

Groundnut digging cum separating machine and trench digger⁴

FARM MACHINERY - AGRI PROCESSING NATIONAL FIRST

Yusuf Khan (32), has studied till the seventh standard and has a workshop of farm machinery in Sikar in Rajasthan. He has been involved in the business of farm tools for the past fourteen years. He makes trench digging and groundnut digging machines as well as other agricultural farm implements. Some of the problems that Yusuf faced during the development of this innovation were financial constraints and availability of raw materials. But he remembers with gratitude the financial and constant moral support offered by Mr. Rakimuddin Nechwa during the process of this innovation. His family and neighbours also stood by him during tough times and his neighbours even helped him to take the machine to distant places for testing. He has offered his services to other innovators for improving their innovations.

Genesis Two-thirds of Rajasthan has sandy soil and groundnut is grown all over the state. The process of groundnut digging involves digging up the ground and separating the groundnut from the soil. But normal groundnut diggers fail to dig out all the groundnuts from the field and many pods still remain in the ground. These have to be manually extracted by labourers. The work is not just strenuous and time consuming, but also costly for the farmer. This gave Yusuf the idea of mechanizing the whole process and led to the development of this unique machine that meets the needs of the farmers and saves a considerable amount of money, time and effort.

The Innovation

This sturdy rugged desert unit is retrofitted on a 35 HP tractor and is powered by the coupler from the tractor unit and has an elaborate system of crankshafts, flywheel, connecting linkages and rotating

vanes on a shaft. A sieve is provided with a vibrating mechanism to filter the groundnut from the soil. As the tractor moves forward, the vanes rotate and dig into the ground. They scoop and drop the soil-groundnut mixture into a vibrating storage unit with a sieve base. The system of linkages and drives vigorously vibrates the entire unit to shake the soil loose. The groundnuts stay trapped at the top in the central storage unit as the soil gets sifted out onto the ground. A window hatch is provided at the back that can be lifted and the groundnut taken out by a person into a basket. The unit consumes four litres of diesel per hour and completes digging one hectare full of groundnut in one day. It weighs 300-400kg and costs Rs. 45,000. Compared to other groundnut digging devices, which only dig and cut groundnut crops, this machine digs out the groundnut and separates it from the soil through the vibrating sieve. This groundnut digger is lighter than other diggers and is able to run on uneven



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ground. This device can also be used for collecting stones from fields and roads.

Advantages

Yusuf has addressed a pressing problem that groundnut farmers in the harsh desert climates of Rajasthan have faced. They do not have an efficient way of harvesting the groundnut beneath the soil that ranges between 15% to up to 25% of their harvest. Losing even an average eight quintals below the ground (25% of the harvest per hectare) means a loss of Rs 12,000, which is a huge amount for any farmer. Manual harvesting takes up to 50 people working at Rs.80/day to remove groundnut in one hectare in a day. Labour is both scarce and expensive in the desert area and the operation is



tedious as the soil has to be sifted and each groundnut has to be picked by hand. Most farmers have large land holdings in the area (greater than 2 hectares and going up to 50 hectares) and there is a need of completing the harvest as fast as possible in October so that sowing can be completed for the next season,

which starts immediately. The machine developed by Yusuf addresses all the above problems. It is an excellent way to improve productivity, cut costs and address the labour shortage. Some of the farmers who have bought this unit also loan it out to others at the rate of Rs. 1500 per day, thus making a handsome profit. For the other farmers also, it is a good bargain as they spend only Rs.1500 instead of Rs 4000 that they would have to pay to the labourers.

Current status

So far, Yusuf has sold more than 15 units of this machine to the local farmers. He wants to start a business with his innovation provided he gets financial help. He is also open to partnerships. NIF has filed a patent application for this innovation.

Trench digger

Apart from the groundnut digging machine, he has made some modified ploughs and trench digging machines. His trench digging machine is more flexible, cost-effective and can be attached to any tractor. The breakdown rate and fuel consumption is lower than that of the other available trench diggers. He has also developed a mechanism for increasing the speed of trench digging machines. The earlier version of the trench digging machine required a truck to be hired for transporting it from one place to another, as it moved only at a speed of 3km/hr. This proved to be rather expensive. Khan made modifications in the gearbox so that it is now possible to move the machine at the speed of a tractor (10 km per hour). The improved model of this machine is costlier than the earlier one by Rs.15,000 to Rs.16,000, but such is its demand that in a year, he has manufactured and sold five such machines.