

SUCCESS STORIES

Impact of Frontline Demonstrations On Farm Mechanization in Haryana

Tractor operated rotavator



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Investigators : **N K Bansal and S Mukesh**
Department of Farm Machinery & Power
Engineering, CCS HAU, Hisar

Compilation and editing : **Dr. Surendra Singh**
Project Coordinator (FIM)
CIAE Bhopal

Editorial Assistance	: Er. YS Bhokardankar Er. G S Chouhan
Word Processing	: Sh. NG Bhandarkar Sh. R K Hadau
Proof Reading	: Er. YS Bhokardankar
Reprography	: Sh. RS Kushwaha

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1. Tractor Operated Rotavator

The preparation of wheat fields after harvesting the paddy crop is quite difficult in heavy soils. Due to crack development in the soil, the implement like mould board plough, disc plough and cultivators etc do not work properly as there is tendency of lifting of big clods and the upper layer of the soil is not always loosened to the desired extent, nor is the proper mixing of different layers achieved. Frequent operation with the conventional implement such as cultivator and harrow has to be performed for the preparation of seedbed for the sowing of wheat crop. In addition, the stubble of rice crop creates problems especially when the crop is harvested with the combine harvester. It requires high amount of energy input (20-30%) for tillage operation. The studies conducted at CCS HAU Hisar revealed that tractor operated rotavator is quite effective to prepare seed bed in dry as well as wet conditions. Hence, the need was felt to popularize tractor operated rotavator in Haryana in rice-wheat cropping system and to encourage farmers/rural youth to use it on custom hiring to increase their income.

Rotavator helps to obtain specific benefits of early seed bed preparation soon after harvesting of paddy crop for sowing wheat, and after harvest of wheat crop for sowing of paddy. This not only requires low energy in tillage operation but also mixes and incorporates the stubbles of previous crop thoroughly in the soil. This improves the soil physical properties and hence, results in increased crop yield. As an ideal seedbed is prepared with the use of rotavator, it facilitates the sowing of wheat by seed-cum-fertilizer drill without any operational problems. The specifications of tractor operated rotavator are given in Table 1.1. The constructional details of rotavator are given in Fig. 1.1 and the exploded view of rotavator shaft along with the blades is given in Fig. 1.2.

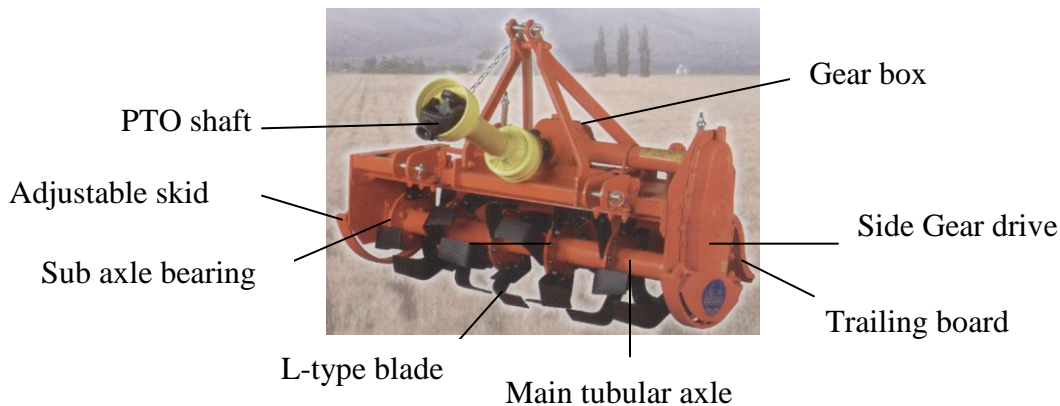


Fig. 1.1: The constructional details of rotavator

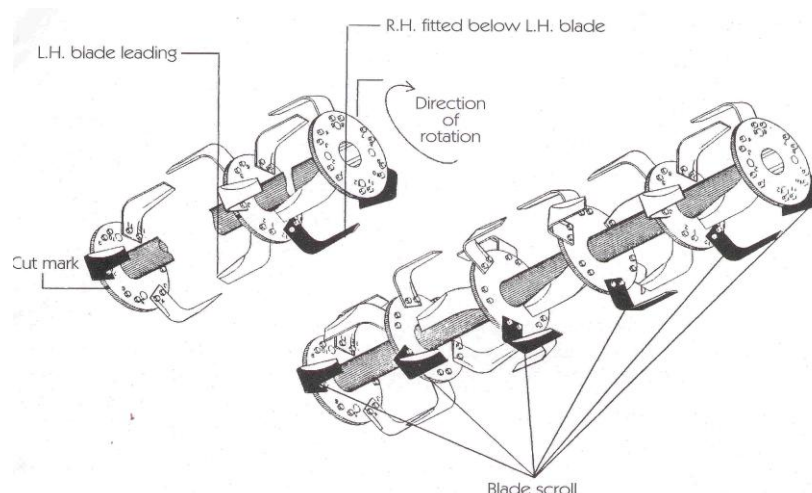


Fig. 1.2: The exploded view of rotavator shaft

Table 1.1: Specifications of Tractor Operated Rotavator

Type of drive	Chain/Gear
Side gear drive	Single/Double
Blade type	L-Type
Width of rotavator (m)	Tractor hp required
1.75	35-45
2.00	45-50
2.25	50-60
2.50	Above 70
Gear box	Single drive
PTO speed (rpm)	540/1000
Over load protection device	Shear bolt

Status and adoption level of tractor operated Rotavator in Haryana

The farmers and unemployed youth were motivated to use this machine on custom hiring basis as an enterprise. There was wide spread response in its adoption particularly in area where paddy-wheat crop rotation is followed. More interestingly small and medium farmers have adopted it as an enterprise for custom hiring. The adoption level of rotavator by the farmers/unemployed youth in Haryana is given in Fig. 1.3. The number of rotavators purchased by farmers as on 31-03-2010 was 10,570. Out of ₹1365 lakhs disbursed during 2008-09 on account of subsidy for the purchase of agricultural implements in Haryana, 40.51% of the amount was utilized for rotavators. During 2009-10, under different schemes of subsidy, farmers have purchased 2824 rotavators. An impressive growth in the adoption of rotavator from a meager figure of 20 in 2001-002 to a cumulative figure of 10,570 in 2009-10 has been seen. The average actual field capacity of 2 m width rotavator in puddling and dry land operation was observed to be 0.5 and 0.4 ha/h respectively. The area tilled by rotavator has risen from 15,700 ha/year in the year 2001-02 to 8,00,000 ha/year (Rabi and Kharif both) in the year 2009-10.

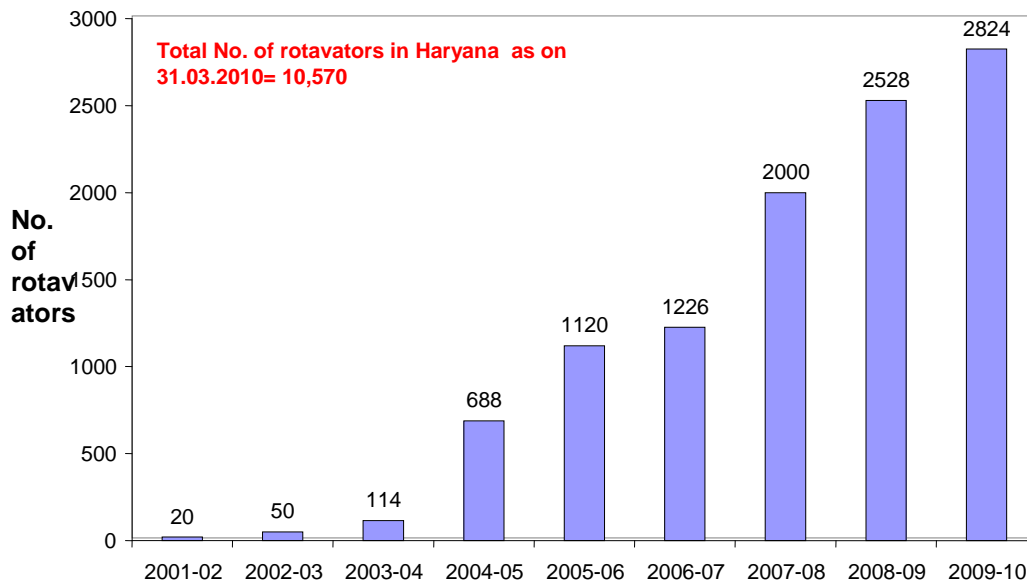


Fig. 1.3: Adoption level of rotavators by Farmers/unemployed youth in Haryana.

The enterprising farmers and unemployed rural youth are engaged in custom hiring business of rotavators *i.e.* incorporating Dhaincha (green manuring) and puddling simultaneously and to prepare seed bed as reduced tillage technology after harvesting of paddy crop for sowing wheat as shown in Fig. 1.4 and Fig. 1.5 respectively. On an average, the custom hiring rate is ₹2000 per ha for 2 m width rotavator for puddling and ₹2500 per ha for field preparation after paddy harvest for sowing of wheat crop. The average area covered by one entrepreneur is about 100 ha/year (50 hectares in puddling and 50 hectares for wheat sowing). The Economics of Rotavator under paddy–wheat rotation during custom hiring is estimated and reported in Table 1.2. The net profit by an individual is about Rs. 1, 12,500 per year. The payback period of rotavator is one year. The total estimated area covered in Haryana with the use of rotavator for puddling is about 4,00,000 hectares and for sowing of wheat is more than 4,00,000 hectares.



Fig. 1.4: Tractor operated rotavator incorporating Dhaincha (green manuring & puddling simultaneously) in standing water for paddy cultivation.



Fig. 1.5: Tractor operated rotavator used to prepare seed bed in single operation after harvest of paddy crop for sowing wheat crop.

Table 1.2: Performance and economics of rotavator under paddy–wheat rotation.

Particulars	Puddling	Wheat sowing
Av. Field capacity (ha/h)	0.5	0.4
Av. Fuel consumed (l/h)	5.0	6.0
Cost of operation ₹/ha	875	1375
Av. rate of hiring (₹/ha)	2000	2500
Av. Work done on hiring (ha)	50	50
Net saving (₹/year)	56,250	56,250
Total saving per year, ₹	1,12,500	
Payback period	One year	
Benefit cost ratio	2.29	1.82

Farmers feed back

- Saves water, time, energy, labour and money.
- Used successfully for green manuring of dhaincha, moong and other crops in wet conditions followed by heavy planker in standing water for puddling and green manuring simultaneously.
- Incorporate straw and residues of paddy, sugarcane, cotton in the soil in single operation.
- Better quality of work achieved in less number of operations compared to traditional practice both in dry and wet land condition.
- Level of field not disturbed.
- Used throughout the year.
- No injury to finger during transplanting.

List of Rotavator manufacturers

Refer Appendix ‘A’ { Sl.No.3, 6, 11, 14, 23, 24, 31, 37, 40, 43, 48, 49, 53, 63, 68, 70, 71, 80, 87, 89, 90, 96 }