Broken grain (%)	2.10
Unshelled grain (%)	0.27
Clean grain (kg/hr)	1250
Fuel consumption (tons-grain/litre fuel)	1.3

Power requirements:

The sheller can use either 5.5hp high-speed single-phase electric motor or 8hp petrol engine. The recommended petrol engine is Briggs and Stratton and the model should either be vanguard or industrial plus. This engine is strong, durable and has readily available spares and a local service centre in Kampala.

Labour requirements

Women, men and children above 18 years of age can operate the sheller. Three to four persons are required to effectively operate it. The four people can shell 9,000 - 11,500 kg of clean grain per day using the sheller, while the same people will shell 2,500 - 3,500kg using the beating method.

Equipment maintenance

The sheller is easy to maintain. Lubricate the bearings with grease thoroughly once a year. You also replace v-belts when they are worn out and begin to slip off the pulleys. The maintenance and servicing of the engine should be according to the manufacturer's manual.

Economic benefit

The machine is ideal for commercial farmers who grow at least 8ha of maize per season, groups of farmers whose combined hecterage is at least 8ha and individuals with view to hiring the sheller out at fee. To shell 1,000kg of clean grain costs UShs. 7,000/= and save UShs. 10,000/= per 1,000kg of grain. Other economic benefits of the sheller include:

1) improvement of productivity, quality and market value of maize
2) reduction in labour and improvement of timeliness in maize production
3) reduction in human strain and suffering during maize shelling
4) provision of employment opportunities to rural people.

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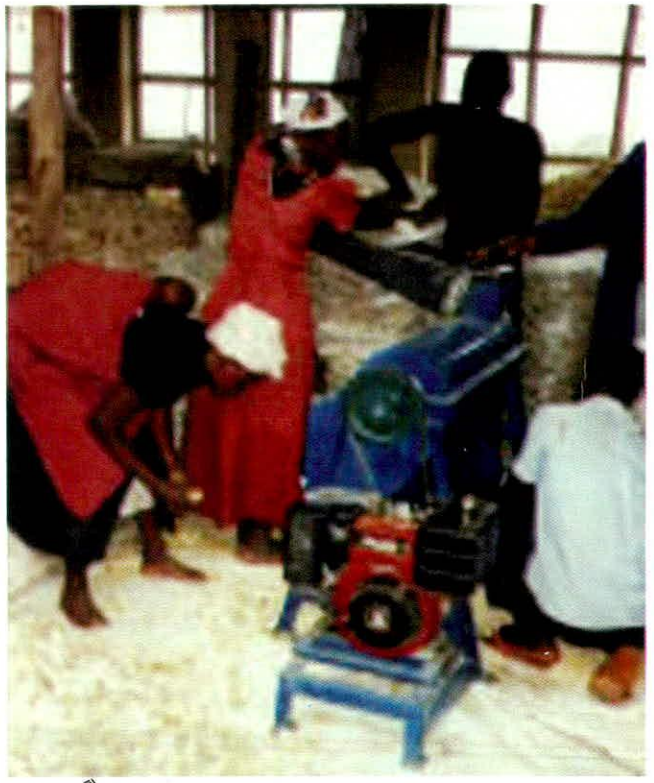
Motorized Maize Sheller for Commercial Farmers



NARO

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Introduction

Maize is one of the major food crops in Uganda. It is replacing some of the staple foods like matoke in central and western regions of this country. The crop is widely used in large communities such as schools, hospitals, army and prisons. It is also used in the manufacture of poultry and livestock feed and high quality low fat cooking oil. The bulk of the maize in the country is mainly shelled by beating the crop either on bare ground or loosely packed in sacks or hand priming of the cobs.

Farmers beating maize in gunny bags on bare ground.

The beating method though productive, results in grain damage and contamination with foreign matter reducing the shelf life and economic value of the grain. Hand shelling produces unbroken grain but takes long time and causes bruising of the palm. Manually operated shellers available on the market have limited output, 10-40kg/hr and cause body strain to operators. The motorised maize sheller reduces labour, improves productivity, quality and market value of the crop.

A child is hand-shelling maize

Equipment description

Figure below shows the motorised maize sheller developed by Agricultural Engineering and Appropriate Technology Research Institute (AEATRI). It consists of shelling unit, feeding hopper, fan, spent cob and clean grain delivery outlets, power unit and frame.

Farmers shelling using a motorised sheller

Mode of operation

Tighten all components before starting. Start the engine and adjust its speed until the shelling unit makes whistling sound. Put one basin full of unshelled maize in the feeding hopper and open the hopper gate to allow maize flow freely into the shelling unit. Add more maize to the hopper to make the shelling continuous. The machine shells the maize, automatically separates the spent cobs and chaff from the grain. Clean grain, spent cobs and chaff are all delivered through different outlets. This helps the farmer obtain clean grain and spent cobs for other uses. Remove the clean grain from the delivery outlet before the heap touches the outlet to prevent the fan from sucking in maize.

Technical Specifications

The sheller use one litre of petrol to produce 1200kg to 1400kg of clean grain depending on operators' experience and yield of maize on the cobs. It is recommended that the sheller be operated at shelling speed of 1100 – 1200 revolutions per minute (rpm). This speed is reached when the shelling unit makes a whistling sound. The sheller operated at the above recommended speed will give the following outputs: