed to in childhood (Speck, Bradley, Harrell, & Belyea, 2001), and healthy eating habits could be better cultivated and maintained during childhood through to the adolescent years (Demory-Luce & Jensen, 2009). These therefore present a window of opportunity to instill in the future generation of Ghanaian the values of African Indigenous crops. In cultural and social studies, Indigenous knowledge could serve as an entry point to introduce traditional foods and dietary habits and highlight the potential they hold to curb chronic diseases in Ghana. Students could be tasked to ask their parents about the Indigenous Ghanaian foods they
recognize and describe how they are prepared. Since most indigenous food habits are influenced by culture, religion and social factors, students could be tasked to inquire of their parents the beliefs and cultural values associated with particular Africa Indigenous foods and how relevant these believes and cultures are in contemporary times. This way, teaching indigenous knowledge on wild foods should not focus solely on the knowledge of the teachers but of the entire community.

The universities and agricultural colleges in Ghana should consider teaching a course in African Indigenous Food Crops, highlighting their histories, values, depletion and invasion by foreign crops. Research scientists at the Council for Scientific and Industrial Research (CSIR, Ghana), particularly nutritional experts, should be tasked to intensify their investigations to determine the possibilities of toxic metabolites that may be hidden in the unpopular Indigenous food crops in Ghana. The consumption of indigenous foods crops should be accompanied with their cultivation, to prevent the extinction of wild foods in high demand in Ghana. The indigenous crops are hardy and resistant to local diseases and pests and able to compete favourably with other plants for space, light and nutrients in the wild; cultivating them requires low capital investment in the form of mechanized irrigation and the use of chemical inputs. This should provide an avenue for peasant farmers to generate extra income in addition to other farming activities to help reduce poverty.


### Appendices

**Appendix 1. Pictures of Some Indigenous African Spices, Vegetables and Cereals**

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Local Akan Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain of paradise</td>
<td><em>Aframomum melegueta</em></td>
<td>efomwusa</td>
</tr>
<tr>
<td>Negro pepper</td>
<td><em>Xylopia aethiopica</em></td>
<td>Awentea</td>
</tr>
<tr>
<td>Calabash nutmeg</td>
<td><em>Monodora myristica</em></td>
<td>widiaba</td>
</tr>
<tr>
<td>Okra</td>
<td><em>Hibiscus sp</em></td>
<td>Nkruma</td>
</tr>
<tr>
<td>Millet</td>
<td><em>Pennisetum sp</em></td>
<td>Ayio</td>
</tr>
<tr>
<td>Sorghum</td>
<td><em>Sorghum sp</em></td>
<td>Atoku</td>
</tr>
</tbody>
</table>
Appendix II. Pictures of Selected Legumes and African Indigenous Leafy Vegetables

- **Common name:** Bambara groundnut
  **Scientific name:** *Vignea subterranean*
  **Local Akan Name:**

- **Common name:** Cats whisker
  **Scientific name:** *Cleome gynandra*
  **Local Akan Name:** tete

- **Common name:** cocoyam leaves
  **Scientific name:** *Colocassia esculenta*
  **Local Akan Name:** Kontomire

- **Common name:** African night shade
  **Scientific name:** *Slolanum nigrum*
  **Local Akan Name:** Bachinia

- **Common name:** Basil tree leaf
  **Scientific name:** *Ocimum gratissimum*
  **Local Akan Name:**

- **Common Name:** Nettle weed
  **Scientific Name:** *Fleurya aestuans*
  **Local Akan Name:** numum/bhonbo

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8 Sources of pictures: All pictures taken from online sources