Mechanised agriculture essential in Sub-Saharan Africa

According to a new report from FAO, mechanisation and appropriate mechanisation strategies have a large role to play in improving agriculture productivity, particularly in Africa, in order to feed the growing world population. The opportunity must be guided in a way that meets smallholder farmers' needs and that does not require a Green-Revolution type of approach with high levels of agrochemical inputs and destructive ploughing operations that threaten soil health and fertility, according to FAO's new report.

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Agricultural mechanisation: A key input for Sub-Saharan African smallholders underlines that agricultural mechanisation in the twenty-first century should be environmentally compatible, economically viable, affordable, adapted to local conditions and, in view of current developments in weather patterns, climate-smart. Mechanisation covers all levels of farming and processing technologies, from simple and basic hand tools to more sophisticated and motorised equipment. It extends far beyond ploughing and can contribute to productivity gains and new jobs in the post-harvest, processing and marketing stages of local and global food systems.

As things stand, two-thirds of the power used to prepare Sub-Saharan African land for farming is provided by human muscle. Comparable rates are 30 percent for South Asia and even lower for Latin America. "There is no doubt that the application of farm power to appropriate tools, implements and machines is an essential agricultural input in sub-Saharan Africa with the potential to transform the lives and economies of millions of rural families," says FAO assistant director-general Ren Wang, head of the Agriculture and Consumer Protection Department.

"Agricultural mechanisation in its broadest sense can contribute significantly to the sustainable development of food systems globally, as it has the potential to render post-harvest, processing and marketing activities and functions more efficient, effective and environmentally friendly," he added.

FAO emphasises that harvesting the fruit of productivity-boosting mechanisation in Sub-Saharan Africa depends on making available and accessible appropriate means of farm power supply. This ranges from draught animals to two-wheel and four-wheel tractors. There is a wide variety of agricultural equipment for precision seeding with minimum soil disturbance, efficient planting and transplanting of seedlings, application of inputs, harvesting and transport, processing and value addition that cover the mechanisation spectrum. It is, therefore, important to assure adequate land tenure and credit systems to encourage investments in mechanization.

Sustainable crop production intensification includes soil protection, ample cover crops and minimal tillage - all key principles of FAO's ecosystem-based "Save and Grow" paradigm and directly supporting the 2030 Sustainable Development Agenda, especially SDG2 to "End hunger, achieve food security and improved nutrition and promote sustainable agriculture".

The benefits of mechanisation in Africa

According to Josef Kienzle, FAO expert and key author of the report, mechanisation allows smallholders both to intensify and expand agricultural production as well as enabling some family members to seek off-farm jobs and incomes.

As rural African youths increasingly migrate to urban centres, the region may face labour shortages along with increasing demand for food to be sent to the cities. Mechanisation can help the often elderly or female farmers who remain in rural areas to keep up with higher output needs, thus contributing to increased food security and climate change mitigation.

It can be achieved when well-managed private sector mechanisation service centres are installed and services are within reach. Interventions from the public sector to help this process include providing specific incentives depending on the mechanisation power source and user type. "It allows for new and often better jobs in the servicing sector, such as for skilled machinery managers, repair service providers, mechanics, dealers and spare part supply centres," says Kienzle.

Future prospects

The goal, says Kienzle, is to reverse a vicious cycle in which low farmer income leads to low potential for investments in seed, fertilisers and appropriate machinery, leading to low yields and even lower income. Successfully inverting the trend can improve farm family welfare and also facilitate a response to the paradox that low demand for tractors also hinders the availability of spare parts and even fuel, reducing the value of investing in mechanisation anyway.
That shift must be driven by the demand of farmers.

Many past initiatives have failed, with subsidised or donated machinery ending up as "orphans" due to the absence of spare parts or repair services. Many countries today have graveyards full of tractors and their associated equipment that seemed cheap at the outset but ended up being very expensive.
Funding sustainable mechanisation is a challenge. While much modern agricultural technology today is too sophisticated to be suitable for African smallholders, options are proliferating.

The report notes that major international suppliers of farm machinery now produce cheaper and more suitable equipment in developing countries, while there are also a number of evolving agricultural machinery companies from Argentina, Brazil, China, India, Turkey and elsewhere - none yet from Africa - focusing on technology transfer in the interests of smallholder farmers.

Cooperatives in several countries - notably Benin and Nigeria - have been successful in furnishing members with mechanisation services with positive economic and social returns as well as broad and active participation. Elsewhere, individuals have created enterprises buying and leasing equipment to other smallholders.

Ethiopia, Ghana, Kenya and Nigeria are all actively studying Bangladesh's experience in agricultural mechanisation, which relies heavily on two-wheel single-cylinder diesel tractors that can be adapted to power well pumps, river boats, threshers, mills as well as producing crops. Farmers with access to appropriate use of such smaller-horsepower tractors can operate them with planters that deposit seeds directly into the soil with minimal disturbance, in line with zero tillage or conservation agriculture regimes.