

PROSPECTS FOR THE SECTORAL TRANSFORMATION OF THE RURAL ECONOMY IN TANZANIA: A REVIEW OF THE EVIDENCE

By

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ABSTRACT

To guide economy-wide modeling efforts to identify specific public investments under Tanzania's second Agricultural Sector Development Programme (ASDP II), this report provides an analysis of the performance of the rural economy of mainland Tanzania over the period 2008 through 2015, with a focus on the agriculture sector. More broadly, we seek to assess the nature and extent of any structural transformation in the rural economy by understanding trends in various components of it. The insights gained will then be used in the economy-wide modeling work to propose portfolios of public investments to foster both agricultural development in the short term—in alignment with the ASDP-II—and, in the longer-term, a sectoral transformation of the rural economy in which far fewer households rely solely on agriculture for their livelihoods.

International data sets were used to examine the macroeconomic performance of the economy of Tanzania as a whole, trade performance, trends in labor productivity by sector, and aggregate crop production. To compile information on employment and several features of agricultural production—crop and livestock production, use of inputs, and agricultural commercialization—plus food consumption patterns, we analyze data from the Tanzania National Panel Survey to generate economic performance indicators specific to the rural mainland.

Encouraging trends are seen along several dimensions, including in changes in food consumption patterns, uptake of improved seed, and an increase in the share of crops harvested that are sold. However, we also see a generally stagnant agricultural sector, maize productivity levels that are scarcely moving, a seemingly moribund livestock sub-sector, and a breakdown in the provision of technical information to farmers. In sum, despite some positive signs, the rural economy in Tanzania is not yet on the threshold of significant changes in its structure. It is unlikely that rural households will soon be as likely to pursue non-agricultural livelihoods as to engage in farming. Given these findings, using the economy-wide model for Tanzania, we next will assess a range of possible public investments that might be made to accelerate the positive trends observed and to address those factors hindering Tanzania from significant economic growth and transformation, particularly in the agricultural sector.

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ACRONYMS

ASDS-II	Agricultural Sector Development Strategy
ASPIRES	Agricultural Sector Policy and Institutional Reform Strengthening
CAADP	Comprehensive Africa Agriculture Development Programme
EAC	East African Community
FAOSTAT	Database of the Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GGDC	Groningen Growth and Development Centre
IFPRI	International Food Policy Research Institute
MSME	Micro, Small, and Medium Enterprise
MSU	Michigan State University
SADC	Southern African Development Community
SAM	Social Accounting Matrix
TAFSIP	Tanzania Agriculture and Food Security Investment Plan
TLU	Tropical Livestock Unit
URT	United Republic of Tanzania
USAID	United States Agency for International Development
USD	U.S. Dollar

1. INTRODUCTION

This report provides an analysis of the performance of the rural economy of mainland Tanzania over the period 2008 through 2015, with a focus on the agriculture sector. The purpose of this analysis is to establish the baseline condition of the rural economy to guide economy-wide modeling efforts aimed at identifying a portfolio of specific public investments under Tanzania's second Agricultural Sector Development Programme (ASDP-II) over the period 2017/18 to 2024/25 that are likely to be most effective in attaining the program goals of increased agricultural production, improved incomes and reduced poverty for rural households, and food security and improved nutrition (URT 2016).

With the support of its development partners, the government of Tanzania has been working since at least 2015 on the design of this program of action for the development of the country's agricultural sector. The ASDP-II is to replace an earlier program, the ASDP-I, that was launched in 2006. Based on the strengths and weaknesses associated with ASDP-I implementation, a revised Agricultural Sector Development Strategy (ASDS-II) was drafted in 2015 (URT 2015). The ASDP-II constitutes the implementation plan for the revised sector strategy. The ASDP-II is to be launched by government in late-2017.

The revised agricultural program seeks to increase production across Tanzania's agricultural sector; improve the incomes of smallholder farmers, particularly through encouraging them to practice farming as a business; and ensure food security for all Tanzanians. To achieve these goals, the principal mechanism will be the promotion of commercialization of smallholder production to contribute to the industrialization of the Tanzanian economy. A broad focus of the program will be the strengthening of specific high-potential commodity value chains—engaging with all stakeholders in those chains from input supplier to producers to various marketers to processors in a growing agro-industrial sector and on to consumers—to improve their effectiveness and profitability. Although the plan will promote improved delivery of public agricultural services nationwide, public investments in the focal commodity value chains under the ASDP-II will be spatially targeted to a limited number of high potential district clusters for each of those particular commodities, with scaling-up of successes more broadly across the country to follow later.

The ASDP-II, if implemented in full, is an ambitious and potentially expensive program. The budget over the life of the program from 2017/18 through 2024/25 is estimated at (U.S. Dollar) USD2.03 billion if the costs related to farm input subsidies and the national Strategic Grain Reserve are included, USD1.35 billion if those costs are excluded. As points of comparison for these costs, Tanzania's gross national product (GDP) in 2016 was estimated at USD47.4 billion and its proposed annual national budget for 2017/18 is USD14 billion. The costs of the ASDP-II could be managed within the current scope of the national budget if significant resources are provided by Tanzania's development partners for its implementation. The financing plan for the program proposes that government cover just under half of the costs, development partners contribute funds to cover about 43 percent through both a general basket funding and off-budget earmarked funding modalities, and beneficiaries co-finance the remaining 8 percent of the costs (URT 2016).

Stakeholders in the implementation of ASDP-II will seek efficient use of whatever financial, human, and institutional resources are dedicated to the program. Consequently, an investment plan for the

ASDP-II will need to be drafted, updating the Tanzania Agriculture and Food Security Investment Plan (TAFSIP) (URT 2011), which was launched in 2011 and was aligned with the first ASDP.¹

An economy-wide model for Tanzania is a useful tool for examining the likely range of development outcomes that would result from implementing different portfolios of public investments aimed at accelerating economic development in rural mainland Tanzania relative to current trends in the rural economy. The investment portfolios evaluated using such a model would differ according to the focus of investments across rural economic sub-sectors or commodity value chains; the salience of non-agricultural investments made in support of agriculture and rural development, such as in rural roads and market development; or the levels of investment actually disbursed under the various program components and sub-components of the ASDP-II. By comparing the development outcomes obtained in the model based on the various public investment portfolios evaluated, guidance is provided as to which portfolio is likely to provide the greatest returns to public investments under the ASDP-II in terms of the desired development outcomes of accelerated agricultural productivity; job creation, increased incomes, and reduced poverty; and improved food security and nutrition. The ranking of the development effectiveness of different public investment portfolios obtained through the economy-wide model analyses has obvious application in formulating an investment plan for ASDP-II.

In this paper, we provide an assessment of baseline, ‘business as usual’ trends in the performance of various sub-sectors or dimensions of the rural economy of mainland Tanzania, disaggregated into different analytical regions. This assessment is done by reviewing recent secondary information on economic performance in Tanzania, as well as some analysis of primary data from the four rounds of the Tanzania National Panel Survey, 2008/09; 2010/11; 2012/13; and 2014/15.² This analysis provides the baseline conditions against which the results of applying different potential public investment portfolios under the ASDP-II within the economy-wide model for Tanzania should be compared to assess the significance of the potential development outcomes each investment portfolio evaluated might provide. The results of the economy-wide model analyses of potential investment portfolios will be presented in a forthcoming paper.

¹ The TAFSIP also was aligned with the principles of the Comprehensive Africa Agriculture Development Programme (CAADP) and has served as the investment plan for the CAADP Compact for Tanzania, which has been centered on implementation of the ASDP-I.

² The Tanzania National Panel Survey is a program of the National Bureau of Statistics of the government of Tanzania, working in collaboration with the Living Standards Measurement Study - Integrated Surveys on Agriculture project of the World Bank.

2. PROSPECTS FOR THE SECTORAL TRANSFORMATION OF THE RURAL ECONOMY IN TANZANIA – A STUDY

2.1. Overall Study Description

The assessment of the development effectiveness of candidate portfolios of public investments under the ADPS-II through economy-wide modeling is the central analytical piece of a program of research that staff from Michigan State University (MSU) and the International Food Policy Research Institute (IFPRI) are doing in 2017 as part of the Agricultural Sector Policy and Institutional Reform Strengthening (ASPIRES) project. The objective of the overall project is to accelerate Tanzania's adoption of more effective policies and programs to drive broad-based agricultural sector growth, improve household food security and nutrition, and reduce poverty. ASPIRES is led by MSU using funding provided by the Tanzania mission of the United States Agency for International Development (USAID/Tanzania) and is implemented in close collaboration with agencies of the government of Tanzania, particularly the Ministry of Agriculture, Livestock and Fisheries. The economy-wide modeling work, from which this paper is a first output, is but one of several activities under ASPIRES.

While the applied focus of the research is the design of a suitable national investment plan for ASDP-II, our broader interest is to better understand the dynamics of sectoral transformation processes in the rural economy of mainland Tanzania and how different public investments should be prioritized to sustain broad processes of economic transformation, not only within the agriculture sector. Rural Tanzanians need to see an expansion of remunerative employment opportunities in non-agricultural sectors of the rural economy. Such jobs will enable them to engage in more specialized household livelihood strategies that will involve movement away from agriculture for many households and for rural households to increasingly rely on the market, rather than own-production, for the food that they consume. If successfully achieved, the economic transformation process, in addition to providing secure livelihoods for many more Tanzanians outside of agriculture, also will result in a more productive and profitable agricultural sector, as farmers produce for a much larger domestic market than is currently in place.

In consequence, the broader interest in the assessments presented in this paper is to judge the nature and extent of structural transformation in the rural economy by understanding trends in various components of it. Patterns seen in current trends in various dimensions of the rural economy will then be used in the economy-wide modeling work to propose portfolios of public investments to foster both agricultural development in the short term—in alignment with the ASDP-II—and, in the longer-term, a sectoral transformation of the rural economy with far fewer households relying solely on agriculture for their livelihoods.

The results of the analyses presented in this paper will permit us to determine whether there is much dynamism in the rural economy of mainland Tanzania to speak of and, if so, whether the changes observed are conducive to a sectoral transformation of that economy to one that increasingly finds household pursuing economic activities that are not based on the farm or in agriculture. If such changes are observed, the economy-wide modeling simulation exercise will assist in identifying which particular value chains or enterprises are most implicated in sectoral transformation processes. The most dynamic value chains will likely be among those on which ASDP-II implementation should focus and towards which public investments should be directed.

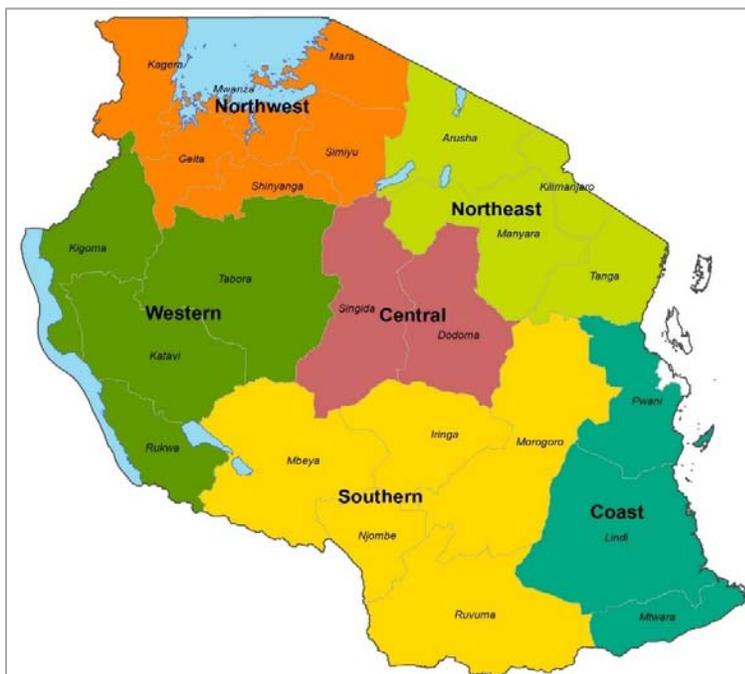
2.2. Economy-wide Model for Tanzania

To provide a clearer context for the analysis to which the trend analyses presented in this paper will contribute, here we describe the economy-wide model. The model for Tanzania is a computable general equilibrium model that simulates the functioning of a market economy, including markets for products and factors, i.e., land, labor, and capital. The model measures how impacts of shocks to the economy—such as the shock of various types of large programs of public investment in the agricultural sector, as proposed under the ASDP-II—are mediated through relative price changes and resource reallocations. The model ensures that resource and macroeconomic constraints are respected, such as when inputs or foreign exchange are limited. The model provides a consistent *simulation laboratory* for quantitatively examining value-chain interactions and spillovers at national, sub-national, and household levels.

In the model, the economy of Tanzania is divided into sectors and household groups that act as individual economic agents. This is done through creating and regularly updating a detailed Social Accounting Matrix (SAM) for the Tanzanian economy. The SAM for Tanzania contains highly disaggregated information on both farm and non-farm sectors across different regions of the country and also takes into consideration monetary flows between institutions within the economy. For purposes of evaluating investment portfolios for the ASDP-II, the highly disaggregated agricultural sector in the SAM with 26 agricultural sub-sectoral accounts allows for assessments to be made of the development impact of quite narrow, sub-sector specific public investments.

Moreover, insofar as available data permits, the SAM is spatially disaggregated to allow for regional-level assessments of the economic effects of simulated shocks to the economy. For the study here of the rural economy of mainland Tanzania, six analytical regions have been created, as shown in Figure 1.

Figure 1. Map of Analytical Regions of Rural Mainland Tanzania for Study of Potential Rural Economic Transformation Pathways



Source: Authors' analysis.

The regions are defined based on spatial patterns of agricultural production, agricultural commercialization, and rural livelihoods, while respecting regional administrative boundaries. This spatial disaggregation allows for closer consideration of where in Tanzania significant returns to various investments in the rural economy are likely to be realized, providing guidance for the spatial targeting of investments. This geography of rural mainland Tanzania is used in this paper in several of our assessments of current trends in the rural economy.

Within the model, producers maximize profits and supply outputs to national markets, where those outputs may be exported or combined with imports depending on relative prices, with foreign prices affected by exchange rate movements. Producers combine factors and intermediate inputs using sector-specific technologies. Maize farmers, for example, use a unique combination of land, labor, tools, fertilizer, and purchased seeds. Workers are divided by education levels, and agricultural capital is separated into crop and livestock categories. Labor and capital are in fixed supply, but less-educated workers are treated as underemployed. Producers and households pay taxes to the government, which uses these and other revenues to finance public services and social transfers. Remaining revenues are added to private savings and foreign capital inflows to finance investment, i.e., investment is driven by levels of savings. The economy-wide model is dynamic, with past investment determining current capital availability.

Finally, the model tracks changes in incomes and expenditures for different household groups, including changes in food and non-food consumption. Poverty impacts are measured using survey-based microsimulation analysis. Individual households in the 2012 Tanzania Household Budget Survey are assigned to one of the model's household groups. Estimated consumption changes in the model are applied proportionally to the survey households and post-simulation consumption values are recalculated and compared to a poverty line to determine changes in poverty status for the survey households. This household-level application of the modeling results also is extended to estimate changes in household food consumption patterns.

An output of collaboration since the mid-1990s between economists and government agencies in Tanzania and IFPRI researchers, the economy-wide model for Tanzania has been regularly updated to allow its use in the timely planning of various public policies and programs. A range of policy issues in Tanzania have been examined by using the model to run policy scenarios to evaluate their impact on economic growth, household welfare, and food security, e.g., Wobst 2001; Mduma and Wobst 2005; Sebens and Wobst 2005; Pauw and Thurlow 2012; Arndt et al. 2012; Diao et al. 2013; and Thurlow et al. 2016.

3. EVIDENCE OF SECTORAL TRANSFORMATION IN THE RURAL ECONOMY OF TANZANIA, 2006 TO 2016

3.1. Evidence of Sectoral Transformation in the Rural Economy of Tanzania, 2006 to 2016

To examine changes in dimensions of the rural economy of mainland Tanzania, several different data sources were examined. International data sets were used to examine the macroeconomic performance of the economy of Tanzania as a whole, trade performance, trends in labor productivity by sector, and aggregate crop production. No consistent spatially-disaggregated time-series of information specific to the mainland rural economy alone is available on these topics, so a national perspective necessarily was adopted. However, in compiling information on employment and several features of agricultural production—crop and livestock production, use of inputs, and agricultural commercialization—plus food consumption patterns, we could make use of data from the four rounds of the Tanzania National Panel Survey to generate economic performance indicators specific to the rural mainland.

For each of the dimensions of economic change considered, only selected highlights are presented. These are enough to indicate whether much dynamism is seen in that component of the mainland rural economy. For most, more in-depth analyses would be possible. However, for the broad objective here of informing the planned analyses using the economy-wide model for Tanzania, the broad overview of each dimension is sufficient.

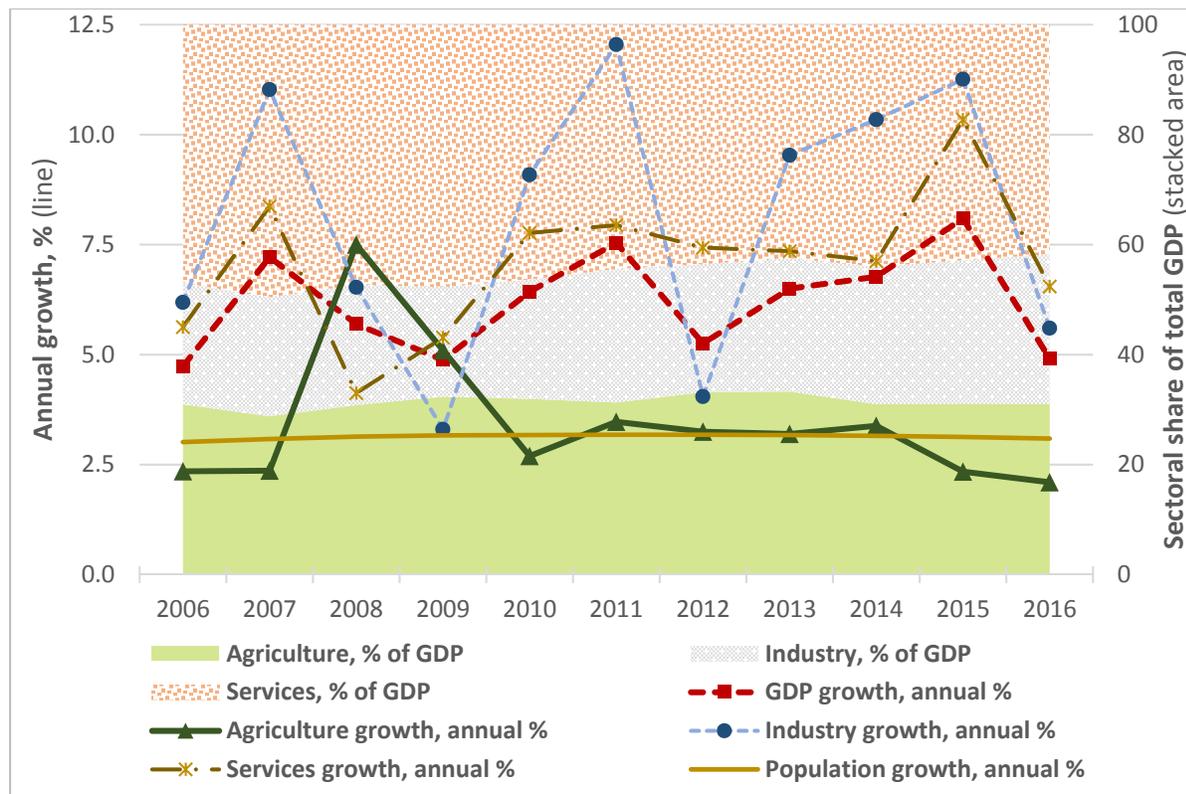
3.2. Macro-economic and Economic Sector Performance

Data on the annual sectoral performance of the national economy of Tanzania over the 11-year period from 2006 through 2016 are presented in Figure 2. Overall annual growth of the economy as reflected in the growth in the GDP is encouraging—average annual growth has been at 6.2 percent over this period and has always exceeded the annual growth of the population.

However, for our purposes of examining how public investments might best accelerate performance in agriculture, the key point to draw from Figure 2 is that the performance of Tanzania’s agricultural sector is lagging relative to the other sectors of the economy. Growth of the sector over past 11 years has only matched population growth, and no more. The agriculture sector, in the broadest analysis, is not a significant contributor to improved household welfare, only just able to meet the needs for food and agricultural products of the growing Tanzanian population. Dynamism in the Tanzanian economy over the past decade has been elsewhere than in agriculture.

While overall changes in the sectoral shares of the economy are not strong, the growth of the industry sector is the strongest, rising from a 20 percent share of the economy in 2000 to 27 percent in 2016, generally taking share away from the services sector, rather than agriculture. (Agriculture’s share over this period remained relatively steady at around 31 percent.) However, the high volatility in annual growth rates of the industry sector of the Tanzania economy, suggests that this growth is from sectors that are exposed to global commodity price movements, as would be the case for mining, or to swings in domestic economy factors, such as might affect the construction sub-sector. In contrast, annual growth in the services sector over this period has been more consistent, if lower on average than in the industry sector.

Figure 2. Sectoral Economic Growth and Sectoral Share of the Economy in Tanzania, 2006 to 2016



Source: World Bank 2017.

While these data are for the Tanzanian economy as a whole, they suggest that the agricultural sector currently is not a significant source of wealth creation for the many rural Tanzanian households engaged in agricultural livelihoods. However, we also do not see a close correlation between the performance of the agricultural sector and the performance of the Tanzanian economy overall. Even as the agricultural sector has exhibited no faster growth since 2010, growth in the Tanzanian economy as a whole accelerated between 2013 and 2015, before slowing in 2016. While a longer time-series would need to be examined to draw conclusive evidence, this suggests that the Tanzanian economy overall is now not as vulnerable to agricultural production shocks, such as those arising from drought or pests, as it likely was in the past.

Although the focus of this report is on the performance of the rural economy of mainland Tanzania, with particular attention to agriculture, both private and public investments in agriculture are an important driver of that performance. Public investment in agriculture in Tanzania overall has not approached the target under the Comprehensive Africa Agriculture Development Programme (CAADP) of 10 percent of public budget being allocated to agriculture. Figure 3 shows that the share of agriculture in the national budget increased in the years following the signing of the Tanzania CAADP Compact in July 2010, but never exceeding 5 percent, and has since declined. Concurrently, private investment in agriculture has also been challenging, as lending to agriculture by banks has been also declined in recent years. Moreover, lending by banks mostly goes to trading and agro-processing. Consequently, reductions in public investments in agriculture, most of which are directed towards primary production, may have a knock-on effect of reduced private investment in post-harvest activities by agro-business, leading to a decline in those sub-sectors.

Figure 3. Share of the Annual National Government Budget for Tanzania Allocated to the Agricultural Sector, 2005/06 to 2015/16



Source: 2015/16 Tanzania agriculture sector performance and public expenditure review (URT 2017).

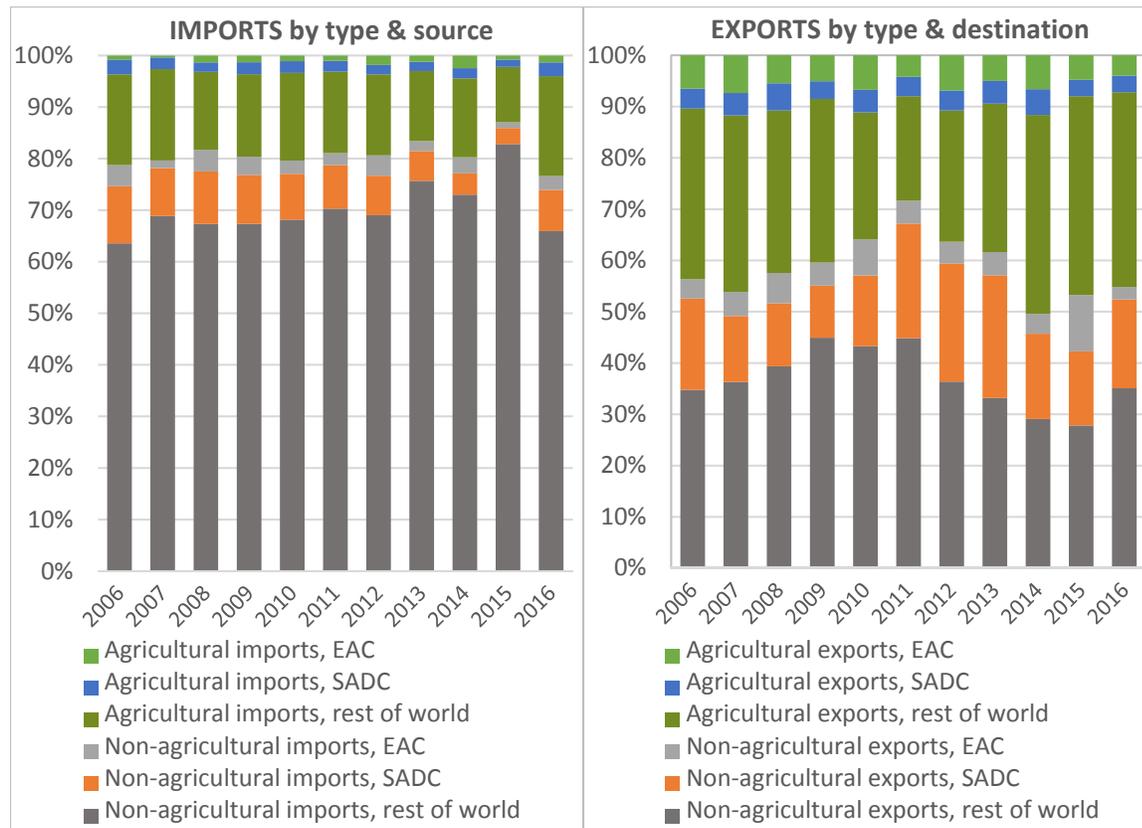
3.3. Trade Performance

The share of exports and imports of Tanzania by value, disaggregated by agricultural and non-agricultural categories and by source/destination are presented in Figure 4. Overall, the value of imports to Tanzania are significantly greater than the value of its exports—between 2006 and 2016, the annual value of imports exceeded those of exports by on average a ratio of 2.3 to 1.0 with an average annual trade deficit of USD5.3 billion. Petroleum products constitute the most important category of imports.

However, trade in agricultural products is more balanced, as shown in Figure 5, which tracks the balance in trade of agricultural products between 2006 and 2016 by source/destination. Among imports, only about one-fifth of them by value are agricultural, the most important agricultural imports, varying by year, are fertilizers, wheat grain or flour, vegetable oil, and sugar. However, over the past decade, generally between 40 and 50 percent of Tanzania’s exports by value have been agricultural (Figure 4). While gold and precious stones is the largest category of exports from Tanzania, several agricultural exports follow, including tobacco, cashew, grain legumes, coffee, tea, cloves, oilseeds, and cotton.

In recent years, the balance in trade in agricultural goods has turned positive, as shown in Figure 5. While this might ostensibly be seen as a positive economic development, suggestive of a more competitive export agriculture sector, the positive balance in trade is a result, at least in part, of the winding down of the National Agricultural Input Voucher Scheme in 2013. This government program, supported by the World Bank, was designed to provide subsidized farm inputs to 2.5 million farmers in 65 high agricultural potential districts over a six-year period (Benson, Kirama, and Selejo 2012). As most inorganic fertilizer used in Tanzania is imported, the notable negative balance of trade in agricultural products between 2010 and 2013 in Figure 5 largely reflects imports of fertilizer from major global fertilizer-producing countries. The subsequent elimination of this trade deficit reflects a sharp reduction in the use of inorganic fertilizer by Tanzanian farmers. Crop production levels and sustainable management of soil fertility by beneficiary farmers are both likely to have declined since the end of the input subsidy program.

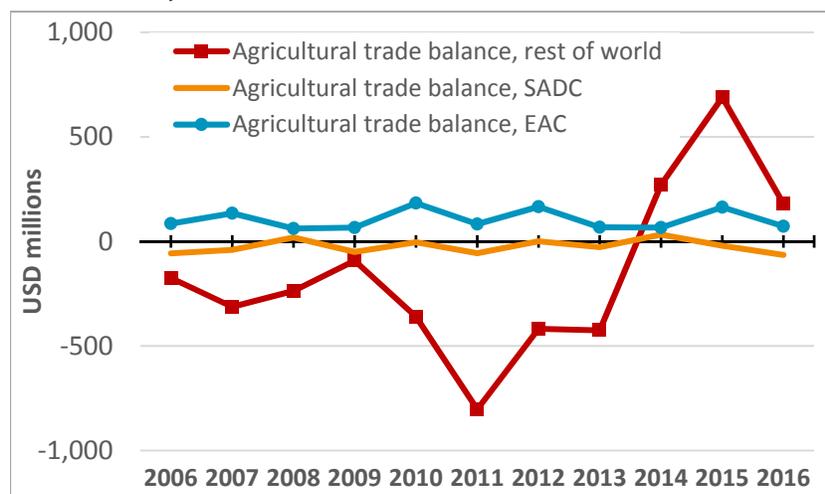
Figure 4. Tanzania's Exports and Imports of Agricultural and Non-Agricultural Products, Percent of Total Value, 2006 to 2016



Source: International Trade Center 2017.

Note: EAC = East African Community; SADC = Southern African Development Community.

Figure 5. Tanzania's Agricultural Trade Balance (Value of Exports Minus Imports), by Destination, 2006 to 2016



Source: International Trade Center 2017.

Note: EAC = East African Community; SADC = Southern African Development Community.

Finally, the disaggregation of imports and exports by source/destination in both Figure 4 and Figure 5 shows that the value of official trade with neighboring countries in the East African Community and in the Southern Africa Development Community remains low. While Kenya and South Africa are among the top ten trading partners for Tanzania globally, all of the rest in the top ten are found outside of Eastern and Southern Africa. Moreover, we do not see growth in regional trade flows for agricultural products, especially—most trade between Tanzania and its neighbors is in non-agricultural commodities.

3.4. Employment

3.4.1. Sectoral Employment Patterns

A common pattern associated with sectoral transformation of primarily smallholder agriculture dominated economies is a movement of workers out of the agricultural sector and into the industry and, especially, the services sectors of the economy. The last labor force surveys conducted across Tanzania show that some change of this nature occurred between 2006 and 2014, with a 9.6 percentage point drop in the share of all workers in Tanzania who are working in agriculture. Most of those who have moved out of agriculture now work in the services sector. (Table 1).

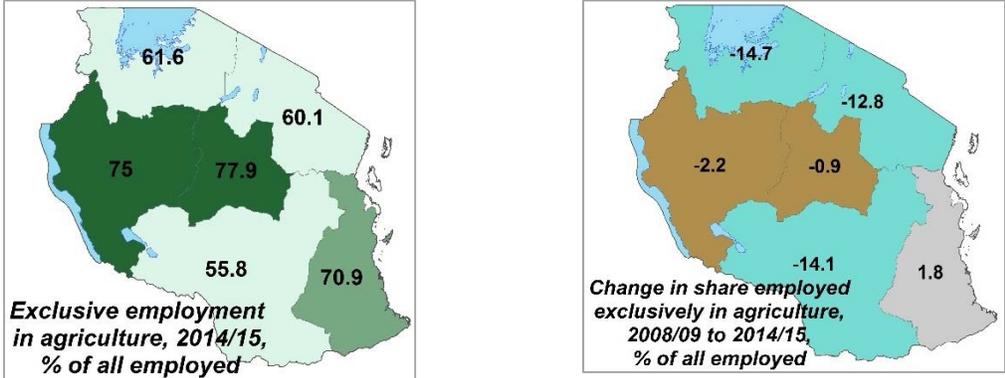
The Tanzania labor force surveys are designed with the assumption that individual workers work in one and only one sector of the economy, even though there is considerable evidence that most rural Tanzania households pursue quite diverse livelihood strategies, with their working members employed simultaneously or seasonally in other sectors than in agriculture. The Tanzania National Panel Surveys, unlike the labor force surveys, allows one to get a sense of how important solely agriculture based livelihood strategies are in rural mainland Tanzania. Information on this is show in the maps in Figure 6.

Table 1. Sectoral Share of Total Employment in Tanzania, 2006 and 2014, Percent

	2006	2014
Agriculture	76.5	66.9
Industry	4.3	6.3
Services	19.3	26.8

Source: National Bureau of Statistics. 2015, Surveys 2006 and 2014.

Figure 6. Exclusive Employment in Agriculture in Tanzania, Percent of All Employed, 2008/09 to 2014/15



Source: Tanzania National Bureau of Statistics Various Years.

While most respondents in each rural zone reported engaging in purely agricultural economic activities in 2014, the share of those employed who do so is dropping in the north and the south of Tanzania, while little change is seen along the coast and in central and western Tanzania. The reasons for this spatially uneven pattern are not immediately obvious, but may reflect how dynamic are the non-agricultural sectors of the economy in each rural zone.

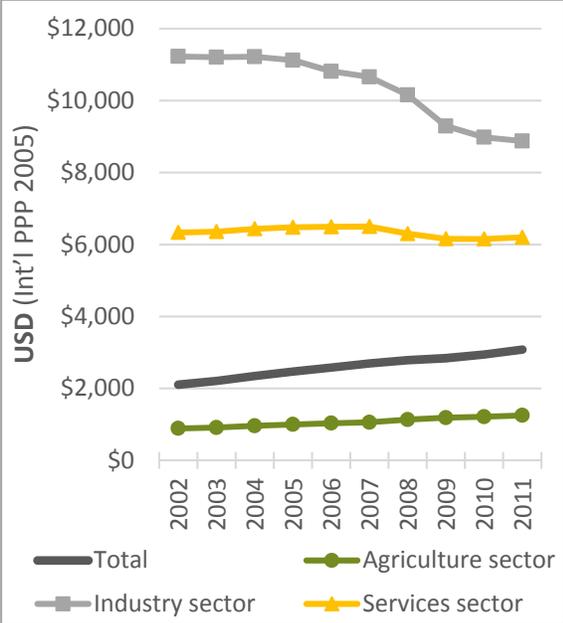
3.4.2. National Labor Productivity

Labor productivity is growing in Tanzania. Tanzania realized increases in labor productivity of 4.1 percent per annum between 2002 and 2011. The declining share of workers exclusively working in the agricultural sector nationally is accompanied by an increase in workers in industry and services where they contribute to greater value of output per worker (Figure 7).

This movement of new workers into the non-agricultural sectors has resulted in a slight decline in labor productivity in the services sector and a more significant decline in the industry sector. This suggests that the agricultural workers moving into these sectors are not finding especially productive jobs, even if the jobs obtained in the other sectors are more productive than those they left in agriculture. These jobs likely consist of basic labor in the industry sector, such as unskilled day laborers in construction, or petty trading in the services sector.

The increasing share of employment outside of agriculture is a welcome development from the perspective of economic transformation in Tanzania. However, the somewhat lower productivity than the norm of the jobs found in the other sectors suggests that there may be as much a set of factors *pushing* workers out of agriculture—including low farm productivity, declining land sizes, and increased production variability—into only slightly better jobs in industry and services. The *pull* factors attracting workers into industry and services may not be quite as compelling as we might wish. However, closer investigation is needed.

Figure 7. Tanzania—Annual Labor Productivity, USD/Worker by Sector, 2002-2011



Source: Analysis of GGDC 10-Sector Database (de Vries, Timmer, and de Vries 2013).

3.4.3. Firms and Household Enterprises

However, recent analysis of where new jobs are being created in rural Tanzania shows that household enterprises—traditionally considered to be informal sources of employment—are the most important source of new employment (Diao, Kweka, and McMillan 2016). Household enterprises, primarily in the non-agricultural sectors, have been more important than formal wage employment as a source of new jobs—almost 90 percent of employment growth in Tanzania between 2002 and 2011 took place in informal firms and not in formal wage employment. Moreover, the growth in labor productivity of rural firms has been similar to urban firms over this period.

But not all informal firms and household enterprises are equally productive or are as effective in job creation. There is significant heterogeneity among micro, small, and medium enterprises (MSME) in this regard. In manufacturing MSMEs, 31 percent of value-added per worker comes from only 5 percent of all such firms, while in trade services MSMEs, 37 percent of value-added comes from only 10 percent of these firms. The sort of informal firms and household enterprises that are most productive and employ the most workers are those that formalize many of their business practices—those that keep business records or which maintain bank accounts.

These findings suggest that public investments in rural non-farm entrepreneurship—particularly training on good technical business practices—may be a significant way to increase opportunities for employment outside of farming in rural areas of Tanzania. Moreover, such technical support and business services should be targeted to the most productive informal firms and household enterprises to promote rural non-farm entrepreneurship. Such a public-sector-led effort could prove to be an important non-agricultural strategy for rural economic transformation.

3.5. Agricultural Production and Commercialization

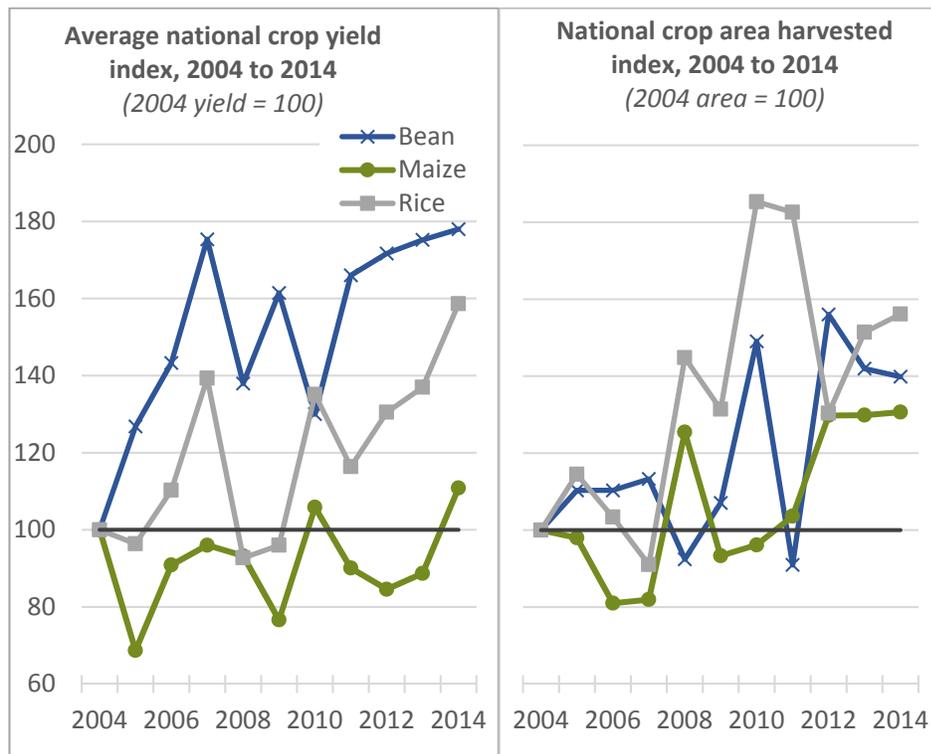
The annual value addition of the agricultural sector to the Tanzanian economy is principally determined by the scope and efficiency of production of crops and livestock by Tanzania farmers. Here we examine several facets of agricultural production.

3.5.1. Crop Productivity

Higher agricultural production levels in Tanzania are being seen—a population growing at around 3 percent each year will require increasing amounts of food. Given the large areas of land in Tanzania with high agricultural potential, all this needed additional food can be produced domestically, rather than imported. But are the additional crops being produced through increased land productivity—that is, greater crop production per unit area—or simply through expansion of the area put to crops? Growing land productivity would be indicative of an agricultural transformation process underway as more efficient use is made of the same land resources to produce crops, whereas expansion in the land area dedicated to a crop is more likely to reflect, at best, static crop production levels.

Figure 8 examines recent yield and harvested area trends for maize, bean, and rice in Tanzania. A decidedly mixed picture is seen. While recognizing that the quantity of maize Tanzania produces is much larger than other crops, maize yields on average are stagnant. All increases in maize production in recent years has been a result of expansion in the maize area across Tanzania.

Figure 8. Production in Tanzania of Major Food Crops—Changes in Yields and Harvested Area, 2004 to 2014



Source: FAO 2017.

Note: In 2004, bean: 0.55 mt/ha national crop yield, 0.81 million ha national crop harvested area; maize: 1.47 mt/ha; 3.17 million ha; and rice: 1.73 mt/ha; 0.61 million ha.

However, more encouraging yield increases are seen for bean and rice even as the land area put to these crops also increases. This improvements in rice and bean productivity may reflect increased use of improved seed and inorganic fertilizer for both crops and possibly some expansion in irrigated land planted to rice. Although not show in Figure 8, encouraging increases in productivity in recent years are seen for other crops, including sunflower and groundnut.

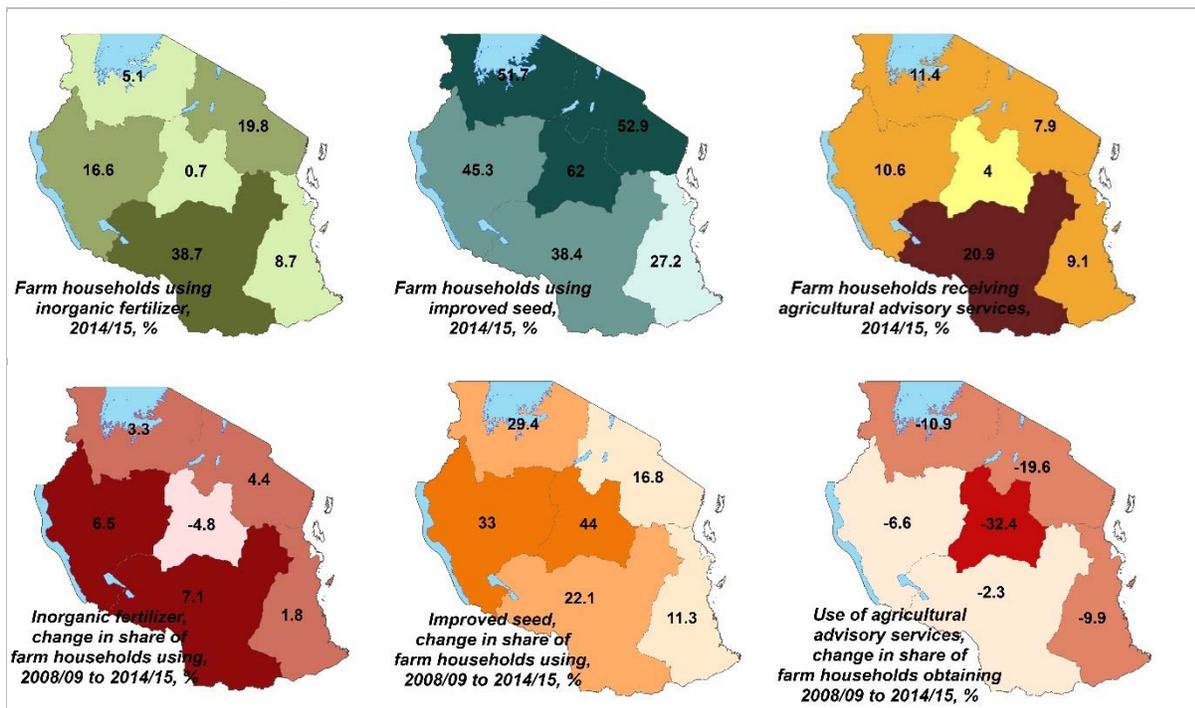
As the staple crop for most Tanzanian households, productivity increases in maize are needed to propel agricultural transformation. Higher maize yields will generate crop surpluses for broader economic transformation and to assure food security. Increased maize production will also deepen food markets, making them more reliable as sources of food and, at the same time, increasing incentives for smallholder farmers to engage in increased specialization in their production. Rural households will increasingly place greater trust in the market as an important and reliable source of maize. With more secure supplies of maize in the market, farmers will increasingly be able to consider their own comparative advantage for crop production to guide their cropping choices. This will permit them to shift their production orientation away from being primarily to meet the subsistence requirements of their households to those crop mixes best suited for their agroecological and market contexts that will provide them with the highest reliable income level. Moreover, as the services and industry sectors continue to grow and provide greater employment opportunities, many rural households may judge moving out of agriculture to be a good choice, so long as they can rely on the maize surpluses of other farmers being made available in the market, in both good and bad years.

Achieving higher maize yields across Tanzania requires the greater use of farm inputs, such as inorganic fertilizer, the use of improved technologies adapted for the different agroecologies of the country, and enhanced farmer knowledge generated through agricultural research and supplied through effective agricultural extension services. Figure 9 presents maps for the six analytical regions of mainland Tanzania on the prevalence of use of inorganic fertilizer and improved seed and access to extension services in 2014/15 and trends in these factors since 2008/09.

The maps in the left column of Figure 9 show a national increase in the use of inorganic fertilizer between 2008 and 2014. However, there are sharp regional differences. Fertilizer use by farm households is most common in the southern part of the country. This region also showed the greatest increase in fertilizer use over the period examined. However, as the southern region is the principal maize-growing area of Tanzania and was specifically targeted under the National Agricultural Input Voucher Scheme to receive considerable amounts of subsidized fertilizer, that fertilizer use rates increased there through 2014/15 is not surprising. As we do not have more recent data to examine, it is not clear if fertilizer use prevalence has remained as high as shown in Figure 9 with the more recent winding-down of the input subsidy scheme. In contrast, the semi-arid central region, where economic returns to fertilizer use may be constrained by poor weather conditions, fertilizer use remains very low, even declining over the period examined. Little fertilizer is applied to crops in central Tanzania. In other regions of the mainland, reasonable growth in fertilizer use is seen, if from a low base on the coast and around Lake Victoria.

The spatial pattern for adoption of improved seed shown in Figure 9 differs from that of inorganic fertilizer. A greater share of farmers in the northern and central regions of Tanzania use improved seed than in southern and coastal areas. Increasing use of improved seed over the period 2008 to 2014 is greatest in the central and western parts of the country.

Figure 9. Recent Changes in Tanzania in Use of Inorganic Fertilizer, Improved Seed, and Agricultural Advisory Services across All Crops, 2008/09 to 2014/15



Source: Tanzania National Bureau of Statistics Various Years.

Improved seed of maize, rice, sunflower, and cotton are increasingly being used in the central region. This finding for the central region is somewhat surprising, given that fertilizer use there is in decline. This pattern may reflect returns to investment in new drought-resistant crop varieties being higher than returns to the use of inorganic fertilizer in these drought-prone areas. In contrast, the southern region, although farmers there are more likely to use fertilizer than farmers elsewhere, does not show strong uptake of use of improved seed, relative to other zones.

The generally increasing use of inorganic fertilizer and sharp increases in the use of improved seed in recent years, even if not consistent across all regions of mainland Tanzania, are encouraging signs of the potential for significantly increased crop production in coming years. However, the important drop in the access that farmers across Tanzania have to agricultural advisory services of any sort over the 2008 to 2013 period sharply diminishes these prospects. Without access to knowledge on new technologies or how to manage their available resources for maximum production, farmers are unlikely to see a significant increase in their productivity levels. The greatest drop in access to extension services is in the central region, which has the lowest agricultural potential of the six analytical regions. Only in the southern region does it seem that the supply of agricultural advisory services is being maintained. Experts on agricultural advisory services in Tanzania will need to be consulted to better understand this significant weakening in the access that farmers have to agricultural advice. However, more balanced investments in increased use of modern farm inputs and the provision of agricultural extension services to farmers would better propel agricultural sector growth and improve prospects for a transformation of the rural economy of mainland Tanzania than recent patterns of input use and access to extension by farmers there.

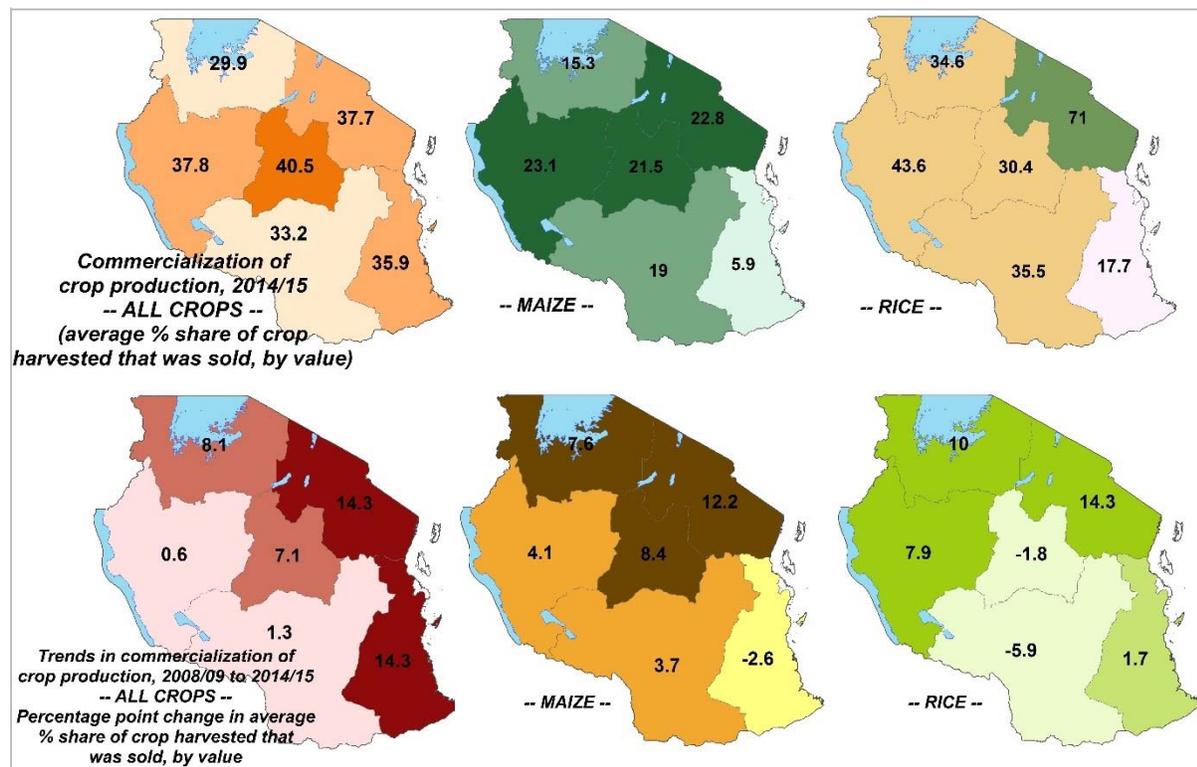
3.5.2. Crop Commercialization

Strengthening agricultural markets in Tanzania requires deepening them through an increased supply of crops brought to them for sale. Figure 10 presents maps on what proportion of the crop harvested was brought to sale, by value, in the 2014/15 cropping season and how these proportions have changed since 2008/09. Maps are presented for all crops and for maize and rice.

Surprisingly, the central zone shows the greatest level of commercialization of crops. This in part reflects a spatial concentration of commercial maize production in Kongwa district in Dodoma region. This district has among the largest average farm sizes nationally, with the availability of land there being attractive for commercial maize production, which frequently is mechanized. The situation for agriculture in the central zone, despite the climatic challenges there, stands in contrast with the higher potential southern highlands where land is scarce. The strong demand for maize in Kenya, in particular, has provided an incentive for commercial maize production in central and northern areas of Tanzania; Kibaigwa, which is located in Kongwa district, is among the largest assembly maize markets in East Africa. While closer analysis is required, this increased agricultural commercialization in the central zone also may reflect fewer non-agricultural livelihood opportunities there than are available in other areas of the country. However, higher growth in commercial crop production is seen recently in the coastal and northeastern areas of the country.

Maize still is produced primarily for own consumption, with overall less than a quarter of the harvest being placed on the market. However, except in the coastal zone, an increasing share of the maize produced is brought to market, particularly in the northeastern part of the country. Rice is more of a cash crop than is maize, with 40 to 50 percent of the rice harvested being sold. However, over time the spatial patterns of commercial rice production have shifted. The northwestern and southern areas of Tanzania are where rice is most commonly produced.

Figure 10. Recent Changes in Tanzania in Share of Crop Harvest that Is Sold—All Crops, Maize, and Rice, 2008/09 to 2014/15



Source: Tanzania National Bureau of Statistics Various Years.

However, while levels of commercial production of rice have increased by 10 percent of the harvest in the northwestern zone between 2008 and 2014, they have declined by about 6 percent in the southern zone. What accounts for this—localized production shocks, the relative movements of prices for rice versus other important crops rendering rice production less remunerative, or some other factors—will require more detailed analysis. There is increased demand from Rwanda for rice produced in the Kahama and Shinyanga areas south of Lake Victoria in the northwest zone which partially accounts for the increased commercialization of rice in the zone. The highest increase in the share of the rice harvest sold and the highest share of the rice harvest sold is in the northeastern zone. However, only about 10 percent of Tanzania’s rice is produced in this zone.

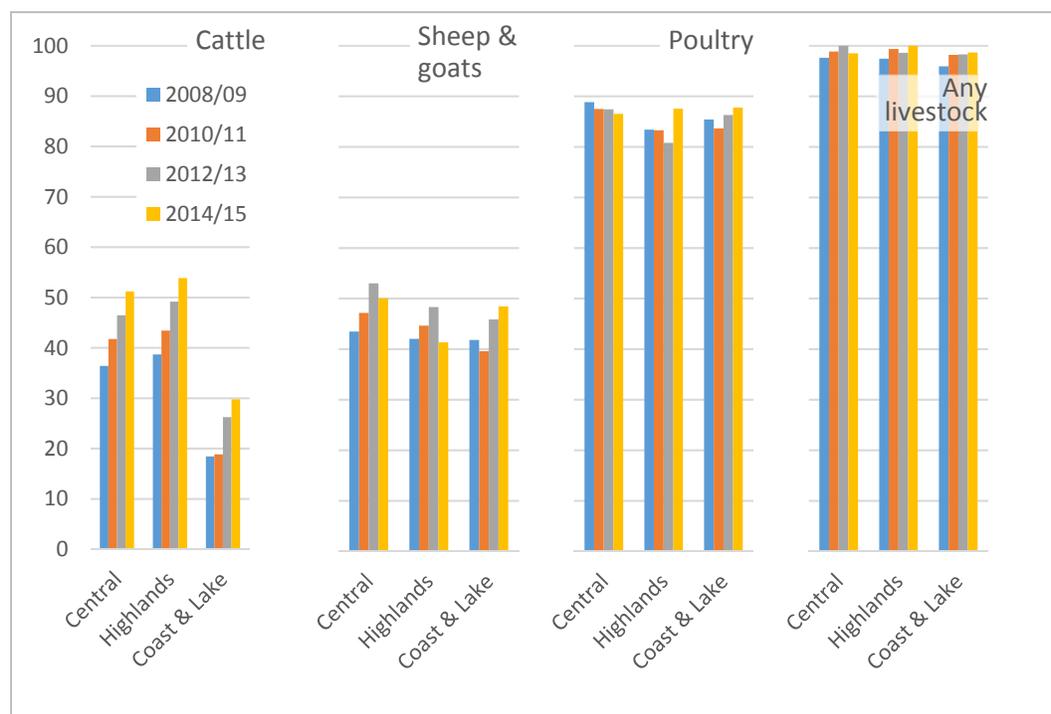
Overall, we are seeing an increased share of the crops harvested being brought to market; 35 percent of crops produced in 2014/15 were brought to market, which was about 7 percentage points higher than was the share marketed in 2008/09. From a perspective of agricultural and economic structural transformation, these trends are encouraging and reflective of an increasing orientation in farm households in Tanzania to produce for the market, and not only for the needs of their own households. Such an orientation should result in deeper agricultural markets handling greater and greater shares of crops harvested. In parallel, we should see increasing specialization in crop production by farm households as markets become a more reliable component of how households obtain the food they require; farm households increasingly will not have to rely solely on their own production for most of the food that they consume. Specialization in crop production should result in generally higher levels of crop productivity and more efficient use being made of Tanzania’s agricultural resources.

3.5.3. Livestock Productivity and Commercialization

Tanzania is the third-largest livestock producer in Africa after Ethiopia and Sudan (URT 2016). Livestock production constitutes about 27 percent of the total value of agricultural sector production in Tanzania. However, this likely is much lower than the economic potential for the sub-sector. Most of the animals farmers own are unimproved breeds, small, and considerably less productive in terms of meat, eggs, dairy, and other products than could be obtained with the use of animals of higher genetic potential. Most farm households in Tanzania own some animals, even if only a few chickens.

Figure 11 and Figure 12 show the share of farm households owning any livestock and the average number of livestock owned, by type, over time. The general impression is of a stagnant sub-sector. Although the share of farm households owning cattle has increased somewhat between 2008 and 2014, this is the only component of the livestock sub-sector in which we see any trend.

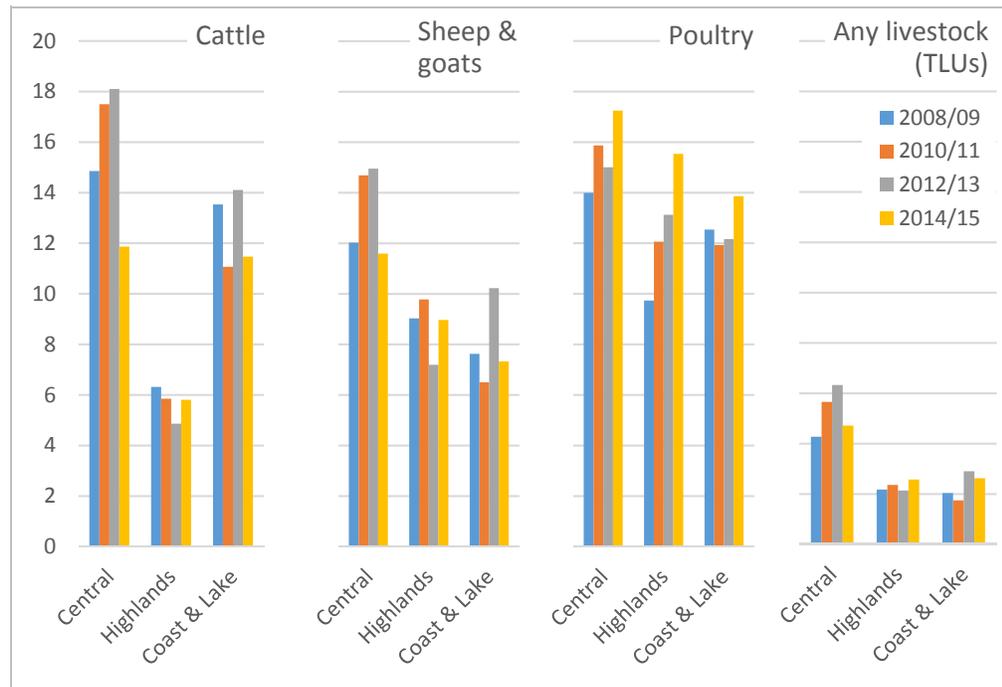
Figure 11. Cattle, Sheep and Goats, Poultry, and Any Livestock—Changing Share over Time of Farm Households in Rural Mainland Tanzania Owning Livestock, by Livestock Production Zones, Percent



Source: Tanzania National Bureau of Statistics Various Years.

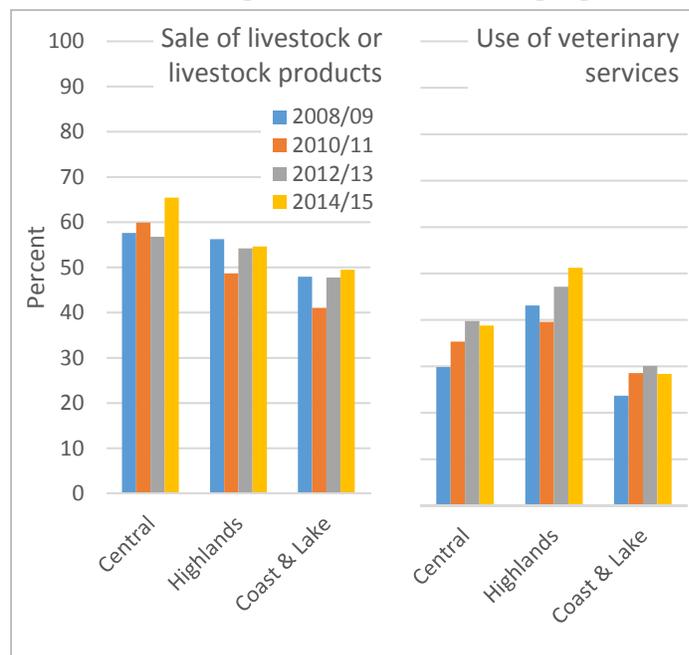
Note: The Central livestock production zone consists of Dodoma, Morogoro, Singida, Tabora, Shinyanga, and Manyara regions; the Highland zone consists of Arusha, Kilimanjaro, Ruvuma, Iringa, Njombe, Mbeya, Katavi, and Rukwa regions; and the Coast and Lake zone is made up of the remaining rural mainland regions of Tanzania.

Figure 12. Cattle, Sheep and Goats, Poultry, and Any Livestock—Mean Number of Livestock Owned over Time by Households Owning Any of the Livestock, by Livestock Production Zones



Source: Tanzania National Bureau of Statistics Various Years. Note: For the definitions of the livestock production zones, see note to Figure 11. The Tropical Livestock Unit (TLU) is computed based on 0.8 for a bull or ox; 0.7 for a cow or steer; 0.3 for a calf; 0.5 for a donkey or horse; 0.1 for a goat or sheep; 0.2 for a pig; and 0.01 for poultry or a rabbit.

Figure 13. Sale of Livestock or Livestock Products and Use of Veterinary Services by Livestock Owning Households—Changing Share over Time, by Livestock Production Zones



Source: Tanzania National Bureau of Statistics Various Years.
 Note: For the definitions of the livestock production zones, see note to Figure 11.

As for crop production, much of livestock production is done with the household's own consumption needs in mind. Around half of all households owning livestock sell their livestock or livestock products (Figure 13, left). However, in contrast to trends in the commercialization of crop production, we do not see any increase over time in the share of livestock owners taking their animals or the products that they produce to market (Figure 13, right). Livestock appears to be neglected commercially, serving primarily to meet household consumption needs or as a store of wealth.

3.6. Food Consumption in Rural Tanzania

Finally, we examine changes in the food consumption patterns of rural households in mainland Tanzania to determine if any are indicative of transformation in the structure of the economy and in the welfare of those households. The statistics presented in Table 2 point in the direction of positive change in the rural economy, even if not strongly so.

Small changes are seen in the composition of the food basket of rural Tanzanian households between 2008 and 2014. The share of calories that come from staple foods has declined by 3.3 percentage points over this period, indicating a small increase in the diversity of diets consumed as households obtain more calories from vegetables and fruit, animal-source foods, and a range of other foods. Among staple foods, the only category showing a consistent increase in the share of calories obtained from that source is for processed cereals, indicating slightly higher reliance on the

Table 2. Changing Patterns in Food Consumption of Rural Mainland Tanzania Households, 2008 to 2013

	2008-09	2010-11	2012-13	2014-15
Household food consumption, share of total calories consumed, %:				
Maize	43.3	42.2	41.4	43.3
Other cereals	11.2	12.7	12.1	11.6
Processed cereals	1.1	1.7	2.0	2.2
Roots and tubers	19.4	16.1	16.3	14.6
<i>Staple foods, total</i>	<i>75.0</i>	<i>72.7</i>	<i>71.8</i>	<i>71.7</i>
Pulses and seeds	9.0	8.2	9.2	8.0
Vegetables and fruits	2.6	3.2	3.2	3.7
Animal products	6.5	7.8	7.6	7.6
Other foods	6.9	8.1	8.2	9.0
<i>Total food consumption</i>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>
Purchased food, share of calories consumed, %	39.7	42.5	45.8	47.9
Purchased food, share of total value of food consumed, %	42.0	46.5	46.8	50.2
Food as share of per capita value of total consumption, %	78.9	76.4	75.9	74.6

Source: Tanzania National Bureau of Statistics Various Years.

Note: "Food consumption in household, share of total calories consumed" by food group excludes food consumed outside of the household and beverages. Value of food consumption, in contrast, includes these foods.

market for food. Looking at the entire food basket, the reliance on the market for access to a diversity of food groups is clearer—the share of calories consumed by rural households that came from food that was purchased increased by 8.2 percentage points between 2008 and 2014 to 47.9 percent. These are encouraging trends if the government of Tanzania would like to see a movement away from broad subsistence oriented agricultural production towards more specialized, commercially oriented production, consistent with a restructuring of the rural economy on the mainland. These statistics indicate increasing market demand for food.

Finally, we also see a downward trend in the share that food makes in the total value of household consumption. This trend is in keeping with Engel's law which posits that, as the income of a household rises, the proportion of its income that the household spends on food falls. This is not to suggest that food consumption or spending on food by rural households in Tanzania is declining. Rather, any increase in their food consumption is lower than is the increase in their income, proxied by their total consumption. This pattern suggests improved welfare for rural households, on average, as households are increasingly able to direct more of their income away from food towards other needs.

4. SUMMARY AND CONCLUSIONS

In Table 3 is a summary of the assessments made of recent trends in dimensions of the rural economy of mainland Tanzania from the perspective of prospects for sectoral transformation of the economy and associated transformation of the agricultural sector into one dominated by highly productive, specialized farmers.

Table 3. Assessing Recent Changes in the Rural Economy of Mainland Tanzania from the Perspective of Prospects for a Sectoral Transformation of the Economy

Indicator	Assessment	
Overall economic growth	Reasonably strong and consistent economic growth overall. Consistent good growth in services sector. Strong growth in industry sector, if volatile.	
Agricultural sector growth	Stagnant, just matching population growth.	
Agricultural trade	Positive agricultural trade balance in recent years, but may reflect lower imports of inputs – inorganic fertilizer, in particular – limiting scope for significant crop production increases. Regional trade levels are low.	
Sectoral share of employment	9.6 percentage point drop between 2006 and 2014 in share of all workers in Tanzania working in agriculture. Share of workers engaging purely in agricultural activities declining in the north and the south of Tanzania; little change elsewhere.	
Sectoral labor productivity trends	Labor productivity increased 4.1 percent annually between 2002 and 2011. But workers moving out of agriculture into industry and services sectors are not finding especially productive jobs. See a decline in labor productivity per worker in those sectors. Some evidence of workers being pushed out of agriculture rather than being attracted by significantly better jobs into the non-agriculture sectors.	
Maize productivity	Generally stagnant. Increase in production due to expansion of area harvested, rather than higher yields.	
Productivity of other crops	Selected crops showing strong increases in average yields.	
Use of inorganic fertilizer	Strong uptake with increasing adoption in south and west, but may not be sustained since end of National Agricultural Input Voucher Scheme.	
Use of improved seed and other planting materials	Significant uptake in northern zones of country; increased adoption in west and central zones.	
Access to agricultural advisory services	Sharp declines in access. Only in southern zone are farmers at all likely to be able to access information on agricultural production.	
Sale of crops by smallholder farmers	Overall, increased share of crops harvested are being brought to market – 35 percent of crops produced in 2014/15 brought to market, 7 percentage points higher in 2008/09. More variable commercialization rates by crop and by rural zone depending on local production and market conditions.	
Livestock ownership	Seeing some increase in cattle ownership, but mixed to stagnant for all other livestock and on other measures.	
Sale of livestock and livestock products	Stagnant to declining, even as see slightly more use of veterinary services.	
Diversity of foods consumed	Increased share of calories coming from vegetables and fruit, animal-source foods, and a range of other non-staple foods.	
Share of food consumed that was purchased	Share of calories consumed that came from purchased food increased by 8.2 percentage points between 2008 and 2014 to 47.9 percent.	
Food share of value of household consumption	Downward trend in the share that food makes in total value of household consumption – in keeping with Engel's law. Suggests rising incomes.	

Source: Authors' analysis.

Notes:  - Encouraging trends;  - Mixed signs;  - Troubling assessment.

Encouraging trends are seen along several dimensions, including in changes in food consumption patterns, uptake of improved seed, and an increase in the share of crops harvested that are sold. However, we also see a stagnant agricultural sector, maize productivity levels scarcely moving, a seemingly moribund livestock sub-sector, and a breakdown in the provision of technical information to farmers. In sum, despite some positive signs, there is little to suggest that the rural economy in Tanzania is on the threshold of significant changes in its structure and that rural households will soon be as likely to pursue non-agricultural livelihoods as to engage in farming. While many of the trends are positive, they still are not of sufficient magnitude to suggest any imminent rapid transformation of the economy.

The next steps of this research project will involve using the economy-wide model for Tanzania to investigate a range of possible public investments that might be made to accelerate the positive trends observed and to address those factors hindering Tanzania from significant economic growth and transformation, particularly in the agricultural sector. The public investments that will be evaluated will not be solely in the agricultural sector. It is clear that increased investments to strengthen markets, to expand and improve transport infrastructure, and to increase the production and expand the effective communication of information for improved agricultural and general economic productivity are all needed. The results of the modeling exercise assessing the efficacy of different public investment portfolios in bringing about increased agricultural production, improved incomes and reduced poverty, and food security and improved nutrition in Tanzania will provide an important input to debates on how the government of Tanzania should use the resources that it has at its disposal to achieve these objectives.

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