

Machinery Starter Package for Mechanization Service Providers in Zimbabwe

Smallholder agricultural mechanization helps to reduce production cost and drudgery making agriculture more attractive to the youth. Successful mechanization in Zimbabwe relies on selection, validation, piloting and scaling of appropriate inexpensive machinery solutions adapted to farm size and financial ability smallholder farmers. Over the past decade, CIMMYT has tested, validated and piloted small scale machinery and business models suitable for southern African farmers. Based on the experiences and successful piloting, CIMMYT recommends the following machinery package for successful roll out through a **Service Provider** Model. A service provider owns and maintains the machinery and operate it on a fee-for-service basis. The service fee is usually much cheaper for the endusers (farmers) compared to the cost of traditional practices and create a win-win situation that makes the business viable for both service providers and farmers.

The two-wheel tractor as main traction force

- This is a two-wheel tractor powered by a 16 HP Diesel engine (Single cylinder, 2000 rpm, water cooled) provides the main traction force
- Different ancillary machinery and equipment such as plough, direct seeders, rippers mechanical weeder, irrigation pump, sprayer, harvester, thresher, sheller, trailer, etc. can be attached
- Has low operational costs (consumes 1.5 -2.0 l diesel/hour depending on operation and load)
- Its engine can power a multitude of equipment with its belts (versatile use of engine)
- Has six gears (including two reverse) that provide an operating speed of up to 15 km/h
- Its maintenance cost is low compared to sustaining a pair of draft cattle



One axle two-wheel tractor (16 HP)

Two-row multi-crop direct seeder

This two-row multi-crop direct seeder can be fitted with the 2WT to sow most grain crops directly into untilled soil and is therefore suitable for conservation agriculture. The seeder can be fitted with the 2WT directly (to walk behind) or via a tool bar (to provide a seat while driving). The main characteristics of the seeder are as follows.

- The row units of the seeder run independently and can follow the undulations of the terrain to ensure optimum seeding depths.
- The distance between the row units is adjustable (between 450-900 mm) to suit crop type.
- Fertilizer is placed during seeding in a separate row about 100 mm apart from the seeding row (side banding)
- Its coulters and double-disc type openers cut through the crop residues without being clogged.



A two-wheel tractor with toolbar and no-tillage direct seeders attached

- Seeding and fertilizer depths can be calibrated to suit crop types and soil condition
- The seeder can be operated by one person while assisted by a helper (to supply seeds and fertiliser, check any clogging, etc.)
- The field capacity of the seeder is 0.4-0.5 ha/h (consumes 1.5 l diesel/h)

Power Maize Sheller (Model: Double-Cob)

This engine-powered double-cob maize sheller can be used for shelling of maize cobs. It drastically reduces human, time and cost compared to tradition hand shelling.

- Continuous feed type maize sheller powered either by an external engine
- Maize cobs are continuously hand fed into its two cylinders where shelling occurs
- Shelled grains get separated from cores and clean grains are obtained at grain chute
- Minimum damage to the shelled grains
- Only husked cobs can be shelled
- This woman friendly machine can be operated by one person while assisted by a helper (to supply cobs and bag the shelled grains)
- Locally made with locally available iron materials and parts and easy to maintain or repair
- Shelling cost: US\$ 10/t (US\$ 60/t in manual shelling)
- Payback period: 10–12 days (25 t)
- Price of the sheller is US\$ 500 (excluding engine)



Double-cob maize sheller

One axel tipping trailer

- Capacity: 1.5 t (1.0 t for rough terrains)
- Speed: 10-15 km/h
- Tractor fuel consumption (diesel): 1.5-2.0 l/h)
- Price of the trailer US\$ 1000 (excluding tractor)



One axel tipping trailer



This technical bulletin was prepared by Abdul Matin and Christian Thierfelder as part of the USAID and SDC-funded the Zambuko/R4 Rural Resilience Projects implemented by WFP and its partners.

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