

# **Review of National Policies Affecting the Expansion and Development of Agricultural Mechanization in Tanzania**

## **Summary**

Agricultural mechanization plays an essential role in agricultural growth and development. In the developing world, tailoring mechanization to smallholder farming could enhance farm productivity, increase the farm area under operation and reduce labor drudgery in major farm operations. In Tanzania, the history of smallholder agricultural mechanization goes back to the 1970s where tractors were mainly used on medium to large scale cotton farms and owners of tractors were providing hired services to smallholder farmers in their neighborhoods. Since then, the government of Tanzania put much emphasis to the expansion and development of smallholder mechanization through different national policies and strategies designed to develop the agricultural sector. Despite the government's efforts, the level of farm machinery use by smallholder farmers in Tanzania is still low. Some of the major challenges include: lack of coordination in linking farmers demand for farm mechanization and the supply of these machineries and their services, the sunk cost nature of farm machinery investments, and lack of machinery maintenance services in rural areas. For a more mechanized smallholder farming to take place in Tanzanian agriculture, further strategies addressing these challenges need to be in place.

*Keywords: policies, mechanization, agriculture, smallholders, Tanzania.*

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## 1. Introduction

Agriculture, particularly smallholder farming, plays a major role in the overall economy of most Sub-Sahara African countries. However, the way farming is practiced and the source of farm power used are slightly different for different regions in the continent. In most countries, human muscle using hand-hoe is the dominant source of farm power used in growing crops. Tanzania is one of these countries where cultivation of about 64% of the farmland in the country is depending on human muscle (MoAFSC, 2013). Under such circumstances, expanding farmlands to exploit the existing natural resource potential for agriculture is challenging. Recent data shows that Tanzania has 44 million hectares of arable land where only 23% is under cultivation (MoAFSC, 2006). According to the same source, farm power was considered as a major limiting factor in increasing agricultural production. Based on data in 2006, table 1 below shows the number of different farm power sources and number of hand-hoes used in Tanzania. The huge number of hand-hoe clearly indicates the estimated number of human muscle used in Tanzanian agriculture. With this recognition, the Tanzanian Government has been formulating different agricultural mechanization policies and implementing different strategies that could facilitate the shift from human muscle powered farming towards draft animal and tractor powered farming.

Since 1970's, a number of agricultural development policies and strategies were formulated and implemented in Tanzania. Some of these policies and strategies have put explicit guidance on the need and development of agricultural mechanization in the country. Before the introduction of Structural Adjustment Program (SAP) in 1980s, the Government of Tanzania was directly putting much effort on agricultural mechanization through importation of tractors and other machineries. However, the efforts were not successful in achieving the expected outputs and attaining strong agricultural mechanization due to poor management, weak infrastructure, poor equipment maintenance, difficulty in obtaining spare parts, etc. The introduction of SAP opened doors for more involvement of the private sector in importing and distributing tractors and other farm implements whereas the government's role shifted mainly to facilitating the business environment for the development of agricultural mechanization (Bishop-Sambrook, 2005). To reduce the challenges in credit facilities needed in input purchase, Agriculture Inputs Trust Fund (AGITF) was introduced in 1994 to facilitate wholesale lending for input loans and equipment loans to cooperatives and individual farms.

Table 1. Farm machineries (tools and power sources) in Tanzania (2006)

Farm tools and power source	Amount (in 2006)
Tractors	7,200
Animal drawn ploughs	585,000
Hand hoe	14,000,000
Oxen	1,300,000

Source: MoAFSC, 2006 on TAMS

In August 2009, the Tanzanian government declared “*Kilimo Kwanza*” (Agriculture First) to develop the country’s economy and the livelihood of rural communities through agricultural growth and development. One of the five major government strategic initiatives under *Kilimo Kwanza* was promotion of agricultural mechanization, through the Ministry of Agriculture, Food Security and Cooperatives and strong private-public partnerships. The mechanization initiative covers a wider spectrum that accommodates small-scale mechanization using two-wheel power tillers to medium and large-scale four-wheel tractor based mechanizations.

The main objective of this paper is to review national policies and strategies related to agricultural mechanization and farm power use in Tanzania. Moreover, the paper assesses how different policies contributed (both positively and negatively) towards the current development in agricultural mechanization sector and use of agricultural machineries by smallholder farmers in the country.

## 2. Analytical Framework

In this paper, we review policy effects on the development and expansion of agricultural mechanization in Tanzania at three interrelated tiers. First, we look at national policies affecting machinery imports (tractors and farm implements) at a cross-border trade level. Policies formulated and regulations set at this level either encourage or discourage the quantity and type of tractors and farm implements imported. Second, imported or manufactured agricultural machineries are passed to end users through effective marketing channels where actors at each stage in the channel are getting proper incentives to keep the business running. Policies and regulations affecting the structure of domestic markets (free competition, incentives for infant

industries, access to credit facilities, etc.) definitely influence whether machinery manufacturers, dealers, distributors, machinery maintenance service providers and machinery operators could enter and stay in the business. Third, given the availability of farm machinery service and demand for these services, farm level machinery use depends on whether farmers are able to afford to buy machineries or able to pay fees for hired services. Policies directly or indirectly affecting smallholder farmers' income influence the demand for machinery use and services.

### **3. Inventory of Policies and Strategies Related to Agricultural Mechanization**

In Tanzania, since 1970s a number of national policies that directly or indirectly promoting and facilitating agricultural mechanization have been formulated. There are also some agricultural development strategies encompassed the implementation of mechanization policies. In this section, these policies and strategies are briefly discussed in their chronological order.

#### **3.1. Structural Adjustment Program (SAP)-1980s**

Like many SSA countries, Tanzania also adopted Structural Adjustment Program (SAP) for a more liberalized economy that supports and encourages private sector involvement. One of the areas where the private sector was encouraged to invest was the supply of agricultural machineries along the supply chain including importation, distribution and service provision both in machinery maintenance and also giving machinery operational services to smallholder farmers. However, the impact of SAP on smallholder agricultural mechanization was limited as the level of private sector involvement in machinery business and particularly machineries that fits to smallholders' need was minimal.

#### **3.2. Agricultural Sector Development Strategy (ASDS)-2001**

The major concern of this strategy was creating an enabling and conducive environment for improving productivity and profitability of the agricultural sector as the basis for ensuring household food security, improved farm incomes and rural poverty reduction in the medium and long-term (ASDS, 2001). Within this framework, the strategy document explicitly stated four incentive structures that support the expansion of mechanization service provision (mainly farm equipment hiring services) to smallholder farmers in the rural community. These four different incentive structures are: (1) financial incentives to local institutes of technology to design and

develop appropriate farm tools and machinery that are suitable for different categories of farmers and farming systems, (2) strengthen support services to promote mechanization, especially among small-scale farmers, (3) financing of research at public and private institutions in order to accelerate development of appropriate smallholder agricultural mechanization and agro-processing technologies, and (4) finance research for the development of appropriate mechanization for smallholder farmers and agro-processing technologies.

### **3.3. National Strategy for Growth and Reduction of Poverty (NSGRP/MKUKUTA) -2005**

Under the general Millennium Development Goals (MDGs), the Tanzanian government introduced the National Strategy for Growth and Reduction of Poverty in 2005. This national strategy gives due emphasis to reducing poverty, hunger, disease, illiteracy, environmental degradation and discrimination against women by 2015.

### **3.4. Tanzania Agricultural Mechanization Strategy (TAMS)-2006**

This strategy was designed to support the Poverty Reduction Strategy and create a development environment that will contribute to enabling rural communities and households achieving sustainable livelihoods through identifying short and medium term priorities that will support the goal of sustainable livelihoods, and contribute to the long-term goal, outlined in Vision 2025, of sustained economic growth.

This strategy is guiding the development process of the mechanization sub-sector in contributing to the national development aspirations of poverty reduction and economic growth. The strategy puts up mechanization interventions that aim to increase profitability of agriculture and other investment in the supply, processing and marketing side. Specific to mechanization, the strategy gave due emphasis to improving access and availability to mechanization inputs, commercialization of agriculture through mechanized farming. In the strategy document, emphasis was also given to promoting the development of post-harvest handling, processing, storage, marketing and rural-based agro-industries and enhancing farmers' access to technologies and services through better financing of agricultural mechanization and improving further the policy, legal and regulatory environment for agricultural mechanization.

### **3.5. Agriculture First (*Kilimo Kwanza*) -2009**

*Kilimo Kwanza* (Agriculture First) is a slogan put by the Tanzanian government to establish agriculture as a top priority across all government ministries where the strategy calls for action by all stakeholders on a set of ten priority areas, to develop opportunities and reduce barriers to growth in Tanzania's agriculture sector. It builds upon the country's Agricultural Sector Development Program (ASDP), which coordinates public investment by the government and donor agencies. Under Pillar No. 7 (Industrialization for *Kilimo Kwanza*), enhancing the supply of agricultural machinery and implements were emphasized and due attention was given to embarking on local manufacturing of agricultural machinery and farm implements.

### **3.6. National Agriculture Policy -2013**

The National Agricultural Policy aimed at developing efficient, competitive and profitable agricultural industry that contributes to the improvement of the livelihoods of Tanzanians and attainment of broad-based economic growth and poverty alleviation. The policy explicitly stated its objective of strengthening agricultural support and technical services that comprise research, mechanization, irrigation, extension and trainings.

Specific to agricultural mechanization, the policy document states the need for better policy on efficient utilization of farm machinery, implements, equipment and agro-processing machines promoted. The policy also states the need for creating conducive environment for private sector participation in agricultural mechanization shall be improved. The policy also encourages efficient utilization of agricultural machinery, implements, equipment and tools and their promotion particularly among women and men farmers. The policy also gives a direction towards the promotion and utilization of agro-mechanization packages and mechanical technologies to local conditions. Due emphasis has also been given to the enforcement of regulatory and quality standards set on agricultural machinery, implements, equipment and tools imported/manufactured and strengthening the provision of trainings for different levels of farm machinery, processing machines facilities and after-sale services.

## **4. Policies and Mechanization in Tanzania**

### **4.1. Regulatory and quality standard checks**

In Tanzania, the Center for Agriculture Mechanization and Rural Technology (CAMARTEC) based in Arusha is assigned the responsibility of testing imported tractors and other farm machineries to determine the suitability of these machineries to soil conditions in Tanzania. Importers need to get approval from CAMARTEC on the suitability of the planned farm machineries to be imported. In addition to CAMARTEC, the Tanzanian Bureau of Standards (TBS) has a general mandate in ensuring the quality of goods imported to the country. Accordingly, before import, quality or standard of imported machineries and equipment are checked in the country of origin where they are inspected and issued Certification of Conformity (CoC). Machineries that passed the inspection and got CoC are imported. After reaching Tanzania, TBS inspects the machinery based on the country of origin's information or TBS links with inspectors in the country of origin for verification. For machineries imported from countries that don't have standards, TBS uses third part services to support. In general, machinery importers ensure their suppliers are conversant with import quality requirements and that their consignments are accompanied with a Certificate of Conformity (CoC) from the appointed TBS Service Providers.

### **4.2. Tariffs and subsidies on agricultural machinery import**

Tariffs levied on imported goods are one source of government revenue but they increase import costs and final prices paid by buyers of imported items. As most farm machineries used in Tanzania are imported from abroad, the Tanzanian government has waived import tariffs on most agricultural machineries to reduce machinery costs and make them affordable to the final buyers. However, there are still taxes on machinery spare parts and fuel used for operations.

With the aim of supporting smallholder agriculture, the government of Tanzania subsidized importation of power tillers (two wheel tractors) to make them affordable for those owning and providing farm operation services. Subsidy initiative carried out under Agricultural Sector Development Strategy (ASDS, 2001) created profitable market for the dealers, and distributors of farm machinery especially power tiller sub-sector. It also encouraged establishment of farm machinery hiring services at region level, district and farm levels. Through this program, groups

and individual farmers at farm level especially smallholder farmers managed to own power tillers and its implements. The strategy also helped in enhancing farm machinery supply chain- from dealers to individual farmers at farm level. Empowerment of individuals in terms of entrepreneurship hence farm machinery hired business development. Figure 1 and 2 show the rapid increase in importation of power tillers during 2009 and 2010 immediately after the government's initiative to enhance smallholder agriculture under *Kilimo Kwanza*.

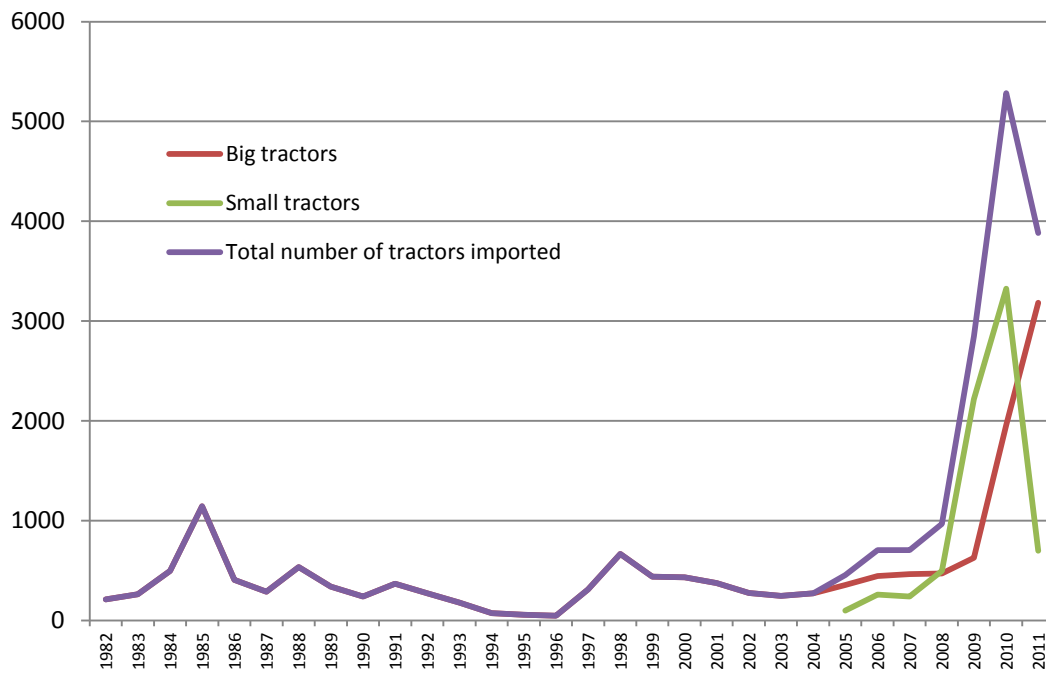


Figure 1. Number of tractors and power tillers imported during 1982-2011



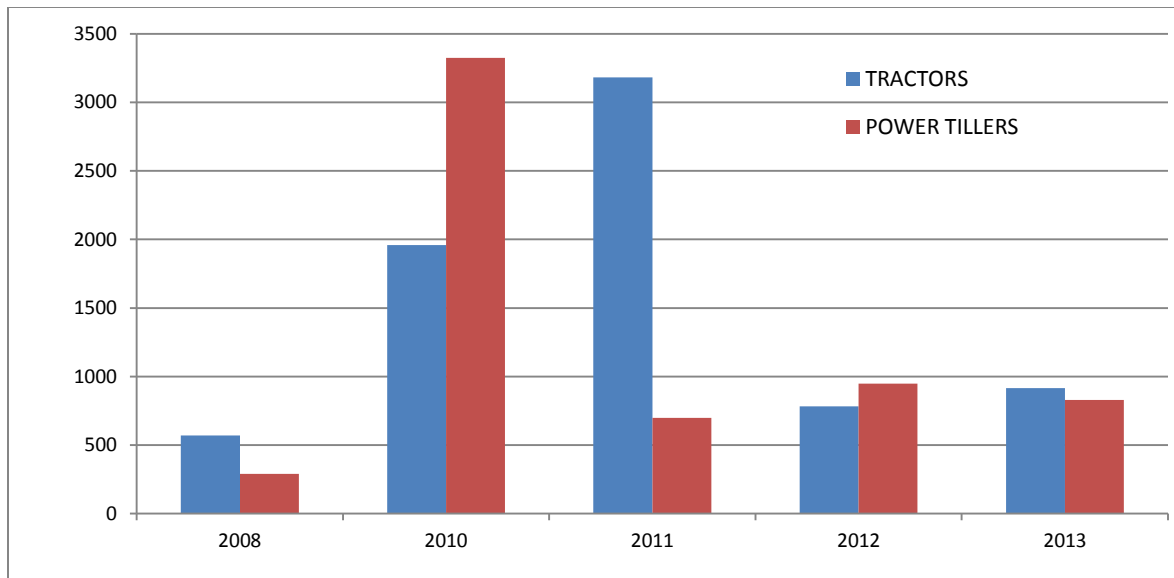


Figure 2. Farm-Power timeline in Mvomero Community-Tanzania.  
*Source: Bishop-Sambrook, (2005:p.9)]*

#### 4.3. Policies affecting domestic machinery trade and services

In addition to facilitating machinery imports, government shall put directives and take all relevant measures to ensure that the imported machineries are transferred to the end users or end users get the necessary services. For this, government policies need to create conducive business environment for machinery trade and facilitate access to credit services to farmers and farmer groups interested in investing in agricultural machineries. Accordingly, the Tanzanian government has established an agricultural window at Tanzania Investment Bank (TIB) for the purpose of supporting farmers (large and medium farmers and service providers) to access investment fund in agriculture sector. The Government also established a line of credit to allow the National Service Corporation Sole Agri-Machinery Project (SUMA JKT) (government owned) a Military Agricultural Dealer) to import or purchase farm machinery both 2WTs and 4WTs with the aim of facilitating the transfer of farm machineries to Tanzanian farmers.

#### 4.4. Incentives for domestic production of farm machinery and implements

In Tanzania, most agricultural machineries are imported from abroad. But the government has been supporting mechanization workshop at the Center for Agricultural Mechanization and Rural Technology (CAMARTEC) that does some re-designing and modifications to adapt farm

implements to local conditions. There are also few local companies manufacturing farm implements such as rippers and sub-soilers. Nandra Engineering Company Limited, Seaz Agricultural Equipment Limited (from Soweto industrial area in Mbeya), InterMech Company Limited (Kihonda industrial area in Morogoro) are among the few companies manufacturing farm implements (Mkoga, 2010).

## **5. Conclusions**

The level of agricultural mechanization in a given country is directly influenced by the diverse policies related to agricultural and industrial development and strategies formulated in achieving the stated goals under these policies. This paper synthesized trade, agriculture and mechanization related policies and documented their direct and indirect effects on the expansion and development of agricultural mechanization in Tanzania. Major findings of this policy review are presented below.

Government policies encouraging the expansion of agricultural mechanization shall focus on public-private partnership where the public sector creates conducive business environment for the private sector to address mechanization demand through adequate supply of farm machineries and implements. Government based subsidized mechanization program may increase the availability of agricultural machineries but sustainability of a subsidized supply system is rather questionable. Once the demand for farm machinery is established and private sectors could see incentives in machinery trade, the government needs to develop a clear exit strategy from subsidized machinery supply through the public sector.

As smallholder farmers may not have the financial capacity to purchase tractors, the feasible arrangement for better agricultural mechanization in smallholder farming has to be a hire service to any of the farm and non-farm operations farmers are willing to pay with the aim of reducing labor drudgery and/or enhancing farm productivity. In this regard, strategies that enhance farm household income and their ability to pay for machinery service and policies that encourage and support the existence of adequate number of trained mechanics, machinery operators, and well organized after-sale services need to be in place.

Different locations have different soil type, landscape, cropping systems and other factors influencing use of agricultural mechanization. Thus, compatibility of mechanical technologies to local conditions and proper mechanization packages could play crucial role in enhancing demand for mechanization use by smallholder farmers. Thus, strategies designed to enhance smallholder farm mechanization shall take diversities of farming systems into consideration.

Generally, the Tanzanian Government has put much effort in formulating policies and designing mechanization strategies to enhance the level of agricultural machinery use in smallholder farming in the country. The number of tractor importation has increased, and through state supported arrangements, transfer of these tractors to end users/service providers was facilitated. Though it is premature to evaluate the impacts of these policies and strategies, the overall direction the country put in developing agricultural mechanization is encouraging.

## References

- Bishop-Sambrook, C. 2005. Contribution of farm power to smallholder livelihoods in sub-Saharan Africa. FAO, Rome.
- Diao, X., F. Cossar, N. Houssou, and S. Kolavalli (2014). Mechanization in Ghana: Emerging demand, and the search for alternative supply models. *Food Policy*. (in press).
- Lyimo, M., 2011. Country presentation on Agricultural Mechanization in Tanzania. Presentation to Workshop on ‘Boosting agricultural mechanization in rice-based systems in sub-Saharan Africa’, Saint Louis, Senegal, 6-8 June 2011.
- Ministry of Agriculture Food Security and Cooperatives (MoAFSC) (2006). Tanzania Agricultural mechanization Strategy (TAMS). Dar es Salaam.
- Ministry of Agriculture Food Security and Cooperatives (MoAFSC). (2013). National Agriculture Policy. Dar es Salaam. October 2013.
- Ministry of Finance and Economic Affairs (2010). National Strategy for Growth and Reduction of Poverty II (NSGRP II). United Republic of Tanzania. Dar es Salaam. July 2010.

Ministry of Agriculture and Cooperative (MoAC). (1997). Agricultural and Livestock Policy.

January 1997, Dar es Salaam

Zakaria J. Mkoga. 2010. Conservation Agriculture for Sustainable Agriculture and Rural Development and Food Security in Southern and Eastern Africa: Monitoring and Impact Evaluation Study Report. October 2010.