

Chapter

Food and Nutrition Security in East Africa (Kenya, Uganda and Tanzania): Status, Challenges and Prospects

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Abstract

Achieving food and nutrition security remains a tall order for developing countries. The FAO, IFPRI, WFP, UNICEF and other international bodies continue to provide active support in order to achieve global food and nutrition security. However, low technological capability, inefficient production, insignificant economic growth, increasing populations and lately climate variability, affect food production, leading to either stagnation or modest gains in food and nutrition security in different regions of the World. For African countries, food and nutrition security continues to improve, albeit at a slow pace, although the recent breakout of COVID-19 is bound to lead to a decline in food production, in the short and mid-term. In the East African Community, political stability, ambitious economic planning, the quest for higher agricultural productivity, improving educational achievement, improving sanitation and health, are contributing to the improving food and nutrition security. To hasten the process, Kenya, Uganda and Tanzania embraced Vision 2030, Vision 2040 and Vision 2025, respectively. These grand, socio-economic plans bore Vision 2050 in the East African Community and Vision 2063 for the African Union. This chapter examines food and nutrition security in Kenya, Uganda and Tanzania, and provides country-specific recommendations for achieving it. These include investing in agriculture, decelerating population growth, using adaptive research to solve farmer-problems, strengthening farmer-organizations and the formation of cooperatives.

Keywords: East African community, Kenya, Uganda, Tanzania, economic and social development, agriculture, food and nutrition security, status, challenges, prospects

1. Introduction

1.1 Food and nutrition security

The FAO-organized Food Summit in Rome in 1996 recognized the need to ensure physical and economic access to safe and nutritious food, if the nutritional needs of any population have to be met and for them to lead an active and healthy lifestyle [1]. However, the FAO World Food Summit of 2001 refined the definition to include health care and sanitation aspects in the context of the environment in

which the food is consumed. Thus food security can be defined in six dimensions that are interrelated, which are: physical availability of food, economic and physical access to food, affordability of the food supply, availability of adequate and safe food, the utilization or the ability of the body to make use of the nutrients and the stability of the dimensions; in summary, the dimensions are access, availability, adequacy, safety, affordability and stability. Even though food is recognized as a universal human right due to its central role in human development, it is currently unmet for billions of people in the world. The state of food and nutrition insecurity is a daily experience in many parts of developing countries, with most countries of Africa being victims of the situation. From the above definition, the United Nations Steering Committee on Nutrition opined that the link of food sufficiency and nutrition status of the consumer should be clearly brought out whenever the subject of food security is discussed. This is because when we consume food, it is supposed to supply the right nutrients in the proportions and form that the body needs for optimal metabolic, physical and physiological functioning. Thus the improved definition that brings out both aspects includes: “access by all people, at all times, by any physical, social and economic means to food that is consumed in adequate quantity and quality, to be able to meet their dietary preferences and needs, and is supported by a sanitary environment, where access to health services and care is assured in order for the consumer to live a healthy and active lifestyle”. It therefore follows that any discussion on food and nutrition security, should consider physical access, availability, affordability, adequacy, quality and stability of the food supply. Quality in this respect encompasses not only physical fitness for purpose of the food item, but its being safe and in the form expected for it to be acceptable to the consumer [2]. The food consumed must meet the quality and quantity requirements of age, gender, occupation and health status of the consumer [3]. Adequate and proper nutritional quality of the food supply is an essential prerequisite for maintaining good health status. The critical role nutrition plays in health and human development, warrants greater commitment to the attainment of good nutritional status. The member states of the East African Community (EAC) have ratified a wide range of international covenants and committed themselves to ending hunger and malnutrition among their populations. Building on these commitments, the current article examines the status and prospects for Food and Nutrition Security in the Member States of the East African Community (EAC). It discusses some basic facts of the Region and delves into the subject matter of the thesis, with the situation in Kenya, Uganda and Tanzania, being examined in some detail. The current chapter also provides a set of recommendations for improving the food and nutrition security situation in the future for each country.

1.2 The East African community

The EAC existed as an important trading block up until its break up in 1977 (it was then made up of Kenya, Uganda and Tanganyika-i.e., Tanzania, but without Zanzibar, Pemba and the smaller Islands in the Indian Ocean); It was revived on 30th November 1999, but the instruments for its re-establishment came into effect in 2000. It has a larger country composition, comprising of Kenya, Uganda, Tanzania, Rwanda, Burundi, and South Sudan. On 14th June 2019, the Democratic Republic of the Congo (DRC) requested to join the trading bloc, but the request is yet to be discussed and determined. The region has a current population of over 150 million people, but is likely to surpass 240 million, if the DRC is formally admitted as a member. The EAC as currently constituted is made up of over 200 ethnic groups. The current 6 member states of the EAC appear in **Figure 1**.



Figure 1.
Member states of the EAC (shaded).

1.2.1 Geography of the region

This part of the continent is composed mainly of plateaus, most of the highest elevations on the African continent and the largest lakes in Africa. In Kenya and parts of Tanzania, the highest elevations in the highlands reach as high as 2000–3000 feet above the mean sea level. The twin Rift Valley Systems run across the Region. The Great or Eastern Rift Valley runs from the Red Sea down through Ethiopia and Kenya going downward towards Tanzania, where the faulting activity created Lake Turkana and Tanganyika. The Western Rift System curves around western Uganda and Tanzania and includes Lake Victoria, the largest tropical lake and the largest and second largest fresh water lake in Africa and the World by surface area, respectively. Africa's highest mountain, Mount Kilimanjaro stands on the edge of the Great Rift Valley at above 19,340 feet (5895 metres above sea level) in northeastern Tanzania. Rwanda and Burundi sit on the edge of the western side of the Western Rift System and are a conflagration of hills and valleys that mesh into the fertile tropical forests of the DRC in the west. South Sudan sits between the dry northern Kenya plains, the semi-arid eastern Uganda and western Ethiopia. South Sudan is made up of tropical forests, swamps and grassland. The Imatong Mountains contain South Sudan's highest point, Mount Kinyeti at 10,456 feet above sea level.

1.2.2 Regional weather and vegetation

The climate of the Region is generally tropical, but the high temperatures are tempered by the high elevations, the valleys and hills of Rwanda, Burundi and western Uganda. Precipitation depends on altitude, with western Kenya, South Sudan, most of Uganda, Tanzania, Rwanda and Burundi receiving high amounts of rainfall. Northern Kenya and the Karamoja Region of Uganda, receive low amounts of rainfall ranging from 5 to 40 inches annually, though Karamoja receives slightly higher than 40 inches annually. These low rainfall areas have low food production

potential and are associated with high poverty indices and therefore poor food and nutrition security. Nomadic pastoralism based on livestock keeping is the major mode of production and livelihood in these semi-arid areas. The region's vegetation is composed of thick woodlands and grassland in the high and wetter elevations, to scanty, thorny shrub and vegetation to desert terrain in the arid and semi-arid plains, respectively. South Sudan is hot with seasonal rainfall as influenced by the annual shift of the Inter-tropical Convergence Zone. Rainfall is heaviest in the southern highlands and reduces towards the north as it merges into the Republic of Sudan.

This chapter examines the economic, food and nutrition security situation in Kenya, Uganda and Tanzania. For each country, some recommendations that are likely to improve food and nutrition security in the long-term are provided.

2. Kenya

2.1 Economy, agriculture and social development

Although the agricultural sector continues to dominate Kenya's economy, only 15–20% of Kenya's total land area has sufficient fertility and rainfall to be farmed, but only 7–8% of the land can be classified as first-class agricultural land. A considerable number of Kenyans make their living off the land, but this trend has continued to decline from the 1980s for various reasons including: rural–urban migration, the low economic gains from the sector, population growth and conversion of agricultural land to residential land, and, sub-division for purposes of inheritance, etc.

Agriculture is the second largest contributor to Kenya's gross domestic product (GDP) after the service sector and fundamentally drives the country's economy, as about 75% of Kenyans earn all or part of their income from the sector. Agriculture generally accounts for 33% of the nation's GDP, but its contribution to the country's GDP has continued to fluctuate over the years as agricultural productivity has either stagnated or declined. This has been observed for major food crops such as wheat and rice. Furthermore, the 15–20% of Kenya's land area that is regarded as suitable for farming is not also utilized efficiently.

Recurrent crises such as drought add to the agriculture-related challenges which largely contribute to the high malnutrition levels in the country. In 2005, agriculture, including forestry and fishing, accounted for 18% of wage employment and 50% of revenue from exports. For decades, the principal cash crops have remained tea, horticultural produce and coffee, with horticultural produce and tea being the major earners of foreign exchange. Horticultural produce and tea accounted for 23% and 22% of total export earnings, respectively. Coffee which has declined in importance due in part to depressed world prices and the decline of land under the crop, accounted for just 5% of export receipts in 2005. The production of major food staples such as maize is subject to sharp weather-related fluctuations. Declines in maize production often times leads to the need for Government to appeal for food aid, as was witnessed in 2004, and even lately in 2016–2017, when as many as 1.8–2.0 million people needed food relief. The expansion of credit to the agricultural sector by the financial sector has enabled farmers to better deal with the large risk of agriculture based on seasonal rainfall and dramatic fluctuations of the prices of agricultural commodities. The expansion of the area under irrigation is another major food policy issue for government as it works to find ways of increasing food production.

Tea, coffee, sisal, pyrethrum, maize, and wheat are grown in the fertile Kenya highlands, which is one of the most successful agricultural production regions in Africa. However, the production of sisal and pyrethrum is declining to levels where there may be no production of these two crops in the near future for various reasons which are outside the realm of the current discussion.

Local livestock breeds (Boran and Zebu) predominate in the semi-arid savanna to the north and east of the country, but exotic dairy breeds such as Friesian, Ayrshire, Sahiwal and crosses of the exotic and local Zebu cattle are kept in the highlands and mid altitudes, with the latter region sustaining the beef breeds. Cash and food crops including coconuts, pineapples, cashew nuts, sugarcane, and maize are grown in most parts of the country.

Kenya Vision 2030, the development blue print for the country, was initiated in 2013 by Emilio Mwai Kibaki, the 3rd President of Kenya. It has the economic, social and political pillars as its anchors; the economic pillar aims at improving the prosperity of all Kenyans through an economic development programme, covering all the regions of Kenya. It aimed to achieve a GDP growth rate of 10% per annum beginning in 2004, but the country has consistently fallen short of the target every subsequent financial year. However, to work towards achieving the target, Kenya is continuing with the tradition of macro-economic stability that has been established since 2002. The New Administration of President Uhuru M. Kenyatta has picked up some key economic deliverables in the Vision, in what in 2018, it has characterized as “The Big Four.”

These are:

1. Universal Healthcare,
2. Manufacturing,
3. Affordable Housing and
4. Food Security,

Through the economic pillar and strategy, Kenya aims to build a just and cohesive society with social equity available to all its citizens and enable them live in a clean and secure environment. The vision presents comprehensive social interventions for improving the quality of life of all Kenyans and Kenyan residents. The strategy contains special provisions to help persons living with various disabilities and previously marginalized communities, who may lack a good education, are unemployed and experience poor nutritional status due to high poverty prevalence among them. These policies (and those in the economic pillar) are equally anchored on an all-round strategy of adopting science, technology and innovation (STI) as the implementation tool. The STI concentrates in certain areas for it to contribute to the success of the initiative, including:

- Education and vocational/technical training
- Healthcare
- Water and sanitation
- The environment
- Housing and urbanization

- Gender, youth and vulnerable groups
- Equity and poverty elimination, and,
- National reconciliation, integration and cohesion

2.2 Food and nutrition security

Kenya has a current population of 47.6 million [4] and is generally regarded as water-deficient and food and nutrition insecure. It suffers from frequent droughts and famines with as many as 2–3 million people affected every time a famine or drought occurs, and, about 10 million suffering from chronic food insecurity and poor nutrition. Most of those affected live in the pastoral, semi-arid and arid areas of the country located in the North, Northeast and Northwest of the country, although parts of the Upper Eastern that include the Counties of Kitui, Makueni and Tana River County in the Coastal Region (**Figure 2**), are often also affected. Some of these arid and semi-arid zones receive as little 5–30 inches or more of rain annually. The other category of consumers that is often affected by food and nutrition insecurity is the slum dwellers, who constitute a considerable percentage of the country’s population, and, live in the inner cities of the major urban settlements. The Cities of Nairobi, Mombasa, Kisumu, Nakuru and Eldoret hold about 20% of the country’s population and will therefore require significant attention in the effort to reduce food and nutrition insecurity in the country. Malnutrition is a public concern and is the single most important contributor to child mortality which stood at 30.6% in every 1000 births by 2018 down from 33.3% in 2015. Malnutrition is mainly due to inadequate food intake and disease, with the underlying factors being poor child care practices, household food insecurity, and inadequate sanitation and health care services, among others. Most of the indicators on food availability, access and affordability, poverty levels and nutritional status are obtained through statistics generated from the Integrated Household Budget Surveys (IHBS) and the Kenya Household and Dietary Surveys (KHDS). The latest IHBS and KHDS were done in 2011 and 2014, respectively. The IHBS surveys show different levels of food poverty across the former eight Kenyan Administrative Provinces, which were abolished after the promulgation of the new Kenya Constitution in 2010 [5].

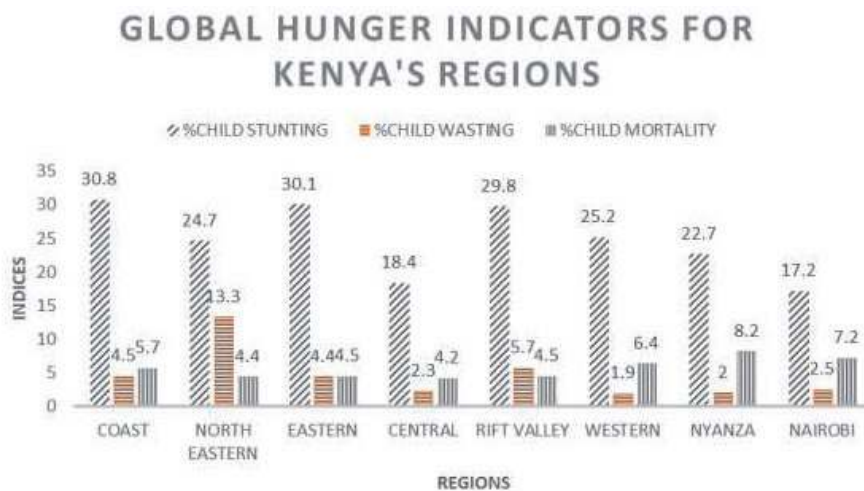


Figure 2.
GHI for Kenya’s regions.

They were replaced by 47 Counties, which came into being in March 2013. The IHBS of 2011 showed food poverty levels of 31, 45, 46, 50, 51, 64 and 66% for the then Central, Eastern, Nyanza, Rift Valley, Western, Coast and Northeastern Provinces, respectively. It is likely that the indicators have declined in some of the regions between then and now. Low indicators are normally apparent in the Provinces where nomadic pastoralists are a significant percentage of the population. The pastoralist, semi-arid and arid areas that compose about 70% of the country's land mass and hold about 30% of the human population, are some of the poorest regions of the country, with the worst food poverty, nourishment, health and sanitation indicators. In the counties where nomadic pastoralism dominates as a form of resource use and production, the factors that seem to be major drivers of food and nutrition insecurity include weather anomalies, water scarcity, ethnic resource-based conflicts and displacements, high food prices, depressed livestock sales prices, hardships associated with migration in search of water and pasture for livestock herds by the nomads, cross-border conflicts and livestock pest and disease outbreaks. Climate variability is an ongoing phenomenon that is affecting food production. The rest of the country falls under the agrarian belt, where arable farming is practised. In the agrarian belt, the major drivers for food and nutrition insecurity include poor transport infrastructure, poor market access for farm produce, climate variability, late arrival of government subsidized fertilizer and agro-chemicals, late payments to farmers for crop delivered to depots of the National Cereals and Produce Board, poor management of farmers' cooperatives, depressed food sales prices and crop pests and livestock diseases. Grossly inadequate storage facilities and poor handling and storage practices for cereal grain, pulses and oil seeds, also contribute to food and nutrition insecurity as considerable amounts of produce is lost through microbially-mediated deterioration and pest infestation. Poor purchase prices, delayed payments of deliveries to National Government grain depots, often encourage sales of surplus harvest to middlemen, who despite offering modest prices compared to government agencies have the advantage of on-the-spot cash payments for produce bought. It is envisaged that the provision of storage facilities through the National Cereals and Produce Board, Co-operatives, improvement in road infrastructure, the expansion of rural electrification programmes, adoption of climate-smart agriculture, diversification of the food supply and diets, especially an increase in consumption of fruits and vegetables will lower food and nutrition security indicators and improve consumer nutritional status and health.

The mortality rate of Kenyan children under age five has fallen steadily since 2000 [6], but remains of grave concern. On the positive side, the level of under-nourishment among Kenya's children fell in 2001–2003 and again in 2013–2015, but recurring droughts have led to a noticeable rise in levels. A decline was also recently observed after the 2016–2017 drought which affected Kenya and her neighbors, and which resulted in drops in agricultural production, increases in food prices [7, 8], and the consumption of inadequate food of low calorie and protein content. The impact of the current COVID-19 pandemic is expected to be disastrous as agricultural production is expected to fall arising from the lengthy lockdowns and restrictions of movement of goods, people, the imposed curfews and the closing down of businesses.

Kenya's child stunting and child wasting levels have also fallen considerably, with the stunting rate dropping from 35.2–26.0%, and the wasting rate falling from 7.0–4.0% in 2008–2009 and in 2014 [9, 10]. Levels vary substantially between regions and counties, with some having values significantly higher than the national averages. The highest child stunting percentages were found in Kitui County and West Pokot at 45.8% and 45.9%, respectively [10]. Although these Counties have high poverty levels (48 and 57%, respectively, based on national

poverty indicators), stunting in Kenya is not perfectly associated with poverty levels. Rather, it seems to be influenced by a complex set of factors that include dietary diversity, feeding and caregiving practices, access to appropriate sanitation and disease prevalence [11, 12]. Wasting is highest in Kenya's northernmost counties: with a value of 22.9% in Turkana, 16.3% in Marsabit, 14.8% in Mandera, 14.3% in West Pokot, and 14.2% in Wajir [10]. These Counties are arid or semi-arid, and are dominated by pastoralism as a form of livelihood and production and therefore have high poverty levels [13, 14]. Moreover, rates of contraception use and women's education levels in these counties are low and fertility rates are high [10]. It has been observed that children's nutritional status is associated with mothers' education and literacy rates [15], both globally and in Kenya, specifically. A study from urban settlements of Nairobi found that maternal education strongly predicts children's nutritional status, when controlling for other socio-economic and demographic factors [16]. Some recent data from Kenya shows that the stunting rate of children whose mothers had no formal education was 31%, while that of children whose mothers had secondary education or higher was 17% [10]. Children's nutrition is also associated with mothers' nutritional status and therefore income. A study from rural Kenya showed a positive correlation between maternal nutrition and children's nutritional status in terms of anthropometric measures [17]. As Kenya attempts to further reduce child undernutrition, albeit with persistent challenges, any gains will be achieved if it addresses infant and young child feeding practices in the Counties. Breastfeeding practices have improved substantially in Kenya, with 61% of children under 6 months exclusively breastfed in 2014, compared with just 32% in 2008–2009 [10, 9]. Meanwhile, in 2014, just 22% of children between 6 and 23 months of age received a minimum acceptable diet [10]. **Figure 2** gives global hunger indicators (GHI) for Kenya's regions.

Although most food and nutrition analyses of Kenya have traditionally focused on rural areas, where rates of child undernutrition tend to be higher than in urban areas, Kenya's population is increasingly urbanizing, and urban food insecurity and undernutrition, are emerging concerns [10, 18, 19]. Urban dwellers are highly vulnerable to food price spikes, which affect their access to affordable food, especially the unemployed, casual labourers who mainly live in the sprawling informal settlements of Nairobi, Kisumu, Nakuru, Mombasa and Eldoret, and increasingly in every major urban centre in the country. Moreover, urban populations live in crowded, poor accommodation, and often lack adequate water, sanitation and therefore live in unhygienic conditions are subject to illness and disease [18, 19]. Child mortality declined much more slowly in urban than in rural areas of Kenya between 1993 and 2008, perhaps because of the deplorable living conditions in urban settlements [20]. In 2014, Nairobi had the second highest child mortality rate among Kenya's regions (**Figure 2**).

Agriculture is considered to have considerable potential to increase household food security and nutrition. Although evidence of the impact of agricultural technologies on relevant outcomes is limited, some studies have shown promising results in Kenya [21]. Dairying and pastoralism play important economic roles among Kenyan smallholder farmers, with significant implications for nutrition. Roughly a quarter of Kenyan households engage in small-scale dairy activities. Studies of pastoralism in four of Kenya's northern, and arid counties—Mandera, Marsabit, Turkana, and Wajir (**Figure 3**) showed that livestock is the main source of livelihood for not less than 57% of households [13, 22]. For pastoralist households, the animals provide the milk consumed by families, and as livestock assets decrease, so does milk consumption affecting children's nutritional status and well-being. Milk consumption at the household level was found to be positively associated with higher body mass index among Samburu youth [23]. Consumption



Figure 3.
The counties of Kenya.

of animal-source foods by Kenyan schoolchildren has also been shown to be positively associated with height and weight gains. A school-feeding programme that tested the effect of different types of snacks given to children found that meat and milk snacks contributed the most to children's arm muscle growth. **Figure 3** shows the current Counties of Kenya.

Kenya is engaged in cash transfer initiatives as a way to lift the poor out of food and nutrition insecurity. The unconditional cash transfer programme for Orphans and Vulnerable Children increased households' food expenditures and dietary diversity, and the consumption of food produced by households themselves. The unconditional cash transfer programme in rural Kenya also increased households' food security and food expenditures, particularly when the transfers are made monthly rather than in a lump sum [24]. Kenya's Hunger Safety Net Programme, an

unconditional cash transfer programme, boosted beneficiaries' food consumption relative to controls and increased dietary diversity for poorer households in the project [25, 26].

Nutrition education can also help improve diet quality for children and adults in Kenya. A pilot study in western Kenya showed that providing nutrition education to fathers and grandmothers on proper complementary feeding practices for children raised social support for mothers, and, resulted in the adoption of beneficial child feeding practices [27]. Despite the need to continue addressing malnutrition in the country, micronutrient deficiencies of Vitamin A, Folic acid, Iron, Zinc and Iodine are widespread, with the re-emerging rise in rickets. However, the iodization of salt and fortification of many processed foods, especially the staples with most of the above micronutrients will alleviate the problem. Emerging issues include child obesity, where female children appear more obese and overweight than their male counterparts.

2.3 Prospects

The operationalization of the Food and Nutrition Security Policy of 2011, the placement of access to quality and adequate food access for citizens in the new Kenya Constitution of 2010 [7] as a human right, and support programmes arising thereof, are providing a firm foundation for the country to effectively address the issues of food and nutrition insecurity in a planned and focused manner. This is backed by an increasing number of interventions from the National and the County Governments and International non-Governmental Organizations, with the most notable being the World Food Programme (WFP) and UNICEF, with the focus for the latter being women and children. The Food and Nutrition Policy of 2011 is themed on 3 areas:

- a. Optimizing the health of Kenyans through good nutrition
- b. Ensuring access and the availability of good quality and affordable food, all the time to consumers
- c. Using cost-effective safety nets to protect the vulnerable populations in order to achieve long-term development

The policy broadly recommends providing specific crops for specific agro-climatic zones of the country. With the focus being on the child, one intervention and recommendation from the policy is providing food subsidy and food aid to vulnerable groups and children, in the latter case by strengthening and making school feeding programmes work. The WFP has for many years sustained the school feeding programmes in the semi-arid and arid parts of the country, despite the programme facing logistical as well as policy difficulties. There are other policy instruments that are currently either being finalized or implemented. Major areas of focus that can boost agricultural production and eventually reduce food and nutrition insecurity in Kenya include but are not limited to:

- Enhancing access to agricultural financing: While Kenya represents a vibrant and enabling market for agricultural produce, the enthusiasm by the banking sector to service commercial agriculture is lacking, as only about 4% of commercial bank lending is for agribusiness, despite most Kenyans being employed in agriculture or agriculture-related businesses.

- Increasing the use of fertilizer: Fertilizer use remains inadequate in Kenya as the Government's fertilizer subsidy programme is inefficient, and often disproportionately benefits more medium/large scale farmers than small-scale farmers. Small-scale farmers are the backbone of the country's agriculture sector. Making the scheme work for small-scale farmers and ensuring that it is efficient, transparent, and targets them, has the potential of raising agricultural output and productivity.
- Establishing private sector-led commodity trading: Similar to the situation in most Africa countries, the Kenya government retains a big role in marketing agricultural outputs, especially maize, the staple cereal crop for a majority of the country's population, thereby leaving little room for private sector participation. Further, the National Cereals and Produce Board buys maize at a premium above the price determined by market forces. These interventions edge out private sector players somewhat, resulting in reduced availability of public finance for other potentially more useful expenditures, e.g., extension services and farmer training.
- Investing in irrigation: While over 80% of Kenya's land area is arid and semi-arid, 2% of the arable land is under irrigation compared to an average of 6% in Sub-Saharan Africa and 37% in Asia [28]. The low usage of irrigation means Kenya's agriculture is fully rain-dependent and susceptible to shocks due to droughts. Investing in irrigation and water management for farmers, can reduce productivity shocks and raise the sector's total productivity, potentially improving food and nutrition security in the country.
- Supporting stronger farmer organizations: Kenya has many geographically dispersed smallholders who are not integrated into key agriculture value chains. Dispersion increases production costs and reduces small-scale farmers' competitiveness. It is envisaged that building stronger farmer-organizations fosters economic inclusion of smallholders and increase their market power, thereby raising their incomes and productivity. Further, while value addition to agricultural commodities remains low in the country, increasing the value addition of agricultural commodities can create more jobs and reduce poverty. A set of recommendations that mirrors the above discussion is provided below.

In conclusion, a decade of rapid economic growth from 2003 to 2013, the inclusion of food and nutrition security in the government's 'big four' priorities in 2018, constitutional changes that devolved administrative responsibilities to county governments since 2013, and the country's openness to innovation, offer **opportunities for the achievement of SDG 2** on Zero Hunger and improved nutrition in Kenya. However, even though the country has recently acquired lower-middle-income status, the **increased wealth has not benefited all Kenyans equally**. Over **one third of the population still lives under the international poverty line** (of \$1.25/day) and **socio-economic disparities between regions and ethnic groups remain**. **Access to adequate quantities of nutritious food remains a challenge for many**, especially in the arid and semi-arid regions, which make up over 80% of the country's land area. Rapid population growth, at 2.9% annually, climate change, stagnating agricultural production and inefficient food value chains are additional challenges. Food insecure families typically live in rural areas, are poor and depend on daily agricultural labour for income. **Families headed by women are more likely to be food insecure than those headed by men**. **Some recommendations to address some of the above concerns follow.**

2.4 Recommendations

- The National and County Governments should minimize climate variability effects on the agriculture sector by expanding viable irrigation schemes, emphasizing the adoption of drought tolerant crops including cassava, sorghum, millet, potatoes and the adoption of small dairy stock by households. These animals are potential sources of income and high biological value protein in the form of meat and milk
- The country should continue scaling up programmes for treatment of malnutrition among vulnerable groups as well as implementing common public health measures such as vaccination, deworming, supplementation and water and sanitation in pastoralist counties, where livestock keeping is a major economic activity
- Prioritize policies and programmes that increase farm and crop productivity, food and nutrition security, and resilience of small-scale farmers and pastoralists. Such steps will be increasingly vital for Kenya's future food and nutrition security improvement as the percentage of the population that is dependent on nomadic pastoralism and rain-fed agriculture is large and highly vulnerable to climate change and droughts
- Continue promoting education for women and girls, particularly in areas dominated by pastoralism that are characterized by low female education attainment rates and high child wasting scores. Women's education and child nutrition have been shown to be positively linked
- Strengthen support for improvements in the WASH environment in Kenya, including implementation of the provisions of the Kenya Environmental Sanitation and Hygiene Policy, 2016–2030. Urban settlements, rural areas, and informal settlements have the lowest levels of improved sanitation, sometimes lacking it completely, compared with planned urban areas [29]. Inadequate WASH facilities and practices are detrimental to human health and nutrition, especially for children
- Strengthen political and educational support to the production, distribution, and consumption of nutritious crops such as vitamin A-rich orange-fleshed sweet potatoes and green and yellow leafy vegetables, and ensure that low income households have access to these products, either by way of them being subsidized or as food aid, where the households are extremely poor, single, and living with disabilities and/or are unemployed
- Ensure that food security and good nutrition are given priority at the national and county levels, recognizing the vital role that County Governments must play given Kenya's devolved government structure. Food and nutrition security decisions should be guided by the data that exists at the county level.
- The Food Security Bill, 2017, and the National Nutrition Action Plan, 2018–2022, are largely still under consideration for implementation [30, 31]. Their implementation would ensure that food and nutrition security is prioritized in Kenya

- Enforce the provisions of “The Breastfeeding Mothers Bill” (2017), which aims to protect women’s right to breastfeed in the workplace and public places. This bill once enforced should further promote breastfeeding in Kenya, which is critical to infant health and development
- Strengthen community capacity to prepare for future nutrition crises by providing staffing, training, and resources for community-based management of acute malnutrition
- Support innovative programmes that provide the support of the integrated management of acute malnutrition, with contributions from local and international partners to deter food and nutrition insecurity

3. Uganda

3.1 The economy, agriculture and social development

Uganda’s economy has in recent years grown at a slower pace, thus reducing its impact on incomes and poverty reduction. Average annual growth rate was 4.5% from 2011 to 2016, compared to the 7% achieved during the 1990s and early 2000s [32]. The slowdown was mainly driven by adverse weather, unrest in South Sudan, private sector credit constraints, and the poor management of public sector projects. However, the economy rebounded in the second half of 2017, driven largely by growth in information and communication technology services and favorable weather conditions for the agricultural sector. GDP growth adjusted for inflation was above 5% in 2018 and rose further to about 6% in 2019 [33]. For better performance, the outlook would require continued good weather, favorable external conditions to boost demand for exports and an increase in foreign direct investment (FDI) and inflows as oil production draws closer, and capital investments are executed as planned. Reliance on rain-fed agriculture, however, remains a downside risk to growth, personal incomes and export earnings from the agriculture sector.

In the long-run, delays and poor management of public investment programs could prevent the productivity gains expected from enhanced infrastructure, while acceleration in domestic arrears may have an adverse impact on private investment which may further limit the extension of credit. Finally, regional instability and a continued influx of refugees is likely to undermine exports and disrupt growth in refugee hosting parts of Uganda. The intensifying conflicts in South Sudan and the Democratic Republic of Congo, currently Uganda’s 2nd and 4th top export destinations, respectively, is likely to negatively affect the growth of Uganda’s exports.

Uganda has a population of close to 42 million by 2019 estimates [34] and has an equatorial type of climate with rainfall in most of the country standing annually at 1000 to 1500 mL, but which can be as high as 2000 mL in the Lake Victoria basin [35]. Karamoja Region, parts of Teso and Acholi Regions in the north, receive much less rainfall with a tendency to be unpredictable and unreliable. The Official Government report issued in 2014 showed that about 83% of the Ugandan population can be classified under Phase 1 Category of minimal or no food insecurity threats, and, was able to meet their dietary and non-food requirements without stress [36]. The report showed wide access and affordability of the food available in the markets with the majority of the population being able to obtain three meals a day of a diversified diet. Only about 1% of the general Ugandan population qualified to be in IPC category 3-a situation of food crisis. Uganda like other EAC

member states faces similar food insecurity threats such as livestock and crop diseases. The common crop diseases include: banana bacterial wilt, cassava brown streak disease, stalk borer disease and recently, maize necrosis which was first spotted in Kenya. Regional cooperation would be required to find solutions to most of these economic and food security threats. In the livestock sector, Foot and Mouth Disease often breaks out, as well as a number of other common livestock diseases that affect the livestock trade across the EAC trading bloc. They are a constant hindrance to planned improvements to food security in the livestock sub-sector.

3.1.1 Political context and development challenges

After the end of the armed conflict in 1986, the Government formed by the National Resistance Movement introduced a host of structural reforms and investments, most of which led to the long and sustained period of high growth and poverty reduction between 1987 and 2010. Policy and legal frameworks continue to improve, notably through the operationalization of the Public Financial Management Act, 2015 [37], though gaps in implementation in procurement and anti-corruption remain major concerns, with consequences for development indicators and directly for public sector-led enablers of food availability and access.

Uganda surpassed the *Millennium Development Goals* target of halving poverty by 2015, and made significant progress in reducing the proportion of the population that suffers from hunger, and in promoting gender equity and economically empowering women. According to the Uganda Poverty Assessment of 2013, more



Figure 4. Regions of Uganda (note that Teso, Acholi and Karamoja are in eastern and northern regions, respectively).

than 67% of the population lived above the extreme poverty line of US \$1.90/day. However, the vulnerability for every 2–3 Ugandans falling back into poverty exists. Estimates from the Uganda National Household Survey of 2016/2017 suggest that the proportion of the population living below the national poverty line rose slightly from 20% in financial year (FY) 2012/2013 to about 21% in FY 2016/2017 [38]. All Uganda's regions registered an increase in the number of poor persons with the notable exception of Northern Region (**Figure 4**), which is the poorest, and where poverty, decreased from 44 to 33%. With one-third of children under five being stunted, Uganda is among the 20 countries worldwide with the highest prevalence of under-nutrition. Stunting in rural compared to urban areas stands at 36% and 19%, respectively. At over 3%, Uganda's annual population growth rate is among the highest in the world, despite observed reduction in fertility rate. Uganda's population of 42 million is expected to reach 100 million by 2050, while the annual urban growth rate of 5.2% is among the highest in the world and is expected to grow from 6.4 million (2014) to 22 million by 2040 [39]. Uganda's refugee population has almost tripled since July 2016 and was around 1.8 million by the end of 2019, making it the largest refugee host in Africa, and the third largest in the world. While its open-door refugee policy is one of the most progressive in the world, as refugees enjoy access to social services, land and can move and work freely, the continued influx is straining host community-refugee relations, service delivery and is likely to negatively influence environmental sustainability.

3.2 Food and nutrition security

Despite producing a variety of food crops and animal food products, malnutrition remains a problem and therefore pockets of under-nourishment and hunger co-exist. Micronutrient deficiencies are common and are exhibited as goiter, vitamin A deficiency and iron-deficiency anemia in the general population, though more common in the poor, children and women of child-bearing age. High malnutrition and under-nutrition rates are generally due to predisposing diseases, HIV/AIDS, inadequate food intake, ignorance, cultural taboos, poverty, etc. The Uganda Food and Nutrition Policy of 2003 emphasized the promotion of good nutritional status of Ugandans through multi-sectoral and coordinated interventions that focused on food security, improved nutrition and increased incomes [40]. The country conducts periodic national income and expenditure surveys, with the latest being the 2009/2010 Uganda National Household Survey. The survey estimated that the incidence of income poverty in Uganda fell by 6.6% points in the 2005/2006 financial year from 31.1 to 24.5% in 2010 [41]. The incidence of income poverty in rural and urban areas was estimated at 27.2 and 9.1, respectively [41].

Although Uganda currently produces sufficient food to meet the needs of its growing population, the absolute number of Ugandans unable to access recommended calories still remains significant in all regions due to the uneven distribution of food, access constraints related to seasonality factors, poverty, inequality in regional wealth distribution and the burden of diseases. The proportion of the population unable to access adequate calories decreased nationally from 23% in 1997 to 15% in 2006 [40]. However, the persistent high rates of malnutrition in children under 5 are symptomatic of the underlying problems of inadequate access to food, suboptimal infant feeding practices, poor health care and sanitation and hygiene practices within the different regions of the Country. It is estimated that more than 30–38% of children suffer from chronic malnutrition (stunting), while about 15% are underweight and 6% suffer from acute malnutrition [42]. Malnutrition in all its forms remains largely a “hidden problem” since a majority of children affected are moderately malnourished and identifying malnutrition in

these children without regular assessments is difficult [42]. Increasingly, Uganda similar to other developing countries is experiencing the double burden of malnutrition where high levels of under-nutrition co-exist with a growing prevalence of overweight and obesity. Malnutrition plays a major role in child morbidity and mortality as wasting and underweight have been shown to significantly increase the risk of both morbidity and mortality in children [42]. Vitamin A and iron deficiencies also carry an increased risk of morbidity and mortality in children [43]. Vitamin A deficiency seems to be linked with an increased risk of mortality from measles and severe diarrhoeal diseases [43], while iron deficiency carries significant adverse consequences for child development [44]. Malnutrition starts early in infancy for children in Uganda. The substantial proportion of children born with low birth weight suggests that high fertility rates, short birth intervals, young maternal age and maternal malnutrition are likely factors that contribute significantly and adversely to child malnutrition from birth. High childhood disease infection rates may be attributable to poor feeding practices, where liquids other than breast milk might be introduced early, such that these foods, if not sanitary enough and safe to eat, serve as avenues for disease spread. As the prevalence of stunting increases with age in children, it is a reflection of continuous nutritional deprivation of children from an early age and as they grow. The prevalence of stunting is highest in northern and southwest Uganda, although the rate of decline since 2001 is fastest in the western region and slowest in the northern and eastern regions. The prevalence of underweight is highest in the East, Central, Northern and Southwest regions, and the rate of decline is slower than the rate of change for stunting. Wasting is rising in all regions, with the smallest increase in Central Region [42]. In women, chronic energy deficiency was 12% in the 2006 Uganda Demographic and Health Survey and has been rising across all regions [42]. Overweight and obesity in women is also rising, but most rapidly in urban areas, Western and Central Regions [42]. Deficiencies in Vitamin A and Iodine, and Iron-deficiency anemia (IDA) remain significantly prevalent as discussed earlier. Vitamin A deficiency affects 20% of women and children, and IDA affects 73% of preschool children and 49% of women of child-bearing age [42]. The immediate causes of malnutrition for children in Uganda continue to be the high disease burden resulting from malaria, diarrhoeal diseases and acute respiratory infections, as well as inadequate dietary intake resulting from suboptimal infant feeding practices, as is commonly found in other developing economies. While breastfeeding is nearly universal, exclusive breastfeeding tapers off rapidly and by six months, only 11% of infants are exclusively breastfed. In addition, late initiation of breastfeeding (86%) and the use of pre-lacteal feeds (54%) are common [42]. Early introduction of foods and liquids and inappropriate complementary feeding are also widespread. Adequate feeding practices are used for only 28% of children under two, when considering continued breastfeeding, appropriate frequency of feeding and diet diversity, three key indicators of adequate complementary feeding. Infant and young child feeding (IYCF) practices are suboptimal, and while social and behavior change communication (SBCC) is one response to address this, SBCC alone will not adequately improve feeding practices. Poverty and food insecurity at the household level play a significant role, but women's lack of control over their time, their competing household and reproductive roles may undermine their IYCF capabilities. To succeed, SBCC efforts must engage men as partners in change. The underlying causes of malnutrition in Uganda remain inadequate water and sanitation, lack of dietary diversity, inadequate health infrastructure and access to health care and food insecurity [42]. Although access to health services has improved in the past decade, the quality of the services has remained generally poor [42]. From casual observations by this author on a recent trip to Uganda (December, 2019),

sanitation and hygiene has not improved, if not worsened in marginalized areas like Karamoja and northern Uganda, and is exacerbated by increasing urbanization and population rise. Food insecurity varies regionally, with the Northern Region suffering from the highest levels of food insecurity, followed by parts of East and East Central Regions and parts of Southwest Uganda. Common causes of food insecurity across Uganda are the lack of diversification in livelihoods, high dependence on agriculture and wage labour, declining wages and rising food prices. While poverty declined across Uganda from 56% in 1992 to 31% in 2006 [42], improvements in the prevalence of poverty are largely attributable to economic growth rather than income distribution and welfare improvement. In fact, income inequality between the wealthy and the poor has steadily widened. Gender inequality seems to be significantly intertwined with poverty and food insecurity in Uganda and has been identified as a primary reason for the persistent poverty. Poverty may be gendered as income inequality seems to be rising as a high percentage of women lack access to resources such as capital. Gender inequality may therefore exacerbate food insecurity for women and children. While 80% of women contribute labour for food production, they own less than 8% of the land on which to farm [42]. Men may earn significantly more than women but spend more of their income on non-food items, while women are left to close the household food security gap. Women are the primary caregivers in families, but may have the least decision-making power; as a result, they have less control over their family care role and time, than they should. In Uganda, women's low involvement and high fertility rates are two critical factors that undermine health and nutrition outcomes in their children. Taking the multiplicity of factors into account, gender inequality substantially undermines women's capabilities to achieve and ensure food security for their families. This situation calls for approaches that improve the design and delivery of nutrition services to prevent, reduce and control malnutrition at the policy, leadership and programme levels, as well as to promote coordination and resource mobilization. Despite the above gloomy picture, Uganda's nutrition situation is better than many other countries in eastern and southern Africa, as Uganda currently produces sufficient food to meet the needs of most of its growing population. Nationally, the proportion of the population unable to access adequate calories decreased from 15% in 2006 to 11% in 2015 [45], and the country is likely to meet the SDG 2 with robust policies in place. **Figure 4** presents a Map of Uganda showing the regions of the country.

3.3 Prospects

Due to the increasing population and deforestation of the country, more arable land is being brought under cultivation for more food production. However, the continuing influx of refugees from South Sudan due to the civil war in that country, political instability further north in the Republic of Sudan and a host of internal factors, are likely to impact negatively on the country's food production capacity. Although indicators of food poverty, malnutrition and under-nutrition are yet to rise significantly, the increasing population and depressed economic growth are likely to negatively affect the food security and nutrition status in the country in the long-term. Rainfall in 2019 remained erratic in most of Uganda as influenced by Cyclone Idai that affected much of southern Africa, and whose effects spilled into parts of Central and Eastern Africa. The effects of this and other natural factors are largely unpredictable, but the outlook does not seem beyond redemption as Uganda can largely feed its people. Recent trade deals with Kenya and the opening of the Kenya-Uganda border with the aim of minimizing interruptions in trade and travel, is already increasing food trade between Uganda's border Counties and Kenya's

Counties of Trans Nzoia, Bungoma, Busia, Kakamega and Turkana. Uganda is the net gainer from these commercial transactions, and its economy is bound to benefit from the increased trade and the likely increased local agricultural output to meet the increasing demand for more food in Kenya. The analysis of the food and nutrition outlook in Uganda indicates that:

- Nutrition indicators are generally improving, but the rate of change is slow
- Under-nutrition which coexists with over-nutrition is increasing
- Food and nutrition security is being undermined by large family sizes,
- Changing gender roles are affecting food and nutrition security in families
- Poor health infrastructure is undermining nutrition outcomes
- Income and wealth disparities are increasing between regions, classes and genders

In conclusion, 89% of Uganda's population is food secure. This population still has normal access to food from their own production and in the market. Food prices in the markets are affordable, and consumers can experience an acceptable food consumption score as most can afford at least three meals per day of a diversified diet. They also have adequate energy intake. Eleven percent of the total population in the country is chronically food insecure. These are scattered in the Karamoja, Teso and Acholi districts and in the slums in the major cities of Kampala and Entebbe. The food security prospects for Karamoja are expected to remain volatile and unpredictable. Food availability is not a limiting factor in most regions of Uganda except in Karamoja, East, Central and West Nile, where production and productivity, frequent dry spells and lack of extension services constrain food production. Although food is largely available, food access and utilization are major limiting factors in the three regions but minor limiting factors in other regions. This has been attributed to the low level of incomes, poor storage practices, lack of awareness of what constitutes good nutrition, cultural food preferences, poor sanitary and food preparation practices and wastage of food during harvest periods due to festivities.

3.4 Recommendations

The semi-aridity of Karamoja, parts of Teso and Acholi Regions, the inevitability of negative effects of climate variability on food production and the increasing food demand by the increasing country's population means that, there is urgent need to put in place different strategies to secure food for all Ugandans. Some workable recommendations include:

- Establishing programmes and mechanisms for slowing down population growth
- Developing a comprehensive national system based on enabling enhanced and sustainable, efficient food production through the use of modern technologies throughout Uganda's arable regions. The new technologies should be research and innovation-driven

- The formation of collaborative partnerships that diversify food sources, as well as implementing legislation and policies that are geared to improving nutrition, while reducing food waste
- Developing a national agriculture strategy that encourages the production of crops well suited to the various local environments and promotes a production strategy that builds on the country's comparative advantages
- More efficient use of the available arable land for food production and semi-arid lands for better livestock farming systems.
- Reducing the rate of deforestation as it impacts negatively on food production, food security and therefore economic growth. Re-afforestation is recommended to replenish the declining forest cover
- Creating a well-planned international trade and investment strategy, that can help hedge against volatility and food shortages, while spurring economic growth. Creating trading and processing hubs should help the country gain access to food supplies whenever necessary, either internally or through imports
- Planning for efficient domestic markets, and transport systems that emphasize reduction of food waste and curbing shortages
- The formation of cooperatives which can make it easier for farmers and other entrepreneurs to obtain credit
- Creating strategic reserves of food and water to take care of year-to-year variations in rainfall and food output, as well as any man-made disruptions in food supply across the country and those due to the vagaries of nature
- Reducing the influence of gender inequality on food security for women and children, by empowering more women and women more

4. United REPUBLIC of Tanzania

4.1 The economy and social development

With a population of 55–56 million people (2016 estimates), Tanzania has had a good economic growth run over the last decade averaging 6–7% annually [46]. Although the absolute poverty index for the country decreased, the number of those living in abject poverty has not reduced noticeably due to the high population growth rate. Depending on weather patterns, the country can be split into two main climatic zones—the drought prone bimodal rainfall zone, situated mainly in the north and west of the country and the Unimodal zone in the south and east of the country [46]. In the bimodal rainfall zones, vulnerability to food insecurity is caused by such factors as water shortages, high food prices and the effects of drought on households. Levels of food poverty and malnutrition are higher in these areas than in the unimodal rainfall areas.

Tanzania ranked 152 out of 187 countries in the 2011 UN Human Development Index and number 54 out of 79 on the 2012 Global Hunger Index. While Tanzania

has been a low-income country (though it has from early 2020 ascended to low-mid-income status) for quite long, it has experienced relatively stable economic growth in recent years, accelerating from 3.5% in the 1990s to approximately 7% in the 2000s. Effective fiscal and monetary policies largely insulated the country from recent international shocks; the maintenance of such policies, as well as investment in infrastructure and high profit yielding businesses are needed for such growth to continue [47]. Despite its economic growth, poverty remains prevalent in the country, particularly in rural areas, similar to any developing country. Approximately 30 million people, or 75 percent of the population, live in rural areas, with the rural households making up 80% of the country's poor [47]. Agriculture accounts for 45% of Tanzania's GDP and provides livelihoods for up to 80% of the country's population [48]. While Tanzania's food self-sufficiency has ranged from 88 to 112% over the past 8 years, localized food deficits are rampant. The low agricultural productivity makes it difficult to achieve significant strides towards poverty reduction and food security. Tanzania's agriculture is characterized by low adoption of new and functional technologies, limited infrastructure and high transportation costs, a lack of adequate market access, and high rates of taxation and non-tariff trade barriers. The Government has made recent commitments to agricultural reform and improvement, such as the "Agriculture First Program", and considerable budgetary allocation to agriculture. Similarly, agribusiness development is being encouraged under such programmes as the "Southern Agricultural Growth Corridor of Tanzania". Tanzania has some of the highest levels of malnutrition among African countries. Approximately 42% of children under five suffer from malnutrition and stunting [48]. Despite sustained and steady growth, over the past two decades, and the achievement of significant progress in economic, social and human development, the resultant progress has not benefited all sectors of society and inequality has widened.

The country currently produces enough food to feed its population, but the poorest and most marginalized families—including refugees have limited access to it. The agricultural sector is largely dominated by smallholder farmers but production is stagnant, while the population is expected to double by 2050. The effects of climate change are deepening the vulnerability of agriculture to disasters. Households in the bimodal rainfall zone feel steep food prices which on comparison can be as high as 60% higher than those felt by families in the unimodal zones of the country. Economic growth for the country has been on the upsurge for most of the 2000–2010 decade [49], though the improvement in food and nutrition security has not proportionately benefitted from the economic growth experienced in the decade. The Tanzania National Bureau of Statistics reports that real GDP growth was 7.0% in 2018, slightly higher than the 6.8% in 2017.

Zanzibar and Pemba Islands have a population of about 1.3 million people with an estimated annual growth rate of 2.8% (estimates for 2016). Of this number, an estimated 14% may fall into the severely food insecure IPC Phase 3-Crisis level or at worst into the Phase 4-Emergency situation and require immediate food assistance in the dry season which comes normally between July and September [50]. This may happen when below normal rains fall in the previous year. This number is normally expected to decrease slightly to about 12% of the population in the October to December period [50]. The most food insecure districts are Kaskazini A, Micheweni and Magharibi. Of main concern is the population in IPC Phase 4 (Emergency) in Kaskazini A and Micheweni in the October to December period. This requires urgent action to protect livelihoods, reduce gaps in food requirement in order to reduce the potential for acute malnutrition in the group. The majority of the population (69%) mainly live in IPC Phase 2 (stressed) and is only able to afford minimally adequate food consumption, but are unable to afford essential non-food

expenditures without engaging in irreversible coping strategies [50]. Households who would be most affected are those who depend on agriculture in both Unguja and Pemba. The main driver of food insecurity is reduced harvest caused by poor Vuli rainfall in October to December and a prolonged dry season that would be experienced in January to March or heavy rainfall experienced towards the end of Masika (resulting in flooding and water logging of soils). These weather shocks often lead to shocks in livelihoods and acute food insecurity, especially for poor households particularly in Micheweni. Shortage of Vuli rainfall significantly affects food availability in farming households. The Vuli season is the most important season for food security in Zanzibar as most of the annual crops are planted in the season. The outcome of poor performance of Vuli rains lowers production below normal production levels, leading to low production of cassava, sweet potatoes, fruits and vegetables. These crops are not only important for household food security, but are also the main source of income for households who depend on the sale of these food crops to meet other basic family needs.

Despite any significant reduction in crop production, food availability at national level is not an issue given the opportunity Zanzibar has of importing food commodities from Mainland Tanzania. The biggest problem is, however, the price of these commodities that usually goes up significantly. Food prices in Zanzibar are always on an increasing trend, resulting in reduced household purchasing power and consequently affecting access to adequate and nutritious food. Although in the Micheweni and Kaskazini A Districts there are numbers of people who may not afford enough food, their situation will normally improve as these areas will be in the Clove harvesting season from October to December. Usually during this season, opportunities for income generation rise as short term jobs abound along the clove picking value chain. However, to avert the situation, it is recommended that the Government and implementing partners support the affected communities by provide farming inputs during the subsequent planting season.

It is envisioned that through Vision 2025, Tanzania agriculture will be transformed from a low productivity industry to a modern and semi-industrialized one that is supported by integrated services that would be available equally in the urban and rural areas [51].

4.2 Agriculture, food and nutrition security

Agriculture generates 30% of the country's export earnings [52]. Approximately 46% of Tanzania's total land mass is suitable for agricultural production, and the country can be a net exporter of food, if appropriate and functional food production strategies are put in place. However, only part of this arable land is marginally suitable for food production due to such factors as infertile soils, soil erosion, land degradation, and droughts. Moreover, 25% of the land is under wildlife reserves and protected forests. The country also has over 23% of its land mass being suitable for irrigated agriculture, thus demonstrating the potential for higher food security, if the land was put to such use. The country has a self-sufficiency ratio of 123 for maize, implying surplus production in this staple crop. Livestock keeping is the most important agricultural activity in most parts of the country, including the marginally-endowed agricultural areas and engages about 36% of households. The share of the livestock sector to the GDP was more than 7% in 2015, while its contribution was more than 30% to the agriculture-related contribution of the GDP in the same period [53]. Generally, the self-sufficiency ratio for food for the country between 2012/2013 and 2015/2016 FY has been over 100%, but variations exist at regional, district and household levels. According to the Tanzania Household Nutrition Survey of 2015–2016, the rate of stunting in children under

the age of 5 years was 35% (reflecting cumulative effects of acute malnutrition), with 5% of children being wasted (too thin for their age), while 4% are overweight and 14% being under-weight [54]. The mixed news is that the extent of stunting and underweight in children declined over the period 1999–2016, but wasting remained unchanged over the same period. Paradoxically for unexplained reasons, all the three nutritional/health indicators are highest in children in the major food production areas of the southern and southwestern highlands, an observation that requires addressing. They are lowest in children in the highest wealth quartile, but are highest in children in the lowest wealth quartile.

4.3 Prospects

Despite efforts between 2007 and 2016 that have reduced the country's poverty rate from 34.4% to 26.8%, the absolute number of poor people has held at about 13 million (approximately 27–28% of the population) [55] partly due to the high population growth rate. Based on the Household Budget Survey of 2017/18, it seems likely that the downward trend in the poverty rate will continue despite it becoming gradual. Government efforts to expand access to social services like education, health, and water have been undermined by their declining quality. This implies that the slowing of factors that contribute most to improved GHI, and any gains in food and nutrition security in the short-term, will therefore be gradual. Real GDP growth is projected to remain in the range of 5–6% over the medium term. This outlook will depend on favorable weather conditions, the steady implementation of reforms to improve the business environment, good fiscal management, and the ability of the Government to address vulnerabilities in the financial sector. The maintenance of low inflation will be underpinned by favorable food supplies and stable global energy prices. The COVID-19 breakout may, however, complicate matters for the country's economy and food security as expected of other Countries of the EAC Region, though the fact that the country did not go into lockdown may mean that it comes off better than its neighbors.

4.4 Recommendations

- As agricultural productivity remains low and poses a significant challenge to poverty reduction and food security, Government should endeavor to remove challenges related to low adoption of new technologies and improve infrastructure in order to reduce transportation costs and market access
- Government should effect medium and long term interventions to reduce the wasting trends of children in the southern and southwestern highlands, which are also the best agriculturally-endowed regions of the country
- It is critical for the country to arrest the observed overweight trends in children through school education and more physical activities, while simultaneously executing parental education
- The Ministry of Agriculture should embark on irrigated agriculture in marginal areas by the use of appropriate and research-driven investments and technologies
- The Food industry should explore the potential for value addition of crop and livestock sector production for export to the EAC and other regional food-deficient countries

- Government requires to manage population growth so that it is in tandem with food production and services provision
- The Government of Tanzania and Development Partners require to take care of any food short falls that may be experienced in Zanzibar and Pemba islands due to short rains in the Vuli season during which period families face food shortages and are therefore likely to experience IPC 2–3 classification of food and nutrition insecurity.
- Support the affected communities by provide farming inputs during the subsequent planting seasons
- Improve the under-execution of public development projects, and,
- Create policies that raise FDI inflows and improved private sector credit growth
- Ensure that any economic growth benefits all sectors of society and social inequality is reduced

Acronyms

EAC	East African Community
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investment
FY	financial year
GDP	gross domestic product
GHI	global hunger indicators
GoK	Government of Kenya
GoU	Government of Uganda
IFPRI	International Food Policy Research Institute
IPC	Integrated Food Security Phase Classification
SDGs	sustainable development goals
UN	United Nations
UNICEF	United Nations Children’s Fund
WFP	World Food Programme
WASH	water, sanitation and hygiene

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