

SUCCESS STORIES

Impact of Frontline Demonstrations

On

Farm Mechanization in Haryana

Self-propelled reaper binder



All India Coordinated Research Project on
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6. Self-Propelled Reaper Binder

Wheat is a major crop of India. The total wheat production during 2006-2007 was 75.80 million tons with an average yield of 27.08 q/ha. Haryana is the third largest producer of wheat with a total production of 10.1 million tons which is 13.27% of total wheat production of India and ranks first in productivity with an average of 42.32 q/ha. Harvesting of crops is one of the important agricultural operations which demands considerable amount of labour. Traditionally, harvesting of crop is done manually using sickles which involves 18 to 25 man-days/ha. The availability and cost of labour during harvesting season are the serious problems. It is estimated that harvesting and threshing of crops consume about one third of the total requirement of the production system. Timely harvest of the crop is vital to achieve better quality and higher yield of the crop. The shortage of labour during harvesting season and vagaries of the weather cause greater loss to the farmers. It is therefore, essential to adopt the mechanical methods so that the timeliness in harvesting operation could be ensured and field losses are minimized to increase the productivity and production on the farm.

To minimize the time and energy involved, harvesting machines based on vertical conveying systems and powered by tractor, power tiller and small engines have been developed. Tractor operated machines are being used by the farmers, but a high cost power source is involved with the machine. Power tillers are popular in selected regions, particularly in some of the paddy growing areas and hilly regions and hence the use of power tiller operated machine is limited. Self-propelled walk behind type reapers are also available. A riding type self-propelled reaper, powered by 4.5 horse power diesel engine, has been found to increase the working efficiency and eliminate human drudgery involved in walking behind the machine. The reaper is suitable for harvesting wheat, paddy, soybean, barley and similar other crops. It is estimated that more than 70% area under wheat is combine harvested and it is increasing continuously due to shortage of farm labour in the state. Combine harvesting leaves behind enormous quantity of straw which was either burnt in the field or requires a lot of energy in straw management but with the introduction of reaper binder the problem of straw is minimized and farmer can get better quality of wheat straw.

Constructional Features of the Reaper binder: The riding type self-propelled vertical conveyor reaper windrower is powered by a 9 kW, single cylinder, water cooled diesel engine having rated engine speed of 3000 rpm. It is provided with four pneumatic wheels; two driving wheels in the front having agricultural tread pattern tyres and two steering wheels at the rear having automotive tyres. Other systems include clutch, brakes, steering, hydraulics, and power transmission and an operator's seat is available to make the machine riding type. The harvesting system include crop row dividers, star wheels, standard cutter bar having 76.2 mm pitch of knife section, vertical conveyor belts and wire springs. The effective cutter bar width is 1.2 m. The crop row dividers enter the standing crop and the star wheels guide the crop towards the cutter bar and help in slightly lifting the crop after it is cut, and in turning it at right angle, prior to its conveying by the lugged conveyor belt.

The two lugged flat belts convey the cut crop towards the centre of the machine and moves back on a platform where it makes a bundle of about 5 kg each. At the end, the crop is discharged on the ground in the rear. The broad specifications of the machine are given in Table 6.1 and cost economics of reaper binder is given in Table 6.2. A view of four wheeled self-propelled reaper binder in operation is given in Fig. 6.1.

Table 6.1: Specifications of self – propelled reaper binder

Parameter	Remarks
Function	Harvesting and binding of grain crops in single operation.
Crops	Wheat, Paddy, Oats, Barley and other grain crops of height from 85 to 110 cm.
Engine	Diesel 9 kW
Clutch	Monodisc, dry
Gearbox	4 forward speeds—1 reverse speed
Speeds, Km/h	1st/5.4 2nd/7.4 3rd/10 4th/14.2 Rev:6.1
Pneumatic wheels	4,50-19. 5,00-14 optional
Cutter bar, m	1.27—1.40
Fuel Consumption, l/h	1.0
Height of Cut, cm	5 to7
Rope Requirement	2.5 Spool/ha
Weight with diesel engine, cutter bar and work/travel car	296 kg
Weight with diesel engine, work/travel car and binding implement	450 kg
Field Capacity, ha/h	0.4



Fig. 6.1: Four wheeled self-propelled reaper binder in operation

Table 6.2: Cost economics of self-propelled reaper binder

Parameter	Remarks
Field capacity, ha/h	0.4
No. of persons required	Two
Labour requirement, man-h/ha	5
Saving in labour as compared to conventional, man-h	155
Cost of harvesting and binding, ₹/ha	1250
Custom hiring rate, ₹/ha	2500
Saving in cost of operation as compared to conventional, Rs./ha	2725
Benefit Cost ratio	2.0
Pay back period	Five years (if area covered is 40 ha)
The height of left over stubbles, cm	10 to 15
The weight of the bundle, kg	2.5 to 7.5

The adoption level of reaper binder is depicted in Fig. 6.2. It is clear from the graph that the farmers purchased 643 nos. of reaper binders in three years *i.e.* from 2006-07 to 2008-09 on 50% subsidy. In 2009-10, the adoption level was not encouraging as the subsidy given on the machine by the Govt. was very less.

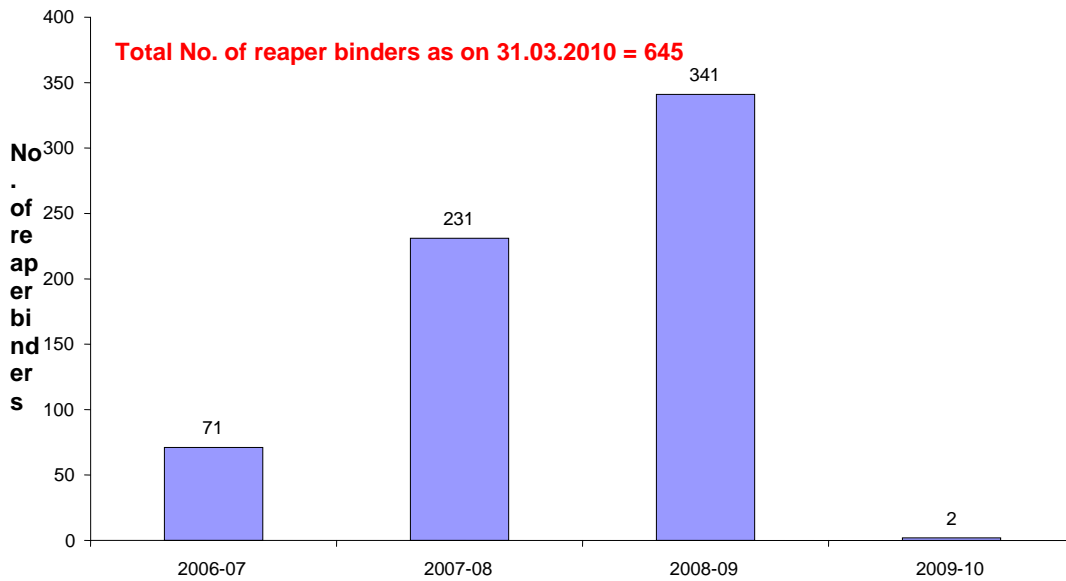


Fig. 6.2: No. of entrepreneurs of reaper binders

List of Manufacturer

Refer Appendix 'A' {S. No. 13}