
ACET 2015

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Promoting Sustainable Rural Development and Transformation in Africa

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Tanzania

Country Report
About the Study

Policy makers and development partners are keen to find interventions that are effective in improving smallholder productivity and raising the income and resilience (including food security) of smallholders. It is ACET’s view that linking the objective of increasing smallholder incomes and resilience to the broader economic transformation agenda will be mutually beneficial to agriculture and the rest of the economy, particularly the manufacturing sector (starting with agro-processing). Such linkage is also likely to raise the profile of agriculture and engage the interest and participation of a wider segment of government and the general population, thereby increasing overall support for improvements in agriculture. This is the rationale for a grant given to ACET by the Bill and Melinda Gates Foundation (BMGF). ACET seeks, through the study of a number of national crop/livestock value chains, to help create this linkage. The poverty reduction objective of BMGF and the economic transformation objective of ACET led us to select the following value chain studies.

<table>
<thead>
<tr>
<th>Crop/livestock</th>
<th>Kenya</th>
<th>Uganda</th>
<th>Tanzania</th>
<th>Ghana</th>
<th>Burkina Faso</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sorghum</td>
<td>×</td>
<td>×</td>
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<td></td>
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<tr>
<td>Millet</td>
<td>×</td>
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<tr>
<td>Poultry</td>
<td>×</td>
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<td>×</td>
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<tr>
<td>Cassava</td>
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<tr>
<td>Cow</td>
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<tr>
<td>Rice</td>
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<tr>
<td>Cotton</td>
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<td>×</td>
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<tr>
<td>Cocoa</td>
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</tr>
</tbody>
</table>

The overall objective of the study is to identify, through the analyses, the policy measures, institutional reforms, and potential public investments that could: (a) help increase the productivity of traditional smallholders and improve post-production value (storage, processing, and market access—domestic or foreign) in order to increase their incomes and improve food security; (b) support the emergence of small- and medium-scale modern commercial farmers and foster linkages between them and traditional smallholders; and (c) increase agriculture's contribution to an overall economic transformation through linkages with industry, starting with agro-processing.
The Tanzania country report is a synthesis of the four value chain studies (i.e., on cassava, dairy, rice, and cotton) and will be the basis for convening policy forums that will bring together the finance, agriculture, and trade and industry ministries, as well as other stakeholders from the private sector, and research and non-governmental sector representatives, to discuss and advocate for policy positions that can unlock the potential opportunities identified in this study. The study was sponsored by the Bill and Melinda Gates Foundation and conducted in partnership with the Bureau of Agriculture Consultancy at Sokoine University of Agriculture on Cassava, Rice and Cotton and with Management Research Associates (MRA) on Dairy. The individual value chain studies can be downloaded at the ACET website: www.acetforafrica.org/agricultural transformation.
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Agricultural transformation is defined here as growth with depth; that is, growth with diversification of the sector, export competitiveness, substantially higher productivity (especially at the farm level), upgraded technology, and noticeably improved household well-being, particularly through higher income levels. A look at Tanzania’s macroeconomic data reveals that it is far from having a transformed agricultural sector despite the recorded growth. Agricultural productivity is low across all products, and for some products, such as milk and cassava, value chain activities beyond primary production are very weak, the agricultural sector barely serves as a source of inputs to the manufacturing sector.

These shortcomings reveal the wealth of value addition opportunities that policies can leverage to boost both the individual product’s value chain and transformation of the agricultural sector. For example, rice productivity can be boosted by setting up a self-sustainable improved-seed vulgarization and distribution scheme and linking smallholder farmers to large millers via contract farming. Introducing zoning of cotton growing areas could provide the right incentive to ginneries to invest in contract farming, which will in turn increase cotton productivity and quality. While cassava is viewed as a food security product by many, increasing the awareness of its versatility among agricultural value chain players and ensuring its constant availability will increase their willingness to invest in it and adopt it as a substitute for expensive starch. Finally, placing milk collection centers in strategic areas to optimize collection from small producers could be the key to reducing informal milk trading.

Interesting activities are already being undertaken at various stages of the value chain across the various products. While these activities are mainly supported by non-governmental forces, they are nevertheless important for rethinking a number of government interventions. Promoting agricultural transformation requires a full re-prioritization in favor of products that promise to deliver not just on food security but as inputs for a competitive agro-processing sector. Cotton and cassava are important crops that have the potential to address food security and promote a labor-intensive light manufacturing sector; however, policies made in the agricultural sector must be aligned to industrial policies in a way that generates mutual synergies. These synergies must be spearheaded by a strong institution that brings the important stakeholders/decision makers to one table to take quick action so as to avoid administrative delays.
I. Background

A. Role of Agriculture in Tanzania

Tanzania is one of the classic cases in which growth has not necessarily delivered on poverty reduction. Over the past 10 years, GDP per capita in Tanzania has grown by almost double from US$306 in 2000 to US$547 in 2011 (World Development Indicators WDI Online). However, the percentage of people living on less than US$2 a day only slightly decreased, from 95% in 2000 to 87% in 2011, as illustrated in Figure1.1.

Further, the agricultural sectors’ contribution to GDP, which makes up about 75% of the work force’s labor, has been shrinking, from more than 30% in 2000 to about 24% in 2010, and is forecasted to decline further, to about 18%, by 2025 (UN Food and Agriculture Organization [FAO], Monitoring and Analyzing Food and Agricultural Policies [MAFAP] program, 2013). Agricultural productivity, which grew by 20% over the past decade and is measured here by value added per agricultural worker (Figure 1.2), has been one of the main drivers of the shrinking of agriculture’s share of GDP. The reintroduction of programs such as fertilizer subsidies through the National Agricultural Input Voucher Scheme (NAIVS), which increased government involvement in the sector, is one factor behind this productivity growth (Baltzer and Hansen, 2011). In fact, this program had to be postponed this year, as Tanzania experienced a production surplus, which led to a decrease in commodity prices. However, agricultural growth alone has not proven sufficient to deliver poverty reduction. While agriculture contributes about 24.1% of GDP and 30% of export earnings, it grew by only 4% each year during the last decade; with the high annual rate of population growth (nearly 3% in many rural regions, as high as 4% in others), one cannot expect agriculture to help reduce poverty at a rate of growth that covers only the increase in population (WDI Online). Attaining poverty alleviation will require a minimum annual agricultural growth rate of 6%, which is in line with the Comprehensive Africa Agriculture Development Program (CAADP) and above population growth. While the upswing in growth of the agricultural sector is welcome, it is not enough. What Tanzania needs is a transformation of its agricultural sector.
Box 1.1: Definition of agricultural transformation

Agricultural transformation is defined as growth with depth; that is, growth with diversification of the sector, export competitiveness, substantially higher productivity (especially at the farm level), upgraded technology, and noticeably improved household well-being, particularly through higher income levels (African Center for Economic Transformation [ACET], 2014).

Figure 1.2: Agricultural value added and agricultural productivity

Source: World Bank and Statistics Division of FAO (FAOSTAT)

One way of gauging Tanzania’s agricultural transformation prospects is by looking at the profile of its agricultural trade. Tanzania’s three primary import products in terms of value are wheat, oil palm, and refined sugar, and its main exports are coffee, tobacco, and cashew. Between 2000 and 2011, the configuration of Tanzania’s top export items did not change; today, coffee, tobacco, and cashew are still the main export items. In addition, these products are processed mainly outside Tanzania, and the level of technology required to produce them has not changed over the years.

It is also important to notice that agricultural imports grew more rapidly, by an annual rate of 14.8%, than exports, which grew by 9.1% during the same period, as illustrated in Figure 1.3 (FAOSTAT Online). This is an indication of Tanzania’s lack of competitiveness and vulnerability to international commodity shocks.
Understanding the necessity of substituting for imports and building a resilient agricultural sector, the government designed policies both to promote local production and value addition activities and to minimize food imports. Some of its most prominent interventions were a number of short-term, ad hoc measures targeted at consumers and producers, which will be discussed later.

**B. Agricultural Policy Framework**

Agricultural policy implementation starts at the budgeting process. In Tanzania, the budgeting cycle usually starts with a review of macroeconomic targets, setting revenue and expenditure ceilings. This phase is facilitated by the Budget Guidelines Committee, which issues an annual budget guideline. The committee is composed of officers from the Ministry of Finance and Economic Affairs, the President’s Office Planning Commission, the Prime Minister’s Office of Regional Administration and Local Government (PMO-RALG), and the President’s Office of Public Service Management. The approved version of the budget guideline is submitted to the Inter-Ministerial Technical Committee, which uses the Medium-Term Expenditure Framework (MTEF), containing the country’s long-term vision for spending, as a tool for planning and monitoring budget outcomes (MAFAP, 2013).

The long-term vision of Tanzania is anchored in the Tanzania Development Vision (TDV) 2025, which the government began formulating in 1995. At the national level, there are two medium-term strategies for implementing TDV 2025: the National Strategy for Growth and Reduction of Poverty 2005/6–2009/10 (MKUKUTA I) and 2010/11–2014/15 (MKUKUTA II), and the Tanzania Five-Year Development Plan (FYDP) 2011/12–2015/16. The agricultural sector’s contribution to the MKUKUTA strategy is outlined in the first of the three clusters of activities for TDV 2025—growth and reduction of poverty.

The Agricultural Sector Development Strategy (ASDS) was adopted in 2001 to support the realization of TDV 2025 and achieve the sectoral policy objectives of MKUKUTA. In essence, the ASDS addresses the need to increase agricultural production to meet the food security objective of self-sufficiency in staple food production, including rice production. The ASDS applies a sector-wide approach (SWAp), which allows for greater coordination of agricultural sector activities by involving key ministries on the one hand, including the Ministry of Agriculture, Food Security, and Cooperatives (MAFSC), the Ministry of Industry and Trade (MIT), the Ministry of Livestock and Fisheries (MLF), the Ministry of Water (MoW), and the Ministry of Finance (MoF), and the private sector on the other (MAFAP, 2013).

To spur agricultural investment, Kilimo Kwanza (“Agriculture First”), a public–private plan launched in 2009 by the Tanzania National Business Council (NBC), aims to achieve a green revolution and boost private-sector participation by the following means: increasing concessional lending to agriculture, empowering agricultural cooperatives, creating commodity exchanges, removing market barriers to agricultural commodities, enhancing trade integration, promoting public–private partnerships for investment in agriculture-related infrastructure and agricultural services delivery, improving access to and use of agricultural knowledge and technologies, and accelerating land reform.
Recently, through the National Agriculture Policy 2013 (NAP 2013), the government made a commitment to “bring about green revolution that entails transformation of agriculture from subsistence farming towards commercialization and modernization through crop intensification, diversification, technology advancement, and infrastructural development.” This agenda is in line with the National Strategy for Growth and Reduction of Poverty (NSGRP) and TDV 2025, which aims to raise the general standard of living of Tanzanians to the level of a medium-income country by 2025. The NAP 2013 is a comprehensive document covering issues ranging from research and development (R&D) and crop breeding to biofuel through agro-processing and a number of cross-cutting issues.

Speedy, effective, and comprehensive implementation of the NAP 2013 and ongoing policies and programs is critical if the stated objectives and outputs are to be achieved. It should be pointed out that many areas identified in the NAP 2013 policy document are already receiving some level of attention. Initiatives such as the Southern Agricultural Growth Corridor of Tanzania (SAGCOT), which was set up to mobilize private-sector investments and partnerships to help achieve the goals of the Kilimo Kwanza strategy, are implementing some of the interventions raised in the NAP 2013, with a strong emphasis on private-sector participation. But several other areas will require new support initiatives in which relevant partners will be expected to act as sponsors and implementers, in collaboration with government. In both categories, the low-hanging fruit must be identified and developed to guide the implementation of the wide-ranging activities.

Apart from these medium- to long-term policies, Tanzania’s agricultural sector is also influenced by ad hoc short-term measures oriented toward consumers and producers. These measures are powerful mostly because they stem from initiatives that seek to address a specific, usually popular issue, while medium- to long-term policies are very broad and lack clear guidance. Some consumer-oriented policies include stock/price control measures and taxation measures, while more producer-oriented initiatives include support for storage and marketing, producer subsidies, and access to credit.

There are also policies and measures targeted at specific products. Table 1.1 provides a general overview of these measures for rice, milk, and cotton, three of the products chosen for the study. Cassava is also a focus in this study, but no specific policies have been designed for cassava given its reputation as a food security crop only, with no value addition opportunities (Abass et al, 2009).

<table>
<thead>
<tr>
<th>RICE</th>
<th>MILK</th>
<th>COTTON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Import tariffs of: 1). 75% to non-EAC 2). 0% to COMESA and EAC 3). 10–25% to SADC</td>
<td>Tax exemption for aluminum and heat-insulated implements for milk storage and collection (2009)</td>
<td>TCB price and input subsidy program since 2008</td>
</tr>
<tr>
<td>Export ban in place</td>
<td>Registration and Traceability Act (2010)</td>
<td>Government compensation to cotton buyers selling at a loss in 2008 only</td>
</tr>
<tr>
<td>Producers exempted from VAT and other local taxes</td>
<td>Amendment of the VAT Act exempting machines and equipment used for collection, transportation, and processing of milk products from VAT</td>
<td>Market information accessible via Internet</td>
</tr>
<tr>
<td>Local trade taxes on other agents in the value chain</td>
<td></td>
<td>Promotion of contract farming</td>
</tr>
<tr>
<td>Financing of six irrigation schemes especially for rice producers</td>
<td></td>
<td>0% import tariff on cotton lint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0–10% import tariff on cottonseed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10–50% import tariff on textile products</td>
</tr>
</tbody>
</table>

Source: MAFAP, 2013
C. Objectives

The overall objective of this study was to identify ways to increase smallholder productivity and improve post-production value (storage, processing, and domestic or foreign market access) in order to improve the incomes and food security of smallholders, and to increase agriculture’s contribution to an overall economic transformation that reduces poverty in Tanzania. This was done by looking at the value chains of rice (“ACET - Rice”, 2014), cotton (“ACET - Cotton”, 2014), cassava (“ACET - Cassava”, 2014), and milk (“ACET - Milk”, 2014) from the point of view of: (a) increasing productivity on-farm, and (b) increasing value capture or value addition along the product value chain (both on-farm and off-farm).

The choice of rice, cotton, cassava, and milk was not made arbitrarily, but was based on their potential to address food and nutritional security and serve as inputs for fueling the manufacturing sector. Figure 1.5 presents the rationale behind the chosen individual commodities in more detail.

Figure 1.5: Rationale behind product choices

Cassava
- An important staple for food security (8% of total agriculture output)
- Being investigated as a potential feedstock for beer industry and as a substitute in the food-processing industry

Rice
- Increasing yield by 8% will close the country’s rice deficit. Potential to become a major export.
- A substantial regional market exists, as the region is a net rice importer (Kenya imports close to 300,000 MT).

Dairy
- The meat and milk sectors make up 23% of agricultural output.
- Tanzania can replicate Kenya’s model and develop a successful dairy industry.
- Big potential local demand (consumption is 40 liters per person, compared to 145 for Kenya)

Cotton
- Important source of income and credit for farm inputs
- Potential to close the edible-oil deficit
- Can supply a growing textile industry in Kenya and the local and regional animal feed industries

The remainder of the report first summarizes the value chain arrangements for each product, as studied in the product value chain reports in Section 2. Section 3 synthesizes emerging issues that the studies identified along the value chains. Section 4 discusses how rearranging the market structure of the value chain will affect poverty in Tanzania across household types. Section 5 identifies the agricultural and industrial policy implications emerging from the analysis and value chain studies. Finally, Section 6 discusses what it will take to make the recommendations a reality and the roles of different stakeholders.
II  Product Value Chain Summary

This section provides short summaries of the four value chain studies conducted in Tanzania. We present brief discussions around the various value chain players’ institutional arrangements, the value addition opportunities, and the challenges in capturing them, and we close with policy recommendations. For a more detailed discussion, we recommend the individual product value chain reports, which were created to contribute to this report.

A. Rice

1. Product Value Chain Steps

i) Production

Ninety percent of rice produced in Tanzania is cultivated by subsistence smallholder farmers under rain-fed conditions (“ACET - Rice”, 2014). Production of rice in Tanzania is concentrated in the Arusha, Mwanza, Shinyanga, Tabora, Rukwa, Mbeya, and Morogoro regions. Paddy farmers usually cultivate plots of between 0.4 and 2 hectares (ha) using traditional methods. However, farmers who have access to irrigation infrastructure, through systems often initiated and controlled by the government but supervised by local water user groups, cultivate between 2 and 2.5 ha. Some larger irrigation-emergent farmers cultivate more than 5 ha of rice using irrigation schemes.

Estimated mean country-level paddy yields for the long rainy season (1.29 MT/ha) fall well below FAO’s yield estimates (2.03 MT/ha). Paddy yield in the short rainy season was much higher, with a mean of 3.20 MT/ha. However, there were significantly fewer short rainy season observations, and these were concentrated in the northern and lake zones, suggesting that geography rather than season may be the driving factor.
Paddy yield estimates reveal one of the largest yield differentials of any staple crop, with the 90th percentile harvesting over 206% more metric tons per hectare than the median plot in the long rainy season (3.46 MT/ha versus 1.13 MT/ha). The variation in yield across zones is similarly large, with the Southern Highlands yielding 300% more than Zanzibar, despite the higher rate of cultivation in Zanzibar. Despite these zonal variations, male- and female-headed households cultivating paddy achieved similar yields during the long rainy season.

We estimated a production function for only the long season, given the small degree of freedom when using the short rainy season. The goal of this exercise was to determine the causes of low yields in Tanzania. We then estimated the marginal contribution of the different inputs and ranked them by their impact. The results show that irrigation adds the most value to yield. This is followed by organic fertilizers, inorganic fertilizers, pesticides, using hired labor, soil type, using one’s own labor for land preparation, and whether or not farmers intercrop paddy with other crops.

![Figure 2.1: Rice production (right axis), import (left axis), and export (left axis)](source)

**Table 2.1: Market share of rice millers in Tanzania**

<table>
<thead>
<tr>
<th>Company</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Highland Company (Mbeya)</td>
<td>6.14%</td>
</tr>
<tr>
<td>Export Trading Company (Kapunga Rice Plantation)</td>
<td>5.67%</td>
</tr>
<tr>
<td>Kilombero Plantations Limited (Morogoro)</td>
<td>7.71%</td>
</tr>
<tr>
<td>Mtenda Kyela Rice Supply Company</td>
<td>21.57%</td>
</tr>
<tr>
<td>Small-scale (many)</td>
<td>58.91%</td>
</tr>
</tbody>
</table>
The respective market shares of various rice millers are presented in Table 2.1. This was estimated using the processing capacities of the millers as found in various online sources. Almost 60% of rice milling is undertaken by small-scale millers. Figure 2.2 shows a picture of a typical small-scale rice milling site. Large millers usually operate below their installed capacity and, as a result, rely on paddy produced by smallholder farmers under an agricultural contract, whereby mills provide inputs to farmers and farmers sell their paddy to the mills at an agreed-upon price.

Figure 2.2: Rice-processing plant at Lwanda Majenje, Mbeya (owned by farmers’ association)

iii) Marketing

Over the past two decades, the functioning of the rice subsector has undergone a substantial evolution. Formerly, rice was milled and marketed by the government entities National Agricultural and Food Corporation (NAFCO) and National Milling Corporation (NMC). Today, rice marketing has been completely privatized, following the privatization of NAFCO and NMC, except for government operations in support services like research, input supply, and extension. This transition has created more opportunities for the private sector; farmers; and micro, small, and medium enterprises (MSMEs) at all levels of the rice value chain. In Dar es Salaam, an intricate network of brokers, wholesalers, middlemen, and retailers ensure that the product reaches the final consumer.

The liberalization of the market led to a two-marketing-channel system made up of a large number of small traders operating between the farmers and the rice mills, forming the dominant channel. These local traders buy small quantities directly from farmers and transport the produce to the mills, after which the rice is sold to inter-regional traders or local retailers, or directly to consumers. In the other channel, the inter-regional traders buy rice paddy directly from farmers and send it to the mills, after which they convey the rice to main consumption centers, mainly in Dar es Salaam and Mbeya.

Locally produced rice is traded in more than 20 wholesale markets across the country. Rice from Malawi enters into the local market in Mbeya city and finds its way to Dar es Salaam. The lowest rice prices are found in rice surplus zones (i.e., Mbeya, Morogoro, Mwanza, Shinyanga, and Tabora), while higher prices are found in the major urban areas where rice is mainly consumed (Dar es Salaam, Dodoma, and Arusha). However, local prices are higher than international market prices, primarily due to inefficiencies in the supply chain and tariff applications (Minot, 2010).
iv) Trade

Tanzania has been a net importer of rice since 2000, with the exception of 2010. The total volume of rice traded has steadily decreased, from a high of 27% in 2000 to below 10% in the second half of the 2000s. The share of rice imports, most of which come from East Asia, in total consumption has followed the same trend. However, imports from developed countries have continued to play an important role in some years, mainly in the period leading up to the food price crisis, with imports coming mainly from Japan and the USA, most often in the form of food aid.

2. Value Addition Opportunities

There are numerous value addition opportunities in the Tanzanian rice value chain, some of which are highlighted below.

Improving yield through vulgarization and distribution of improved seeds: Efforts at increased production will be futile unless improved seeds are made available. It is estimated that 90% of farmers in the country use farmer-saved (recycled) seeds to cultivate rice (Tanzania National Rice Development Strategy [NRDS], 2009). The low rate of improved-seed utilization in the country results from the unavailability of breeder foundation seeds. However, high demand for improved seeds for paddy production means that the potential exists to produce them. Areas for strategic focus include:

i) Production of basic and certified rice seeds
ii) Strengthening the rice seed distribution network in the country
iii) Supporting on-farm seed production
iv) Creating awareness among farmers of available varieties of rice seed
v) Strengthening the capacity of public and private seed companies

These, coupled with concerted efforts by all actors along the chain, will translate into increased production.

Increasing farm revenue by reducing post-harvest loss: There is opportunity to be captured in the rice sector through increased efficiency in production and post-production activities. Smallholders incur many losses in post-harvest, ranging from 15–50% (International Rice Research Institute [IRRI], 2009). The introduction of more efficient technologies for harvesting, handling, drying, storing, and milling paddy at the village level is essential to reducing post-production losses. Our present impression is that post-production is labor-intensive, involving hand-reaping, sun-drying before threshing by trampling, and wind winnowing. This results in poor-quality milled rice. A strategy for improvement would promote the following:

i) Warehouse receipt systems that ensure producers get a better price for their produce, earn more, and have reliable sources of food and income
ii) The establishment of strong, self-supporting producer groups in which members support each other to produce, process, package, and market their rice
iii) Development of producers’ knowledge, skills, and confidence to improve their bargaining power
iv) The establishment of wider links in the rice trade to allow for competition in the regional and world markets
3. Challenges in Capturing Value

Major constraints to embracing the aforementioned opportunities, as identified by the study, are as follows:

**High risk aversion among producers discourages technology adoption:** In 2008, Tanzania’s Agricultural Seed Agency (ASA) produced and marketed about 120,000 MT of improved rice seeds, but fewer than 10% of rice farmers adopted them. One reason is that the seeds were not sufficiently popularized to reduce farmers’ risk aversion; farmers were less willing to adopt because of limited knowledge. In addition, the systems under which ASA was operating did not seem to be sustainable.

**Agricultural contracts are not well enforced:** Direct business relationships are lacking between farmers and the processors/millers who are the key actors in rice marketing. Although some transactions are made through contract agreements, marketing is still very much linked to traditional relationships with local agents and brokers. In addition, instances of contract violation are rampant, such that proper enforcement structures, like third-party referees, must be in place.

**Lack of incentives for quality in processing:** Investment in new and modern milling equipment and accompanying facilities, such as graders and destoners, is hampered by insufficient access to needed capital (credit) and equipment, and by a rice market that does not reward millers for the quality of rice they produce.

**Limited reliable storage facilities:** Commercial storage facilities are especially scarce in the areas of production. All the warehouses used are owned by millers and located in urban centers. Farmers have only traditional storage facilities, which are limited in capacity and often inadequate for preventing post-harvest losses due to pest infestation.

**Weak collective action among farmers:** Most farmers work individually on marketing and other activities related to their paddy production. There are only a few farmers’ organizations in the sector, mostly limited to small production groups of 20–40 members at the village level. At the regional and national levels, there is no collective representation of rice producers. This prevents rice farmers from benefiting from group lending opportunities.

4. Policy Recommendations

**Designing a sustainable scheme for financing rice seed multiplication and distribution:** One of the most important potential policy interventions is the promotion of a sustainable seed multiplication and distribution scheme. While the number of seed companies in Tanzania grew from 16 to 55 after the passing of a policy to oversee multiplication and distribution, the sector still faces a number of constraints, including the financial constraints of local breeders who are familiar with the local varieties, and lack of resources among the responsible authorities for registering breeders and germplasms. There is a general lack of awareness of or demand for improved varieties of seed. In addition, the coverage of agro-dealers is poor in some rural areas, resulting in limited use of agricultural inputs by a large proportion of rice producers. A financing scheme must be put in place to address many of the constraints mentioned above. One of these could be financed by an additional tariff on imported rice, to be redirected to a fund responsible for supporting seed multiplication and distribution. In this way, the more the country imports, the more it will be able to finance its local industry.

**Linking paddy farmers to large-scale millers via contract farming:** As noted earlier, rice marketing in Tanzania is highly fragmented, such that over 90% of production is controlled by small-scale traders who mill their paddy in small milling stations, often yielding low-quality rice. The remaining share of the rice market is distributed among large millers who have the technology necessary to produce quality rice, but often operate under capacity. As the middle-class segment of the population grows, more and more households demand high-quality rice,
but the low supply of paddy to large mills limits local supplies, which must be supplemented by imports. Linking smallholder paddy producers to large-scale millers may provide a win-win opportunity, but the central question of how to do it remains. For a start, it is important to understand the various terms and conditions of a typical rice contract and gauge the different parties’ preferences for their characteristics to determine the nature of a possible contract farming arrangement between farmers and millers. In addition, once a contract framework is established, proper regulations must be put in place to ensure that contract parties do not violate their obligations. This includes a third-party enforcement mechanism approved by both the farmers and the millers.

B. Cotton

1. Product Value Chain Steps

i) Production

Cotton is Tanzania’s second major export crop after coffee. It provides direct income and employment to about half a million households, and an estimated 40% of the population depends on cotton. Cotton is cultivated on about 300,000–500,000 ha of land (about 9% of the total cultivated land in Tanzania) by rain-dependent smallholder farmers. Farms range in size from 0.5 to 5 ha, with the average being slightly above 1 ha. Yields, at 550 kg per ha, are very low by international standards, and the seed cotton bought by the ginneries is often of poor quality and/or badly contaminated.

ii) Processing

Seed cotton ginning is the process of separating lint from seeds. In addition to ginning, ginneries also clean the seed cotton and bale the cotton lint. Seed cotton is conveyed from storage facilities at the ginneries to a processing room, either by means of a suction system or manually. Foreign matter is manually removed from the seed cotton by laborers.

Figure 2.3 shows photos of gins used in Tanzania. The two primary systems of ginning in the country are the modern roller ginning system and the older saw ginning system. There are 62 ginneries in Tanzania’s Western Cotton Growing Area (WCGA) and eight in the Eastern Cotton Growing Area (ECGA).
As of 2008, a total of 60 ginneries were registered with the TCB, including 14 saw ginneries and 46 roller ginneries, with a total ginning capacity of 3,958 bales per shift. During the 2010/11 cotton farming season, a total of 37 ginneries were inspected by the TCB and permitted to operate. In the preceding season, 34 ginneries were licensed. Table 4.1 in Section 4, “Value Chain Rearrangement Simulations and Implications for Poverty,” presents the market share of the various ginneries operating in Tanzania.

iii) Marketing

Less than 30% of the cotton lint produced in Tanzania is marketed to local textile mills for use in dying, spinning, weaving, and printing *khangas* and *kitenges*, bedsheets, garments, knitting, woven blankets, and socks. The textile industry consists of 23 privately owned mills, annually producing about 110 m² of the above-mentioned items. These mills operate at about 40–50% of their installed capacity. It is estimated that 50 textile mills had been established by the government and private sector as of 2002; however, only 23 of these firms (46%) are operating.
iv) Trade
Tanzania’s cotton exports consist mainly of cotton fiber. In 2010, for example, fiber constituted 87% of all cotton exports, followed by cotton yarns and threads (8%) and cotton woven fabrics (5%) (Salm et al, 2011). Cotton fiber exports alone are reported to be equivalent to 62% of Tanzania’s total textile and clothing exports (ibid), affirming that most of the value addition in Tanzanian cotton takes place abroad. Major export markets include China, India, Pakistan, Indonesia, and Thailand. Very little cotton lint is imported, as illustrated in Figure 2.4.

2. Value Addition Opportunities

**Increasing productivity through appropriate farm management practices:** The production of seed cotton in Tanzania is characterized by smallholder farmers. Almost 90% of cotton production comes from smallholders who grow cotton on farms with an average size of 1-2 ha. There is virtually no estate production of the crop, which is grown under rain-fed conditions. The volume of seed cotton produced has fluctuated for many years, but remains at low levels despite huge potential for increased production. This expansion is important not only for increasing foreign earnings from cotton but also to address the shortage of lint supply for local factories. Improving the production and productivity of seed cotton requires the use of improved seed varieties, better use of fertilizer (organic and inorganic) and other chemicals, better husbandry, and, where possible, the establishment of irrigation and water control in cotton farming. Equally important is the improvement in production efficiency by lowering post-harvest quality losses.

**Filling the edible-oil deficit with cotton oil:** The national demand for edible oil is huge, presently estimated at around 170,000 MT (Kadigi, 2014). The FAO recommends a minimum per capita oil consumption of 5 kg per annum. With Tanzania’s population at around 45 million, the national demand for edible oil is around 225,000 MT per annum, while estimated national production is around 60,000 MT (ibid). This leaves a gap of about 165,000 MT (73%), which is presently filled through imports of semi-refined palm oil (ibid). Demand is expected to grow alongside growth in population, projected at nearly 3%. This huge demand–supply gap has created an investment opportunity for cottonseed production and cottonseed oil processing in the country. Apart from this, the market demand for cottonseed oil is high compared to other, imported oils, due to its competitive price, high quality, and low cholesterol content (“ACET - Cotton,” 2014).

**Using cottonseed cake for the livestock sector:** Cottonseed cake produced in Tanzania used as animal feed competes with other feeds, including sunflower cake, sardine, and fishmeal. The demand for these feeds has been growing with the modernization of the country’s livestock sub sector. Feed, especially for intensively raised animals such as dairy cattle, poultry, and pigs, accounts for 60% of overall production cost (“ACET - Cotton,” 2014). The increase in demand for industrial feeds has led to a rise in the price of cottonseed cake. In addition to local demand, cottonseed cake is reportedly exported, unofficially, to the neighboring countries of Kenya and Uganda. Ultimately, there is value to be captured in expanded production of cottonseed cake, translating into increased incomes.

**Improving textile competitiveness by addressing the high cost of power:** A modern mill in Tanzania can be as competitive as any in the world, so long as the power supply is maintained, allowing it to operate at its potential of 8,400 hours per annum without interruption. Knitted fabric conversion costs in Tanzania are some of the lowest in the world, after India, Egypt, and China; capital costs are high, but offset by inexpensive labor and electrical power. Overall, a vertical operation, including spinning, weaving, and/or knitting, established in Tanzania with modern machinery, a consistent supply of power, and an internationally competitive rate of finance, has the potential to be highly competitive at the international level. Given a reliable electricity supply, Tanzania should be able to make a strong case for foreign direct investment in its mills based on the above assumptions (Salm et al, 2011).
Tapping into AGOA by promoting a local textile industry for final products: As mentioned, most Tanzanian cotton is currently exported as fiber. Additional value can be seized if the fiber is processed into fabric and garments before it is exported. Interestingly, the US's African Growth and Opportunity Act (AGOA) gives preferential access to the US market for garments assembled in Africa, including Tanzania. In light of proposed changes in the legislation aimed at restricting the amount of third-country fabric used in garment production, there is a huge opportunity to develop a garment industry in Tanzania, assuming that the country’s recurring electricity supply disruptions are addressed.

3. Challenges in Capturing Value

Below are several challenges to capturing the value opportunities in the Tanzanian cotton chain described above, as identified by our study.

Genetically modified organisms (GMOs) are illegal in Tanzania: (Bt) cotton, a genetically modified cotton containing a protein that produces a natural insecticide, is not accepted by the local legislature, in line with Tanzania’s fear of adopting GMOs in its agricultural sector. This precludes the sector from increasing productivity by lowering its output’s vulnerability to pests.

Lack of trust between cotton farmers and community aggregators: An unfortunate new trend has arisen in the cotton value chain, in which some stakeholders deliberately contaminate cotton seed with trash and foreign matter in order to raise the weight of their production and thus their profit. Farmers and buying agents have blamed each other for these acts. The consequences are disastrous for the industry and the country, which has been flagged as a risky source of cotton for buyers.

High proportion of old equipment: About 20% of the country’s spinning sector capacity is under 10 years old, nearly half the global average, and some mills have not been upgraded in over 40 years. Only about 8% of mill spindles in Tanzania are less than 10 years old (Salm et al, 2011).
4. Policy Recommendations

**Zoning of cotton-growing areas to encourage contract farming and lint quality:** Contract farming has been promoted as a means for increasing cotton productivity through access to inputs. The Gatsby Foundation has sought to promote contract farming, given its anticipated benefits to the industry. However, the current competitive structure discourages ginners from providing extension advice and improved inputs to farmers, because when the crop is marketed the ginners who do not invest in this way can afford to undercut any who do. This lack of investment hinders farmers' productivity and the quality of their product. It is important to assign specific cotton-growing areas to individual ginners with exclusive buying rights, as is done in Burkina Faso. Zoning assignments will encourage ginners to invest in their farmers and ensure higher yields, while the government simply plays the role of enforcer.

**Introducing improved business processes among union-managed ginners:** Cotton ginners managed by unions have been found to be inefficient in their operations and management practices. Our field investigations found drastic differences in both production costs and output productivity among ginners managed by private actors versus those managed by unions. Union-managed ginners must receive new business process management skills. An assessment of the business models and governance structures of these ginners is necessary to identify the gaps in management vis-à-vis privately managed ginners. If gaps related to business processes are found, there may be an important opportunity for donors such as the Japan International Cooperation Agency (JICA) to support the introduction and implementation of practices such as kaizen among these ginners. Improving their technical efficiency will translate into better prices for farmers.

**Promoting alternative sources of energy to support the textile industry:** An efficient and reliable power supply is necessary to ensure the competitiveness of downstream textile activities. Alternative sources of energy must be identified to support these activities. This includes solar and wind, which may involve high initial costs, but the energy savings will be high enough to quickly recover the capital. Some of the available options will be discussed in section 5.
C. Cassava

1. Product Value Chain Steps

i) Production
Cassava is an important subsistence food crop in Tanzania, especially in semi-arid areas, and is sometimes considered as a famine reserve when other cereals fail, due to its drought tolerance. Eighty-four percent of the total production in the country is used for human consumption; the remainder goes toward other uses, such as starch making and livestock feed. The roots and leaves of cassava are of major nutritional importance in the country. Tanzania is the fourth largest producer of cassava in Africa, with annual root production estimated at 5,500,000 MT from 761,100 ha (7% of the total harvested agricultural land in 2011) (FAOSTAT Online). The main producing areas in Tanzania include the coastal strip along the Indian Ocean (accounting for about 48.8% of total production), the areas around Lake Victoria (23.7%) and Lake Tanganyika (7.9%), and along the shores of Lake Nyasa (13.7%). In these areas, cassava is regarded as the first or second staple food (Mtambo, 2007).

![Figure 2.7: Cassava production and trade (in MT)](image)

Source: FAOSTAT

ii) Processing
Cassava is processed mostly using rudimentary tools. Initiatives to improve cassava processing in Tanzania date back to 2003, with the introduction of new technologies to enable smallholder cassava processors to produce high-quality cassava flour (HQCF). This move went hand in hand with the organization of smallholder cassava farmers into processing groups. The initiative started with a few groups and has grown to include more than 150 as of 2010 (Cassava: Adding Value for Africa [CAVA] project, 2012).
Apart from the smallholder farmers’ processing groups, private entrepreneurs engaged in processing HQCF have emerged in recent years to take advantage of improved technology and the potential market for quality cassava products in urban areas. However, processors who have established modern plants, using electricity and/or fuels such as oil and kerosene, are very few. There are only four such processors, each of which generates a relatively large volume of product and has a fairly large share of the market for processed cassava products, as illustrated in Table 2.2. Figure 2.8 illustrate how the various types of processing units operate.

### Table 2.2: Medium-scale cassava processing firms and their market shares

<table>
<thead>
<tr>
<th>Firm Name</th>
<th>Capacity</th>
<th>Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ukaya</td>
<td>20 MT/week</td>
<td>34.5%</td>
</tr>
<tr>
<td>Kimaceco</td>
<td>13 MT/week</td>
<td>22.4%</td>
</tr>
<tr>
<td>Mvinjeni</td>
<td>15 MT/week</td>
<td>25.8%</td>
</tr>
<tr>
<td>Sululu and other small-scale processing groups</td>
<td>10 MT/week</td>
<td>17.3%</td>
</tr>
</tbody>
</table>

### iii) Marketing

Traditionally, processed cassava is sold at village markets, but most buyers of processed products, like cassava chips and cassava flour, are located far from rural processing units. Cassava flour is distributed to wholesalers, supermarkets, and other retail outlets, with the main buyers being supermarkets in urban areas. Logistical arrangements for transportation, warehousing, and wholesaling are based on agreements between processors and their clients. However, some wholesalers bring their vehicles directly to the processors to purchase cassava and agree on a price that offers reasonable returns to both parties.

### iv) Trade

As illustrated in Figure 2.7, cassava exports are very weak, as Tanzania does not import cassava and exports only negligible quantities of it.
2. Value Addition Opportunities

Introduction and adoption of improved cassava varieties: Several actions can be taken to increase cassava yields, including improving cassava husbandry practices (such as the proper selection of cassava planting materials, timely planting, and weed control), promotion of high-yielding cassava varieties, improving access to markets for cassava and cassava products, and the development and distribution of pest- and disease-tolerant cassava varieties. The introduction of high-yielding varieties (18–25 MT/ha), along with an expansion of the country’s planted area of cassava, has the potential to produce manifold increases in production volumes Match Makers Association ([MMA], 2012; Farm Radio International, 2013). According to the FAO (2000), high-yielding varieties could result in surplus cassava for farmers to sell. However, this should be accompanied by improving access to markets for the surplus cassava in order to sustain high yields.

Linking the cassava sector to the livestock sector to increase cassava’s value: There is a growing recognition of cassava’s potential to serve as a livestock feed. The whole cassava plant, including roots, leaves, and stem, is a good source of carbohydrates and protein. Leaves can be used as silage or dried for feed supplementation and as leaf meal for feed concentrates. Stems can be mixed with leaves and used as ruminant feed or dried for feed concentrates. Roots can be chipped or pelletized and used as feed, while root peels, broken roots, fibers, and bagasse from starch extraction and gari can be dried and used directly as animal feed or as a substrate for single-cell protein production. The use of cassava root in animal feeds is increasingly important in Tanzania, and generally in the developing world.

Introducing standards to address the negative image of cassava: There is a growing market for cassava products, especially starch, in eastern and southern Africa. Therefore, promoting investment in the cassava sub sector and ensuring corresponding technical support and sustainable growth in the market is of paramount importance. Finding additional applications for cassava will expand and sustain the market, while market innovations such as quality standards, product grading, branding, and certification will improve the image of cassava and its marketability, further catalyzing market-segmented demand. Such demand can stimulate the participation of more value chain actors, particularly if price transmission and financial benefits are equitably allocated. Moreover, grading and branding are required to ensure that every grade or standard of a product has its own market channel and value. Packaging could facilitate the use of standard measures in product marketing and improve the quality, aesthetic appeal, and market value of cassava products. This will help unlock doors into international markets for Tanzanian cassava-byproducts and benefit value chain actors.

Transforming cassava into high-quality cassava flour (HQCF) to increase its value and shelf life: Cassava has a very short shelf life, making storage an important element of its value chain. However, cold storage facilities such as refrigerators, which can greatly enhance cassava’s shelf life, are mostly unavailable to smallholders in rural areas. Processing raw cassava into convenient food products, such as HQCF, will also improve its shelf life, and there is a high and mounting demand for HQCF in most urban and rural markets, in part due to consumers’ perception that it is a more nutritious product than maize and wheat flour. The demand is especially strong for packaged and branded HQCF, which customers see as both healthy and convenient. Demand is also growing in the baking industry, presenting an opportunity to diversify into the production of HQCF for baking (C:AVA, 2012). HQCF can also be used as raw material for the production of glucose syrups, industrial alcohol, bakery products, and adhesives, and as an extender for plywood glues. There is thus an opportunity to create a thriving market for smallholders in the cassava industry.
Leveraging the versatility of cassava to expand its use into a wide range of industries: Additionally, cassava could be incorporated into beer production, amplifying the use of cassava and stimulating production by farmers. Success stories and lessons can be drawn from the cassava beers now produced in Mozambique by SABMiller (“Impala”) and in Ghana by both Guinness and Accra Brewery Ltd. The brewing industry holds ample opportunity for smallholders and other value chain actors in Tanzania’s cassava industry.

3. Challenges in Capturing Value

Negative image: The general perception of cassava is as a food security or subsistence crop. Its negative image prevents it from being made a priority in agricultural policy deliberations. Until its image improves, it will continue to receive scant support.

Bitter taste of improved varieties: Local cassava varieties with low root-yield potential continue to be favored over improved, high-yielding varieties, largely due to taste preferences. Improved varieties are more bitter than most of the local varieties, hence their low adoption rate.

Poor crop management practices: This includes late planting of cassava cuttings, poor weed control on cassava farms, and insufficient use of agrochemicals, such as fertilizer and pesticides.

Poor export market: Available cassava studies have reported that raw cassava is distributed through the consumption market, traditional or artisanal processors, and modern processors. There is apparently no export market for raw cassava in Tanzania.

Lack of appropriate tools for harvesting: Farmers surveyed indicate that uprooting cassava using hand-hoes is difficult during the dry season, meaning that some of the cassava roots are left underground.

Poor processing tools: Traditional cassava processing is common in Tanzania, but poor processing techniques result in poor quality and inadequate safety of processed cassava products, a hindrance to the exploitation of market opportunities.

Low availability of fresh cassava: The study found that processors are unable to optimize their operations by consistently processing at the installed capacity of their plants (between 4 and 8 MT per day) due to low availability of fresh cassava. This further affects the adoption of HQCF by food processors, as they must be guaranteed a consistent supply of flour.

1 However, the growing demand for cassava by breweries in Ghana is not yet fully met by local producers.
4. **Policy Recommendations**

Adoption of bitter cassava varieties must be promoted through farmers’ field school models and subsidizing cassava processing units in large cassava-producing areas. The CAVA project has shed light on the numerous potential uses for cassava. Beyond human consumption, cassava can be used as a raw material for animal feeds and for the manufacturing of industrial products. There are indications that novel cassava products will continually be adopted as an ingredient in the manufacturing of convenient fast foods for urban consumers and in industry in some African countries (Mtambo, 2007). Rapid urban population growth, coupled with the growing need to substitute for imports of manufacturing inputs, are two drivers of demand for cassava-based products. These innovative uses of cassava were made possible mostly by the introduction of improved processing units, which made possible the production of high-value cassava products such as HQCF, introduced by the International Institute of Tropical Agriculture (IITA).

However, the low supply of HQCF to satisfy industrial demand proves a major risk of its adoption. Manufacturers will only adopt HQCF and similar products if they can be guaranteed a constant supply, which the current value chain structure is not able to deliver. A constant supply of high-value cassava products for commercial use is dependent on the supply of fresh cassava, which can easily be provided by plantations. However, large-scale farming of cassava for industrial starch manufacture is not a common practice. Therefore, the viability of the cassava value chain for the production of high-value products, both for urban consumption and for manufacturing inputs, depends on smallholder farmers’ ability to produce fresh cassava in commercial quantities. This is far from the case today in Tanzania, where cassava is considered more of a famine reserve crop and less a cash crop for urban consumption or an industrial raw material, as is the case in some West African countries.

Policy efforts toward promoting the adoption of improved cassava varieties must be promoted simultaneously with the introduction of processing units. One way to promote adoption of improved varieties is to create awareness of the commercial opportunities behind them, while ensuring their producers of a ready market that will buy their output right after harvest. Farmers need to be made aware of the cost and expected benefit associated with adopting and producing improved cassava varieties, relative to the cost and benefit of traditional varieties. This can be done by way of farmers’ field school, which uses experiential learning and a group approach to help farmers in making decisions, solving problems, and learning new techniques (Davis et al, 2010). Second, cassava processing must be further encouraged. Budding as well as mature entrepreneurs need to be identified, trained, and given seed funding to establish cassava processing units in strategic locations where improved cassava varieties have been adopted.
D. Dairy

1. Product Value Chain Steps

i) Production

The livestock industry accounts for 3.8% of Tanzania’s GDP. The dairy sub sector contributes 30% of this output, while beef accounts for 40% and all other livestock contributes 30%. Though not fully commercialized, the dairy sub sector employs more than 2 million households and over 100,000 intermediaries through their participation in milk production, milk collection and processing, trading, and marketing. Dairy production also provides small-scale farmers with a regular cash income without requiring the sale or slaughter of the cow itself. Production has increased to 1.85 billion liters of milk in 2012, due to an increase in the number of animals of both indigenous and improved breeds. On the other hand, the volume of milk generated by the processing industry has shrunk by more than 70% in the last 20 years; currently only 110,000–130,000 liters are produced per day, down from 400,000 liters per day in 1990. The country is a net importer of dairy products, which are generally distributed, purchased, and consumed in urban centers mainly by middle-income earners.

ii) Processing

Milk processing in Tanzania is mainly undertaken by small- and medium-scale plants with capacities ranging from 500 to 120,000 liters per day. There are about 55 milk processing units with an installed capacity of 417,000 liters per day, but their capacity utilization is only about 30%. Competition among domestic processors in the dairy industry is relatively weak; their most serious competition is from hawkers and, to some extent, imports. Specifically, the market share of local milk processors is such that the top processor is responsible for over 40% of total production, as illustrated in Table 2.3.

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2 This figure includes the Utegi and Tommy dairies, which have not been in operation for over 10 years.
### iii) Marketing

The most striking feature of the milk market in Tanzania is its highly fragmented nature, with very weak or nonexistent links between various sub-markets. A large number of transactions take place outside of any formal market channels. For this reason, it is difficult to gather accurate data on marketing. A constant and significant gap exists between demand and supply for specific products, though it fluctuates depending on the location and time of year.

### iv) Trade

Tanzanian milk production and current per capita consumption limit the country’s ability to export raw milk products. There are reports that in the past, a Kenya-based company purchased raw milk from the northern zone of Tanzania and sent it to Kenya for processing, afterward returning a finished, packed product. For reasons that are unknown and could not be established during the product study period, this arrangement was blocked by the Tanzania Revenue Authority over five years ago. Consequently, there are no official exports of raw milk. A market does exist for processed dairy products, and the common customs union among the East African Community (EAC) countries promotes this kind of trade. However, only one Tanzanian processor producing specialized items, AZAM Ice Cream, has found its way to the EAC market.

According to a recent publication by the Tanzania Milk Processors Association (TAMPA, 2011), while imports have been rising at about 9% annually, sales of locally processed milk have declined by more than 80% over the last 15 years, accompanied by the closure of 13 dairy plants in that period.

### 2. Value Addition Opportunities

**Increasing the milk supply through cross-breeding improved bulls or through artificial insemination (AI) services:** The dairy industry in Tanzania has great potential, and current development strategies are aimed at modernizing and commercializing the industry to make it competitive. So far, milk production is mainly from indigenous cattle, followed by improved dairy cattle and dairy goats. Judging from the 2007/8 livestock survey report, and taking into consideration the average quantity of milk produced per cow, the productivity of both indigenous and improved dairy cattle is low in almost all coefficients. Average production of all breeds, however, has been highly affected by the productivity of indigenous cattle, and the breeds of dairy cattle currently used have been cited as one of the constraints to improving production and productivity. There exist over 21 million indigenous cattle in Tanzania, and this offers a great opportunity for cross-breeding with improved bulls or through AI services. Specific and deliberate strategic interventions, with implementation plans, should be designed.

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**Table 2.3: Tanzanian milk processors’ market share**

<table>
<thead>
<tr>
<th>Processor</th>
<th>Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanga Fresh Ltd.</td>
<td>40%</td>
</tr>
<tr>
<td>Mara Milk</td>
<td>8%</td>
</tr>
<tr>
<td>ASAS Dairy</td>
<td>6%</td>
</tr>
<tr>
<td>Tan Dairies Ltd.</td>
<td>6%</td>
</tr>
<tr>
<td>Northern Creameries</td>
<td>4%</td>
</tr>
<tr>
<td>CEFA</td>
<td>4%</td>
</tr>
<tr>
<td>Other processors</td>
<td>32%</td>
</tr>
</tbody>
</table>

Source: “ACET - Milk”, 2014
immediately to increase the number of improved cattle, whether pure or cross-bred. This, coupled with better use of Tanzania’s large tracts of rangeland for production of fodder, will translate into an increase in milk production.

**Ensuring better price opportunities by planning calving months to correspond with the high season for milk prices:** Dairy products consumed in rural areas are characterized by low value addition, primarily due to the absence of milk processing storage facilities. The perishable nature of milk also limits its ability to be stored, preventing farmers from taking advantage of seasonal price differences. Understanding these price differences would enable farmers to plan the calving months of their dairy cows so that peak production periods coincide with high milk prices. This will boost the industry when accompanied by improved husbandry and extension delivery to smallholders.

**Placing milk collection centers in strategic areas to optimize collection from small producers.** Producers sell most of their milk to the informal market; this is partly due to the lack of readily available selling points, such as milk collection centers (MMCs). The current number and locations of MCCs are not proportional to farmers’ locations. Adding more MCCs and positioning them closer to the producers may benefit the industry, as their presence would increase the amount of milk collected and processed and, equally, reduce spoilage before the milk reaches consumers. This would enable processors to bulk and collect a reasonable quantity of milk at any given time.

Additionally, strengthening collective action through the formation of producer groups in the dairy industry would improve the price that farmers get per liter. Working collectively, producers gain bargaining power and sometimes can engage in value addition by processing and even marketing.

**Promotion and development of specialized distributors for dairy products.** Our study found that processors distribute their products without collaboration with other processors. For instance, ASAS transports its products from Iringa to Dar es Salaam, Tanga Fresh Ltd. from Tanga to Dar es Salaam, and Shambani from Morogoro to Dar es Salaam. Each of the processors uses its own van, meaning that the sector incurs costs for three different drivers, fuel, etc. In an improved system, the distribution cost may be reduced by at least 40% if ASAS, traveling from Iringa and passing Morogoro, shared its transport by using one truck, preferably owned and operated by one of the many existing specialized logistics and transport companies. Similarly, products from Tanga could be bundled in Chalinze in order to use the same transport from ASAS and Shambani en route to Dar es Salaam. This value addition finding is in line with an earlier observation made by NIRAS (2010).

### 3. Challenges in Capturing Value

The dairy industry in Tanzania holds great promise, but this potential is grossly affected by a number of constraints and an amorphous value chain.

**Consumer preference for unprocessed milk:** There seems to be a preference for unprocessed milk among consumers in both rural and urban areas. This consumer preference presents an avenue for informal marketing activities, which will escape both processing and regulatory authorities.

**High cost of feed:** The practice of inbreeding, high nutritional needs, and the high cost of feed supplements are drawbacks to the productivity of improved breeds of dairy cattle.
Too many regulations: Unreliable policy interpretations, several duplicated regulations, unfriendly tax regimes, and increasing electricity costs have discouraged investment in the processing industry and overall value improvement, and may continue to do so.

Poor milk collection infrastructure: Due to remote production areas and poor infrastructure, the collection and marketing of milk constitute the most serious bottlenecks. Hence, up to 70% of milk produced is consumed locally, either in fresh form or with limited value addition in products such as cultured milk, ghee, and local butter. The remaining 30% is then either sold to neighbors or traders or given away to animals in the homestead.

Poor access to utilities infrastructure: Milk is mainly produced by indigenous cattle, which are widely distributed in different areas, including remote villages where road infrastructure is poor and provision of utilities such as electricity is inadequate. These problems contribute to inefficiencies in milk collection and additional costs for collection and processing.

The seasonal nature of milk production discourages long-term investments in infrastructure. The seasonal availability of milk (an acute problem in the traditional sector) discourages the establishment of MCCs and processing plants, even when electricity is nearby. Despite their large capacities, all of the MCCs operate below their installed capacity.

4. Policy Recommendations

Temporarily subsidizing extension and AI services: There are several ways to increase the numbers of genetically improved animals. Selection may be practiced within existing local populations, but this method often must be ruled out because of the low genetic base with which one has to start. The importation of superior breeding stock is too costly to be adopted on a large scale, although one alternative could be to import them from Kenya, where exotic breeds have adapted to the tropical conditions. Crossing local females with superior imported sires is another method, which has been adopted at different times by many developing countries. With the advent of AI, the principle of cross-breeding was given a new instrument for implementation on a large scale and at comparatively low cost. So far, private-sector involvement in AI is low, as many farmers cannot afford it. One suggestion for increasing demand for AI could be to revise the stringent regulations and tax schedules governing the dairy sector so that a portion of the tax revenue is used to subsidize AI services for a limited period, until a minimum number of improved dairy cows is reached in the system.

Priority and practical support for implementation and regulation of the Dairy Act: The Dairy Act was designed to provide for the production, regulation, and promotion of the dairy industry; establishment of the Tanzania Dairy Board; and repeal of the 1965 Dairy Industry Act, as well as other related matters. Overall, while having good policies that advocate for the development of the dairy industry is welcome, the most important aspect of such policies is the ability to implement them, along with enacted laws and subsequent regulations. While informal milk trading is technically illegal, the law prohibiting it is not implemented by the respective entities. It is therefore recommended that it be decriminalized and that traders be assisted to improve hygiene.
III. Synthesis of Emerging Issues

Over the four product value chain studies, we noted a number of emerging issues worth discussing. These issues are rather new opportunities that, if expanded, can greatly improve the products’ value chains. We synthesize these emerging issues in Table 3.1 below. We later provide a discussion of these issues following a value chain approach.

Table 3.1

<table>
<thead>
<tr>
<th>Opportunities for improving farm-level production</th>
<th>Opportunities for improving post-harvest logistics (including storage and transport)</th>
<th>Opportunities for strengthening processing sector and improving linkages to smallholders and markets</th>
<th>Opportunities for improving processor-to-market logistics</th>
<th>Opportunities for improving processor-to-market logistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growing number of medium and large cassava farmers</td>
<td>Cassava farmers have been increasingly forming groups to improve cassava value chain</td>
<td>Introduction of modern cassava processing units</td>
<td>Introduction, but slow adoption, of high-quality cassava flour (HQCF) among bakers</td>
<td></td>
</tr>
<tr>
<td>Introduction, but slow adoption, of improved cassava varieties</td>
<td>Contract farming for linking cotton farmers to off-takers</td>
<td>Production of cottonseed cake for the livestock feed sector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addressing rice financing and storage constraints through a warehouse receipt system (WRS)</td>
<td>Milk aggregators are increasingly entering into complex contract schemes with commercial processors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participation in group lending for securing daily expenditure of rice farming</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improved packaging and labeling to guarantee rice quality for consumers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A. Opportunities for Improving Farm-Level Production

1. Growing Number of Medium and Large Cassava Farmers

Cassava production is dominated by smallholder producers, growing on an average land area of less than 3 ha per household. In recent years, medium- and large-scale cassava production has emerged, especially in the eastern and southern zones. This is partly due to efforts by the government, NGOs, and development partners to promote the commercialization of cassava. Five emerging farmers from those interviewed during our field survey in December 2013 and January 2014 reported cultivated cassava land of 20–130 ha. These farmers were found in Mkuranga and Rufiji in the eastern zone and Mtwara in the southern zone. No medium- or large-scale farmers were found in Morogoro (eastern zone) and Misungwi in the lake zone. The largest farm, 300 ha, was reported by an emerging farmer in the Bungu ward of Rufiji District. Unlike smallholder farmers, the medium- and large-scale cassava farmers reported using modern farming equipment and occasional use of pesticides.

2. Introduction and Challenges of Improved Cassava Varieties

Most smallholder farmers in Tanzania grow traditional cassava varieties with low yield potential. In recent years, however, improved cassava varieties with high yield potential, as well as disease and pest tolerance, have been developed through collaborative research between two agricultural research institutes in Tanzania, the IITA and the International Center for Tropical Agriculture (CIAT). The improved varieties have been disseminated to smallholder farmers. However, adoption of new varieties of cassava is low, as they are relatively bitter compared to the traditional varieties. This creates resistance among farmers who see cassava more as a food security product and less as an input for the manufacturing sector.

B. Opportunities for Improving Post-Harvest Logistics

1. Addressing Rice Financing and Storage Constraints Through Warehouse Receipt System

Agricultural financing and storage have always been the bane of smallholders in Africa, and this is no different for smallholders involved in the production of paddy in Tanzania. Although the country has the capacity to store rice, it is largely concentrated in urban centers and generally lacking in rural areas. The ability to store paddy is critical to the value chain, as it allows farmers to take advantage of seasonal differences in price. Tanzanian grain markets exhibit the highest seasonal variation in price in East Africa; prices can rise by as much as 192% from the period immediately after harvest to the period immediately preceding the next harvest. This high fluctuation in seasonal price creates a strong incentive for the development of further grain storage capacity, which will give smallholders a better bargaining price and translate into increased income. In practice, few new entrants into the grain markets have the capacity to construct and fill new warehouses. The warehousing receipt system (WRS) is one system to ensure the storage of paddy, which translates into agricultural financing. This system has been practiced in the Kilombero and Ifakara districts.
2. Increasing Participation in Group Lending for Securing Daily Expenditures of Rice Farming

The rice market in Tanzania is very dynamic, with huge price fluctuations over the course of the year, as mentioned above. Traders, mostly from large urban centers, come to the farms during harvest time and offer farmers very little cash for their paddy. They then sell it at high profit margins further along the supply chain. However, in recent times, various organizations have put forth initiatives to mobilize farmers to form groups or cooperatives. For instance, Rural Urban Development Initiatives (RUDI), a local NGO, is implementing the Building Rural Income Through Associations (BRITA) project, which has organized rice growers in Mbarali District in the Mbeya Region and Kilombero District in the Morogoro Region in Tanzania to form savings and credit cooperative societies (SACCOS). These societies help farmers secure funds for their daily expenditures and store their harvested crops in the warehouse.

3. Improved Packaging and Labeling to Guarantee Rice Quality

Packaging is still in rudimentary stages in the rice subsector in Tanzania. However, there are a few innovative entrepreneurs, such as those from the Sokoine University Graduate Entrepreneurs Cooperative, who are training to conduct product development through quality packaging to reach niche markets in the mini-stores and supermarkets in Morogoro, Mbeya, Dar es Salaam, and other emerging cities and town centers. Moreover, farmers in Mbeya have started packaging and labeling their rice to make it easily distinguishable in the market, as rice from Mbeya is famous for its aroma and quality compared to rice from other regions, and hence is sold at a higher price.
C. Opportunities for Strengthening the Processing Sector and Improving Linkages to Markets

1. Contract Farming for Linking Cotton Farmers to Ginneries

Contract farming is generally a recent development in Tanzania, effectively begun in the mid-2000s as a means of increasing cotton productivity. Efforts to introduce contract farming became particularly evident in 2010, when stakeholders in the cotton industry resolved to embrace it as a way of rescuing the industry from the brink of collapse. It was decided that contract farming should be implemented throughout the country’s WCGA beginning with the 2011/12 growing season. The stakeholders believed that contract farming would guarantee farmers’ inputs and market, as well as a stable price and income, since contract farming requires ginners to pay up front upon delivery. Farmers have been eager to enter into contracts with ginners, as they provide farm inputs on credit with an agreement to recover input expenses after the sale of cotton lint. The TCB oversees the contract performance to protect the interests of both parties. Ginners are required to provide loans to farmers for inputs, which are offset during the selling season between the farmers and the ginner. All the money for these loans is collected through the Cotton Development Trust Fund (CDTF) from ginners and distributed to farmers. In this way, cotton dealers are led to invest, becoming directly involved in the industry rather than remaining mere traders of the commodity, which in turn is expected to improve yields and quality. In the 2011/12 season, through 5,565 farmers’ business groups, about 62% (311,000) of the estimated 500,000 cotton growers in Tanzania signed contracts with ginners and have received inputs on credit.

While contract farming is important to facilitate sector-wide coordination, so that individual ginners may concentrate on competing in output and export markets, it has also brought about many difficulties. One of these is the exposure of some ginners to free-riding by cotton-buying competitors when producers side-sell cotton. Addressing this problem requires ginners to seek ways to restrain the actions of competitors (horizontal coordination), which in turn would result in excessive transaction costs on their side. Another issue with contract farming has been the failure of some producers to deliver high-quality seeds. Ginners and other actors in the supply chain must ensure comparable grading practices in the sector.

Farmers need to be organized to deal with ginners, and farmers’ associations in Tanzania have a huge role to play in increasing the bargaining power of those involved in contractual farming, but these groups are not well coordinated. The government and other development partners must facilitate the process of organizing seed cotton farmers into functioning groups.

2. Increased Organization of Cassava Farmers to Improve the Cassava Value Chain

Smallholder farmers in the cassava sector tend to act individually and thus exert little influence on credit institutions and input and output markets. This situation is now changing. Several NGOs, along with projects or programs supported by development partners involved in commercializing cassava in Tanzania, are promoting farmers’ organizations for lobbying, advocacy, facilitating cassava processing, and access to input and output markets for cassava. These include VECO-Tanzania, which is active in Mkuranga; CAVA, a Bill and Melinda Gates Foundation–funded project, which is active in Mtwara; the Common Fund for Commodities (CFC); the IITA; and the Great Lakes Cassava Initiative of Catholic Relief Services. A cassava situation analysis carried out in 2009 by the CAVA project revealed 72 cassava groups in the Mtwara Region, whose existence was confirmed during our recent field survey in Mtwara Rural District. Farmers’ organizations were also observed to exist in the Rufiji District, Morogoro Rural District, and Misungwi District during the field survey.

Apart from their promotion of groups for the above-named reasons, some NGOs and projects are making efforts to link groups to local banks for credit by providing credit guarantees to the bank and full technical assistance to the beneficiaries. Alternatively, some have developed microfinance institutions suitable for cassava, which were
D. Opportunities for Improving Processor-to-Market Logistics

1. Complex Contract Schemes Between Milk Aggregators and Processors

This report looks at evolving milk bulking and collection models in a number of districts. In practice, these systems vary between regions, districts, and specific milk sheds. In the cooperative model, member producers collectively deliver their milk at designated MCCs, which are owned by the cooperatives themselves. The cooperative then either looks for a market and negotiates a price or engages in value addition by processing and sometimes marketing. Producers are supported by the cooperative to access inputs or even training relevant to their production. Payments to members are made not on delivery, but on either a bimonthly or monthly basis. Members contribute a small amount (approximately 3% of the price of a liter) through deduction to cover the costs of milk collection and running the cooperative. The determination of basic quality control measures rests with the cooperative through the MCCs. This cooperative model was explicit and observed in Tanga, Kilimanjaro, and Arusha.

2. Introduction of Modern Cassava Processing Units

An assessment of mechanized cassava-processing groups in Tanzania by Abass et al (2013) showed that the number of such groups increased from about eight in 2003 to more than 120 in 2010. The rapid growth in mechanized activities seems to indicate a long-unfulfilled desire to mechanize cassava processing, and the recognition by local governments, NGOs, and development agencies of the opportunities to improve livelihoods through mechanization. Adoption was found to be highest in the eastern zone of Tanzania, followed by the southern zone.

E. Opportunities for Product Development and Market Channel Development

1. Introduction of HQCF

Initiatives to improve cassava processing in Tanzania date back to 2003, with the introduction of new technologies to enable smallholder producers to generate HQCF. As mentioned earlier, private entrepreneurs have recently emerged to exploit the potential market for HQCF, but only four of them, each with a relatively large market share, use modern processing equipment. However, the quantity of HQCF produced by these processors is not constant, given the generally unreliable cassava supply from smallholder farmers. The number of modern processors generating a constant supply of HQCF also declines during the rainy season due to a lack of appropriate cassava drying technology.

2. Production of Cottonseed Cake for the Livestock Feed Sector

The demand for animal feed from alternative sources, such as cottonseed, has been growing along with the modernization of the livestock subsector. Pathways to modernizing the livestock sector have involved upgrading breeds and intensified rearing, which requires adequate supplies of quality industrial feeds—and hence a vibrant animal feed sector. Feed, especially for intensively kept animals, such as dairy cattle, poultry, and pigs, accounts for 60% of overall production cost (Kadigi, 2014).

Apart from intensive dairy, poultry, and pig production systems, beef cattle fattening, especially in the lake zone, has recently emerged as an enterprise, increasing the demand for cottonseed cake and other industrial feeds in the region. According to Mlote et al (2012), this increased demand led to a corresponding increase in the prices of cottonseed cake and other feeds during the 2011/12 season; however, prices declined substantially in the 2012/13 season.
IV. Value Chain Rearrangement Simulations and Implications for Poverty

One of the objectives of this report is to produce empirical evidence of the impact of policies targeted at various product value chains on both the price of the product and on poverty levels of both producers and consumers. To reach this objective, we studied the interplay between agriculture supply chains, farm constraints, and poverty in the cotton, cassava, rice, and milk value chains. We then mapped the existing supply chains, characterizing the existing market structures and domestic competition policies (regarding privatization, regulation, entry, mergers, etc.). At the farm level, we studied the constraints faced by smallholders in efforts to increase productivity and break the cycle in which low productivity exacerbates vulnerability to poverty. We also studied how market configurations and farm constraints interact to create useful instruments of poverty eradication.

To do all of this, we used a model of supply chains developed for this purpose by ACET. In this model, farmers must decide what to consume and what to produce given prices and various constraints, such as endowments, transport costs, production costs, and infrastructure access. In the case of exported cash crops (cotton), farmers sell products to oligopsonies, which then conduct the international trading. In the case of exported food crops (cassava), oligopsonies take charge of exports, but there is also a domestic residual market of Tanzanian net consumers of cassava. Finally, in the case of imported foodstuffs (rice and milk), excess demand is met via international trade, and net consumers must purchase these agricultural goods from oligopolies. In our experiment, we shocked the market structure of the supply chain and considered (arbitrary) changes in the number of firms and their market shares, as well as changes in complementary factors that could be affected by policies. We matched the resulting changes in market price with household welfare to measure the heterogeneous poverty effects.

The premise here is that policy will affect the value chain, either via the market structure or via complementary factors such as international price, marginal cost of production, fixed cost of production, endowment, risks of food insecurity, prices of complementary or substitute products, and demand. These variables will in turn affect the farm-gate price, which, depending on whether the farmer is a net producer or net consumer, will have an impact on poverty.

Table 4.1 displays the market shares for processors of cassava, cotton, milk, and rice in Tanzania. Cassava is traded mostly informally; of the formal processors, Ukaya, as outlined earlier in Table 2.2, processes 20 MT per week, or 34.48% of the market, followed by Mvinjeni, with 25.86%. The farm-gate price for cassava is freely determined by market forces. On the other hand, the government predetermines the minimum cotton price and subsidizes it to ensure improved welfare for farmers. The largest cotton processor in Tanzania, Kahama Cotton Company, controls around 8.35% of the market, followed by S&C Ginning with 8.07% and Kahama Oil Mills and Afrisian Ginning with 7% each.

Most of the milk produced in Tanzania is consumed at the farm level or sold to neighbors. In fact, less than 5% of production is formally marketed, while 70–80% is consumed or lost at farm level and the remaining 15–25% is sold fresh and unprocessed, through informal markets via informal traders. The approximately 55 milk processors in Tanzania produce about 130,000 liters of milk per day (32% of total capacity). Some players, including Tanga Fresh Ltd., own more than one processing unit. The market share of formal milk processors is such that the top two processors are responsible for about 50% of the total production. Prices for milk are freely determined by market forces.

3 Details about the model can be found in Depetris-Chauvin, Porto, and Mulangu (2015).
Rice marketing in Tanzania is very fragmented, with over 90% of production being controlled by small-scale traders. The remaining share of the market is shared among four major players, including the Southern Highland Company, Export Trading, Kilombero Plantations Ltd., and Mtenda Kyela Rice Supply Company. The first three of these are plantations, and the fourth is a large-scale trader that maintains a purchasing contract with about 15,000 farmers. Since the liberalization of the market, the rice market is free from government intervention and marketing boards. Both the producer and the wholesale prices for paddy in Tanzania are determined by market forces, as well as the international price of the commodity.

Table 4.1

<table>
<thead>
<tr>
<th>Cassava</th>
<th>Shares</th>
<th>Dairy</th>
<th>Company</th>
<th>Shares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most is informally traded, formal traders include:</td>
<td></td>
<td>Only 5% of the milk is formally marketed, of which:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sululu</td>
<td>17.24%</td>
<td>Tanga Fresh</td>
<td>27.0%</td>
<td></td>
</tr>
<tr>
<td>Ukaya</td>
<td>34.48%</td>
<td>Musoma Dairies</td>
<td>22.0%</td>
<td></td>
</tr>
<tr>
<td>Luna Investment/Kimaceco</td>
<td>22.42%</td>
<td>ASAS</td>
<td>6.0%</td>
<td></td>
</tr>
<tr>
<td>Mvinjeni</td>
<td>25.86%</td>
<td>Mara Milk</td>
<td>5.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tan Dairies</td>
<td>5.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other processors</td>
<td>35.0%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rice</th>
<th>Shares</th>
<th>Cotton</th>
<th>Company</th>
<th>Shares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Highland Company (Mbeya)</td>
<td>6.14%</td>
<td>Kahama Cotton Company</td>
<td>8.35%</td>
<td></td>
</tr>
<tr>
<td>Export Trading (Kapunga Rice Plantation)</td>
<td>5.67%</td>
<td>S&amp;C Ginning Co.</td>
<td>8.07%</td>
<td></td>
</tr>
<tr>
<td>Kilombero Plantation Ltd. (Morogoro)</td>
<td>7.71%</td>
<td>Kahama Oil Mills</td>
<td>7.07%</td>
<td></td>
</tr>
<tr>
<td>Mtenda Kyela Rice Supply Company</td>
<td>21.57%</td>
<td>Afrisian Ginning</td>
<td>7.05%</td>
<td></td>
</tr>
<tr>
<td>Other small-scale traders (many)</td>
<td>58.91%</td>
<td>Olam (T) Ltd.</td>
<td>6.92%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gaki Investment Ltd.</td>
<td>6.02%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fresho Investment Ltd.</td>
<td>4.80%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>NIDA Textile Mill</td>
<td>4.08%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jambo Oil Mill</td>
<td>3.88%</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>NGS Investments Ltd.</td>
<td>2.93%</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>BIORE</td>
<td>2.24%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aham Investment Ltd.</td>
<td>2.05%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>All others</td>
<td>36.5%</td>
<td></td>
</tr>
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</table>

Table 4.2: Cotton price changes and household welfare

<table>
<thead>
<tr>
<th>% Variation in Utility</th>
<th>Baseline</th>
<th>Leader Split</th>
<th>Leaders Merge</th>
<th>Exit of Largest</th>
<th>Equal Market Shares</th>
<th>Perfect Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competition Policy</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>International Price</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.01</td>
</tr>
<tr>
<td>Poor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competition Policy</td>
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<td>0.00</td>
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<tr>
<td>International Price</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Non-Poor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competition Policy</td>
<td>0.00</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>International Price</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.01</td>
</tr>
</tbody>
</table>
Table 4.3: Rice price changes and household welfare

<table>
<thead>
<tr>
<th>% Variation in Utility</th>
<th>Baseline</th>
<th>Leader Split</th>
<th>Leaders Merge</th>
<th>Exit of Largest</th>
<th>Equal Market Shares</th>
<th>Perfect Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competition Policy</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.02</td>
</tr>
<tr>
<td>International Price</td>
<td>-0.22</td>
<td>-0.22</td>
<td>-0.22</td>
<td>-0.22</td>
<td>-0.22</td>
<td>-0.21</td>
</tr>
<tr>
<td>Poor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competition Policy</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>International Price</td>
<td>-0.05</td>
<td>-0.05</td>
<td>-0.05</td>
<td>-0.05</td>
<td>-0.05</td>
<td>-0.04</td>
</tr>
<tr>
<td>Non-Poor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competition Policy</td>
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<td>-0.14</td>
<td>-0.14</td>
<td>-0.14</td>
<td>-0.13</td>
</tr>
</tbody>
</table>

Note: The above tables represent only the first-order impact on household welfare.

These results are expected, given the nature of the exercise considered here, and they are also comparable to those from existing literature on the topic (see the review in Lederman and Porto, 2014). Various elements must be taken into account. First, the income shares and budget shares used in the first-order approximation are typically small. Some products are relevant separately, on both the production side and the consumption side; however, a price change affects both households that are net consumers and those that are net producers, thus the net effect tends to be small. Second, for the products considered here, the market is already characterized by some degree of competition, thus leaving scant room for sizable price changes. The combination of small price changes with small net benefit ratios (Deaton, 1997) implies small impacts.

We found that the market structure within the products’ value chains can influence the poverty level of primary producers. While changing the market structure of food products has a negligible impact on poverty, it exerts noticeable effects in the case of cash crops. However, looking at changes in international prices, we note that the poverty implications of the change depend on the prevailing market structure. The greatest reduction in poverty results from a change in international price when the prevailing market structure is perfect competition. It is recommended that the government identify the barriers of entry to the various product value chains and design policies to remove them, as a competitive value chain will have positive implications for poverty reduction.
V. Policy Imperatives Arising

The policy recommendations made here are at the country level and derive from a number of observations. First, we looked at the value chain opportunities and emerging issues discussed earlier and determined the viability of the identified opportunities by taking into account the challenges and constraints. Second, we considered the results of the empirical simulations, which allowed us to draw conclusions about the poverty impacts of implementing policies to address value chain constraints. Here we discuss general recommendations targeting both the agricultural and the manufacturing sectors.

A. Efficiently Managing Government’s Interventions in the Agricultural Sector

Despite progress made toward adopting a more coordinated sectoral approach, with initiatives such as Kilimo Kwanza and the ASDS, agricultural policies in Tanzania are still implemented through myriad ad hoc programs and projects. Government decisions on trade, especially those relating to tariffs, are numerous and sometimes contradict other policy objectives. While markets have been liberalized to a great extent, indicative prices persist for several commodities; indeed, the government intervenes directly in pricing through the National Food Reserve Agency. Furthermore, commodity boards play a significant role in specific commodities (mainly export products, but also sugar). The agricultural sector is still subject to export taxes and high local taxation, and ad hoc interventions such as tariff waivers and export bans are frequent. It is important to manage both the initiation and the implementation of these policies so as to avoid misalignment with the vision of other ongoing policies.

B. Developing a Resilient and Sustainable Seed Multiplication and Distribution System

A key determinant of productivity, as noted earlier, is the use of improved cultivars. In general, farmers use the previous year’s harvest as seed due to high seed costs. This practice tends to reduce productivity in the long run, as older-generation seeds gradually become ineffective. It is therefore important to set up a sustainable seed multiplication and distribution network that reaches out to smallholder farmers. Setting up such a system will require a collaborative approach. MAFSC, in collaboration with MIT, can impose a progressive import tax (0.05%, for example) on imported milk, cassava, rice, and garments and use the tax revenue to finance a seed multiplication and distribution system for the respective products. In this way, more imports will result in more funding for seed multiplication and distribution.
C. Transforming Input Subsidies into Market-Smart and Sustainable Systems

There is still ample room for closing the yield gap, and fertilizer/input use is an important factor in improving production. However, governments are often obligated to subsidize inputs in order to make them accessible and affordable. As articulated by the World Bank’s 2008 World Development Report, there are good arguments for providing modest subsidies on strategic inputs such as fertilizer, but the way those subsidies are administered matters a lot. First, they should be designed to build markets by providing input vouchers redeemable through private input dealers. Second, the vouchers should be targeted insofar as possible to those who do not currently use fertilizer due to lack of credit, knowledge, or ability to withstand risks. Third, the subsidy should be modest in relation to other critical public expenditures, such as research and development, and there should be a clear exit strategy. This may entail strengthening financial and risk markets to reduce the costs and risks of the commercial use of fertilizer. While some input subsidy programs have some elements of this approach, most have failed on all of these criteria.

D. Facilitating Access to Land and Tenure Security

For farmers to be able to respond to policy incentives, ties to land and natural resources need to be recognized, clearly defined, identifiable on the ground, and enforceable at low cost. This will ensure that local people benefit from investments, while investors enjoy tenure security that encourages them to make long-term investments, e.g., in irrigation. The current land tenure system in Tanzania, especially among the Chagga people of northern Tanzania, discourages permanent land transfer (even by purchasing) outside the family. Instead, a father is expected to split his land among his male children, who will do the same for their children. In the end, future generations will inherit smaller tracts of land, keeping them in poverty. Today, modern information technologies and low-cost and participatory tools can greatly reduce the time and cost of formalizing property rights, at the individual and group levels. Ethiopia, for example, has successfully provided a title that recognizes inheritable use rights by both husband and wife to millions of farmers over the past decade, at the cost of US$1–2 per plot. Such low-cost interventions can be strategically implemented in other parts of the continent.

E. Developing Guidelines/Laws for Regulating Contract Farming Agreements

Contracts have become a common method for linking smallholder farmers to markets and other sectors, as noted in the “Synthesis of Emerging Issues” section. Agricultural contracting offers potential benefits for value chain actors due to the various types of guarantees it offers. However, there seem to be no clear regulations in place to govern these important agreements. Tanzania, for example, lacks enforcement of existing regulations relating to agribusiness transactions, especially those involving smallholder farmers. Consequently, agribusiness contracts are often violated, largely fueled by the absence of a relevant and specific legal framework and enforcement mechanisms to settle differences between principals and agents. It is important to assess the prevalence of contract farming in Tanzania (as it varies by product) and assess the nature and incidence of contract violations affecting agribusiness, including smallholder farmers. That information can be used to facilitate the development of a credible policy that provides a conducive regulatory environment for the enforcement of agribusiness contracts.
F. Addressing Energy Supply Disruptions in the Agro-Processing and Manufacturing Sectors

Lack of access to uninterrupted energy sources is a major limitation facing any initiative toward promoting an agro-processing sector. This report has already noted that a modern textile mill in Tanzania can be internationally competitive, so long as power supply disruptions are addressed. In the context of reducing agricultural manufacturing costs, energy access must focus on innovative policies designed to satisfy demand on the ground. While proposing concrete policy recommendations for Tanzania’s agro-processing sector may require a much more detailed study, we propose here general guidelines as identified by the United Nations Industrial Development Organization (UNIDO) in its 2011 publication *Agribusiness for Africa’s Prosperity.*

General energy policy alternatives include:

- **Incorporating decentralized energy distribution approaches.**
  Creating energy supply points in remote rural areas to provide needed energy services has the potential to encourage small- and medium-scale processing and production. Although small-scale decentralized energy is not the ultimate solution to an energy deficit, its role is crucial and must be incorporated into energy planning at all levels.

- **Improving locally available energy supply resources.**
  The hydroelectricity generation potential of the continent remains largely untapped, as is the potential for solar and geothermal energy sources. Large hydroelectric power projects have received bad press of late, in part due to their social and environmental costs. As the debate over new hydropower projects continues, the continent lags behind, with only 1,500 hydroelectric dams out of a world total of 45,000.

- **Matching energy technologies with needs.**
  The design of energy systems for the agro-processing sector should be driven by areas of greatest need—namely, electricity for heating, cooling, and mechanical services. The basis of the plan should be aimed at meeting specific needs and not simply supplying energy.

- **Financing energy services.**
  Considering the reduced effectiveness of the public–private partnership (PPP) model associated with the recent financial crisis, which led international banks to shy away from long-term loans, an emerging source of financing called carbon finance is now gaining recognition in developing countries. Carbon finance is suitable for investments in agro-processing infrastructure, such as the Clean Development Mechanism (CDM), which aims to reduce greenhouse gas emissions while providing funds for development in developing countries at the same time. Projects such as wind farms and solar panels can easily be financed via the CDM.

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Implementing the above policy recommendations will require mobilization of financial resources and human capital and revamping policy priorities. In this section, we first discuss how ordinary budget allocation can help support these policy recommendations. Second, we argue that agricultural policies must be aligned with industrial activities in order to ensure that agriculture exists not only to provide food security but also to fuel the manufacturing sector. Third, we discuss how the roles of value chain stakeholders, including policy makers, can be efficiently synchronized.

A. Revisiting Current Agricultural Financing Priorities

Public spending is one of the most direct and effective instruments that governments can use to promote agricultural transformation and poverty reduction simultaneously. Yet public agricultural spending in Africa has historically been very low compared with that of other developing regions. In 2003, the initiators of the CAADP sought to address this by getting sub-Saharan African countries to pledge to increase government support to agriculture in order to achieve the goal of 6% annual agricultural growth. One of the ways identified to achieve this goal was to encourage African heads of state to allocate 10% of their national budgets to agriculture.

Unfortunately, many African governments, including Tanzania’s, operate in an environment of scarce public resources, and so far only a few countries—Burkina Faso, Ethiopia, Mali, and Malawi—have met these growth and spending targets. Modern-day Tanzania has never allocated more than 9% of its budget to agriculture, and the growth rate of the sector has never reached 6%, as illustrated in Figure 6.1 below. One of the major setbacks governments face as they work to increase agricultural spending is the dearth of information about which types of agricultural investments contribute the most to development goals (Fan, Mogues, and Benin, 2009). While many believe that increasing budget allocation to agriculture is important, a greater understanding is needed about the types of expenditures that bring the most value for money in agribusiness.

Figure 6.1: Share of national budget to agriculture and annual growth of agricultural sector (in %)

Source: WDI Online and MAFAP, 2013
Regardless of Tanzania’s government policies, there must be a way to allocate resources across different agricultural subsectors, whether by way of agriculture-specific policies, industrial policies, general agriculture support policies, or specific product support. Agriculture spending may also come in the form of payments to primary producers, as subsidies or income support; to consumers by way of food aid, cash transfers, and other poverty alleviation support; and to input suppliers or to agro-processors. The fundamental goals of this spending are to increase efficiency, maximize productivity, and reduce poverty. In some cases, governments may have clear principles on how to prioritize scarce public resources, but they often lack the requisite information to formulate policies, outline principles, and design strategies.

Looking at the way the government of Tanzania allocates its product-specific expenditures, we note that 17% of specific expenditure on crops went to rice. Eighteen percent of rice-specific expenditure on subsidies went to variable inputs, and only 2% of rice-specific expenditure was spent on research, training, and extension. Moving rice up the value chain will require serious investments in research and extension. This expenditure should target seed multiplication and distribution activities in order to create a sustainable model.

Milk research, extension, and marketing received even less, with 0.04% of agriculture-specific expenditure going toward these activities and 5.7% going toward input subsidies; research, training, and extension; storage; and marketing. We have already identified AI as an activity that should be strategically subsidized by the government at first, which will necessitate an increase in budget allocation.

Cotton is individually targeted by 0.26% of agriculture-specific expenditure in research, extension, training, and subsidies on variable inputs. In general, cotton is seen as a ginner’s crop, subject to less government responsibility. In addition, the sector has received ad hoc support to improve farmers’ access to both inputs and insecticides.

<table>
<thead>
<tr>
<th>Rice</th>
<th>Milk</th>
<th>Cotton</th>
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<tr>
<td>• Expenditure targeting crops: 17% of agriculture-specific expenditure in input subsidies; research, training, and extension; storage; and marketing</td>
<td>• Expenditure targeting livestock: 5.7% of agriculture-specific expenditure in input subsidies; research, training, and extension; storage; and marketing</td>
<td>• Expenditure targeting cotton and coffee: 0.01% of agriculture-specific expenditure in marketing</td>
</tr>
<tr>
<td>• Expenditure targeting maize and rice: 18% of agriculture-specific expenditure in subsidies to variable inputs</td>
<td>• Dairy individually targeted by 0.04% of agriculture-specific expenditure in research, extension, and marketing</td>
<td>• Cotton individually targeted by 0.26% of agriculture-specific expenditure in research, extension, training, and subsidies on variable inputs</td>
</tr>
<tr>
<td>• Expenditure targeting cereals: 2% of agriculture-specific expenditure in research, training, and extension and strategic grain reserves</td>
<td></td>
<td>• Transfer of TSh 4,390/MT of seed cotton to farmers for purchase of insecticides in 2009; TCB paid price support transfer of TSh 80,000/MT of seed cotton in 2010</td>
</tr>
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Budget allocation says a lot about a government’s agricultural priorities. While the policy documents highlight the priority areas of the government, the budget allocation does not necessarily follow through. In Tanzania, the focus is mainly on providing subsidized inputs (mostly fertilizers) to both maize and rice producers. However, one of the main avenues identified for further value addition is ensuring the accessibility and affordability of improved seeds for crop production and services, such as AI in the case of milk. From the simulation results, we found that the welfare of processors is linked with that of farmers, so ensuring affordable access to inputs such as electricity, a crucial input downstream, can mitigate farmers’ poverty levels. We first recommend that the current fertilizer subsidy program insert a graduation feature, whereby better-off farmers will eventually no longer qualify for the subsidy. In this way, some resources can be reallocated to leverage the value addition opportunities mentioned above. We caution that policy makers should not jump straight into investment in the “low-hanging fruit” opportunities identified earlier; rather, these should be preceded by a proper cost–benefit analysis to determine the value for money associated with various value addition options.

B. Aligning Agricultural and Industrial Policy

Very often, agricultural policies are drafted independently of industrial policies. In fact, the only common theme between agricultural and industrial policies is the goal of contributing to the national vision. As a result, agriculture remains a sector reserved exclusively for addressing food security because no real incentives are in place to connect it with the manufacturing sector. Policies designed by MIT to promote agro-processing are implemented without taking into account the realities of the agricultural sector and therefore seldom reach their objectives. Thus it is important for industrial policies to be aligned with agricultural policies, not only for traditional cash crops but also for food crops and other products that present viable value addition opportunities in the manufacturing sector.

**Box 6.1: Industrial policy**

Industrial policy is not restricted to industrial products, despite its obvious reference to industry. Ansu (2013) argues that industrial policies include policies aimed at expanding or upgrading the production and export of a particular set of agricultural products, service activities, and manufacturing activities.

Reviewing the results from the simulation exercise, we first note the importance of the market structure of value chain players, especially those who deal directly with farmers. Yet this does not necessarily mean that perfect competition is the best arrangement. The ideal market structure depends on whether the product is a net import or a net export. Industrial policies must therefore ensure that the right market structure is encouraged depending on the trade status of the product so that farmers can get the best price.

In the case of Tanzania, and specifically for the four products under study, we have found a number of ways in which policy makers in both the agricultural sector and the manufacturing sector can join forces. In the rice sector, we found that quality of rice is an important area for value addition. Discussions have taken place about introducing processing standards for all rice sold to consumers; at the same time, farmers are being encouraged to adopt improved rice varieties appropriate to the agro-ecological features of their production areas. However, the current machines used by rice millers (especially small- and medium-scale ones) are designed to process a specific type of paddy, which may differ from the ones local farmers are producing. As a result, processed high-yield rice may be susceptible to breaking during processing and thus fetch a lower price in the market. For that reason, industrial incentives must be geared toward promoting quality by subsidizing milling machines to take account of the local varieties adopted by farmers. The machines promoted must be adequate to the paddy varieties produced in each area, so that millers can deliver on quality by ensuring a low percentage of broken rice or damages associated with processing non-mature paddy.
Box 6.2: Steps for developing industrial policy

(1) An important point from which to begin aligning agricultural policies with industrial ones is in activities or sectors where the country has a comparative advantage. However, finding these sectors may not be straightforward. It will require the government to identify what it is relatively good at and can do cost-effectively relative to neighboring countries and sub-regional or regional neighbors.

(2) Once these areas are found, it is important to identify and support business opportunities to leverage them. The government should prioritize those areas already spontaneously entered by some domestic private firms and try to identify: (i) the obstacles that prevent these firms from upgrading the quality of their products or services, and (ii) the barriers that limit entry to those industries by other private firms.

(3) The government can then implement policies to remove these constraints, both downstream and upstream, and use randomized control trials (RCTs) to test the effects of these policies so as to ensure the effectiveness of scaling them up at the national level.

We argued earlier that efforts toward promoting adoption of bitter cassava varieties must be accompanied by the provision of incentives for processors who can transform the cassava into inputs for the manufacturing sector. However, doing business with a large number of smallholder farmers can be very expensive. The coordination costs can seriously undermine the benefits associated with processing HQCF, especially considering the high cost of transporting cassava. It is important to determine this coordination cost and put in place a scheme that rewards processors that have proven themselves capable of working with smallholder farmers, but face constraints associated with coordination. Further, first-mover incentives must be introduced to reward downstream value chain players that include cassava-based products in their activities.

The integration of smallholder farmers in the rest of the value chain is generally believed to stimulate economic growth and poverty alleviation. The introduction of contract farming between farmers and off-takers, and among downstream value chain players, has led to the emergence of private-sector standards; however, increasing standards may result in the marginalization of poor farming households who cannot afford the additional cost associated with meeting them. In Tanzania, this problem is faced by cotton producers, who are influenced by political economy pressures preventing them from meeting the standards imposed by private ginneries. Milk processing also requires strict safety and hygiene standards, which preclude most smallholder producers from participating in the value chain. The standards bureau, with contributions from both MAFSC and MIT, must first develop standards. Second, farmers must be encouraged to use collective action to help address some of the additional costs associated with meeting private standards. The government should help establish the necessary platform for farmers to come together and leverage their mutual social capital.
C. Synchronizing Stakeholder Engagement: Advocacy Platforms

One of the hallmarks of agricultural transformation is that it transcends the responsibility of several ministries—agriculture, industry and trade, finance and economic planning—as well as specialized units. Agricultural transformation is a matter of national interest and requires the participation of all stakeholders. Coordinating all of these stakeholders can be a daunting task. One approach enjoying some success in emerging countries is to set up a dedicated and highly skilled agricultural transformation promotion team, consisting of government officials from the MAFSC, MIT, MoF, and the office of the president or prime minister, as well as leading outside experts. This team should have sufficient stature and experience to effectively interact with the private sector, including multinational firms, and all the stakeholders mentioned earlier. Coordination of donor efforts is another important role for such a team. The team would identify key areas where the government should intervene in order to facilitate the alignment of agricultural policies with industrial policies, influence budget allocation, and serve as a convening platform for the necessary stakeholders. High-level agricultural transformation units have recently been established in Ethiopia and Nigeria, a development from which Tanzania can learn.


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