



APPROPRIATE MECHANIZATION FOR AFRICAN SMALLHOLDERS: A PATHWAY TO SUSTAINABLE INTENSIFICATION AND RURAL EMPLOYMENT

KEY MESSAGES

- A lack of labor is increasingly limiting the productivity of many smallholder farms. Adoption of sustainable intensification practices, such as conservation agriculture, is likely to worsen this issue, as they require more labor and more precision.
- Mechanization provides farming precision and control over resource allocation while decreasing physical labor. It incentivizes farmers to adopt sustainable intensification practices that seek to produce more food, improve nutrition and boost rural incomes without negative social or environmental impacts.
- Appropriately sized mechanization – such as multipurpose two-wheel tractors – meet smallholder farming needs, reduce drudgery and time to get produce to market.
- Private mechanization service provision in rural areas is a viable way to deliver agricultural machinery to the largest number of farmers, including the resource poor and women-headed households.
- Mechanization creates viable employment opportunities for rural youth and women as service providers and market actors along the value chain.

WHAT WE DO

With an extensive network of public and private sector partners in sub-Saharan Africa, CIMMYT:

- Identifies, develops, tests and improves technologies such as zero-till planters powered by tractors of various sizes adapted to African conditions.
- Freely shares designs for replication.
- Offers support throughout the supply chain, from importers to manufacturers, service providers, technicians and farm advisors.



“Small mechanization frees farmers from back-breaking labor while saving money, conserving inputs and increasing productivity.”

Bruno Gerard,
CIMMYT Sustainable Intensification Program Director

Why is scale-appropriate mechanization important?

- Increases labor productivity, reduce the drudgery that affects women disproportionately and makes farming more attractive to youth.
- Enables smallholders to adopt sustainable intensification practices – such as conservation agriculture – which require greater farm power and precision.
- Increases control over row planting, precise fertilizer application and timely planting.
- Complements farm labor, which is growing scarce due to urbanization, the increase in off-farm jobs and aging rural populations.



“Mechanization creates work for service providers and it also stimulates other businesses along the mechanization value chains. Once demand for mechanization is established, employment opportunities grow for mechanics, fuel providers, savings and loans associations and spare part dealers.”

Frédéric Baudron,
leader of CIMMYT’s Farm Mechanization and Conservation Agriculture for Sustainable Intensification (FACASI) project

TWO-WHEEL TRACTOR: MULTIPURPOSE TOOL FOR SMALLHOLDERS

Relatively cheap and easy to operate, the two-wheel tractor can be used for many different applications.

CIMMYT and partners develop locally available machinery or work with importers to make them available.

<p>Multipurpose:</p> <ul style="list-style-type: none"> • Attachments to two-wheel tractors can be used to speed up crop establishment, improve soils through reduced tillage, and conserve resources, such as fertilizers, through precise application. • Threshing and shelling tools add value to crops while helping farmers to reach the market on time. 	<p>Improved precision:</p> <ul style="list-style-type: none"> • Mechanized direct seeding and fertilizer applications lead to efficient use of resources (seeds, fertilizers, fuel, time, etc.). • Row planting is precise in depth and application of fertilizer below the seeds. • Effective row planting can ease weeding thus reducing yield losses. • Mechanized shellers and threshers improve the quality of the grain and reduce postharvest losses, ensuring farmers fetch good prices.
<p>Reduce hard labor and time:</p> <ul style="list-style-type: none"> • The reduction of drudgery is a key element of mechanization and contributes to reducing women’s hard workload through the development of technologies apt to their needs. Small maize shellers eliminate grueling physical labor and reduce the time to shell a ton from days to hours. 	<p>Increased production:</p> <ul style="list-style-type: none"> • Trials in Ethiopia found wheat yields increased by up to 40% by mechanized direct seeding, compared to conventional crop establishment. • Trials in Zimbabwe found mechanized conservation agriculture increased yields by 300 kg/ha, due to better plant density and better placement of seeds in terms of depth.



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