



Maize

Key Messages:

- *Ad hoc trade and market interventions make maize markets risky while increased transparency and predictability will support the development of a more commercial and profitable maize value chain in Tanzania.*
- *The NFRA operations should be reviewed and improved since existing interventions bring only minimal benefits to farmers in terms of price support but carry large financial implications.*
- *To increase productivity, the Government should explore ways to reduce the market price of fertilizer and promote the adoption of integrated soil fertility management practices by smallholder farmers.*

1. Introduction

Tanzania is among the major maize producers in Sub-Saharan Africa, with the second largest area planted with maize after Nigeria. Most maize (about 85%) is produced by small-scale farmers (Wilson and Lewis, 2015). Approximately 30% of maize-growing households are headed by women who contribute to about 70% of the total labour input in maize production (DTMA 2014). It is both a food and a cash crop, generating close to 50% of rural cash income, an average of USD 100 per maize producing household (USAID, 2010).

2. Maize Value Chain

The maize value chain in Tanzania is presented in Table 1 and Figure 1.

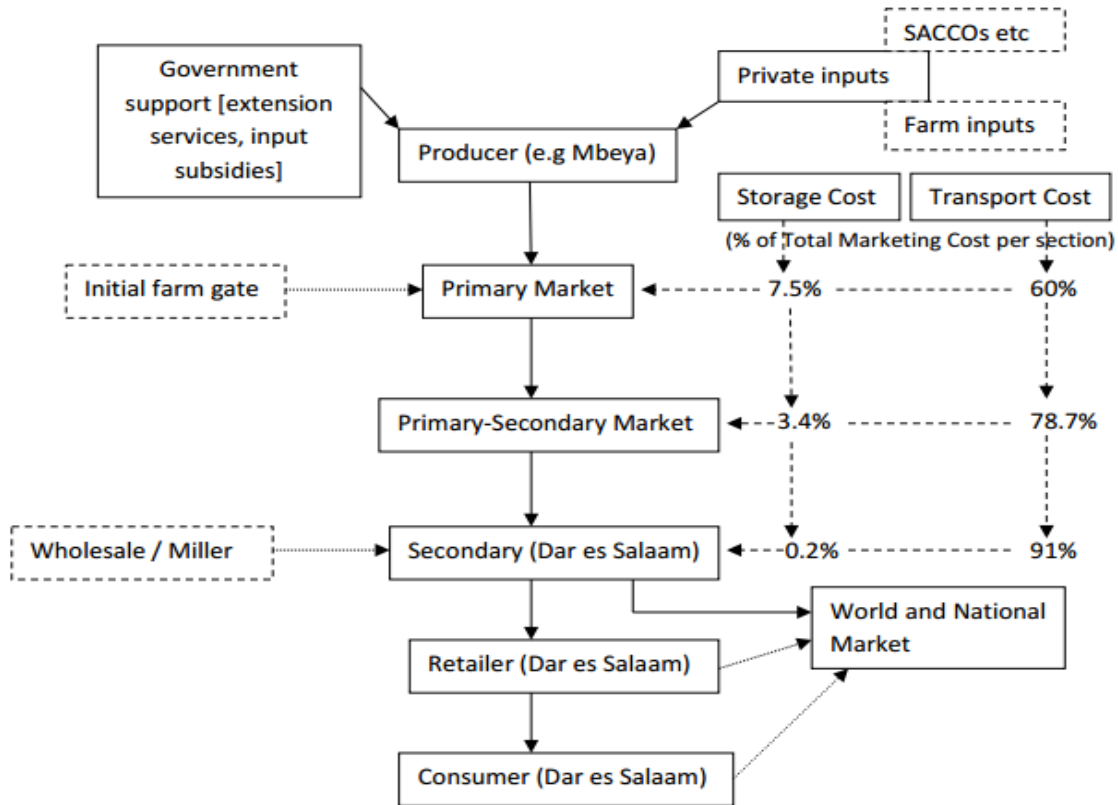
Table 1. Actors in the maize value chain in Tanzania

Category	Example of actors
Input providers	Seed companies, research institutes
Farmers	Small, medium and large scale farmers
Storage (post-harvest)	National Food Reserve Agency (NFRA) -- this is also a market outlet, grain silo makers, commercial warehouse
Distribution and marketing agents	Small assemblers /primary traders, middle men and women, secondary traders, wholesale traders, grain retailers, grain export-import traders, processed product retailers (including shops and supermarkets)
Processors	Small millers, large commercial millers, food processors, animal feed millers
Consumers	Households, schools, hospitals, armed forces and prisons.
Government agencies/ policy makers and regulators	Government extension workers, cess collectors, government leaders, Ministry of Agriculture, Tanzania Bureau of Standards
Regional bodies	Eastern Africa Grain Council (EAGC)—is a regional organization for the grain value chain stakeholders whose members are farmers, traders, millers and service providers such as banks, warehouse operators and input suppliers from the East African Community (EAC) and the World Food Program (WFP) which in fact for some recent years it has become the largest maize trader in the region.



Source: compiled by authors based on: Barreiro-Hurle, 2012; Wilson and Lewis, 2015

Figure 1. A simplified value chain for maize in Tanzania



Source: Barreiro-Hurle, 2012

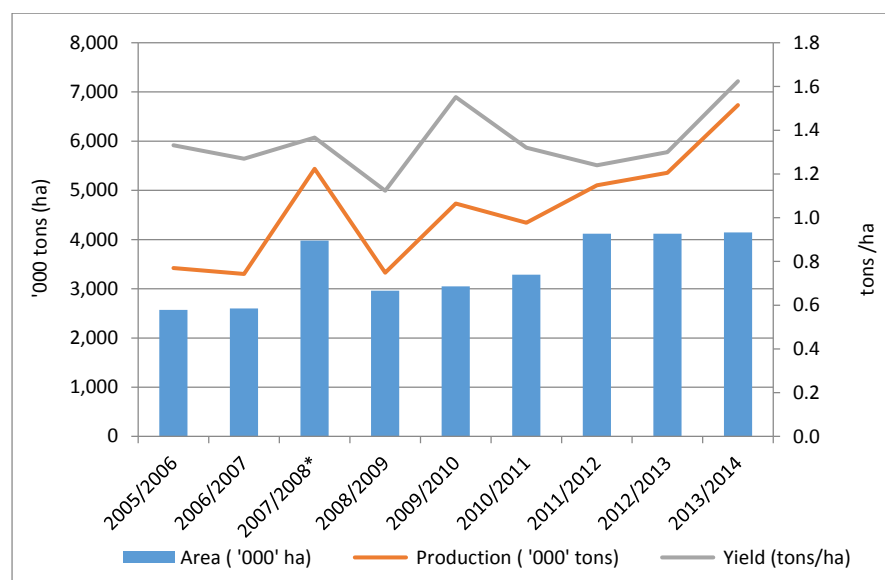
2.1 Production, Productivity and Farming System

As shown in Figure 2, maize production steadily increased from 2008/09 to 2013/14 when total production volumes doubled. This is largely attributable to the National Agricultural Inputs Voucher System (NAIVS) that primarily targeted maize and rice production through subsidized seed and fertilizer (MALF, 2015). However, maize productivity in Tanzania is very low, with an average of 1.4 tons/ha over the 2005-2014 period, much less than the Sub-Saharan Africa (SSA) average of about 1.8 tons/ha (Abate et al, 2017). In fact, growth in maize production has mainly been a result of increased area under production rather than growth in productivity. According to the Food and Agriculture Organization of the United Nations (FAO), approximately 4.1 million ha of land is dedicated to maize production in Tanzania. Low productivity is a major concern given the importance of the crop to the country's food security and economic well-being (DTMA, 2014).



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Figure 2. Maize production, productivity and area under cultivation in Tanzania (2005-2014)



Source: MAFC, 2015

Maize in Tanzania is adapted to agro-ecologies ranging from near sea level to 2400 meters (m) above sea level, depending on the variety. Table 2 shows the distribution of maize in Tanzania with the major maize producing regions in the Southern Highlands (Iringa, Mbeya, Rukwa and Ruvuma) and the Lake Zone (Kagera, Mara, Mwanza and Shinyanga).

Table 2. Distribution of maize production in Tanzania

Zone	Regions	Share of total maize production (%)
Southern Highlands	Iringa, Mbeya, Rukwa and Ruvuma	26
Lake Zone	Kagera, Mara, Mwanza and Shinyanga	25
Eastern	Tanga, Pwani, Dar es Salaam and Morogoro	13
Northern	Arusha, Kilimanjaro, Manyara and Tanga	12
Western	Kigoma and Tabora	10
Southern	Lindi, Mtwara and Tunduru District of Ruvuma	8
Central	Dodoma and Singida	6
Total		100

Source: MAFC, 2015

The traditional maize production systems are often not profitable, particularly in the Central Zone and Southern Highlands (Table 3). However, under improved agricultural production practices, productivity increases and leads to very profitable returns.



Table 3. Maize Profitability across Agro-Ecological Zones in Tanzania

Zones	Farmer's Practice Type	Cost/ha '000 (TZS)	Productivity Kg/ha	TZS/Kg	Revenue/ha	Profitability
Southern Highland	Local	585	1750	250	437	-148,
	Semi-improved	927	6250	250	1562	634
	Improved	1,077	8000	250	2000	922,
Central Zone	Local	153	2,250	180	405	251
	Semi-improved	300	3,125	180	562	262
	Improved	444	6,500	180	1170	725,
Western Zone	Local	666	800	350	280	-386
	Semi-improved	1,000	3000	350	1050	50
	Improved	1,030	6000	350	2100	1,070
Northern Zone	Semi-improved	1,122	5500	350	1925	803
Lake Zone	Local	233	1500	400	600	367
	Semi-improved	514	2500	400	1000	486
	Improved	584	4500	400	1800	1,216

Source: Adapted from Farm Budgets, Agriculture Research Institute(s) 2010

Maize production and productivity are affected by frequent droughts, diseases (including the maize streak virus, maize lethal necrosis, leaf blight, leaf rust, grey leaf spot and ear rot), field and post-harvest insect pests (stalk borers, armyworms, weevils and the larger grain borer). Maize varieties tolerant or resistant to some of these challenges are already available but not adopted by many farmers. Other challenges include inadequate access to improved inputs such as fertilizers and quality seed, limited access to irrigation facilities, limited access to agricultural extension services, limited access to agricultural credit (for input supply, agricultural production as well as trade), uncertain land tenure, weak producer organizations and lack of adequate quality storage facilities which lead to high post-harvest losses.

2.2 Structure, Conduct and Performance of the Maize Market

The maize market is characterized by asymmetric information flow systems and little opportunity to benefit from economies of scale. Producers are price takers and prices are determined by domestic supply and demand. However, big maize traders such as AZAM and Mohammed Enterprises make the market less competitive. Moreover, government interventions through the National Food Reserve Agency (NFRA) and export restrictions



sometimes distort market prices. Export bans can also affect production since farmers will not invest in maize if a ban is in place (Xinshen *et al*, 2012 and Barreiro, 2012).

The key challenges facing the maize sub-sector include poor rural infrastructure; unpredictable market due to periodic bans on maize exports and release of food aid; local taxes on farm production; weak business skills of producers and traders; limited access to market information; limited capacity to adhere to quality standards; and, inadequate institutional and technical capacity for agricultural trade. In addition, maize marketing is characterized by a lack of trust and goodwill among producers, traders and processors (Wilson and Lewis, 2015). Some of these constraints are now being tackled on a sector-wide level.

2.3 Consumption

Maize is the main staple food and is consumed by the majority of households in both rural and urban areas, contributing to between 24% and 41% of total calories consumed (Cochrane and D'Souza, 2015). The amount of maize consumed in the country has been increasing steadily in the past decade, mainly attributable to population growth and increased use of maize as animal feed. Consumers prefer white flint maize; the amount of yellow maize grown in Tanzania is therefore negligible (DTMA, 2014) though recent release and cultivation of improved varieties has attracted its gradual increased production for animal feed and human consumption. Maize is usually processed into flour and mixed with water to make *ugali* (stiff porridge). Maize consumption has also accelerated by the introduction of school feeding programs where *ugali* is the largest portion of the meal offered to primary school pupils (Barreiro-Hurle, 2012). It is expected that domestic and regional demand will increase significantly in the coming years, with additional demand for yellow maize for livestock feed (Wilson and Lewis, 2015).

2.4 Investment Opportunities

The growing demand for maize for human and animal feed in Tanzania as well as in the other eastern and central African countries creates an opportunity for agribusiness in Tanzania. Producers, traders and millers are likely to benefit from increased production and growth in trade. The following are key investment opportunities in the maize sub-sector:

- **Large scale production of maize in high potential areas** of Manyara, Kigoma, Kagera, Rukwa, Mbeya, Iringa Morogoro and Ruvuma regions.
- **Trade and marketing of maize and maize products:** Growth in productivity and production needs to be complemented with investments in trade at national and regional levels.



- **Production and marketing of inputs such as quality seed and fertilizer:** There is potential for the private sector to invest in producing improved seed varieties and other improved inputs such as mechanized agricultural equipment, fertilizers and agro-chemicals.
- **Building and operation of maize warehouses** with drying and cleaning facilities: Limited access to quality storage facilities is one of the key challenges facing the maize industry. Warehouses need to be constructed in major maize production zones for purchase of maize from small scale farmers which then will need to be dried, cleaned and stored. Other warehouses need to be constructed in major cities from where maize would be wholesaled. A strategic option is to work with farmers' associations who are provided with inputs, guaranteeing supply of maize.
- **Commercial scale production of maize under irrigation:** Climatic conditions are very suitable for maize cultivation during the rainy season in many parts of Tanzania. However, yields under rain-fed cultivation are low and unpredictable. Irrigating maize will result in higher and more predictable yields as well as more stable maize prices. Strategic options include construction of new irrigation systems for maize production on top of cultivation on existing irrigation schemes.

3 Development Partners Supporting the Maize Value Chain

Development Partners (DPs) have been supporting the maize sub-sector development in Tanzania since independence. The most recent interventions are:

- The Food and Agriculture Organization of the United Nations (FAO) through the Food Systems Development Program whose objective is to strengthen the capacities of public and private sector organizations and food chain actors to coordinate, plan and support food chain and business development in the Southern Highlands of Tanzania.
- The United States Agency for International Development (USAID) through NAFKA Project; its objective is to strengthen maize and rice value chains in Tanzania.
- The United Kingdom through support to the African Agricultural Technology Foundation (AATF) for the development of drought and disease resistant varieties of maize in Tanzania with the aim of improving maize productivity.
- The Japan International Cooperation Agency (JICA) has also supported the service delivery systems of irrigated agriculture in areas where they are producing maize and rice under the project titled Technical Cooperation in Supporting Service Delivery Systems of Irrigated Agriculture (Tanrice).
- The Bill and Melinda Gates Foundation through support to the project, Drought Tolerant Maize for Africa, whose objective is to develop drought-tolerant and well



adapted maize hybrids. This project is implemented by the International Maize and Wheat Improvement Center (CIMMYT) and the International Institute of Tropical Agriculture (IITA).

- The International Fund for Agricultural Development (IFAD) through the Marketing Infrastructure, Value Addition and Rural Finance (MIVARF) Project whose objective is to enhance incomes and food security of targeted populations through enhanced access of poor rural households to a broad range of financial services, coupled with the necessary capacity building and linkage to markets.

4 Key Policy Issues in the Maize Commodity Value Chain

Reducing ad hoc trade and market interventions and making interventions more transparent and predictable, alongside the design of specific measures to facilitate market access, will be key to supporting the development of a more commercial and profitable maize value chain in Tanzania. Given the importance and potential for growth, investments in this sector will be beneficial for the country's economy as a whole.

As maize generates 50% of rural incomes in Tanzania, it is of utmost importance to foster incentives for maize growers who are, in large part, smallholders. Despite the provision of inputs subsidies since 2003, maize yields are still low and production levels remain very volatile. Also, trade restrictions may exacerbate domestic price volatility and discourage farmers' production, which will ultimately have negative implications for food security and potential export earnings. The government announced in 2012 that it would not further resort to export bans, yet a new system of export licensing still hampers streamlined trade. Easing the ability of traders and producers to engage in national and international trade would improve maize markets and ultimately benefit both farmers and consumers.

Reducing market inefficiencies by improving infrastructure to reduce transportation costs, removing local taxes, or setting monitoring systems would lead to a more integrated market that can better transmit price incentives to farmers.

The functioning of the NFRA should also be reviewed and improved, as its interventions seem to bring only minimal benefits to farmers in terms of price support against large financial implications and possible distortive effects on markets.

Key Recommendations



Increasing productivity: The Government should explore ways to reduce the market price of fertilizer and promote the adoption of integrated soil fertility management practices by smallholder farmers. Creating a soil information map and encouraging tailor-made nutrient fertilizers through dispersed blending facilities will increase nutrient absorption and reduce soil depletion.

Promoting transparent and rules-based trade policies: Frequent and ad-hoc export bans, as well as heavily bureaucratic administrative procedures required for licenses and export permits make the market unpredictable and sometimes very unprofitable for traders. This situation discourages investment by both resource-poor, risk-averse small-scale farmers and commercial investors. Furthermore, the private sector plays an important role in stabilizing the market since it can often respond to price changes much faster than government, importing when prices are high and exporting when prices are low.

Supporting quality improvement: Enhance the competitiveness of the maize industry in the regional and global agro-market through quality improvement measures like awareness creation, investment in technology and capacity building for various actors along the value chain (Match Maker, 2014).

Reducing post-harvest losses: While striving for fractional increases in productivity, farmers are losing double what they gain after harvest during threshing and storage. Training on post-harvest grain management methods and technologies as well as construction and rehabilitation of storage infrastructure would significantly reduce grain losses after harvest.

Enhancing access to market information: Reliable information systems are not well established, resulting in information asymmetry meaning that farmers are often receiving unfair prices.

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