



# ACIAR POLICY BRIEF

Research findings with policy implications

## Commercializing Smallholder Mechanization: The role of public and private sectors

### MAIN MESSAGES

- Smallholder mechanization is at the top of the agenda of several governments in Africa, nevertheless, effective implementation lags behind.
- Both governments and the private sector have a key role to play in the implementation of smallholder mechanization.
- Synergisms between public and private efforts are required. Efforts by the public sector should revolve around setting supportive policies that can foster the growth of the service provision sector by underwriting regulatory frameworks, capacity building and supporting extension services.
- Focus for mechanization investments should be towards the most labor demanding operations where the cost saving proposition would be most visible can facilitate the diffusion of smallholder machines into locations with labor scarcity, low density of draft animals, or where cropping systems are most favorable to agricultural mechanization.
- There is opportunity for household mechanization to add value to household produce, and for multi-purpose mechanisation serving multiple tasks on the farm and household.

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## SUMMARY

Smallholder mechanization is part of the recent agricultural transformation agenda that most African countries have embarked on, with the aim of improving agricultural productivity, bringing new farmland into production to feed the increasing population, and creating rural employment for the youth. However, the adoption of mechanization in smallholder agriculture cannot be achieved overnight. Rather, it is a process that involves both the public and the private sector, where governments set proper policies and strategies with medium to long-term goals aimed at transforming the type and level of farm power, and a vibrant private sector takes hold of the business opportunities stimulated by the government policies. Moreover, the private sector has to be able to respond to farmers' immediate demand for machinery services at affordable prices. In this regard, government contribution in supporting business entities supplying machineries and machinery services to smallholder farmers is critical. The support may include the creation of enabling business environments and technical capacity building programs. A broad national mechanization scheme can start with the most demanded machinery services and gradually, and then a step wise process that takes account of business opportunities for service providers.

## INTRODUCTION

Recognizing that farm power constraints limit the adoption of sustainable intensification by smallholders in Eastern and Southern Africa (ESA), the Farm Mechanization and Conservation Agriculture for Sustainable Intensification (FACASI) project has been implemented in Ethiopia, Kenya, Tanzania and Zimbabwe since 2013. The project is supported by the Australian Center for International Agricultural Research (ACIAR) and implemented by the International Maize and Wheat Improvement Center (CIMMYT) in collaboration with a number of national, regional and Australian partners experienced in agricultural mechanization. The project's goal is to improve smallholder farmers' access to mechanization and reduce labor drudgery through accelerated delivery and adoption of two-wheel tractor (2WT) based technologies. The project evaluates and demonstrates 2WT-based technologies to support conservation agriculture (CA) systems, tests site specific business models for a fast delivery of 2WT-based mechanization, and identifies key improvements needed in the national policies and institutions to accelerate smallholder mechanization.

## POLICY IMPLICATIONS

Over the past four years, a number of lessons were learnt from the implementation of FACASI in the four target countries. The key implications for policy are summarized as follows.

- There is a need for proper demand assessment of the tasks to be mechanized, based on farmer readiness to shift to mechanized operations and the business opportunities for machinery service providers.

- It is important to have a clear agricultural mechanization policy and strategy supported by other related and favorable policies including farm machinery mobility on public roads, trade and investment encouraging the private sector engagement in machinery supply, manufacturing, and service provision.
- Efforts should continue to focus towards the development of well-equipped machinery service provision units in rural areas with diverse options in farm power and implements ready to address the diverse interests of smallholder farmers in their vicinity.
- In addition to the existing strong government support from the supply side of agricultural machineries, it is also essential to trigger the uptake/use of machinery services by smallholder farmers through well-developed commodity markets and/or income generating non-farm activities, to boost farmers' capacity to pay for the services.

## APPROACHES AND RESULTS

### Multiple services for better return (Tanzania)

In Tanzania, in all the three districts (Babati, Arumeru, and Mbulu) where FACASI project intervened, financial analyses showed that using 2WTs for ploughing and transporting alone was beneficial but as indicated in Figure 1, the maximum net present values from the use of 2WTs and accessories were attained when power tillers were used for shelling maize (in addition to ploughing and transporting services). Provision of multiple services to smallholder farmers help machinery owners making use of their machinery for most of the year, maximizing their use rate and the return on their investment.

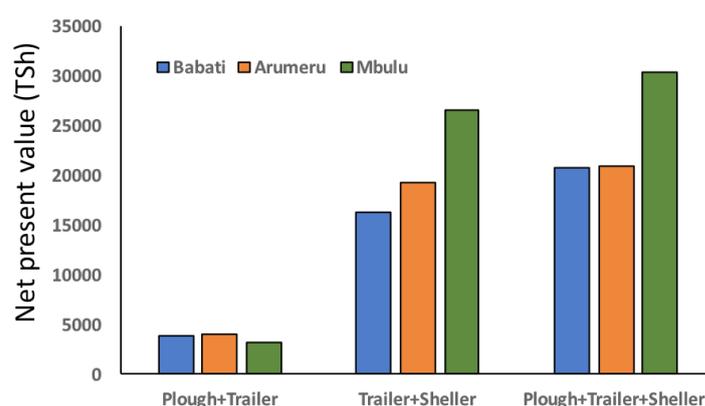


Figure 1. Net present values (TSH) of 2WTs and accessories used for different activities in Tanzania. Source: FACASI Survey (2016)

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#### Gradual expansion of services and power source (Kenya)

The expansion of mechanization service provision in rural area needs careful assessment of farmers' demand for different services, analyzing the appropriate farm power type needed to do the job, and the attractiveness of business opportunities for service providers. Combining different farm power and providing several services from one point (a hub approach) could help the service provider in diversifying operational activities across time and space. Such a diversified and multi-functional operation enables machine owners to use them throughout the year and helps strengthen the cash inflow to the business owner. The gradual development of service provision shown in Figure 2 is the experience of the Kenya Network for Dissemination of Agricultural Technologies (KENDAT). In close collaboration with the FACASI project, KENDAT moved from draft oxen powered farm machinery service provision mainly limited to ploughing and direct seeding (CA) to the 2WT based services with the additional inclusion of transportation. In 2015, KENDAT broadened its partnership and brought the USAID funded Feed the Future Innovation Engine (KFIE) on board. Through the extended partnership, the service provision unit has expanded both in terms of the type of machinery services made available to the smallholder farmers and the type of farm power through the purchase of four wheat tractors (4WTs) and accessories. The machinery service providing hub also equipped itself with skilled technicians taking care of the repair and maintenance services and trained machinery operators.

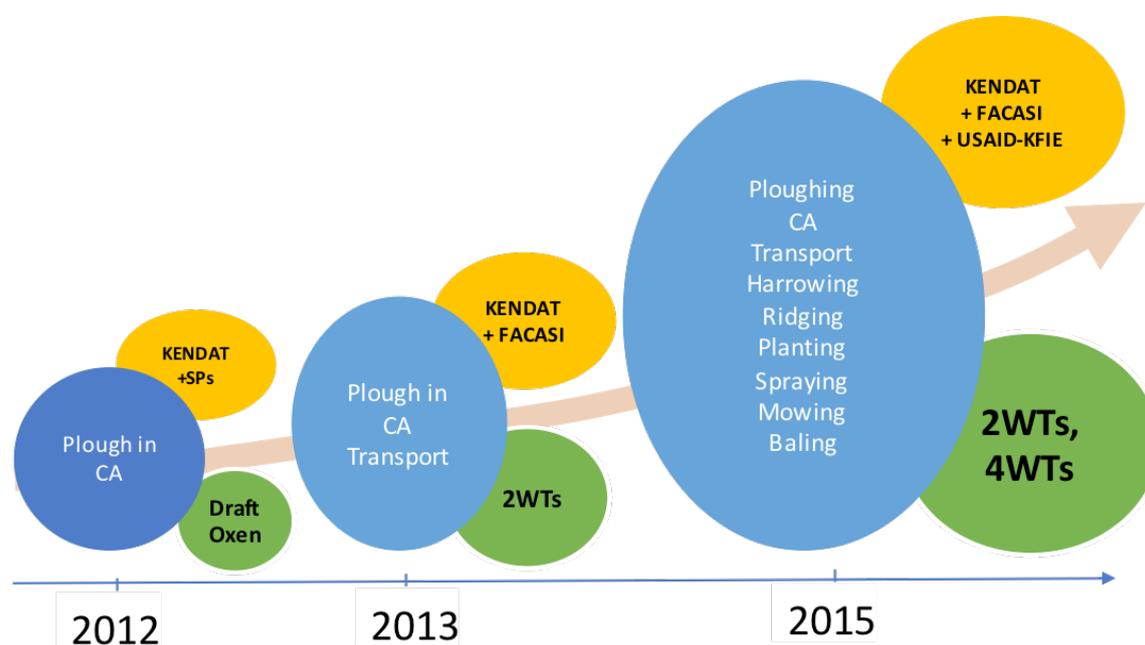


Figure 2. The gradual development of mechanization service provision Hub at Laikipia (Kenya).

### Developing the machinery supply chain (Zimbabwe)

In Zimbabwe, the approach of FACASI has been to involve machinery dealers and manufacturers from the onset. In particular, the project organized (1) joint promotion of small mechanization with these private companies, and (2) built the capacity of local manufacturers in the design and assembly of two-wheel tractor-based seeders (through formal training sessions and continuous mentoring). The project also used a value chain approach and did not focus only on crop establishment, but also worked on post-harvest operations (e.g., shelling) for which there is a high demand in the country. The project also did not focus solely on two-wheel tractors, but also worked on small mechanization solutions that have a very high capacity-to-cost ratio, such as small (single or double cob) shellers which only costs \$60 USD but have a capacity of shelling 3 tons of grain per day.

Since the start of the project in Zimbabwe (in 2014), the number of agribusinesses and rural service providers involved in small mechanization has increased. The growth has been particularly fast for shelling service providers (and it should be noticed that dealers ran out of stock in June 2017 and couldn't fulfil the demand). Moreover, the project is lobbying for improved policies regarding—amongst others—licensing of two-wheel tractors and their operators (with the Ministry of Transport and Infrastructural Development) and lifting of the import duties on steel and spare parts which limit the growth of the local agribusiness sector (with the Ministry of Industry and Commerce).

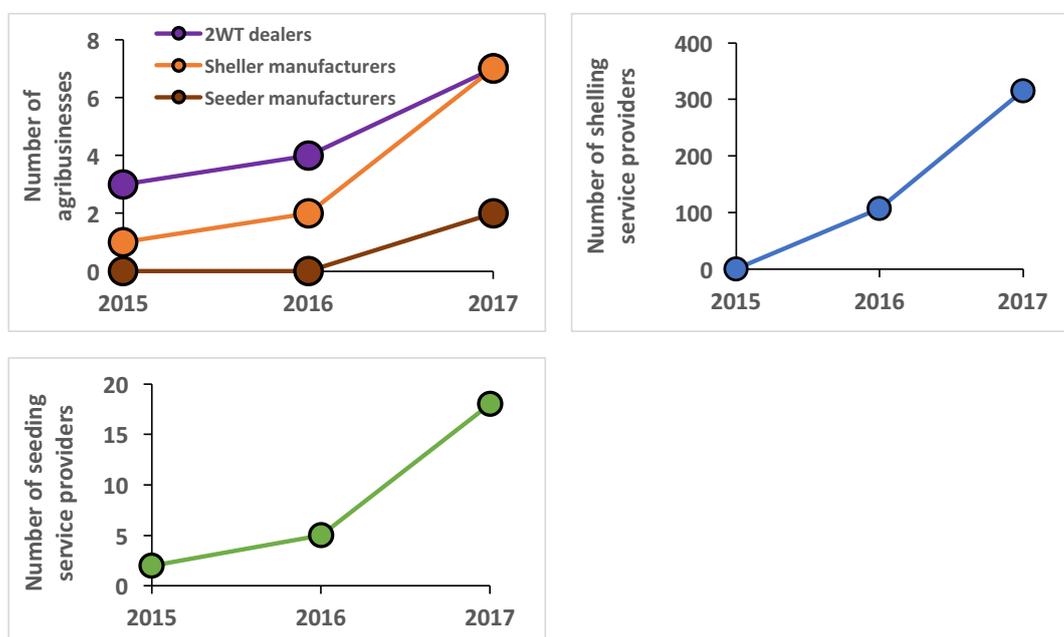


Figure 3. Expansion of agribusiness and machinery service providers in Zimbabwe

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#### **Growing commitment in agricultural mechanization (Ethiopia)**

The Ethiopian Agricultural Transformation Agency (ATA) and the Ministry of Agriculture (MoA) recently formulated a clear agricultural mechanization strategy to increase farm power from the existing 0.38 kW/ha to 1 kW/ha by 2025. The strategy also targeted the gradual substitution of animal power in the agricultural operations with mechanical and/or electrical power. The establishment of the Mechanization Directorate at the Ministry of Agriculture, and due emphasis given to rural youth employment partly through agricultural mechanization shows the government's commitment in supporting agricultural mechanization. However, there are still some issues in this regard that need the attention of policy makers. These include: (1) lifting or reducing import tariffs on spare parts, (2) ensuring the availability of guarantee funds and loans for machinery imports and business, (3) supporting machinery service providers through a mix of innovative financial products (e.g., leasing), capacity building, certification, and promotion to raise awareness and create market demand, (4) establish machinery testing and certification centers to assure quality, and (5) for the service providers to take the full advantage of the multipurpose nature of tractors, expand the range of services offered.

#### **CONCLUSIONS**

In commercializing smallholder mechanization, both the public and the private sectors have key roles to play. Strong commitment from a government in creating enabling business environment for the private sector through the implementation of supportive policies and strategies is crucial to foster sustainable agricultural machinery supply and service provision business. As we have acknowledged, the role of the public sector is important in laying the groundwork for the growth and development of a smallholder machinery sector. However, public sector dominated, highly subsidized and supply driven agricultural mechanization schemes, which some governments may favor as a way to jumpstart smallholder agricultural mechanization, may temporarily help but is unlikely to be sustainable. There are risks brought about by shifting (political) priorities by governments which may in turn lead to spasmodic efforts that fail to achieve long term impacts. Hence, the expansion of smallholder mechanization needs to take a deliberate path that strengthens the private sector as a key plank of smallholder mechanization based on businesses that supply machinery and related services based on assessed market demand.

## REFERENCES

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## CONTACTS

DR Moti Jaleta and Dr Frederic Baudron work for the International Maize and Wheat Improvement Center (CIMMYT)



Australia



Botswana



Ethiopia



Kenya



Malawi



Mozambique



Rwanda



Tanzania



Uganda



Australian Government

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