

## Comparative Performance of Different Types of Weeder for Wetland Rice in Chhattisgarh Region

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### ABSTRACT

Performance of three weeders namely Ambika paddy weeder, Cono weeder and Power operated rotary weeder were compared with the hand weeding. The highest plant damage (14.88 per cent) was observed in Power operated rotary weeder and lowest (10.22 per cent) was got in hand weeding. Field capacity (0.19 ha/h) under Power operated rotary weeder, Ambika paddy weeder (0.0589 ha/h) and Cono weeder (0.013 ha/h), Hand weeding (0.0026 ha/h). Highest field efficiency 69.45 per cent was observed under Ambika paddy weeder and the lowest in 61 per cent Power operated rotary weeder. Performance index of Power operated rotary weeder, Ambika paddy weeder, Cono weeder and Hand weeding was found (0.10), (0.045), (0.031) and (0.026) respectively.

**Key words:** Weeder, Rice, Performance of weeder.

### INTRODUCTION

Rice is one of the chief grain of India. Moreover, this country has the biggest area under rice cultivation, as it is one of the principal food crops. In Asia where 95% of the world's rice is produced and consumed. Rice is the staple food of more than a half of the world population<sup>3</sup>. Weeding is the removal of unwanted plants in the field crops. Weeding is one of the critical stages in rice cultivation and affects yield and quality of rice. It was accounted that losses due to weeds in main crops are more than 40 million tons per year<sup>2</sup>. In India, farmer spent so much money for controlling weeds every year, in the

production of major crops. Poor weed control leads to loss of several tones of major food grains every year.

Hand weeding is time consuming, labour intensive, back-breaking and often costlier than other method of weed control. Mechanical weed control is very effective as it helps to reduce drudgery involved in manual weeding, it kills the weed and also keeps the soil surface loose insuring soil aeration and water intake capacity. The Cono weeder is operated by pushing action. In case of Ambika paddy weeder, 5-6 cm of standing water is maintained in the field.

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Then manually operated weeder is operated between the rows of rice crop by pushing and pulling action of weeder. Power operated paddy weeder is operated in between the crop rows in forward direction only. The weeds were cut, uprooted and thoroughly mixed into the soil by rotary cutter blade.

The testing was carried out to access the technical and economic performance of the existing weeding operation *viz.* hand weeding, Ambika paddy weeder, Cono weeder and Power operated rotary weeder. The potential of the weeders were compared on the basis of weeding efficiency, quality and quantity of work done, field efficiency, performance index, energy consumption and operational cost. The experiment was laid out with four weeding methods and each method was replicated four times, in line sown rice crop with a row spacing of 20 cm.

#### Performance of Weeders

Weed population and weed dry matter production at 20 DAS and 60 DAS were studied and observed. Minimum population of weed was recorded under Cono weeder has to be performed at 30 DAS; while the maximum population of weed was recorded under power operated rotary weeder has to be performed at 40 DAS. Weed dry matter production was found significantly maximum ( $15.42 \text{ g/m}^2$ ) in power operated rotary weeder has to be performed at 20 DAS and minimum weed dry matter (11.02) was production by hand weeding. Data from the Table 1 reveal that the weed dry matter was significantly influenced by the different weeding method at 60 DAS.

Weeding efficiency was also calculated at 60 DAS. This was determined by counting the number of weeds before and after using the weeder on the 4 blocks (replicated four times). Highest weeding efficiency 95.28 per cent was observed under hand weeding followed by 91 per cent, 78 per cent and 70 per cent in Power operated rotary weeder, Ambika paddy weeder, Cono weeder respectively. Weeding efficiency of hand weeding was found significantly higher over the other three treatments.

Highest plant damage 14.88 per cent was observed under Power operated rotary weeder followed by 13.46 per cent, 13.96 per cent and

10.22 per cent in Ambika paddy weeder, Cono weeder and hand weeding respectively. During hand weeding, weeds were pulled out manually by the farm labours. In case of hand weeding only weeds were removed by hand without damaging the plants. The plants are damages very low. In case of other three weeder the plants were damaged higher than hand weeding due to mechanical operation.

Power operated rotary weeder was the best weeder having highest field capacity 0.19 ha/h because it has higher speed during operation as compared to other weeding method and it was operated in intra rows, thus saving the time. Due to high weed infestation in the field during weeding operation under Ambika paddy weeder and hand weeding both take higher time for weeding operation, thus have operation, thus have poor quality of work done as compared to Power weeder. Field efficiency was maximum under Ambika paddy weeder (69.45 per cent) as it may be due to less clogging in soil and higher width of cut compared to other treatments, and recorded the highest field efficiency.

The performance index of the operation with different types of weeders showed that power weeder attained higher values in comparison to the remaining weeders. Power operated paddy weeder showed higher energy consumption of 1521.80 MJ/ha as it may be due to the involvement of both man and machine.

The minimum cost of operation was observed under Power operated rotary weeder (808.42 Rs/ha) followed by Ambika paddy weeder (1050 Rs/ha) and Cono Weeder (1160 Rs/ha) respectively. The highest cost of operation was observed with hand weeding (4250 Rs/ha). The cost economic was minimum in Power operated rotary weeder due to less time engagement of human labourers as compared to all other weeding method and the higher cost economic was in hand weeding due to involvement of more number of human labourers whose efficiency is variable.

Thus, it is inferred that mechanical weeding with Ambika paddy weeder was not only proved efficient but also found better on the basis of plant damage, field efficiency, performance index and cost of operation.



Fig. 1: Ambika paddy weeder



Fig. 2: Cono weeder



Fig. 3: Power operated rotary weeder



Fig. 4: Hand weeding

Table 1: Performance of different types of weeder in wetland rice

Weeding method	Weed population, m <sup>-2</sup>		Weed dry matter (g/m <sup>2</sup> )		Weeding efficiency (%)	Theoretical field capacity (ha/h)	Actual field capacity (ha/h)	Field efficiency (%)	Performance index	Energy consumption (MJ/ha)	Cost of operation (Rs/ha)
	No. of weeds in 1 m <sup>2</sup> before weeding	No. of weeds in 1 m <sup>2</sup> after weeding	Weed dry matter (g/m <sup>2</sup> )								
			20 DAS	60 DAS							
1. Hand weeding	222	10	11.02	12.10	95.28	-	0.0026	-	0.026	927.16	4250
2. Ambika paddy weeder	182	40	12.95	19.27	78.03	0.0848	0.0589	69.45	0.045	270.40	1050
3. Cono weeder	168	47	12.04	19.59	70.90	0.019	0.013	68.42	0.031	302.11	1160
4. Power operated rotary weeder	245	22	15.42	11.53	91.00	0.302	0.19	61.00	0.10	1521.80	808.42

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