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Social and economic
dimensions of smallholder
based agriculture and food
security

Local and regional variations in conditions for agriculture and food security in Tanzania: A review

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AgriFoSe2030

Agriculture for Food Security 2030
- Translating science into policy and practice

Today more than 800 million people around the world suffer from chronic hunger and about 2 billion from under-nutrition.

This failure by humanity is challenged in UN Sustainable Development Goal (SDG) 2: "End hunger, achieve food security and improve nutrition and promote sustainable agriculture".

The AgriFoSe2030 program directly targets SDG 2 in low-income countries by translating state-of-the-art science into clear, relevant insights that can be used to inform better practices and policies for smallholders.

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Contents

Summary	3
Acknowledgements	3
1. Introduction	3
1.1. Background information	3
1.2. Methodology	4
2. Key crops and livestock kept in Tanzania	4
2.1. Agriculture and food security in Tanzania	4
2.2. Rainfall distribution in Tanzania	5
2.3. Farming systems in Tanzania	7
2.4. The distribution of key crops grown in Tanzania	7
2.4.1. Main food crops grown in Tanzania	8
2.4.1.1. Maize	8
2.4.1.2. Sorghum and millet	9
2.4.1.3. Rice	10
2.4.1.4. Wheat	11
2.4.1.5. Roots and tubers	11
2.4.1.6. Green banana	12
2.4.1.7. Pulses	13
2.4.2. Main cash crops grown in Tanzania	14
2.4.2.1. Tobacco	14
2.4.2.2. Cashewnuts	15
2.4.2.3. Coffee	16
2.4.2.5. Tea	16
2.4.2.6. Cloves	17
2.4.2.7. Cotton	17
2.4.2.8. Sugarcane	17
2.4.2.9. Edible oilseeds	18
2.5. The main livestock kept in Tanzania	19
2.5.1. Beef and dairy cattle	19
2.5.2. Sheep and goats	20
2.5.3. Pigs	20
2.5.4. Poultry	21
3. The constraints affecting agriculture along the value chain in Tanzania	21
3.1. Production constraints facing smallholder farmers	21
3.1.2. Land availability, tenure and management	21
3.1.3. Access to input and output market	22
3.1.4. Agricultural extension and innovation	22
3.1.5. Access to agricultural credit	23
3.2. Systemic constraints and upgrading opportunities	24
3.2.1. Business enabling environment	24
3.2.2. Vertical and horizontal linkages and product value chain	24
3.3. Climate change and related food security challenges	24
4. Crosscutting issues	24
4.1. Gender disparities	24
4.2. Urbanization	25
4.3. HIV/AIDS	25
5. The way forward for smallholder agriculture in Tanzania	26
5.1. Enabling smallholder farmers to benefit from high-value agricultural markets (HVA)	26
5.2. Marketing strategies that can improve market access and competitiveness for smallholder farmers	26
5.3. Contract farming	26
6. Conclusion	27
References	28
List of acronyms	39

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Summary

In Tanzania, agriculture is considered the backbone of the economy, contributing about 30% of the total GDP. It is the livelihood of 65 to 70% of the population and accounts for close to three quarters of rural incomes. Agriculture in Tanzania is dominated by smallholder farmers who occupy a large portion of the farmland and produce most of the crop and livestock products. Smallholder farmers play a vital role in agricultural production and food security. Food insecurity is directly linked to poverty and poor agricultural performance among smallholder farmers. The aim of this study was to review available literature on the local and regional variations of agricultural conditions and food security for smallholder farmers in Tanzania and to identify the main constraints along the different value chains. The study was carried out for three months, and the internet was a major source of information and data. The agricultural sector in Tanzania comprises food and cash crops as well as livestock production. Food crops are cereals, pulses, roots and tubers, important cash crops include coffee, tea, tobacco and cashew nuts. The main livestock kept in Tanzania are cattle, goats, sheep, pigs and poultry. The study found that agriculture in Tanzania, as in most other Sub-Saharan African countries, has failed to become an engine of growth and economic transformation due to constraints along the value chain. These constraints include land tenure and management, access to input and output markets, and access agricultural extension and agricultural credit as well as the risk posed by climate change. Moreover, a number of crosscutting issues closely linked to rural development, such as the situation of women and youth, increasing urbanization, and the effects of the HIV-epidemic. Finally, the strategies likely to strengthen the position of smallholder farmers should include measures to enable them to benefit from high-value agricultural markets, improve their market access and value chain competitiveness, as well as to promote farmers organizations and contract farming.

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1. Introduction

1.1. Background information

The latest estimates by FAO and others in 2017 indicates over 815 million people in the world were undernourished, women, children and the elderly remain the most vulnerable demographic groups, and smallholder farmers are the socioeconomic group most affected (FAO, IFAD, UNICEF, WFP and WHO, 2017). In sub-Saharan Africa (SSA), one in eight of the population is estimated to have been undernourished in 2014-2016 (FAO, 2016). Even though the proportion of undernourished (undernourished refers to the proportion of the population whose dietary energy consumption is less than their minimum energy requirements, FAO, 2008) people has fallen, the number of food insecure (food insecure are defined as a situation that exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life, Napoli, 2011) people in SSA has increased dramatically in the past decades due to population growth, increase in food price, and climate change and conflict on some area (Chikhuri, 2013; FAO, 2015). Agriculture remains the most important economic sector in SSA. It is the main source of livelihood for close to three quarters of the population and the primary instrument for poverty alleviation, economic growth and improved food security (Asfawa et al., 2012; Asafu-Adjaye, 2014). Agriculture in SSA accounts for a quarter of the gross domestic product (GDP), employs more than half of the total workforce and contributes over 50% of the total export revenue in many African countries (IMF, 2012; Mbilinyi et al., 2013; Schaffnit-Chatterjee, 2014).

In Tanzania, agriculture is considered as the backbone of the economy and the main driver of economic growth, contributing nearly a third of the GDP or USD 13.9 billion and 65% of raw materials for the industry (Economic Outlook, 2016; Suleiman and Rosentrater, 2016). According to the UN's World Food Program (WFP, 2013) and the World Bank (WB, 2015) agriculture in Tanzania provides over 30% of all exports, serves as livelihood to over 65% of the population and accounts for about 75% of the incomes of rural households. Agriculture in Tanzania as in other SSA countries is dominated by smallholder farmers (Smallholder farmers are described as those farmers holding less than three hectares of land and own only a few heads of livestock, Salami et al., 2010 IFAD 2013, and producing a variety of crops and livestock products, both for subsistence and cash, Parrish et al., 2005) who occupy large portions of the land and produce most of the crops and livestock products (Salami et al., 2010; Asafu-Adjaye, 2014). This gives smallholder farmers a vital role in agricultural production and food security. For instance, more than 70% of the agricultural output in Eastern African is produced by smallholder farmers (Schaffnit-Chatterjee, 2014). The objective of this study was to review the published literature on local and regional variations in agriculture conditions and food security of smallholder farmers in Tanzania. The study puts the following research questions: (i) what is the distribution of key crops grown and livestock kept in Tanzania? and (ii) which are the constraints affecting agriculture along the value chain?

1.2. Methodology

The study was carried between May-July 2017, the author spent one month as a guest researcher at the Department of Human Geography, Lund University, Sweden, and two months at the Department of Food Technology, Nutrition and Consumer Sciences, Sokoine University of Agriculture, Morogoro, Tanzania. The databases such as Google Scholar, Web of Science, Scopus, and Emerald were used to collect literature from published journal articles, reports and book chapters. Additional information and data were gathered from Tanzania's Government Ministries, e.g. the Ministry of Agriculture, Livestock and Fisheries, the Ministry of Industry and the Ministry of Trade and Investment, the Bank of Tanzania (BOT) and the National Bureau of Statistics (NBS). Also, the websites of the Statistical Databases of the Food and Agriculture Organization of the United Nation (FAOSTAT), the World Food Program (WFP), the United Nations Development Program (UNDP), Feed the Future, the International Fund for Agricultural Development (IFAD), and the Swedish International Development Cooperation Agency (SIDA) were reviewed. The keywords used during the literature search were limited to smallholder farmers and agriculture, food security agriculture, climate change, farming systems, livestock, agriculture polices and Tanzania'. Over thirty peer reviewed articles and several other documents were reviewed.

2. Key crops and livestock kept in Tanzania

2.1. Agriculture and Food Security in Tanzania

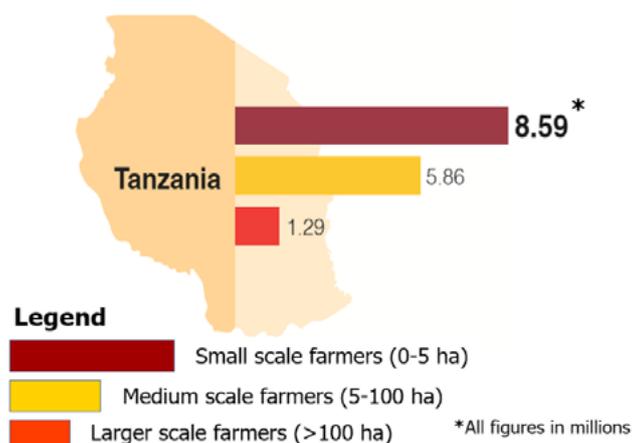


Figure 1. Area controlled by small, medium and large-scale farmers in 2015 (Adopted from Jayne and Ameyaw, 2016).

Agriculture is the main source of food and the largest contributor of the Tanzanian economy. However, despite its huge contribution to the economy, in 2016/17, the agricultural sector in Tanzania grow only 2.7% compared 6.6% for tourism and 6.5% for mining sector (Tanzania Invests, 2017). Moreover, in 2016/17 fiscal year only 7% of the government expenditures was dedicated to the agricultural sector (Tanzania Economy, 2017). Like in other SSA countries, agriculture in Tanzania is dominated by smallholder farmers who operate an average of 0.2 to 3.0 hectares of land (TAFSIP, 2011). Smallholder farmers in Tanzania occupy over 80% of the arable land (Figure 1) (TAFSIP, 2011) and rely mainly (64%) on hand hoe and rain-fed agriculture (AGRA, 2017; IFAD, 2017). According to FAO (2011), smallholder farmers are estimated to produce over 80% of the food in developing countries.

Furthermore, most of the smallholder farmers in developing countries, including Tanzania, are vulnerable due to the small sizes of their farms, inadequate access to and use of modern agricultural techniques, low levels of income, poor policies and low government support like subsidies on agricultural inputs (seeds and fertilizers) (IFPRI, 2013; Effah-Abedi, 2014). Although they play an important role in the food security, smallholder farmers normally are among the poorest group in developing countries (HLPE, 2013). In Tanzania, improving food security is a key objective of the national strategies for growth and the reduction of poverty (MKUKUTA, Mkakati wa Kukuza Uchumi na Kupunguza Umaskini Tanzania, – National Strategy for Economic Growth and Reduction of Poverty) (Schindler et al., 2014). The food security of individual countries is measured by the Global Hunger Index (The Global Hunger Index, GHI, is designed to comprehensively measure and track hunger globally and by country and region. Currently 2017 GHI Report - IFPRI, 2017- for 119 countries. The measuring of the GHI aims to trigger actions to reduce hunger.

The component indicators used to calculate the GHI are Undernourishment, Child wasting and stunting, and Child mortality. For more information visit <http://www.ifpri.org/topic/global-hunger-index>. In 2016, the value for Tanzania was 28.4 with 32.1% of population undernourished, which indicates that the situation was serious (AGRA, 2017; IFPRI, 2017). The food security in Tanzania is characterized by seasonal and regional food shortages (Schindler et al., 2014). This is due to population increase, environmental degradation, urbanization, climatic change, and compounded by failed agricultural policies. In general, Tanzania situation are better compared to neighbouring countries.

According to Global Information and Early Warning System (GIEWS) on food and Agriculture, 28 African countries including Burundi, Democratic Republic of Congo, Ethiopia, Uganda, Kenya, Malawi, Mozambique, and Somalia are facing food insecurity and requiring external assistance for food due to conflict and drought conditions (FAO, 2018). The current food security status in Tanzania and other countries around the regions can be expressed in terms of main cereal production between 2016 and 2018 as shown in Table 1.

Table 1: Main cereal production in East Africa.

Countries	Wheat			Coarse grains ¹			Total cereals ²			
	2016	2017 estim.	2018 f'cast	2016	2017 estim.	2018 f'cast	2016	2017 estim.	2018 f'cast	Change 2017/18 (%)
Ethiopia	4.5	45	4.5	20.7	20.5	20.5	35.4	25.1	25.1	0.0
Kenya	0.2	0.2	0.3	3.6	3.2	3.5	3.9	3.6	3.9	8.9
Uganda	0.0	0.0	0.0	3.2	3.4	3.4	3.4	3.6	3.6	0.4
Tanzania	0.1	0.1	0.1	7.0	7.1	7.2	10.5	9.7	10.4	8.0

¹Coarse grains include (Maize/Corn, Sorghum, Pearl Millet, Finger Millet)

²Total cereals includes wheat, coarse grains and rice (paddy). Source (FAO, 2018).

2.2. Rainfall Distribution in Tanzania

Over 95% of the agricultural activities in Tanzania depend on rainfall (Hepelwa, 2010). There are two predominant precipitation regimes (WFP, 2013; Suleiman and Rosentrater, 2016). The unimodal rainfall regime covers the Southern, Southwestern, Central and Western parts of the country (Figure 2). These regions have one long rainy season from November/December to late April. The bimodal rainfall pattern dominates in the Northwest, the Northeastern Highlands, parts of the Coastal belt, the Lake Victoria basin and the Zanzibar Islands (Figure 2) (WFP, 2013). The bimodal precipitation regime has two rainy seasons, one short rainy season (Vuli) from October to December and a second longer rainy season (Masika) from March to May (Rowhani et al., 2011; WFP, 2013). The average annual rainfall distribution in Tanzania is shown in Figure 3.

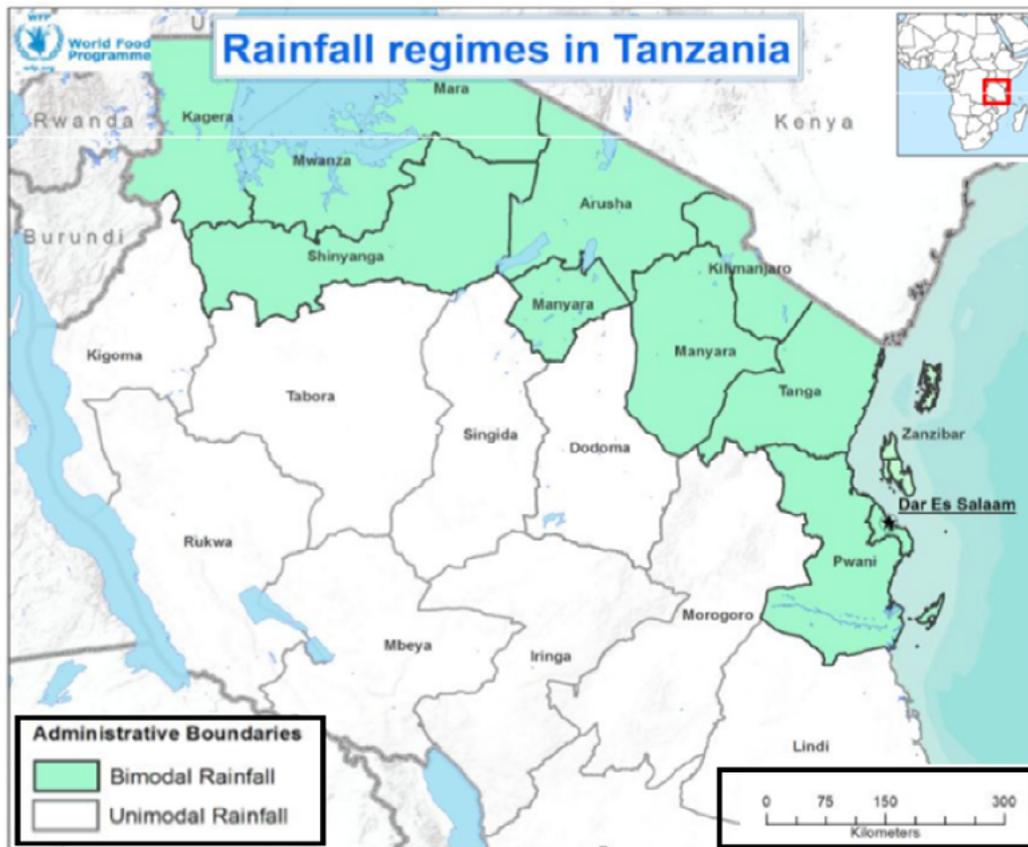


Figure 2. Rain fall regime in Tanzania (Modified from WFP, 2013).

Over the past decades the precipitation over Tanzania has become more varied (unreliable and unpredictable) and more unevenly distributed over the geographical zone due to environmental degradation and climate changes (IFRC, 2008; Mbululo and Nyihirani, 2012). According to a World Bank report (WB, 2017a) on climate change the average annual precipitation in Tanzania decreased significantly between 1960 and 2006. The decrease was by 2.8 mm per year or 3.3% per decade. The highest annual decreases have been observed in the Southern parts of the country (McSweeney et al., 2010). During the same period (1960-2006) the mean annual temperature increased by 1°C (WB, 2017a). According to Adhikari et al. (2015) climate change is projected to increase the temperature and precipitation variability in East Africa. The climate projection model shows that the temperature in Tanzania will increase by 2 to 5°C by the mid-2090s (McSweeney et al., 2010). Likewise, rainfall projections indicate changes in annual precipitation ranging from -1 to +18% by 2060s and - 4 to + 30% by the 2090s (USAID, 2012; McSweeney et al., 2010). Figure 3 shows the average monthly rainfall and temperature in Tanzania from 1901-2015.

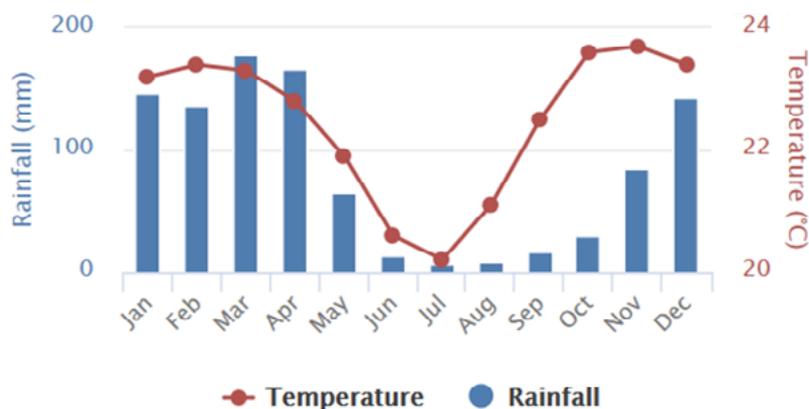


Figure 3. The average monthly rainfall and temperature in Tanzania from 1901-2015 (WB, 2017a).

2.3. Farming Systems in Tanzania

There are different types of farming systems (Farming systems, FS, can be defined as “a population of individual farm systems that have broadly similar resource bases, enterprise patterns, household livelihoods and constraints, and for which similar development strategies and interventions would be appropriate”, Dixon et al., 2001.) in Tanzania. FS can broadly be classified by geographical location, type of farming, household livelihoods, similarities in the challenges faced and the availability of natural resource bases (Dixon et al., 2001). The main FS in Tanzania are the maize-mixed, cereals and root crops, root crops and tubers, highland perennial and agro-pastoral millet/sorghum FS. Additional FS in the country are the irrigated, intensive mixed crop-livestock, forest based, dualistic (mixed larger commercial farming and smallholders), coastal artisanal fishing and urban farming systems (Mnenwa and Maliti, 2010).

2.4. The Distribution of Key Crops Grown in Tanzania

Geographically, Tanzania is endowed with diverse and complex climatic conditions (Suleiman and Rosentrater, 2016). Based on topographic characteristics, rainfall patterns, temperature, growing seasons, soil types, land forms and production practices, Tanzania has been divided into seven agro-ecological zones (AEZ) as shown in Figure 4 (NAPA, 2007; Mohammed, 2016).

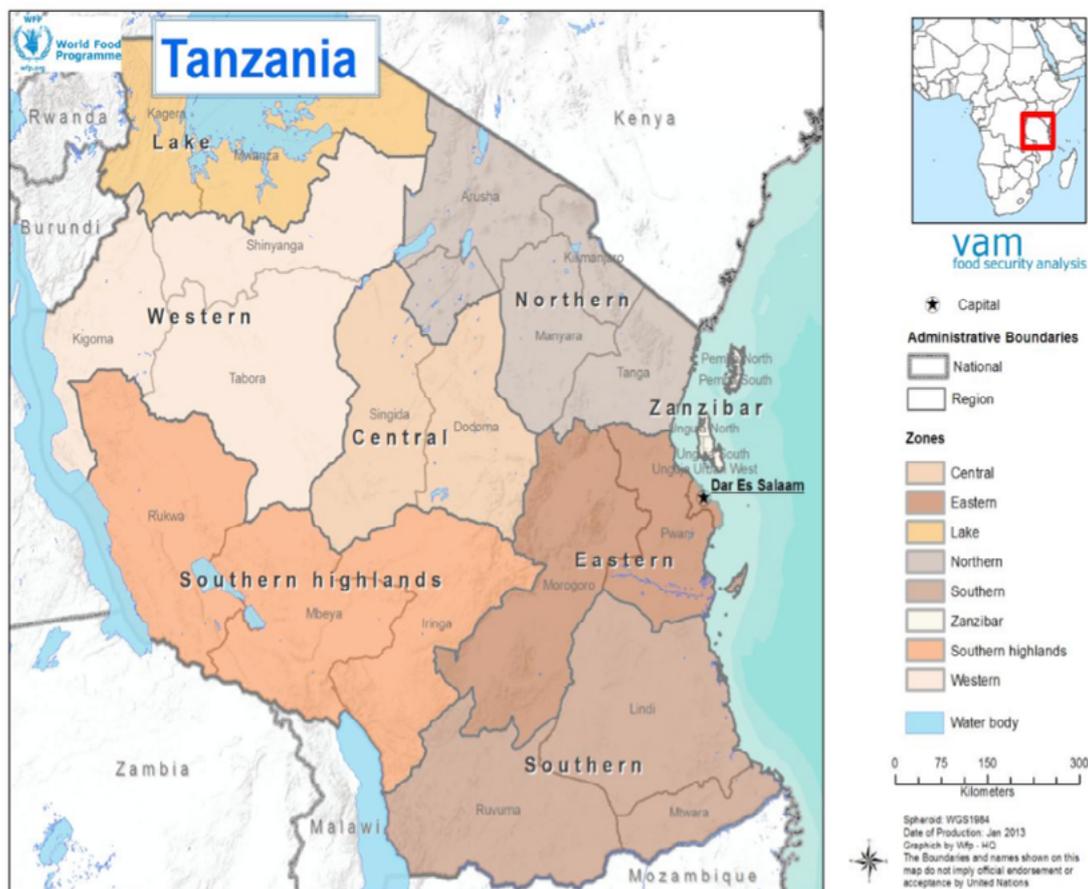


Figure 4. Agro-ecological zones (AEZ) of Tanzania (WFP, 2013).

In Tanzania, only 24%, or about 10.56 million ha (hectares), of the potentially arable land (44 million ha) are used for crop production (Rowhani et al., 2011). Agriculture producers are divided into three main groups: smallholder farmers, with less than three hectares of land, the medium scale (5-100 ha) and large-scale farmers with farms of more than 100 hectares. The smallholder farmers who are the most important group contribute over 85% of the total production, while the other two groups (medium and large scale) produce the rest of 15% (Levard, 2014). Large-scale farms are mainly privately owned or farmed under private-public partnerships (Rowhani et al., 2011). The crops of the agricultural sector in Tanzania comprise food crops and cash crops. Food crops refer to the production of basic food

staples, including cereals, pulses, roots and tubers, and bananas. Cash crops are those that may be sold at home or at the international commodity markets and may be either food or non-food commodities (Babier, 1987). The best examples of cash crops are coffee, tea, sisal, sugarcane, oil seeds, tobacco, cashew nuts and cloves. The distribution of these crops is shown in Figure 5.

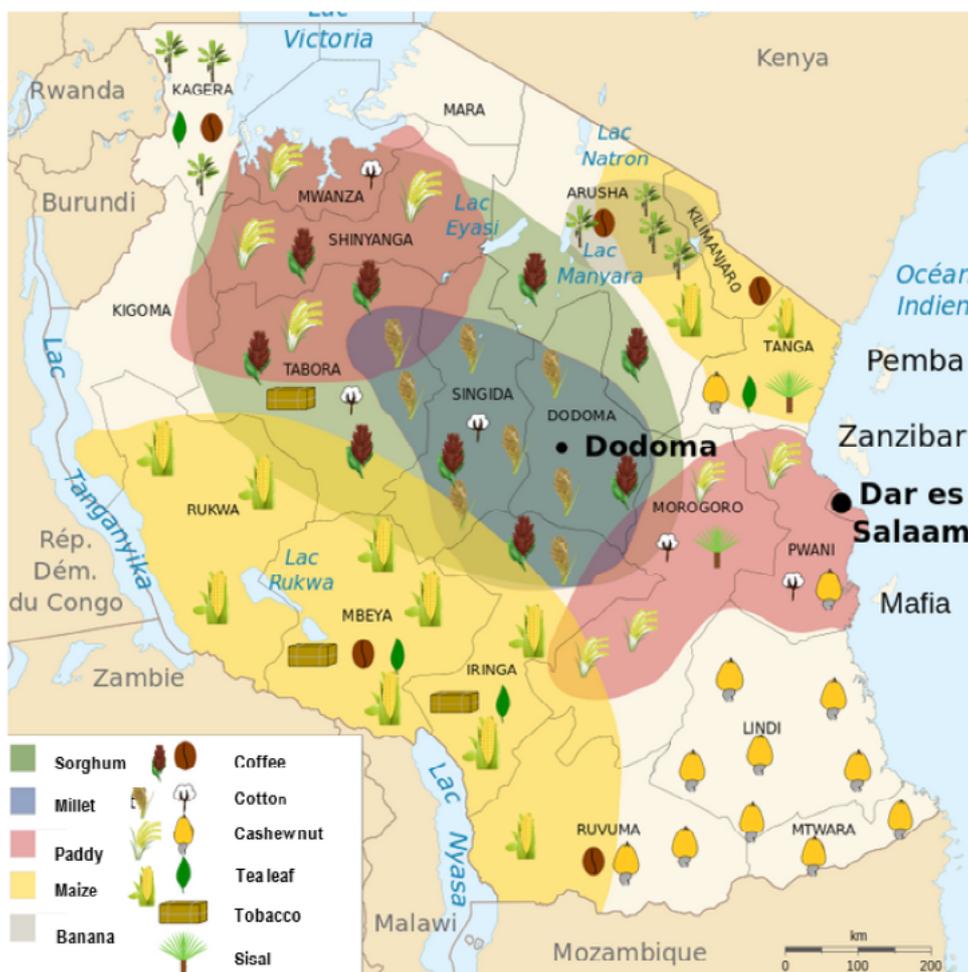


Figure 5. Distribution of food and cash crops grown in Tanzania (Modified from Shakki, 2008).

2.4.1. Main Food Crops Grown in Tanzania

The main food crops grown in Tanzania are maize, cassava, bananas, rice, wheat, sorghum/millet, pulses (common dry bean, cowpeas, yellow and green grams, chickpeas, lentils, and pigeon peas), fruit and vegetables, which are grown on over 85% of the cultivated land (NBS, 2016) and mainly by smallholder farmers (Rowhani et al., 2011). Cereals are the most important food crops covering about 61% of the total area planted followed by root and tubers (14%), pulses (12%) and fruits and vegetables (1%), the remaining 12 % is used for other crops such as bananas, cotton, tea, coffee, sisal, cashew nuts and others (NBS, 2016).

2.4.1.1. Maize

Maize is most important food and cash crop in the country. Maize has been identified as a key crop to enhance income, food security and poverty alleviation (Homann-Kee et al., 2013). It is cultivated in nearly all AEZ of Tanzania although in different proportions (Suleiman and Rosentrater, 2016). In 2014, over 4 million hectares of land was used for maize production (FAOSTAT, 2017). According to Pauw and Thurlow (2011), maize occupied 45% of the total land allocated for cereal crops in Tanzania. Overall productivity is, however, very low with a national average yield between 1 and 1.5 metric tons (MT) per hectare (Barreiro-Hurle, 2012). The major proportions of maize produced in Tanzania comes from three AEZ: The Southern Highland zone (45%) (Figure 5), the Lake zone (20-30%) and the Northern zone (10%) (USAID, 2010). Maize production in Tanzania fluctuates considerably from year to year, mainly due to variations

in rainfall patterns. Figure 6 shows maize production and the area cultivated from 1990-2014.

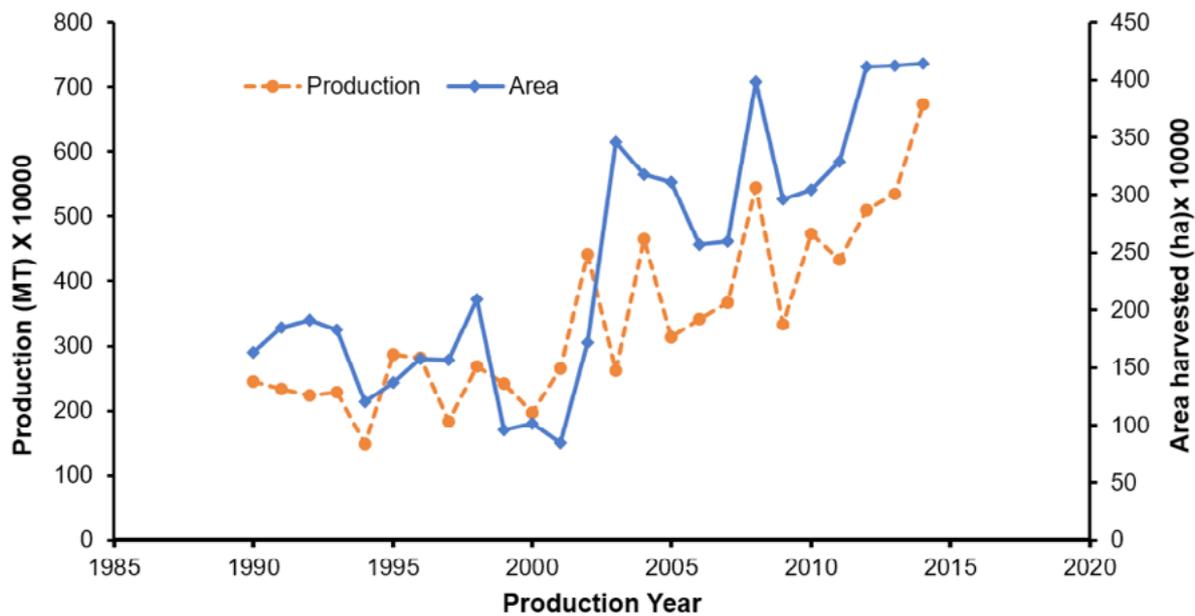


Figure 6. Maize production and area harvested from 1990-2014 (FAOSTAT, 2017).

Maize production in Tanzania is categorized into four main groups; (i) smallholder farms, these are usually less than 10 ha. This category contributes over 80% of the total production, (ii) community farms (50-100 ha) produces 10%, (iii) large farms (over 100 ha) produce 5% and (iv) larger public and private farms (over 100 ha) produces the remaining 5% of the total production (Croon, 1984). The major constraints of maize production in Tanzania are the pre-and postharvest losses due to insect pests and diseases. According to Suleiman and Rosentrater (2016) and Abass et al. (2014) the main insect pests of maize in Tanzania include field insect pests like *Busseola fusca*, *Cicadulina mbila*, *Gryllotalpidae*, *Helicoverpa armigera*, and *Spodoptera exempta*. While the main storage insect pest responsible for postharvest losses of maize are *Sitophilus zeamais*, *Prostephanus truncate*, *Tribolium castaneum*, *Callosobruchus maculatus* and *Plodia interpunctella*. Moreover, mycotoxins (secondary metabolites that are produced by several fungal genera and exert toxic effects on human and domesticated animals, Peraica, 1999) especially aflatoxin and fumonisins is another huge burden to maize producers in Tanzania and other tropical countries (Merck, 2006). The recent report shows in 2016 fourteen (14) peoples perish due to consuming maize contaminated with mycotoxins (aflatoxin) in Central regions of Tanzania (GP, 2016).

2.4.1.2. Sorghum and Millet

Sorghum and millets are the second and fourth most grown cereal crops in the country and together cover about 663,000 hectares of the arable land (FAOSTAT, 2017). Tegemeo, Pato and Macia is the most common improved sorghum varieties grown in Tanzania (Bucheyeki et al., 2010). In 2014, Tanzania produced over 800,000 MT and 250,000 MT of sorghum and millet respectively (FAOSTAT, 2017). They are usually grown in drought prone areas where maize cultivation is risky (Schipmann-Schwarze et al., 2015) and serves both as a staple and as a cash crop. About three-quarters of the production comes from the central semi-arid regions, Dodoma and Singida. The crops are also cultivated in Shinyanga, Mwanza, Mara, Lindi, Mtwara and in some of drier parts of Morogoro region (Rohrbach and Kiriwaggulu, 2007) (Figure 7). These crops are mainly grown by small-holder farmers on small plots of about 1.0-1.5 ha of land (Rohrbach and Kiriwaggulu, 2007). Sorghum and millet used as food (ugali), beverage (togwa), local brew and as animal feeds (USAID, 2009). In addition, sorghum now is used by larger industries like Tanzania Breweries Limited (TBL) as a source of malt to make opaque beer such as *Chibuku* (Makindara et al., 2013).

Moreover, the average yield of sorghum and millet in Tanzania is very low, about 0.7 and 0.5 MT/ha respectively, which is well below the global average of 5 MT/ha and 4 MT/ha for sorghum and millet respectively (FAOSTAT, 2017). Farmers grow both local and improved varieties, although local varieties are preferred due to better taste and resistance to insect infestation during storage (ASARECA, 2012). However, the government is encouraging farmers to grow improved varieties (*Tegemeo*, *Pato* and *Macia*) because of higher yields, early maturity and better performance in drought conditions (Mitaru et al., 2012). According to several researchers (Msongaleli et al., 2017; Mitaru et al.,

2012) the low productivity of sorghum and millets is the result of environmental factors (such as drought, poor soil fertility, pest infestation and diseases), management factors (like poor agronomic practices and poor management of stress factors such as weeds and pests), limited knowledge and information exchange, institutional bottlenecks, market limitations (poor market infrastructure, unfavorable government policies, low prices), as well as limited processing and utilization and high postharvest handling losses. Figure 7 show production trends of sorghum and millets from 1990-2014.

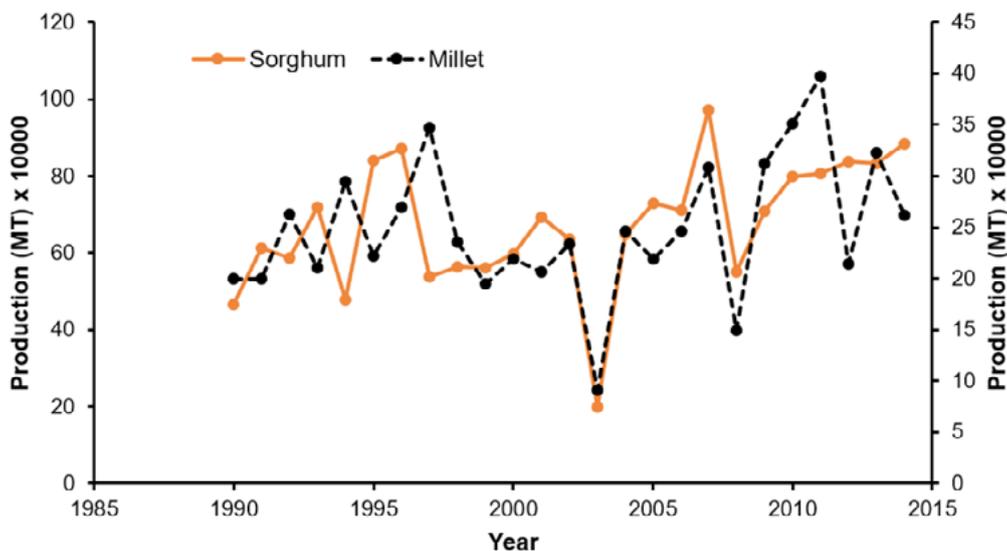


Figure 7. Sorghum and millets production trends from 1990-2014 (FAOSTAT, 2017).

2.4.1.3. Rice

Rice (paddy rice) is the third most important cereal crop in Tanzania after maize and sorghum and second most important food and commercial crop after maize (RLDC, 2009). Around 90% of the rice is produced by smallholder farmers with an average farm size of 1.3 ha (Match maker, 2010). It is grown nearly in all agro-ecological zones and mainly concentrated in Morogoro, Tabora, Mbeya, Mwanza, Shinyanga, Arusha, Kilimanjaro, Manyara, Dodoma, Tanga, Coast, and Iringa regions (EAAPP, 2011). In 2014, Tanzania produces over 2.6 million MT of rice in over 900,000 ha of land (FAOSTAT, 2017). However, the productivity and yield is very low, the average yield of rice oscillates between 1.3 to 2.4 t/ha (Ngailo et al., 2016) compared to 6 -10 t/ha in India (Ricepedia, 2017) or 8-12 t/ha in Madagascar (Laulanié, 211). Rice in the country is grown in three main ecosystems; rain-fed lowland, rain-fed upland (dryland) and irrigated lowland (RLDC, 2009). Moreover, dryland occupied more than half (over 50%) of the total rice production in Tanzania (EAAPP, 2011).

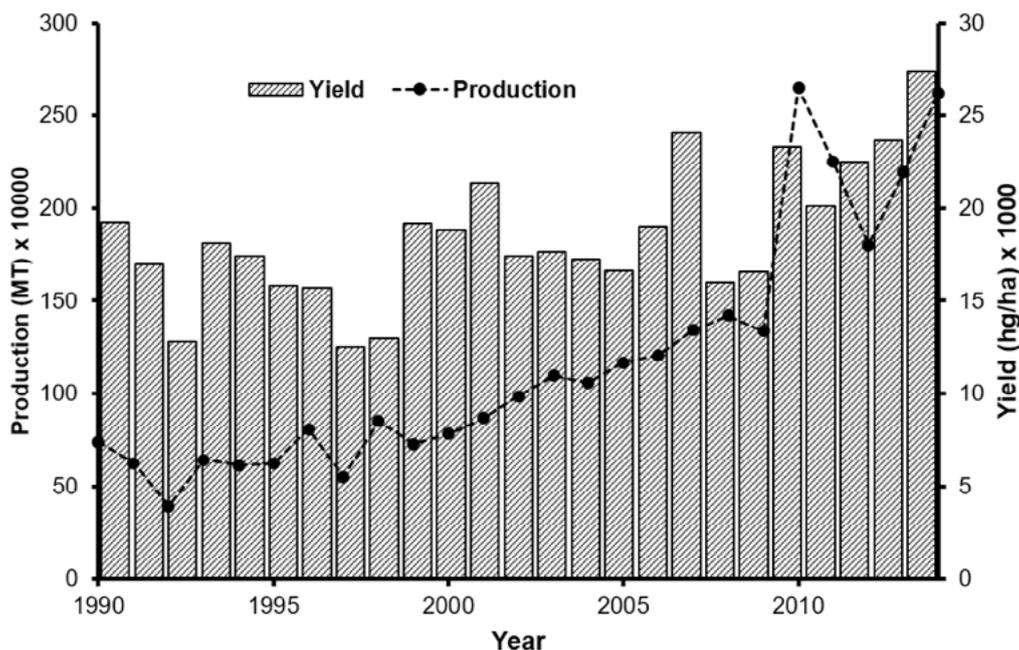


Figure 8. Rice production and yield trends in Tanzania from 1990-2014 (FAOSTAT, 2017).

Despite low yield the overall production of rice over the past two decades show positive trends (Figure 8) from 0.74 million MT in 1990 to over 2.6 million MT in 2014 (FOASTAT, 2017). This is partially due to an increase in the area of cultivation, proper application of fertilizers, and stable price of rice (RLDC, 2009). The main constraints of rice production in Tanzania among others include; limited production and distribution of improved seeds (inputs), high post-harvest losses due to poor post-harvest handling and uses of inefficient milling machines, low level of mechanization and poor infrastructure (Match maker, 2010; EAAPP, 2011; GRiSP, 2013).

2.4.1.4. Wheat

Wheat is Tanzania's fourth most important cereal crop after maize, rice and sorghum (Mtaki, 2016). It is produced by both small- and large-scale farmers, mainly (>90%) in the Northern AEZ (Arusha, Kilimanjaro and Manyara regions) and the Southern Highland AEZ (Iringa, Njombe, and Mbeya regions) (Maro and Barreiro-Hurlé, 2012). According to FAO estimates about 100,000 MT of wheat are produced annually in Tanzania (FAOSTAT, 2017). The production has, however, remained well below local demand, creating a huge gap between consumption and production (ReNAPRI, 2015). Tanzania imports about six times as much wheat as is produces domestically (Maro and Barreiro-Hurlé, 2012). The main exporters of wheat in Tanzania are Australia, Russia, Argentina and Canada (Maro and Barreiro-Hurlé, 2012). Figure 9 show production trends yield, and the area harvested from 2000 to 2014.

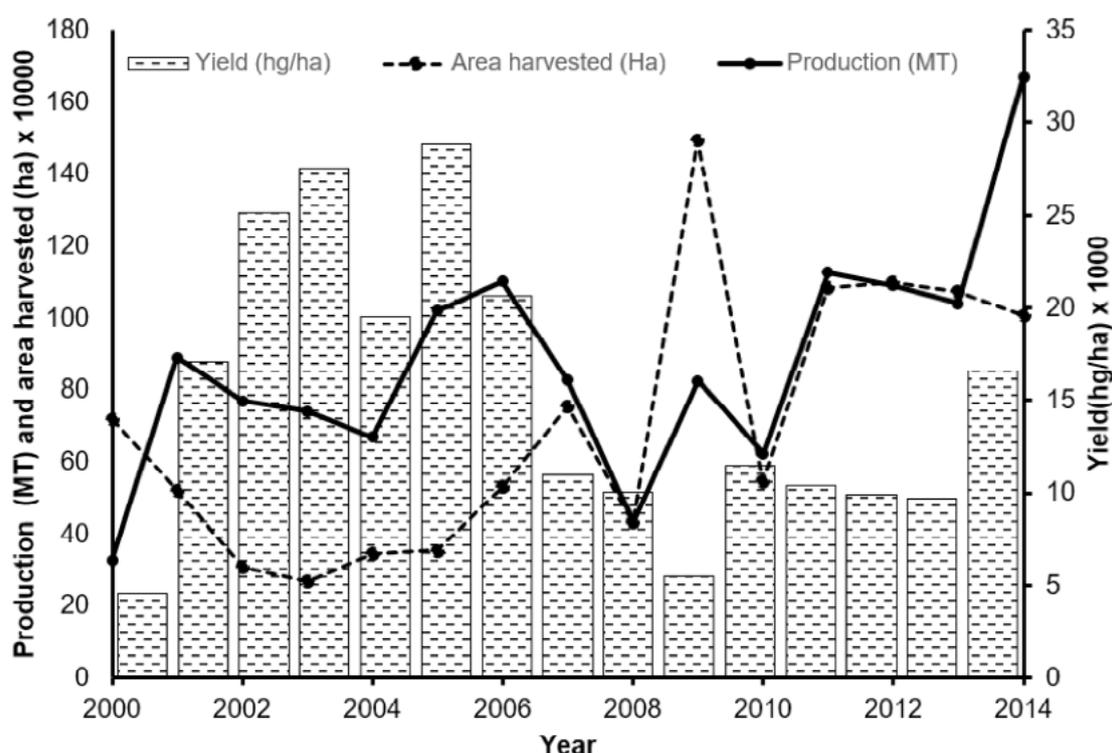


Figure 9. Production trends, Yield and area harvested of wheat in Tanzania (FAOSTAT, 2017).

2.4.1.5. Roots and Tubers

Roots and tubers are important staple crops, second to cereals, in tropical and sub-tropical countries (Chandrasekara and Kumar, 2016). They include cassava, potatoes, sweet potatoes, and yams. These four crops account for about 95% of the total root and tuber crop production in SSA (Sanginga, 2015). Tanzania is one of the largest cassava producers in Africa and the most important in East Africa (FAOSTAT, 2017). Cassava is the second most important food crop after maize in the country in terms of both production and per capita consumption (James, 2015). It is produced in almost all regions of mainland Tanzania and Zanzibar, but the major cassava producing regions are Mwanza, Lindi, Shinyanga, Tanga, Ruvuma, Mara, Kigoma, Coast regions and the Zanzibar Islands (MOA, 2017). Cassava is a convenient crop for smallholder farmers, because it grows on poor soils and is tolerant to drought conditions and serves as a food security crop in drought prone areas (Lazaro et al., 2007). In 2014, Tanzania produced over 4.9 million MT of cassava on over 800,000 hectares of land (FAOSTAT, 2017) mostly by small scale farmers with 0.5 to 2 hectares of land (Kapinga et al., 2000). Of the total cassava production about 85% is used as human food, the remaining is used

as animal feed, for export or starch production (Kapinga et al., 2000).

2.4.1.6. Green Banana

Green banana is fourth most important crop in the world after rice, wheat and maize, and staple crop for many peoples in tropical and sub-tropical countries (Banano, 2016). The current world production is around 114 million MT (FOASTAT, 2017). Africa contributes only about 4.5% (20.5 MT) of the total world production (FOASTAT, 2017). Uganda and Tanzania produce over half of all bananas grown in Africa, other large producing countries are Angola, Burundi, Cameroon and Kenya (IITA, 2014). In 2014, Tanzania produced 3.2 MT (Figure 10) of banana (FAOSTAT, 2017), which is the main staple food for 20 to 30% of the population and play a key role in food security (Ndunguru, 2009). Banana is also the main source of income for many rural households (Kilimo trust, 2012).

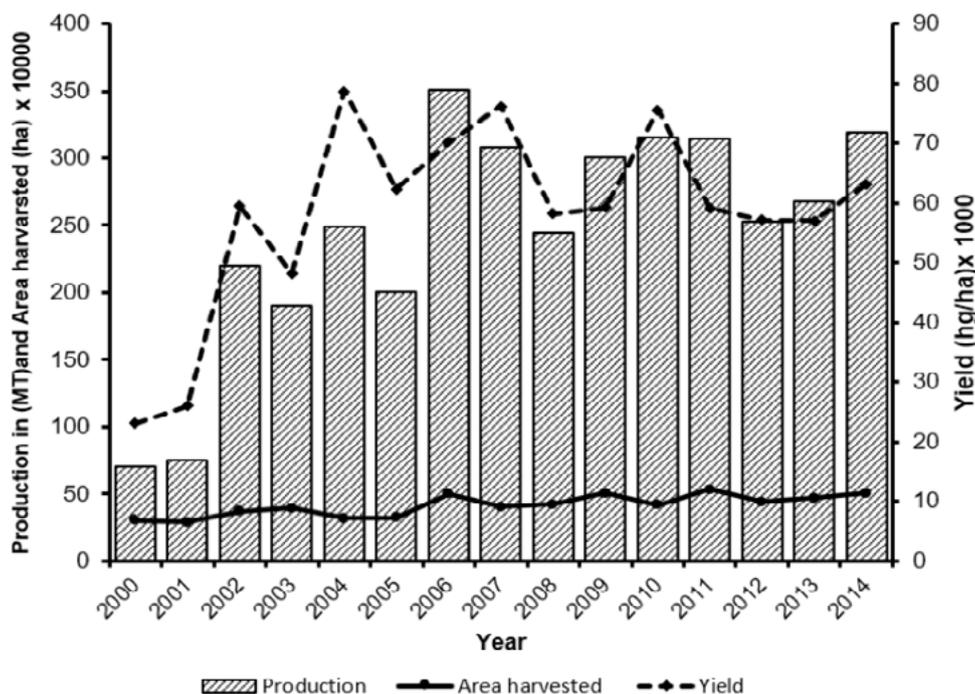


Figure 10. Banana production, yield and area harvested in Tanzania (FOASTAT, 2017).

Moreover, in terms of major food crops consumed in Tanzania, green bananas rank third after maize and cassava with a per capita annual consumption of about 84 kg per person (Kilimo trust, 2012). It is mainly grown by smallholder farmers on an average field size ranging from 0.5 to 1.7 ha per household in a predominantly rain-fed conditions (Mbwana et al., 1998). Bananas are normally intercropped with other annual and perennial crops like coffee, maize, beans, cassava, sweet potato and other horticultural crops (Kilimo trust, 2012). The most important banana growing areas in Tanzania is shown in Figure 11 (Ndunguru, 2009). Kagera, Kilimanjaro and Mbeya regions together produces about 80% of the total banana production in the country (Figure 11). The average yield of banana production in Tanzania has declined significantly over the past decades. For instance, in 1960' the average yield in Kagera region was 18 tons/ha but has declined to less than 6 tons per ha in the mid 2000's (Rugalema and Mathieson, 2009).

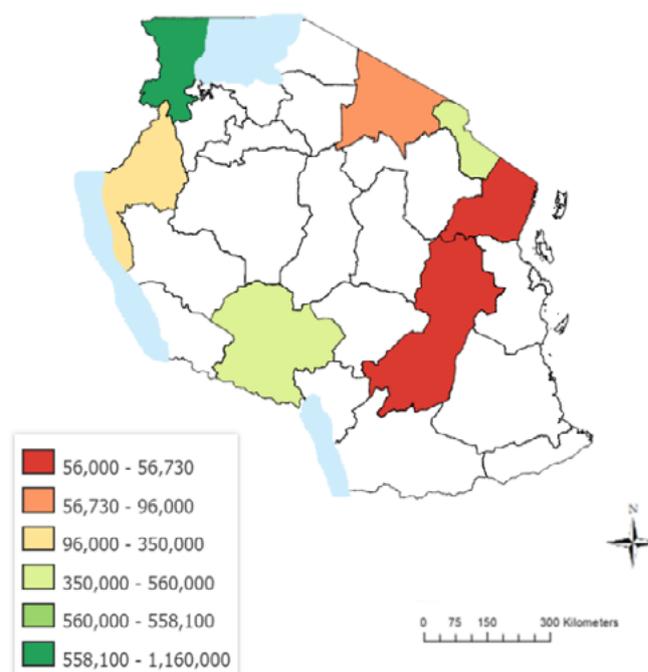


Figure 11. Major banana production regions in Tanzania (modified from Kilimo trust, 2015).

The main constraints of banana production in Tanzania include lower yielding varieties, pest and diseases like banana weevils (*Cosmopolites sordidus*), Fusarium wilt diseases and Black sigatoka (*mycosphaerella fijiensis*) (Rannestad et al., 2011; Ramadhani et al., 2017). Also, declining in soil fertility and holding sizes, limited genetic base, and poor agronomic practices (Ndunguru, 2009; Gallez et al., 2004; Rugalema and Mathieson, 2009). According to Nkuba and Said (2003) the main socioeconomic constraints facing the banana industry in Tanzania are poor marketing and distribution systems, lack of credit facilities, poor infrastructure and poor distribution channels.

2.4.1.7. Pulses

Pulses or grain legumes are the third most important staple food commodity in Tanzania after maize and cassava (Hillocks et al., 2006). Pulses are the main source of protein and calories for millions of low-income households in Tanzania (Katungi et al., 2009) and play a significant part in mitigating food and nutrition insecurity among smallholder farmers (Karanja, 2016). Pulses occupy about 12% of the total cultivated area in Tanzania (NBS, 2013) and the most important are the common dry bean, cowpeas, yellow and green grams, chickpeas, lentils, and pigeon peas. Table 2 shows some pulses production, yields and trade trends from 2000-2014.

Table 2. Average pulses production yield and trade in Tanzania (2000-2014).

	Common beans	Cowpeas	Chickpeas	Peas, green	Pigeon peas
Area (Ha)	1,134,394	1,973,23	1,163,99	5,504	250,509
Production (MT)	1,114,500	1,905,00	972,28	250,509	248,000
Yield (MT/Ha)	9,825	9,654	8,353	171,63	9,900
Imports (MT)	832	-	-	-	-
Exports (MT)	119,44	-	-	-	-

Source: FAOSTAT (2017).

2.4.1.7.1. Common Dry Bean (*Phaseolus vulgaris*)

Common beans (*Phaseolus vulgaris*) are the main grain legume grown in Tanzania (Hillocks et al., 2006). The country is the sixth biggest producer of *Phaseolus vulgaris* in the world and the second in East Africa (FAOSTAT, 2017). In 2014, the country produced over 1.1 million MT of *Phaseolus vulgaris* on 1.2 million ha of land (Figure 12) with per capita consumption of about 19 kg (NBS, 2013). Over 75% of the households in the rural areas depends on *Phaseolus vulgaris* for their daily food needs (NBS, 2013). As most of the crops discussed in this report, common beans are mainly grown by smallholder farmers, particularly women (Binagwa et al., 2016), and usually intercropped with maize, sunflower, sesame and other crops (ITC, 2016). The common bean is widely cultivated in the Kilimanjaro, Arusha, Manyara and Tanga regions, as well as the Mbeya, Ruvuma, Iringa, Morogoro and Rukwa regions, but also in the Kagera and Kigoma regions (ITC, 2016).

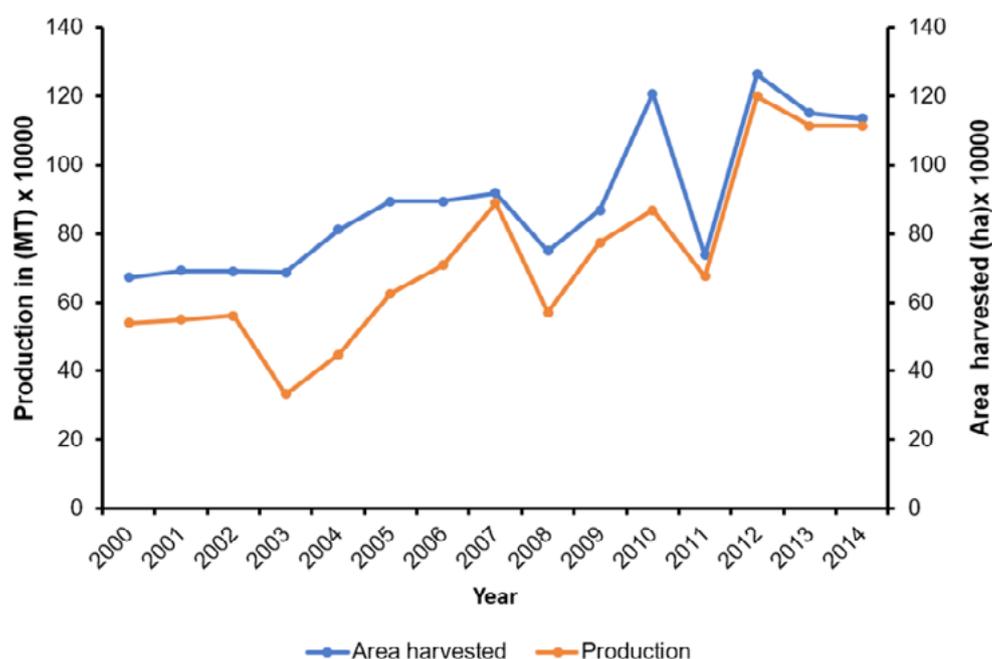


Figure 12. Common beans (*Phaseolus vulgaris*) production and area harvested in Tanzania (FAOSTAT, 2017).

Tanzania is a net exporter of *Phaseolus vulgaris* due to adequate production. Over the past decade (2004-2014) exports of pulses, including the *Phaseolus vulgaris* has increased by an average annual rate of about 22% (ITC, 2016). The common beans from Tanzania are mainly exported to neighboring countries like Kenya, Malawi, Zambia, Burundi and the Democratic Republic of Congo (Katungi et al., 2009). Other export destination of Tanzania pulses are India, Pakistan, United Kingdom, Italy and Canada (ITC, 2016). The main constraints of production of the *Phaseolus vulgaris* and other pulses in Tanzania include poor seed quality, dependence on rainfall, and, the presence of pests and diseases, and high postharvest losses (Hillocks et al., 2006).

2.4.1.7.2. Pigeon Peas (*Cajanus cajan*)

Tanzania is the leading producer of *Cajanus cajan* in Africa and the third in the world after India and Myanmar. In 2016, Tanzania produced about 270,000 MT of *Cajanus cajan* (FAOSTAT, 2017). *Cajanus cajan* is a drought tolerant legume grown mainly in semi-arid regions. It is widely grown in the Northern (Arusha, Manyara, Kilimanjaro and Tanga), Eastern (Morogoro and Pwani), and Southern zones. It also cultivated in Mtwara, Mbeya, Iringa, Sumbawanga, Kigoma, Kagera, Mara, Songea, Tabora and Lindi regions (Karanja, 2016). *Cajanus cajan* from Tanzania are mainly exported to India, United Arab Emirates (UAE) and Pakistan. *Cajanus cajan* from Tanzania is considered as best in Africa due to their purity of color (Kulkarni, 2013). Figure 13 show production trends of *Cajanus cajan* in Tanzania.

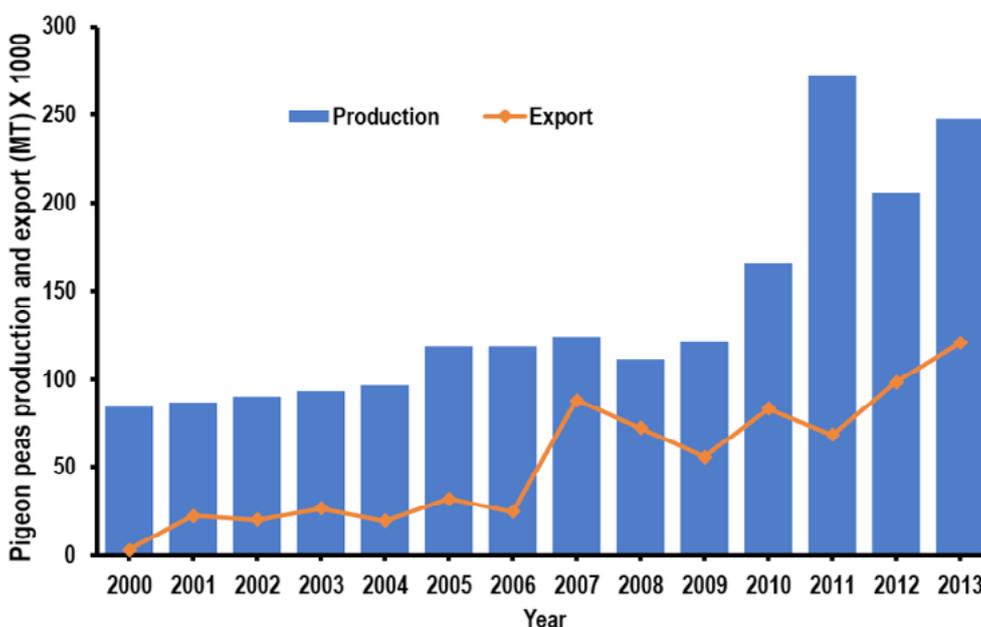


Figure 13. Production and export trends of *Cajanus cajan* in Tanzania from 2000- 2013 (FAOSTAT, 2017; TDP, 2018).

2.4.2. Main Cash Crops Grown in Tanzania

The most important cash crops grown in Tanzania are tobacco, cashew nuts, coffee, tea, and cloves. Other cash crops produced in the country are cotton, sisal, sugarcane, pyrethrum, and oil seeds.

2.4.2.1. Tobacco

Tobacco is the major cash crop in Tanzania producing 273 million US\$ in export revenue in 2016 (BOT, 2017). It contributes about 36% of the country's foreign currency earnings and is the main source of income for over 100,000 farmers (Mayuya, 2013; Tuinstra, 2015). In 2014, Tanzania produced over 700,00 MT of tobacco, making Tanzania the second largest producer in Africa after Malawi and the eighth in the world (FAOSTAT, 2017). Like other crops most of the tobacco in Tanzania is produced by smallholder farmers on plots of about 1.5 hectares of land (TTB, 2017). Most of the tobacco production in Tanzania is done under contract farming (TTB, 2017). In the past decade the tobacco production has increased significantly (Figure 14) from 26,000 MT in 2000 to over 120,000 MT in 2012 (FAOSTAT, 2017). This is mainly due to the effectiveness of extension services, contract farming and economic reform in the tobacco sector (Tuinstra, 2015). Over 85% of the Tanzanian tobacco is exported and the biggest markets in 2015 were Germany, Poland and Russia (Kaguruki, 2010; BOT, 2017). Figure 14 shows production trends of tobacco leaf production from 2000 to 2014. Tobacco is mainly grown in Tabora, Songea, Kahama, and Singida regions, and to a

lesser extent in the Mara, Iringa, Mbeya, and Morogoro regions (TTB, 2017). Historically, Tabora is the most important tobacco growing region and accounts for over 60% of the total national outputs (Tuinstra, 2015).

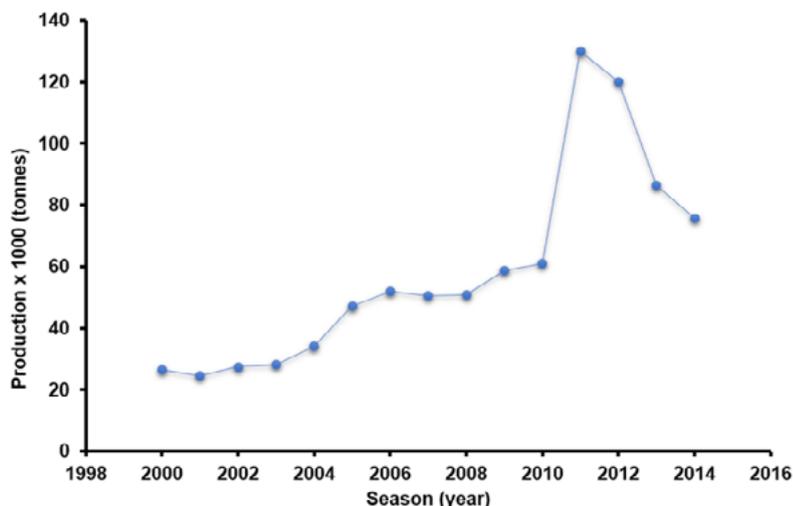


Figure 14. Production trends of tobacco in Tanzania from 2000-2014 (FAOSTAT, 2017).

2.4.2.2. Cashewnuts

Cashewnuts is the second most important contributor to the agricultural export basket after tobacco (BOT, 2017). In 2015, Tanzania exported 170,000 MT of cashewnuts worth US\$ 250.8 million (TPSF, 2017). Cashewnuts accounts for about 24% of the country’s total agricultural export (FAO, 2015). Tanzania is the third and the eighth biggest producer of cashewnuts in Africa and in the world respectively, and well known for the production of premium quality cashewnuts (PASS, 2017; CBT, 2011). In the last five years, production has increased steadily (see Figure 15), and the highest production (250,000 MT) so far was recorded in 2016 (WCC, 2017). The average yield of cashewnuts is about 227 kg/ha (Rabany et al., 2015). Likewise, the total area planted has increased significantly due to price increases and favorable government policies like the warehouse receipt system (FAO, 2015). The warehouse receipt systems, WRS, denotes a kind of trade by which commodities are stored in a Licensed Warehouse(s), the owner of the commodity receives Warehouse Receipts which certifying the title of deposited commodities as of specific ownership, value, type, quantity and quality - grades. The Warehouse Receipt facilitates storage, future trade and access to credits (for more information see http://www.wrs.go.tz/includepage.php?page=about_wrs). Almost all (>98%) of the production of cashewnuts are produced by small-scale farmers (CBT, 2011). According to the cashewnuts board of Tanzania 90% of the nuts are exported unprocessed and only 10% is processed for local consumption (PASS, 2017). The Tanzania cashewnuts is mainly exported to India, Vietnam, USA, Netherlands, Germany, United Kingdom and others (Rabany et al., 2015). The crop is grown mainly in the Mtwara, Lindi and Ruvuma regions, which account for between 80 and 90% of the total production (PASS, 2017). Cashewnuts are well suited for the conditions in these regions because it is drought tolerant crop, grow well in poor soils and can be intercropped with food crops (Mitchell, 2004). The major constraints and challenges of cashewnuts production in Tanzania, as highlighted by Mitchell (2004), include deterioration of quality, lack of credit, lower yielding varieties, lack of domestic processing, increasing government levies, and the ambiguous roles played by the cashew boards. Other obstacles are low producer prices, lack of market information, decreasing access to labor, pests and diseases and overcrowding of trees (Martin et al., 1997). Figure 15 shows cashewnuts production trends from 2000-2014.

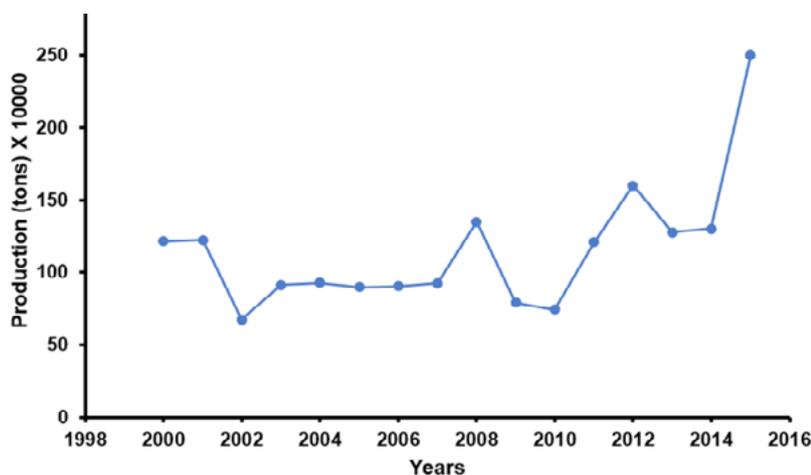


Figure 15. Cashewnuts production in Tanzania from 2000- 2015 (FAOSTAT, 2017).

2.4.2.3. Coffee

Coffee is the Tanzania's third most important agricultural export commodity after tobacco and cashewnuts (MALF, 2015; BOT, 2017). In 2014, Tanzania produced over 48,000 MT of coffee of which 70% were Arabica, grown in Arusha, Kilimanjaro, Mbeya and Ruvuma regions and 30% Robusta from Kagera (FAOSTAT, 2017; Wikipedia, 2017). The same year coffee was planted on 275,000 ha of land (FAOSTAT, 2017). It accounted for 14% of agricultural exports and contributed approximately US\$ 115 million to the export earnings and provide the main income for 400,000 rural families (Baffes, 2003). About 80% of the coffee in Tanzania is produced by smallholder farmers with an average of between 0.5 and 2.0 ha of land (Baregu et al., 2013) and the other 20% are produced by large estates (ESRF, no date). Figure 16 shows coffee production trends in Tanzania.

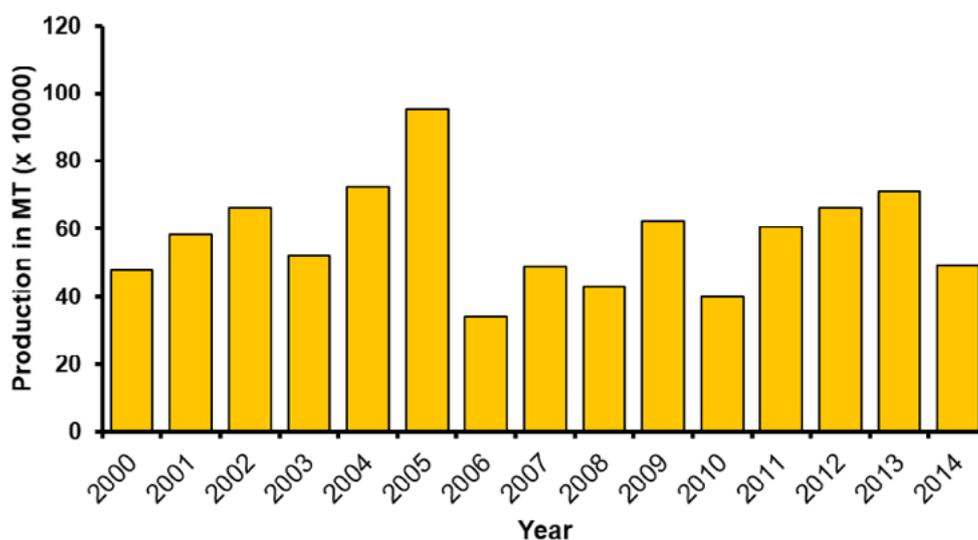


Figure 16. Coffee production in Tanzania from 2000-2014 (FAOSTAT, 2017).

2.4.2.5. Tea

According to the Bank of Tanzania and the Tea Board of Tanzania (TBT), tea is the fourth largest export crop in Tanzania (BOT, 2017). In 2015/16 fiscal year, tea contributed US\$ 49.8 million to export earnings equivalent to 6.5% of total export revenue (TBT, 2017). It is a source of livelihood to over 2 million people (Baffes, 2003). Tanzania rank fourth largest tea producer in Africa and 17th in the world (FAOSTAT, 2017). In 2014/15 production year, Tanzania produces over 33,000 MT of tea (FAOSTAT, 2017). Tea in Tanzania is mainly grown in seven districts (Mufindi, Njombe, Rungwe, Lushoto, Korogwe, Muheza, and Bukoba) (TBT, 2017). It is grown by smallholders (0.3 ha) and by large estates of about 100 ha and above (Baffes, 2003). Over 90% of the tea is exported mainly to the United Kingdom, Kenya, Pakistan and other countries (TBT, 2017). Figure 17 shows production trends of tea from 1990 - 2014.

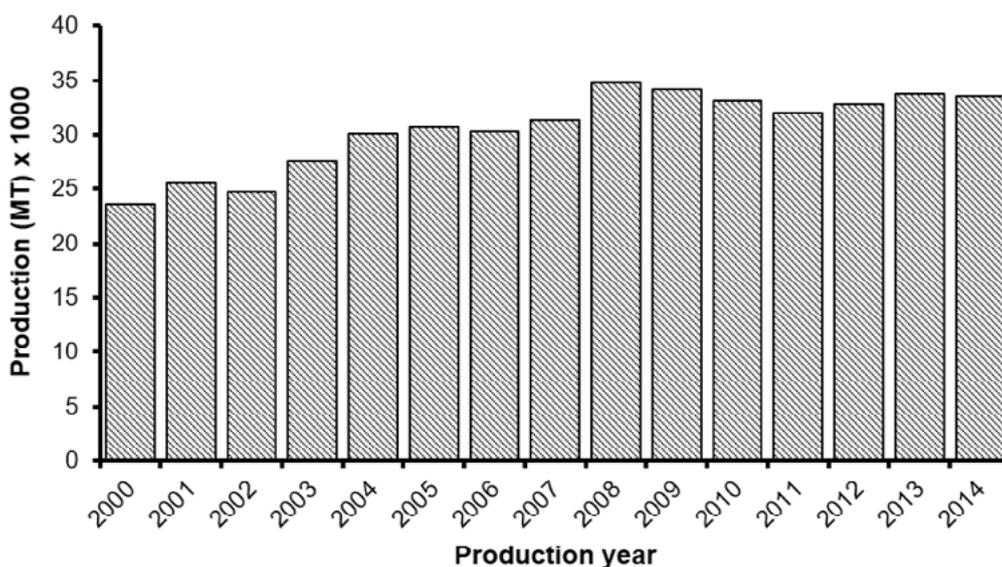


Figure 17. Tea production trends in Tanzania from 1990-2014 (FAOSTAT, 2017).

2.4.2.6. Cloves

Cloves is one of Tanzania's traditional export crop ranked fifth after tobacco, cashewnuts, coffee and tea. In 2016, cloves contributed about US\$ 46 million in export revenue (BOT, 2017). Over 80% of the cloves is grown in Zanzibar, mainly on Pemba Island (ZSTC, 2017). According to the Zanzibar State Trade Corporation (ZSTC) over 5,000 MT of cloves were produced in 2016 (ZSTC, 2017). Tanzania is the third largest producer of cloves at global level after Indonesia and Madagascar (FAOSTAT, 2017). Cloves have been a major foreign exchange earner in Zanzibar for the last 150 years and accounts for over 75% of the revenues of the government of Zanzibar (ZSTC, 2017). However, the production has declined significantly from 15,000 MT in 1991 to 8,000 MT in 2014 (FAOSTAT, 2017). At the same time yield have increased significantly since 2000 as shown in Figure 18.

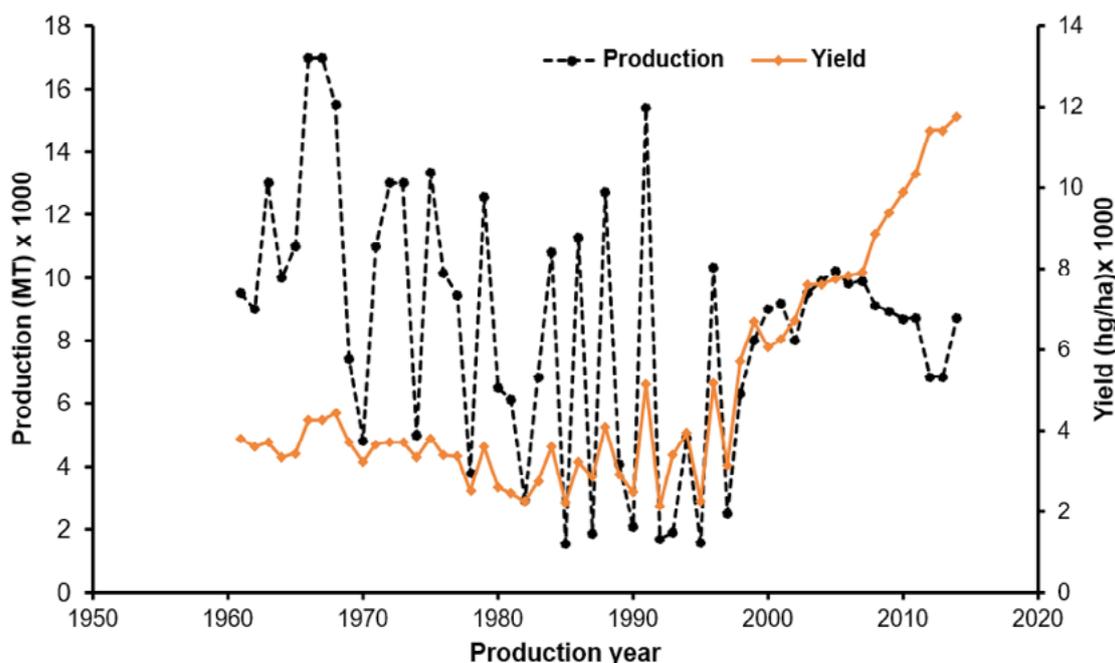


Figure 18. Cloves production trends from 1960-2014 (FAOSTAT, 2017).

2.4.2.7. Cotton

Cotton is the sixth most important cash crop in Tanzania. It is a traditional cash crop and source of livelihood to about 40% of the population (TCB, 2015). It is grown in two major areas: The Western Cotton Growing Area, including Simiyu, Shinyanga, Mwanza, Geita, Mara, Kagera and Kigoma regions, and the Eastern Cotton Growing Area comprising Morogoro, Tanga, Coast, Iringa, Kilimanjaro, Manyara and Arusha (Baffes, 2003). The Western growing area produces over 97% of the national output (USDA, 2015). Cotton is grown mainly by smallholder farmers with a small plot of land (0.5-2.0 ha) under rain-fed conditions using limited agrochemical inputs (Mwangulumba and Kalidushi, 2012; USDA, 2015). In 2014, Tanzania produced over 155,000 MT of cotton (FAOSTAT, 2017). The overall average yield of cotton is very low, about 270 kg of cotton lint per hectare compared to 440 kg per hectare in Benin (TCB, 2017; FAOSTAT, 2017). Over 80% of the cotton is exported and the biggest importers are India, China, Bangladesh, and Thailand. Others include Malaysia, Indonesia, Korea, Kenya and Switzerland (TCB, 2017). According to Mwangulumba and Kalidushi (2012) Tanzania produces the world's best organic cotton.

2.4.2.8. Sugarcane

Sugarcane is another important commercial crop in Tanzania. It is the main source of sugar produced both for export and domestic consumption (Tarimo and Takumura, 1998). In 2016, Tanzania produced over 294,000 MT of refined sugar (SBT, 2017). The production of sugarcane has increased significantly over the past three decades (Figure 19). However, despite production increases, it does not meet domestic demand and it is estimated that Tanzania has an annual sugar deficit of about 290,000 MT (PLAAS, 2014; SBT, 2017). Sugarcane is mainly produced in three regions, Morogoro, Kagera and Kilimanjaro (Chongela, 2015) and is grown by small-scale out-growers and by large scale farmers/estate. It is processed in four main local factories: Kilombero Sugar Company Ltd (Kilimbero I & II), Mtibwa Sugar Estates Ltd, Kagera Sugar Ltd and Tanganyika Planting Company Ltd (SBT, 2017).

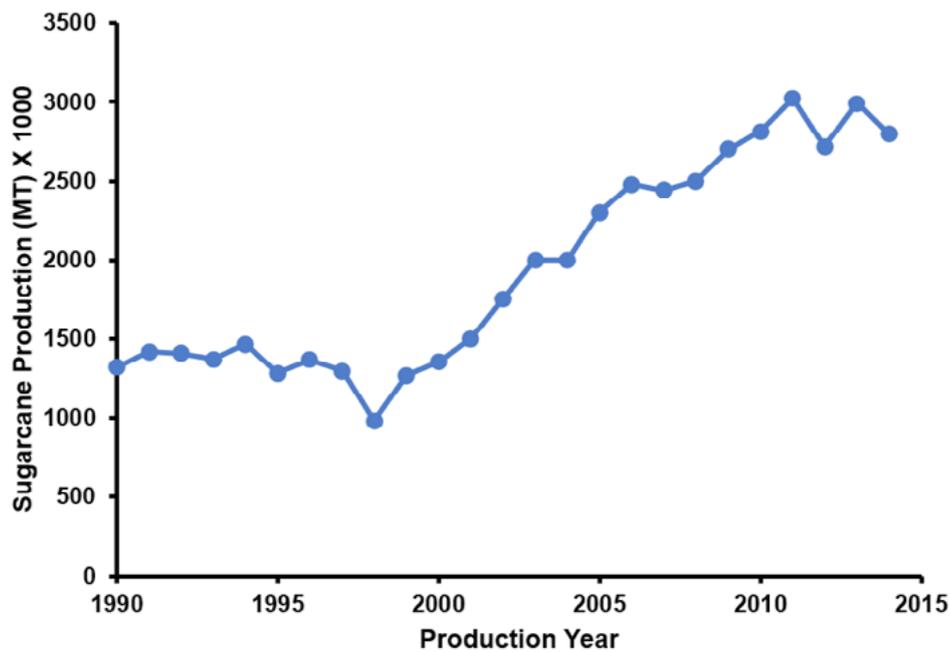


Figure 19. Sugarcane production in Tanzania from 1990-2014 (FOASTAT, 2017).

The industry provides direct employment to about 30,000 workers and indirectly to over 75,000 workers (SBT, 2017). The sugar industry also contributes a significant amount to the government revenue. According to the Bank of Tanzania report, sugar contributes about 1% to the GDP, equivalent to US\$ 30 million per year (BOT, 2017). The main challenges facing sugarcane industry in Tanzania, as outlined by the Sugar Board of Tanzania include low yields for out-growers, poor infrastructure in the fields of out-growers, high harvesting cost, postharvest losses, and market imbalances (SBT, 2017).

2.4.2.9. Edible Oilseeds

Over the last two decades Tanzania has been experiencing positive growth in the production of all major oil seeds (MRA Management Associates, 2014-) as shown in Figure 20.

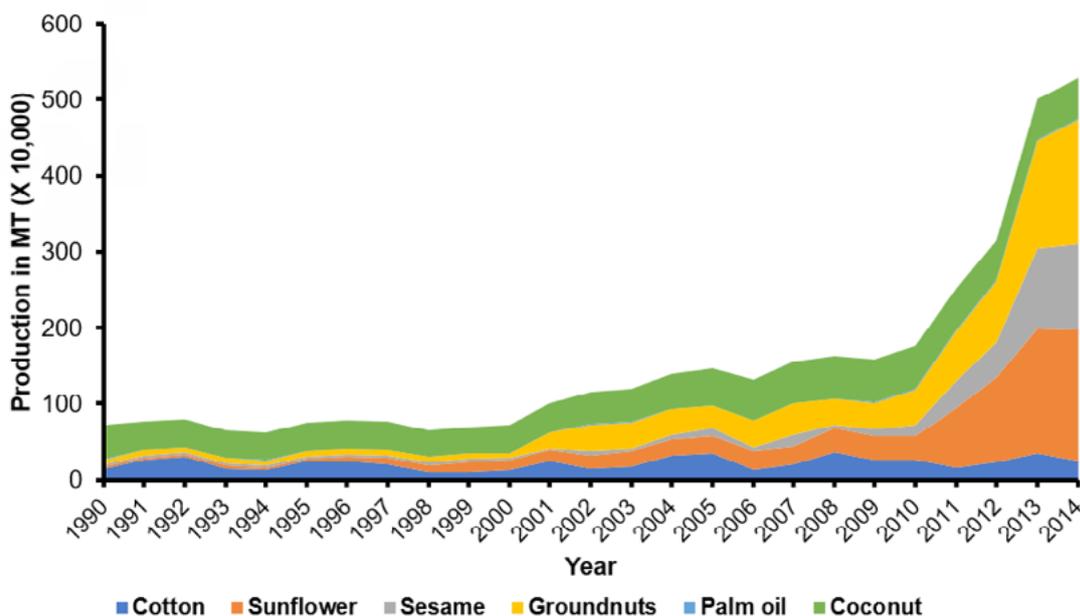


Figure 20. Production trend of major oilseeds in Tanzania from 1990-2014 (FAOSTAT, 2017).

Like other crops, oilseeds are mainly produced by smallholder farmers with small pieces of land and production is rain-fed and intercropping with main crops such as maize. The most important oil seed produced in Tanzania is sunflower. Tanzania is the leading producer of sunflower seeds in Africa and among the ten largest producers in the

world (FAOSTAT, 2017). In 2014, over 1.7 million MT of sunflower seed was produced (FAOSTAT, 2017) equivalent to about 4% of the world production (MRA Management Associates, 2014). According to Ministry of Trade, sunflower contributes about 50% of the oilseeds in the country (ITC, 2016). Over the past decade (2004-2014) the country has experienced net positive increase in sunflower production (see Figure 21) this is due to an increase in domestic demand, availability of high-quality seeds, public-private partnerships and mass promotion as an alternative crop for semi-arid areas (MRA Management Associates, 2014). Sunflower is cultivated all over the country but is mainly grown in the Central Corridor regions of Dodoma and Singida. The main constraints of sunflower and other oilseeds are similar to other crops like poor infrastructure (particularly regarding road network), high post-harvest losses due to insect infestation, low yields, low level of processing, and high cost of agricultural inputs.

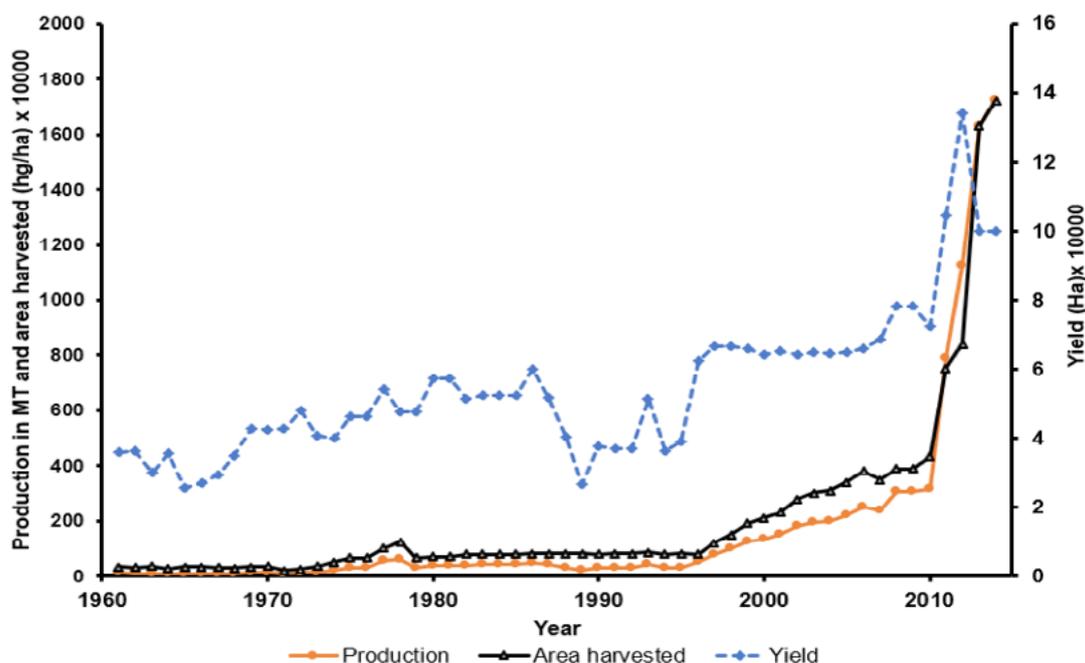


Figure 21. Sunflower seed production in Tanzania from 1960-2014 (FAOSTAT, 2017).

2.5. The Main Livestock Kept in Tanzania

Livestock farming is an important agricultural activity in Tanzania and accounts for 3.8% of the GDP of which 30% comes from the dairy sub-sector (TAMPA, 2016). According to Covarrubias et al. (2012), over half of the Tanzanian households are to some extent involved in livestock activities. Despite the several challenges the livestock production grew steadily from 3.4% in 2010 to over 5.4% in 2014 (NBS, 2016). This increase has been reported for all major livestock products. The main livestock kept in Tanzania are beef cattle, dairy cattle, goats, sheep, pigs and poultry.

2.5.1. Beef and Dairy Cattle

Tanzania has the third largest cattle population in Africa, more than 24 million heads (Figure 22) (Cook, 2015). Almost all (>99%) belongs to smallholder farmers, big dairy farms and ranches only own about 1% (Kurwijila et al., 2012). The beef and dairy cattle farming in Tanzania are categorized into two main production systems traditional/extensive and modern/intensive (NLP, 2006). The traditional production system is further sub-divided into agro-pastoral, pastoral and mixed farming systems (MMA, 2008). The farmers keep both indigenous, and cross-breeds, but indigenous breeds, like Tanzania Short Horn Zebu, are preferred because they are more resistant to disease and better adapted to the prevailing low level of feeding (MMA, 2003; Msuya, 2013). Beef production increased from 2.1 million MT in 2000 to over 3.0 million MT in 2014 (FAOSTAT, 2017). Milk also has increased from 1.92 billion litres in 2013 to over 2.1 billion litres in 2015 (TAMPA, 2016). The cattle population in the country is unevenly distributed. The regions with most cattle are Dodoma, Singida, Manyara, Arusha, Mara, Shinyanga and Mwanza (Kurwijila et al., 2012).

2.5.2. Sheep and Goats

Sheep and goats are mainly raised by low income smallholder households with average flocks of less than ten animals (Covarrubias et al., 2012). Their geographical distribution is the mirror image of beef and dairy cattle since they are often herded together (MMA, 2008). Compared to other livestock, sheep and goats are well adapted to many agro-ecological zones (TLMI, 2015). According to TLMI (2015) there are about 18 million goats and 9 million sheep in Tanzania (Figure 22). They are raised primarily for consumption on special occasions like Eid or Christmas (Kanani, 2009). The main constraints of sheep and goats include poor supply of inputs (feeding, water and drugs), insecurity (especially in pastoral communities), frequent droughts, shortage of breeding stock and poor management practices (Kanani, 2009).

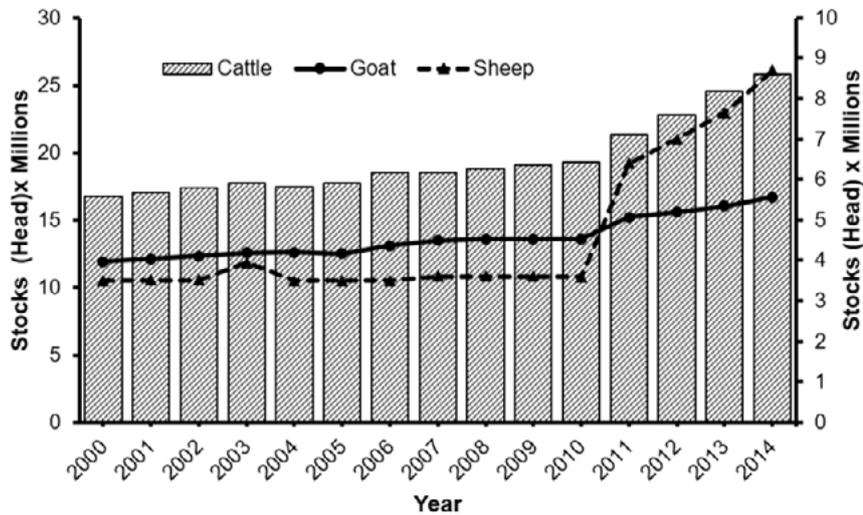


Figure 22. Cattle, Goat and Sheep Stocks in Tanzania (FAOSTAT, 2017).

2.5.3. Pigs

Pig farming is mainly carried out by small holder farmers. According to Wilson and Swai (2014) over 95% of the pigs in Tanzania are kept by small-scale producers with unit average of 3.04 animals. There are approximately over five million pigs distributed all over the country (FAOSTAT, 2017). However, the majority (over 54%) of pig farming is concentrated in the Southern Highlands (Mbeya, Iringa, Njombe, and Ruvuma) (Kimbi et al., 2015). Pigs are also reared in Morogoro, Dodoma, Kilimanjaro, and Kagera regions (Wilson and Swai, 2014). There are two major pig production systems in Tanzania namely; traditional small-scale production and modern intensive systems (Maziku et al., 2017). The traditional small-scale production systems which is a composite of small herds with an average holding of one to three per household and a litter size of 6-8 (Maziku et al., 2017). Traditional production is characterized by high mortality rate, low level of biosecurity and productivity, inbreeding, low market off takes and poor food safety (Kamaghe et al., 2014; Kimbi et al., 2015). On the other hand, modern intensive systems are characterized by improved breeds, and relatively good productivity (Lekule and Kyvsgaard, 2003). The major challenges facing pig farming in Tanzania include lack of high quality animal feeds, limited knowledge of production, diseases such as like African swine fever and others (Kamaghe et al., 2014; Petrus et al., 2011). Figure 23 shows pig production trends in Tanzania.

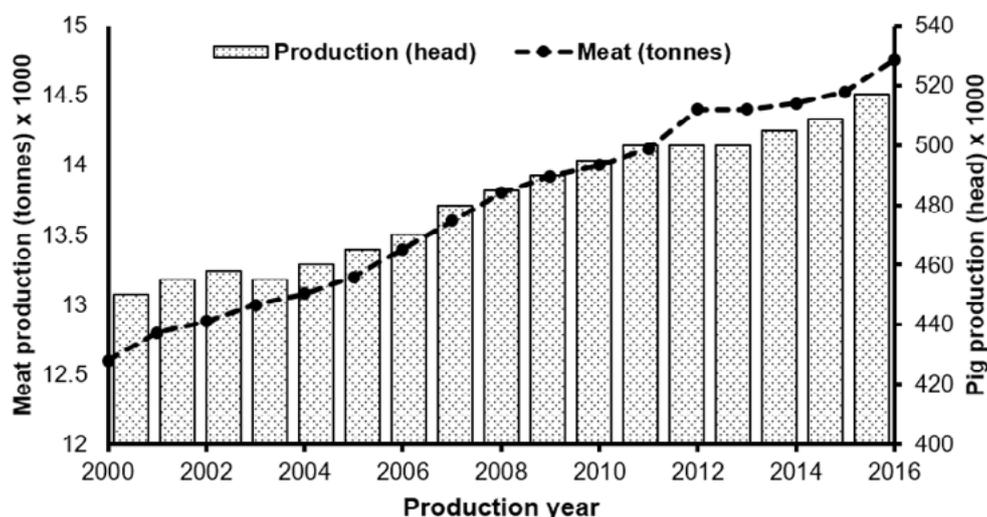


Figure 23. Pig production in Tanzania (FAOSTAT, 2017).

2.5.4. Poultry

Poultry farming in Tanzania is mainly dominated by small holder farmers. According to Rural Livelihood Development Company, over 60% of the chickens are kept by smallholder farmers (RLDC, 2014). Almost every household in the rural communities owns a few birds (The Guardian Kilimo Kwanza, 2014). By 2015, Tanzania had about 69 million chickens, of which 37 million are indigenous/local and 32 million are commercial poultry (NBS, 2016; www.sapoultry.co.za). Indigenous chicken most reared by rural households contributes about 70% of the meat and egg production in the country (Mubito et al., 2014). “Most of these rural households keep local chicken for subsistence as well as for income generation” (Kisungwe et al. 2012: 2). They are two main types of poultry farming systems, traditional and commercial (Mubito et al., 2014). Chicken farming is one of the fastest growing businesses in Tanzania due to urbanization, increasing demand for food and cheap sources of high-quality protein (Mubito et al., 2014). Poultry industry plays important role in the livelihoods both in urban and rural area. It is a source of income, and manure for rural communities (The Guardian Kilimo Kwanza, 2014). It is believed that poultry farming has potential to reduce the problem of unemployment facing youth in the country (www.sapoultry.co.za). Moreover, egg production has increased significantly over the past five years from 2.9 billion eggs in 2010 to over 4 billion in 2015 (NBS, 2016). The main challenges facing poultry industry in Tanzania include poor nutrition and husbandry management, low productivity per producer, lack of organisation among producers and high mortality rate due to diseases, predators and theft (Kisungwe et al., 2012).

3. The constraints affecting agriculture along the value chain in Tanzania

Agriculture has failed to become an engine of growth, economic transformation and poverty reduction in Tanzania and most SSA countries. These are due to many constraints affecting smallholder farmers along the agricultural value chain. The most important constraints include production constraints, lack of access to input and output markets, systemic constraints, policy-related and institutional constraints. To these can be added the effects of climate change and related food security challenges.

3.1. Production Constraints Facing Smallholder Farmers

The production constraints include land tenure, and management, access to input and output markets, agricultural extension and innovation, as well as access to agricultural credit.

3.1.2. Land availability, tenure and management

One of the major obstacles facing smallholder farmers in SSA, including Tanzania, is the lack of fertile land for agricultural expansion (Wonder, 2014). Land is the most important agricultural resource for these farmers, playing a key role in agricultural and livestock productivity, as well as for poverty alleviation (Baloyi, 2010). According to Rakotoarisoa et al. (2012), cited by Wonder (2014), the high population increase in SSA has significantly affected land access for smallholder farmers as the smaller pieces of land are subdivided upon inheritance (Djurfeldt and Jirstrom, 2013). This has resulted in a fragmented production system and low productivity (Salami et al., 2010). A study conducted by Jayne et al. (2002), showed that farm sizes of smallholder farmers in many African countries declined at a fast rate and contributed to increasing poverty in rural areas. Furthermore, according to Jayne et al. (2002:6) “... inequality in land distribution has been found to have a strong inverse relationship with economic growth and poverty reduction strategy.” Recent data from the World Bank shows that the ratio of arable land per person in Tanzania has decreased significantly from 0.50 ha/person in 1960's to about 0.25 ha/person in 2015 (World Bank, 2017). The same trends have been reported in Kenya and Uganda (Wonder, 2014). In addition, the difficulties to gain access to land to provide adequate livelihoods is, according to Mayers and Niang (2017), also one important factor forcing young rural Africans to migrate to urban areas and abroad to seek a better future.

Moreover, the uncertainties regarding land tenure (“Land tenure is a set of rules that determine how land is used, possessed, leveraged, sold, or in other ways disposed of within the societies. These rules may be established by the state or by customs, and rights may accrue to individuals, families, communities, or organizations”, Laiser, 2016:1) and management has long been a thorny issue in Tanzania. Land tenure in Tanzania has passed through different historical milestones. The latest land tenure regulations include Tanzania's 1995 Land Policy, and Tanzania's 1999 Land Act and Village Land Act (Laiser, 2016). Regardless of past and current regulations on land tenure smallholder farmers are seen to be victims of endless conflicts over land (Laiser, 2016). These conflicts have been among smallholder producers themselves (like smallholder farmers and pastoralists), or between smallholder farmers and large-scale investors (Laiser, 2016). The conflict between smallholder farmers and livestock keepers are on an increase in Tanzania due to increasing population pressure and decreasing in natural resources like water, land and

pastures (Mwamfupe, 2015). According to Simbarashe (2012) the conflicts over land use between smallholder farmers and livestock keepers are mainly contributed by a land tenure dispute between customary and granted land rights. In addition, cited by Mwamfupe (2015: 2) that "... the land policy has some deficiencies because it does not guarantee security of tenure to some users, especially smallholder groups". This leads to large areas of land being allocated to multinational companies and larger investors leaving small-scale producers landless (Chachage, 2010).

3.1.3. Access to Input and Output Market

Access to input and output markets for agricultural produce remains a major challenge for millions of smallholder farmers in SSA (AGRA, 2014). This has been identified by many researchers (see, e.g. Ahmed et al., 2016; Loeper et al., 2016) as a key constraining factor facing this group of farmers in developing countries and as being a major cause of the high levels of poverty in the rural areas in SSA (Reardon and Timmer, 2007). Access to markets is an important component along the value chain for smallholder farmers to improve their livelihoods (Cai et al., 2012). According to Salami et al. (2010), access to input and output markets are a key condition for the transformation of the agricultural sector in developing countries from subsistence to commercial production. Moreover, due to limited access to market many smallholder farmers receiving low prices by selling their agricultural products informally. Normally at farm gate, by the roadside sales or at village and rural local markets (Ferris et al., 2014), very few afford to send their produces to district or region markets (Petro, 2015). This is due to poor infrastructure, and too many hidden costs. For instance, the studies conducted by Mbise et al. (2011) and Maziku et al. (2015) on marketing of beans and maize respectively produced by smallholder farmers in Tanzania, found many smallholders find difficult to participate in formal markets due to several transaction costs that are incurred when marketing their crops. These somehow acts as barriers and denies farmers' access to different market opportunities (Petro, 2015).

According to Bwalya et al. (2013) high transaction costs exclude many poor resource farmers to sell their products at official market channels. Likewise, high transaction costs associated with extension service, agricultural inputs (like fertilizers and improved seeds) and credit inhibit buyers from engaging smallholder farmers and impede the effective functioning of output markets (Fowler, 2015). In addition, physical access to market is another major constraint for smallholder in Tanzania. Most roads in the rural areas where most of the farmers are situated are impassable at certain times of the year. This undermines the ability of smallholder farmers to sell their produce and buy their agricultural inputs (IFAD, 2003a). It results high transportation cost and restricts opportunities for farmers to increase their income.

Moreover, other governmental policies like sudden export tariffs/bans inhibit smallholder ability to output markets. For instance, since 1980's Tanzanian government has imposed maize exportation bans more than five times (Makombe and Kropp, 2016). These bans create market uncertainty and have detrimental impacts on smallholder farmers' income by hindering their access to higher prices in international markets (Makombe and Kropp, 2016). According to (Kagira, 2011 and Diao et al., 2013), although maize export bans ensure the domestic food supply. However, reduce farmers' maize prices by 7 to over 30%, which result into decrease in farmers' income, which lead to reduced investment in maize production sector. Thus, market improvement will improve livelihoods of smallholder farmers and reduce poverty (Cai et al., 2012).

3.1.4. Agricultural Extension and Innovation

The recent data from SSA show a gradual decline in access to public sector extension services (Ferris et al., 2014). It is reported from many developing countries that agricultural extension officers visit smallholder farmers only once a year (Ortmann and King, 2007). This is, due to the limited number of extension officers in relation to their large number of clients (1:1500) (Loeper et al., 2016), which makes it hard to implement changes in agriculture and remains a major bottleneck to the agricultural development in developing countries (Kavoi et al. 2014). International organisations such as the World Bank and FAO have acknowledged that, in many developing countries investment in agricultural extension and innovation has declined significantly due to lack of resources and funds from donor countries (Prior, 2014). Oladele and Wakatsuki (2005) pointed out that efforts to increase agricultural productivity in SSA is limited by insufficient extension staff and continued use of outdated and ineffective technologies.

Smallholder farmers in SSA are often said to be poor adopters of new methods and technologies. This may partly be explained by the poor performance of extension services, which tend to develop ideas and policies with too little attention to the needs of smallholder farmers, and lack of access to relevant technologies (Zhou, 2010). At the same time, Gatzweiler and von Braun (2016) point out that enhancing agricultural productivity by means of improving input supplies such as improved seeds, fertilizer and pesticides, is one among the best ways to support adoption and innovation among smallholder farmers and the key to increasing farm productivity (Iheke and Nwaru, 2013).

Furthermore, smallholder farmers in Tanzania have limited access to extension services. According to ASDP (2005)

and Rukonge et al. (2008) about 60-75% of the smallholder farmers in Tanzania, do not have access to extension services. Like other SSA countries, the agricultural extension system in Tanzania face many obstacles including poor institutional, bureaucratic organizational structure, and communication problem (Mattee, 1994). Moreover, most of the extension agents are civil servants who tend to pay more attention to the paper works like filling forms and preparing reports than to the immediate needs of the farmers (Mattee, 1994; Daniel et al., 2013). Likewise, the communication linkage between agricultural stakeholders in Tanzania is by top-down where passing of information is through extension agents excluding smallholder farmers (Nyamba, 2012 and Philip, 2014). In addition, information from the farmers /field has to pass through several levels before reaching decision makers. This problem of poor communication is exacerbated by lack of extension workers. The current average ratio of extension worker to farmer in Tanzania is 1 : 2,000 (Hella, 2013). Also, geographic location of the country, poor working conditions, lack of transport and poor infrastructure, which make it difficult for extension agents to visit each village (Mattee, 1994). In addition, lack of training for extension workers is another problem. According to Philp (2014) under-trained extension personnel meet many challenges in responding to farmers' questions, during farm and office visits.

However, the new reform to re-structure and decentralized duties of extension service to local government will give more power and flexibility for extension workers to plan and implement different programs with little interruption from central government (Wataye, 2016). The central government will remain only with the task of policy formulation, providing funds and monitoring the implementation of different projects (Wataye, 2016). This reform will help many farmers to access different services provided by agricultural extension officers and other agricultural inputs like credits and fertilizer. The most beneficiaries of this change are the farmers who actually mostly reside in rural areas.

3.1.5. Access to Agricultural Credit

In Tanzania other developing countries, lack of access to agricultural credit for smallholder farmers has been an obstacle to agricultural development for several decades (Manganhele, 2010). It has been argued by many scholars (see, e.g. Manganhele, 2010; IFC, 2014; Hong and Hanson, 2016), that access to credit for smallholder farmers is essential to pave way for long term sustainable gains in farmer productivity and incomes, and thus reduce hunger and poverty in rural areas. For instance, in Tanzania in 2010-2011, only 2.2% of the smallholder farmers received credit for the purchase of agricultural inputs (WFP, 2013). Generally, there is lack of credit support for rural investments and marketing of crops (Mutalemwa, 2013). According to (Mmari, 2012; Manganhele, 2010; 2014; Hong and Hanson, 2016) lack of credit prevent smallholder farmers from acquiring modern inputs, e.g. better seeds, chemical inputs and labour-saving technologies, which affects both the yield and the quality of their output. Access to agricultural credit is a key to unlock farmers' potential, to increase productivity, income and reduce poverty in rural population (Auma and Mensah, 2014).

Furthermore, Tanzanian smallholder farmers have limited to access agricultural credit to facilitate acquisition of agricultural inputs such as improved seeds, agro-chemicals and modern agricultural technologies (Elias, 2015). In Tanzania, very few banks (Tanzania Agriculture Development Bank, the Tanzania Postal Bank, The Tanzania National Microfinance Bank, Access Bank and Twiga Bancorp) offer financial support (loan) to smallholder farmers to facilitate agriculture activities (Elias, 2015; Mirando, 2016). According to Nawai and Shariff (2010) many smallholder farmers in developing countries excluded from credit facilities due to insufficient collateral to support their loans, high transaction and monitoring costs. Likewise, many banks in Tanzania consider agriculture as a high-risk venture and will not lend to smallholder farmers because most of them depends on rainfall, have low experience on credit management, and little security to guarantee the loans (Mutatina, 2008).

Further, to overcome this problem in 2000 the government of Tanzania formulated the National Microfinance Policy-NMP 2000 (NMP, 2017). With the aim of enabling the private financial sector to grow and provides micro loans to micro/small business, contributes to economic growth and poverty reduction (Kapwani, 2014). Over the past 15 years, Tanzania has experienced tremendous growth of microfinance institutions like SACCOs (Savings and Credit Cooperative Societies) and VICOBA (Village Community Bank, Kipesha 2013; NMP, 2017). The country is estimated to have over 5000 microfinance institutions, with over 700,000 members (Girabi and Mwakaje, 2014). According to IFAD (2003) cited by Girabi and Mwakaje (2014: 228), "It is believed that microfinance will enable smallholder farmers to easily access to credit facilities without collateral". However, there is huge public concern on the effectiveness of microfinance institutions in the country on poverty reduction and lend to smallholder farmers. Because most of the microfinance institutions are concentrated in the urban areas, charge high interest rate, unfair provisions in loan agreements, reckless lending and unfair loan collection and recovery procedures (NMP, 2017).

3.2. Systemic Constraints and Upgrading Opportunities

3.2.1. Business Enabling Environment

Lack of an enabling business environment (BEE) is another important factor limiting development and competitiveness of smallholder farmers in the product value chain (McKague and Siddiquee, 2014). This refers to the business-friendly conditions that must be in place for proper development of smallholder agriculture, including, government policies, land-use policies, import and export tariffs, labour laws and others (McKague and Siddiquee, 2014).

3.2.2. Vertical and Horizontal Linkages and Product Value Chain

One of the biggest obstacles of smallholder farmers in Tanzania is the lack of vertical and horizontal links across the product value chain. Vertical linkage is described as the connection of farmers to various levels of the value chain, from agricultural input, processors, exporters to the local traders (Dunn et al., 2014). Vertical linkages reflect the quality of relationships that brings the product up and down the value chain (Dunn et al., 2014), while horizontal linkage is the connection within the level or at the same level of the value chain. For instance, the connection between farmers and exporter associations (Dunn et al., 2014). The key role of the horizontal linkages at the farmer level includes product aggregation to reduce transaction costs, increases in economies of scale, sharing of skills and resources, and better access to information (Dunn et al., 2014; Herrmann et al., 2015). According to Bai et al. (2009) the vertical and horizontal linkages between and within levels are critical for the development of smallholder farmers and lack of them is an obstacle to change.

3.3. Climate Change and Related Food Security Challenges

Climate change is a huge burden for millions of smallholder's farmers across the globe. It is believed to be the major cause of weather variability, reduction in agricultural productivity, and postharvest losses in many parts of the world (Salami et al., 2010). According to Egal (2015), climate change has direct links to food security and undermines current efforts to address undernutrition and poverty in developing countries. Climate change has increased the frequency and severity of extreme events such as droughts and floods in SSA (Salami et al., 2010), resulting in land degradation, soil erosion, crop failures, and loss of livestock (BMGF, 2013).

Moreover, "agriculture is the most important sector in SSA and is set to be hit the hardest by climate change" (Komba and Muchapondwa, 2015:1). Since, agriculture is the backbone of Tanzanian economy and the majority of smallholder farmers depend on agriculture for their livelihood, thus climate change will have a significant effect on food security in the country. It is estimated that economic losses from climate change impacts on agriculture in Tanzania is around US\$200 million every year (CSA, Climate-Smart Agriculture, 2015). The adaptation seems to be the most efficient way for smallholder farmers to counteract the impacts of climate change. These include the use of improved crop varieties, shifts in crop production areas, planting drought and disease-resistant crops, application of fertilizer, changing planting dates, mulching and irrigation (Komba and Muchapondwa, 2015; Nsemwa, 2015).

4. Crosscutting issues

The most important crosscutting issues regarding smallholder farmers in Tanzania are: (i) gender disparities (ii) urbanization and (iii) HIV/AIDS.

4.1. Gender Disparities

Women and youth make up the major part of the workforce in rural areas. According to Actionaid (2011) women smallholders comprise about 43% of the agricultural labor force of developing countries. For Tanzania, women form 75% of the agriculture labor force (AGRA, 2017). In Tanzania, children and youth under 25, represent about 64% of the total population (UNICEF, 2012). Generally, smallholder farmers in developing countries face many obstacles. However, women and youth smallholders face extra hurdles beyond those of their male colleagues. According to Ndwiga (2011) women and youth farmers in developing have less access to information, new technology, land, extension services, inputs and credit, and are also often excluded from decision-making. Furthermore, rural women and youth in developing countries rarely receive attention and tend to be invisible to policy makers deciding on agricultural policies, programs and budget allocations (Actionaid, 2011). For instance, "women own only 1% of the land in Africa; receive only 7% of extension services and 1% of all agricultural credit" (Actionaid, 2011: 3).

According to SOFA Team and Doss (2011) and Osori et al. (2014) underperformance of the agriculture sector in Tanzania is partially due to the existing gender inequalities in access to resources, including education and training,

land and decision-making powers. The study conducted by Osori et al. (2014) found the majority (over 48%) of the women and youth in Tanzania Mainland are employed in the agricultural sector, however self-employed women and youth earn significantly less than men. In their paper, Oduol and Mithöfer (2014) found that market failure is a common problem for most smallholder farmers, but the effects of market failure for smallholder women farmers are particularly high because they have more difficulties to entry the modern market chains.

4.2. Urbanization

The growth of the urban population in Tanzania has slowed down from 3.3% per year in 1978 to about 2.7% in 2012 (Wenban-Smith, 2014). The same trend has been observed by Andersson Djurfeldt (2015) in other countries. Nevertheless, urbanization is still considered as a big threat for food security in developing countries, as most of the food is produced by smallholder farmers (FAO, 2011). A large part of young people in developing countries, sees agriculture as un-attractive area to work in, with few future opportunities (FAO, 2014b). This makes many of them migrate to urban areas, in search for formal and informal jobs (Jayne et al., 2006). This results in decrease in labor force as well as agricultural productivity (FAO, 2014b). It is projected by the World Bank that in 2050, over 70% of the world’s population will be living in urban areas (ECOSOC, 2014). For instance, in Tanzania, “by mid-century, the country’s urban population is projected to quintuple, rising from less than 15 million people in 2012 to over 60 million people” (Worrall et al., 2016: 5). This will have significant impact on food security and agricultural production in Tanzania (Jayne et al., 2006).

4.3. HIV/AIDS

The HIV/AIDS pandemic is one of the many challenges facing rural communities in SSA. In 2016, approximately 1.4 million of people in Tanzania were living with the HIV virus (UNAIDS, 2017). The most affected households are those in rural areas which depend heavily on agriculture for their livelihood (Parker et al., 2009). However, up-scaling the access to anti-retroviral drugs (ARVs) have helped to limit the impact of HIV/AIDS in Tanzania (Figure 24) (Avert, 2017). According to the UNAIDS (2017), the number of new infections declined by more than 20% between 2010 and 2015.

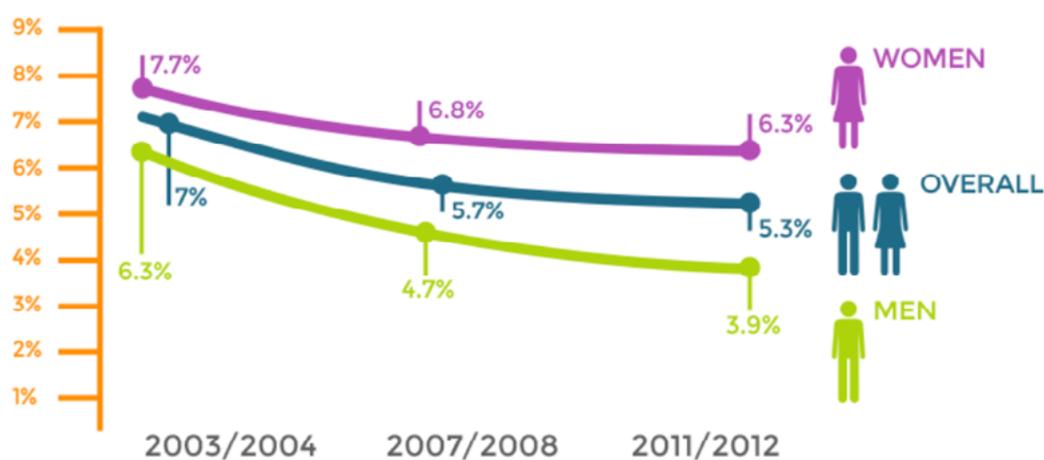


Figure 24. HIV prevalence among adult in Tanzania (Avert, 2017). Prevalence is affected by both fall in new infections and the death of infected persons.

However, despite all these efforts, HIV/AIDS and related illnesses have continued to exert a negative impact on smallholder farmers and agriculture (Russell et al., 2007). According to United Nations Department of Economic and Social Affairs/Population Division (No date), most of the population, most affected by HIV/AIDS in developing countries lives in rural areas. Agriculture in the rural areas provides a livelihood for over 70% of the population. “Hence, it is to be expected that the HIV/AIDS epidemic will cause serious damage to the agriculture sector in those countries, especially in countries that rely heavily on manpower for production”. Likewise, mentioned by Kormawa (2006:3) that “HIV/AIDS affects the most active and productive segment of the rural society, thereby threatening agricultural productivity and food security”. Moreover, the reductions in household labor and resources can be expected to lead to reductions in agricultural cultivation and output (Gillespie and Kadiyala, 2005). According to Parker et al. (2009), the death of an adult male head of household is particularly associated with declines in agricultural output. For instance, the household survey conducted by Zimbabwe farmer’s union in 1997 found that agricultural out decrease nearly 50% of the household affected by AIDS and overall maize production in Zimbabwe was decreased to about 61% due to the effect of HIV/AIDS (Jayne et al., 2010). However, according to Jayne et al. (2005; 2010) the demographic effects of

the HIV/AIDS epidemic is temporary and much smaller than predicted, because even the most affected countries (like Swaziland and Botswana) will have a stable number of working age adults over time.

5. The way forward for smallholder agriculture in Tanzania

5.1. Enabling smallholder farmers to benefit from high-value agricultural markets (HVA)

The participation of smallholder farmers in HVA is essential for economic development and poverty reduction (Henson et al., 2008). The HVA will offer lucrative opportunities for increased income, employment, better access to credit, quality inputs, technical support, information and technology (Birthal et al., 2007). The high-value segment of agriculture like dairy and meat products, fruits and vegetables, spices, herbs, and flowers offer considerable opportunities to smallholder farmers into increased their income and improve their livelihood (Birthal et al., 2007). According to Zossa and Pletzige (2007) HVA products, especially horticultural products are the fastest growing components of international agricultural trade. However, a common problem encountered by many smallholder farmers entering HVA market chains is that their products often do not comply with the prevailing technical standards (local and international) (Davis, 2006). Thus, a technical support service and enhancement of capacity for all players along the chain is essential to help make and keep products marketable (Davis, 2006). It is also important to support research about access to HVA markets through the development of improved and new products. In addition, a "... supportive public policy environment is essential to support the establishment of appropriate legal, regulatory and food control framework, land tenure, credit, and water use systems." (Davis, 2006: 16).

Further, in Tanzania production of HVA is dominated by smallholder farmers with less than 2 hectares (MMA, 2017). According to Mutayoba and Ngaruko (2015) that the growing of HVA crops will contribute to a significant reduction of poverty, increase incomes and improve livelihood of the smallholder farmers in Tanzania. In 2015, HVA contributed about 38% of the foreign income earned from the agriculture sector (MMA, 2017). In the last decade the export value of HVA increased eight times from US \$64 million in 2005 to over US\$ 545 million in 2015 (MMA, 2017).

5.2. Marketing strategies that can improve market access and competitiveness for smallholder farmers

Most smallholder farmers in Tanzania and other developing countries operate as individuals. They have a poor understanding and limited experience of market negotiation, little access to market information, and lack the capacity to compete on the regional and international markets or perform satisfactorily on existing ones (Kawa and Kaitira, 2007). Ultimately, their lack of market knowledge tends to make them passive, rather than active players in the market (IFAD, 2003b). Opening markets for this group of farmers is crucial for economic development and poverty reduction (Obi et al., 2011). Moreover, improving market access means to increase the access to necessary farm inputs and farm services, as well as the ability to deliver farm products to buyers (van Tilburg and van Schalkwyk, 2012).

A competitiveness strategy is a plan for moving smallholder farmers to become more sustainable and productive (Lapar et al., 2012). It represents a vision for how producers might collaborate to achieve growth, rather than seeing one another simply as competitors (Lapar et al., 2012). According to Webber and Labatse (2010) cited by (Mmari, 2012) the competitiveness of African agriculture can be strengthened through both horizontal and vertical coordination that allows farmers to benefit from economies of scale in various activities within chain nodes. In addition, Mitchell et al. (2009) view horizontal coordination as a pre-requisite stage in process, function, and product upgrading in value chains. Improving competitiveness would push smallholder farmers to innovate and find ways to increase their productive capacity.

5.3. Contract Farming

Prowse (2007) describes contract farming as a system where a private sector firm provides smallholder farmers with inputs such as credit, seed, fertilizer, pesticides and technical assistance during the growing season in exchange for exclusive purchasing rights for the resulting crop. Contract farming can serve as an instrument to transfer technology, to open up new markets, including export markets, of non-traditional export products, reduce farmer's price risk, and introduce value-added production activities (Woodend, 2003). Moreover, contract farming has the potential to link farmers to markets, give them access to credit and inputs, and to stimulate agricultural production (Oluoch-Kosura, 2010). However, many smallholder farmers in Africa views contract farming as a means of exploiting smallholder farmers by larger scale farmers (Guo et al., 2005). Likewise, the study conducted by the Bank of Tanzania in 2016 identifies the many challenges of contract farming include, low competition due to the limited number of buying companies leads to low price; inadequate contract negotiation skills, poor transport infrastructure in the areas surrounding the schemes which increases the cost of production and lack of legislation governing implementation of contract farming (Nsimbila et al., 2015 and BOT, 2016).

Furthermore, contract farming in Tanzania has been practiced since the colonial era, however, officially was introduced by the Government of Tanzania in 2010 (MMA, 2006). The implementation of contract farming started in 2012 and cover almost all traditional cash crops, including cotton, tobacco, sisal, tea, coffee, sugarcane and sunflower (BOT, 2016). According to Henningsen et al. (2015) the interest in contract farming is growing in Tanzania because of the failure of many farmers' cooperatives. In general, mixed results on the impact of contract farming on agricultural development and smallholder farmers in Tanzania has been reported. Some study shows positive effects of contract farming on farm size and productivity. For instance, tobacco, and sisal farmers reported an income increase and better access to health services (BOT, 2016). On the other hand, growers of sugarcane and cotton experienced record decline in income since joining contract farming (BOT, 2016). Also, many smallholder farmers reported the that market for their produces is no longer a problem, but the markets are still characterized by low prices and payment delays (BOT, 2016).

6. Conclusion

This study reviewed published literature on local and regional variations on agricultural conditions and food security for smallholder farmers in Tanzania. It focuses on two key research questions: what is the distribution of key crops grown and livestock kept in Tanzania and what are the constraints affecting agriculture along the value chain? Agriculture is the backbone of the Tanzanian economy and the main source of food for the population as well as the largest contributor to the GDP. The sector is dominated by smallholder farmers who occupy large portions of the land and produce most of the crops and livestock products. Smallholder farmers thus play a vital role in agricultural production and food security. The main crops produced in Tanzania are maize, rice, sorghum, millet, cassava, tobacco, cashew nuts, coffee, tea, sisal, sugarcane, oilseeds and cloves. The overall production of food and cash crops often varies considerably from year to year due to weather variability. The most important livestock kept in Tanzania are beef and dairy cattle, sheep and goat, pigs and poultry. The principal production constraints of smallholder farmers in Tanzania are land tenure and land management, access to resources and support services, access to input and output markets, agricultural extension and innovation, access agricultural credit and climate change. Other constrains that hider smallholder farmers in Tanzania include excluding women and youth in policy making, urbanization and HIV/AIDS. Strategies and policies, such as improving market access and competitiveness, enabling smallholder farmers to benefit from high-value agricultural markets as well as the strengthening contract farming, could contribute to solutions to the problems encountered by smallholder farmers along the product value chain in Tanzania and other developing countries.

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List of acronyms

AEZ	Agro-ecological zones
BOT	The Bank of Tanzania
CBT	Cashew-nut Board of Tanzania
FAOSTAT	Food and Agriculture Organization of the United Nation Statistics
FOA	Food and Agricultural Organization of the United Nation
GDP	Gross Domestic Product
GIEWS	Global Information and Early Warning System
GHI	Global Hunger Index
HIV/AIDS	Human Immunodeficiency virus/ acquired immunodeficiency syndrome
HLPE	The High-Level Panel of Experts on Food Security and Nutrition
IFAD	International Fund for Agricultural Development and Swedish
IFPRI	International Food Policy Research Institute
IMF	International Monetary Funds
MALF	Ministry of Agriculture, Livestock and Fisheries
MDGs	Millennium Development Goals
MKUKUTA	Mkakati wa Kukuza Uchumi na Kupunguza Umaskini Tanzania
MT	Metric tons
NBS	National Bureau of Statistics
SIDA	International Development Cooperation Agency
SSA	Sub-Saharan Africa
USAID	The United States Agency for International Development
UNICEF	The United Nations Children's Fund
WB	World Bank
WFP	World Food Program
ZSTC	Zanzibar State Trade Corporation
TCB	Tanzania Cotton Board
TAMPA	Tanzania Milk Processors Association
TBT	Tea Board of Tanzania
TTB	Tanzania Tobacco Baord
SBT	The Sugar Board of Tanzania