



Mechanisation for Agricultural Transformation

Background and Context

Under the African Union's 2014 Malabo Declaration, AU member states have explicitly committed themselves to making investments in '*suitable, reliable, and affordable mechanisation and energy supplies*' in order to double productivity by 2025 (Commitment to Ending Hunger, 3(a)). In spite of this commitment, however, only a few countries have actually included mechanisation in their National Agriculture Investment Plans (NAIPs). In 2018, the AU presented the Inaugural Biennial Review Report on the implementation of the Malabo Declaration and the Africa Agricultural Transformation Scorecard (AATS). Indicator (i) of Performance Area #3– Ending Hunger – measures '*access to agriculture inputs and technologies*'. This indicator reflects countries' commitment to and progress in promoting the utilisation of cost-effective and high-quality agricultural inputs, irrigation, mechanisation and agrochemicals for crops, fisheries and aquaculture in order to boost productivity.

Benefits of specifically including mechanisation investment strategies in countries' NAIPs include the development of the policy and regulatory frameworks that are necessary for incentivising private investment in the development, supply and maintenance of agricultural equipment and related technologies, in addition to facilitating the leveraging of public funds for mechanisation within agricultural value chains.

Main Challenges to Rapid Mechanisation of Agriculture in Africa

Africa currently has the highest growth rates of population, urbanisation and middle-class consumers of any continent. Combined, these factors are fuelling a sharp increase in food demand, which has led to a rapid increase in

KEY MESSAGES

In order to raise agricultural land and labour productivity, to generate rural employment and make it more attractive and to achieve future growth and poverty reduction agendas, governments must embrace the technological, policy, and institutional innovation opportunities afforded by mechanisation. Successful mechanisation along the value chain will have to be a priority in any future development and growth agendas for African smallholder agriculture. Its success depends on organisational innovations such as reliable services and cooperation arrangements for and with farmers.

agricultural import expenditures by African countries. Between 2001 and 2011, the total value of agricultural imports rose tenfold, to nearly US\$80 billion per year.¹

The failure to accelerate and sustain growth within the agriculture sector will have major impacts on African countries as well as on global food markets. By missing out on the opportunity to capture a larger share of the growing demand from continental and global agricultural markets, Africa will miss the opportunity to create wealth and employment opportunities.

Currently, Africa is the continent with the least mechanised agricultural system in the world. African farmers have ten times fewer mechanised tools per farm area than farmers in other developing regions, and access has not grown as quickly as in other regions. 50-85% of farm work continues to be done manually, without the support of animals or

¹ African Union Commission (2018). Inaugural Biennial Review Report of the African Union Commission on the Implementation of the Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared prosperity and Improved Livelihoods.

machinery.² Only 10% of total power for land preparation in sub-Saharan Africa comes from engine-powered machines, usually using fossil fuels.³ Africa also continues to have the highest share of food loss and waste – a total of 36% across the continent (*cf. Knowledge Note: Post-Harvest Loss*). 30% of this is lost due to poor harvesting, post-harvesting, processing and packing processes. For example, estimates indicate that around one millions tons of additional milled rice could be available in Africa by halving on-farm post-harvest losses alone through the use of appropriate, locally available, suitable and adapted milling machines. This translates to 17% of current rice imports per year, worth an equivalent of US\$410 million.⁴

Furthermore, the use and power of tractors in Africa has barely increased over the past 40 years. In 1960, Kenya, Uganda and Tanzania *each* had more tractors in use than India. By 2005, India had 100 times more tractors in use than the three countries combined. In 1980, meanwhile, there were just two tractors per 1,000 hectares; by 2003 this had fallen to an average of just 1.3. By comparison, there were 7.8 tractors per 1,000 hectares in 1980 in Asia and the Pacific region – by 2003 this had jumped to 14.9.⁵

There are also strong disparities between North and sub-Saharan Africa: in 2007, only 37% of the continent's tractors were found in SSA, with West and Central Africa showing the lowest uptake on the continent, with just 9% and 2% respectively.⁶

On the other hand, substantial and visible progress and growth in some African countries and in some sectors is reason for optimism. However, more needs to be done to meet future food demands and to further accelerate agricultural transformation. It will, therefore, be crucial to analyse and address the technological, policy and institutional innovations that are required in order to improve agricultural land and labour productivity more quickly, as well as to learn from those African countries for which adoption of sustainable mechanisation has contributed to socially sustainable mechanisation pathways and agricultural growth.⁷

Recommendations for Anchoring Mechanisation within NAIPs

The development of national agricultural mechanisation investment strategies that form part of countries' NAIPs

must be encouraged by governments, as they will support the development of the policy and regulatory frameworks that incentivise private investments in supply of agricultural equipment. Such strategies will also enable governments to mobilise further public funds to be directed to mechanisation and new technologies for agricultural development. They will also contribute to the CAADP target of doubling productivity by 2025, in addition to increasing the availability of, and access to, machinery and technologies specified under the AU's Biennial Review Performance Area #3, Indicator (i). Furthermore, increased availability of machines and technologies will stimulate the creation of employment opportunities, particularly in rural areas and for off-farm activities. Crucially, if done in the right way, mechanisation will be employment-enhancing without being labour-replacing.

As women continue to dominate the informal food processing and trading sectors, in addition to comprising a significant share of the manual farm labour force in most African countries, mechanisation can reduce much of the drudgery of farming activities while simultaneously improving the efficiency and timeliness of farming, as well as creating new employment and entrepreneurship opportunities in other segments of the value chain. For young people, the adoption of small, affordable and easy-to-maintain tools and technologies could stimulate jobs and entrepreneurial opportunities, such as in the processing and transport segments or the hiring services market.

The 'uberisation' of mechanisation and other hiring service models, meanwhile, offers real opportunities and provides viable alternatives to costly subsidy programs and government-run procurement and distribution schemes. Furthermore, in the longer term, countries may consider opportunities to leapfrog stages of technological development through the design and adoption of equipment which uses alternative sources of energy and advances in digital technology. These machines will need to increase productivity along the entire value chain while minimising the costs to both the environment and to agricultural ecosystems.

There are important lessons that can be learned from those African countries that have already included mechanisation in their NAIPs and are at the forefront of making progress with mechanisation. A study of seven African countries – Ethiopia, Malawi, Mali, Morocco, Rwanda, Tanzania and Zambia – conducted by the Malabo Montpellier Panel,

2 FAO and African Conservation Tillage Network (2017). Consultative Meeting on a Mechanization Strategy: New Models for Sustainable Agricultural Mechanization in sub-Saharan Africa.

3 FAO and UNIDO (2008).

4 Africa Rice. Post-Harvest. Accessed 4 June 2018.

5 FAO (2011).

6 J. Kienzle, J.E. Ashburner and B.G. Sims (2013). Malabo Montpellier Panel (2018).

7 Malabo Montpellier Panel (2018).

in June 2018, analysed which policy decisions had been taken and which interventions had been implemented to substantially increase the uptake of mechanisation and technologies along the entire value chain.⁸ The findings of the study resulted in the following seven specific policy recommendations:

- ▶ **Elevate national agricultural mechanisation investment strategies to priority status within National Agriculture Investment Plans (NAIPs).** The development of national agricultural mechanisation investment strategies that form part of countries' NAIPs must be encouraged by governments and supported by the policy and legal frameworks that incentivise private investments in supply of agricultural equipment.
- ▶ **Design socially and politically sustainable mechanisation pathways.** With new machines and technologies constantly emerging, it is ever more important that governments design mechanisation strategies that generate new employment opportunities for those working in the rural on- and off-farm economies. This is particularly important given how critical employment is to reducing poverty, reducing migration and maintaining political stability.
- ▶ **Prioritise mechanisation along the entire agriculture value chain.** Governments must prioritise mechanisation along the entire food value chain, not just at the production level. This calls for investments into the design and development of technologies that improve the quantity and quality of food. More emphasis should be placed on post-harvest and processing technologies that increase the commercialisation of farmers' production by adding value to crops while at the same time reducing food loss, reducing waste and increasing food safety.
- ▶ **Investments in supportive infrastructure and vocational training at scale.** Governments must increase their investment to build and improve necessary infrastructure, such as irrigation, transport networks and electricity grids. This infrastructure is needed for smallholder farmers in remote, rural areas to be able to harness the opportunities of new machines and technologies and facilitate access to markets that are otherwise inaccessible. Furthermore, the provision of training facilities needs to be enhanced in order to expand access to opportunities for skills development and upgrading along the value chain; cooperative systems and the private sector should engage in this process (*cf. Knowledge Note: ATVET*).
- ▶ **Create a conducive business and services environment.** It is essential that the private sector is incentivised to take agricultural mechanisation to scale.



The principal methods for achieving this are providing financial security, smart subsidies and / or tax waivers when engaging with smallholders. Meanwhile, access to new machinery for farming and processing, in particular by smallholders, women, and youth initially requires a supportive fiscal regime in which sales taxes are low and barriers (such as import duties on agricultural machinery, spare parts, and raw materials for local manufacturing) are minimised. Creating this conducive environment will further facilitate the advancement of entrepreneurial machine-hiring services through the acquisition of machines and tools for production, processing and trading. Low income smallholders and women farmers may need to be assisted to be able to pay for such services, however.

- ▶ **Develop an African agricultural machinery industry.** Africa needs to further develop its own agricultural machinery industries in a way which makes use of the region's inventiveness while also taking account of its specific contexts. The industry may grow as a mix of small, creative start-ups, some of which may work in partnership with established international corporations. The private sector can play a crucial role in bringing to scale the design, development, and provision of

technologies that are proven to be impactful. Increased cooperation between the private sector and research institutions, meanwhile, is needed in order to strengthen domestic mechanisation efforts. This can be achieved by developing locally appropriate and affordable machines and technologies. Substantial investment in public-private partnerships must therefore be made in order to foster research and development, vocational training and skills development programmes, as well as to stimulate innovation along the value chain (*cf. Knowledge Note: Research and Extension*). This needs to include the design and manufacturing of equipment and the servicing of machinery and tools, such as through mechanisation service centres and technical extension services which include the collective action of farmer organisations.

- **Empowering smallholder farmers' and women's groups.** In order to bring to scale locally developed and proven technologies, the integrated provision of services such as 'one-stop shops', at which farmers receive advice to match their demand with the appropriate technologies and inputs, is needed. Since women in Africa continue to make up a significant share of farm labour, they too need to be actively involved in the innovation and scaling up of mechanisation and the development of new technologies.

It is a promising sign, that between 2005 and 2014, several African countries were able to increase the uptake of mechanisation along the entire agricultural value chain; in this way they increased their agricultural output and generated new off-farm employment opportunities.^{9,10} Their experiences can help other governments develop country-specific mechanisation strategies and policies that favour collaboration between the private sector, research institutions and the governments themselves.



9 Ibid.

10 O.K. Kirui, and J. von Braun (2018).

Further Information

- Malabo Montpellier Panel (2018). *Mechanized: Transforming Africa's Agriculture Value Chains*. Dakar. - [View](#)
- AUC and FAO (2018). *Sustainable Agricultural Mechanization – A Framework for Africa*. African Union Commission and Food and Agriculture Organization of the United Nations. - [View](#)
- FAO and UNIDO (2008). *Agricultural mechanization in Africa - Time for action*. Food and Agriculture Organization of the United Nations and United Nations Industrial Development Organization: Vienna. - [View](#)
- FAO (2011). *Investment in agricultural mechanization in Africa*. Food and Agriculture Organization of the United Nations: Rome. - [View](#)
- J. Kienzie, J.E. Ashburner, B.G. Sims (2013). *Mechanization for Rural Development: A review of patterns and progress from around the world*. Integrated Crop Management Vol. 20-2013.
- O.K. Kirui, and J. von Braun (2018). *Mechanization in African Agriculture: a Continental Overview on Patters and Dynamics*. ZEF Working Paper Series No.169. Bonn, Germany. - [View](#)

Published by: African Union Commission - Department for Rural Economy and Agriculture (AUC-DREA) and African Union Development Agency – NEPAD

Prepared by: Dr. Katrin Glatzel, IFPRI / Malabo Montpellier Panel

Designed by: Twaai Design

Supported by: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

ISBN-Number: 978-0-6399233-2-1

Date: June 2019