

## SEED TO SEED MECHANIZATION IN PADDY

P Babu, N Kishor Kumar, A Sowjanya, N Raja Kumar, N Sathi Babu, Vimala Beera,

Krishi Vigyan Kendra, Kondempudi, Anakapalli, ICAR, ANGRAU, AP-531026

Corresponding Author : babucae002@gmail.com

Manuscript No: KN-V3-2/008

### Introduction

Agricultural Mechanization has assumed greater importance for enhancing the agricultural production and productivity by efficiently and effectively utilizing scarce resources and costly farm inputs improving timeliness factor, reducing labour cost and human drudgery etc. for all cropping systems. Traditional methods of field operations require huge number of labour and more time ultimately lead to increase in cost of cultivation. With the increasing industrialization and urbanization, employment opportunities have been increased and acute shortage of labour is often experienced by farmers during field operations. To overcome the shortage of labour or to perform the field operations at right time and to take the advantage of favourable situation in dry-land conditions, the need of the hour is the mechanization. Mechanization is a process of adoption of need based, location specific, efficient and precision tools, devices, equipment and machines matching to available power source, suitable for local soil, crop and socio economic conditions. Mechanization is the one, most and major factor contributing in reducing cost of cultivation, improving the efficiency of doing work and performing timely field operations with more precision and comfort. Information on various improved tools or machinery for cultivation of paddy crop is given below in operation wise.

S.No	Equipment	Function	Image
<b>Land Prepration and Primary tillage Implements</b>			
01.	Mould Board Plough	<ul style="list-style-type: none"> <li>Preparing field up to 30- 45cm, turned and pulverized. Destroy grasses and seeds in the field.</li> <li>The implement can efficiently be used in stone free, non sticky soils. Field capacity – 1.5-2 ha/ day</li> <li>Cost – Rs. 55,000/-</li> </ul>	
02	Cage Wheels and disc harrow	<ul style="list-style-type: none"> <li>Cage wheel is a traction device which support the vehicle by distributing the weight of the machine over as great an area as possible, reduce soil compaction and prevent it from bogging down .</li> <li>Puddling is the process of churning of soil and water upto a depth of 10-15 cm.</li> <li>This causes soil particles to go under suspension for some time and then settle.</li> <li>The bigger particles settle first and then the finer ones with passage of time.</li> <li>Thus, the finer particles formed a layer at the top which helps in reducing infiltration</li> </ul>	

03	Power Tiller	<ul style="list-style-type: none"> <li>• The marginal and small farmers can afford it as it is cheaper compare to the tractor, and the government is providing subsidy range from ` 40,000-90,000.</li> <li>• It is a 12 hpselfpropelled machine specifically useful for paddy fields and orchards as it can take short turns.</li> <li>• It comes with a package of implements like rotavator for puddling, cultivator for land preparation and it is also used for operations like pumping, threshing and farm transport.</li> <li>• It takes about 5h to puddle one hectare.</li> </ul>	
04	Rotopuddler	<ul style="list-style-type: none"> <li>• The rotopuddler were found suitable for development of puddle bed in term of puddling index and percolation rate.</li> <li>• The depth of puddle bed was found highest in rotopuddler.</li> <li>• The cost for developing puddle bed was less.                             <ul style="list-style-type: none"> <li>• Field capacity 2.0-2.5 ha/day</li> </ul> </li> </ul>	

**SOWING /TNASPLANTERS**

01	Seed Cum Ferti drill (Direct seeded Rice)	<ul style="list-style-type: none"> <li>• Direct seeding of Rice with Ferti Cum Seed Drill can reduce the labour requirement during transplanting.</li> <li>• This technology holds special significance in the production system with regard to saving labour component by 30-50% and increases productivity by 20-30%.</li> <li>• It covers 9 rows of 20-22.5cm row-to row spacing at a time. Plant to plant is continuous.</li> <li>• Crop matures 7-10 days earlier than the transplanted paddy, Light in weight and easy to handle, an area of 3-4 hectare per day can be shown and saving in seed requirements of 15-17 kg per acre is sufficient depending on variety.</li> </ul>	
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02	Drum Seeder (Wet Rice)	<ul style="list-style-type: none"> <li>• Direct seeding (Wet) in rice is identified as viable technology to overcome the problem of high cost of production and to mitigate flood and drought situation in nursery season.</li> <li>• Drum seeder is light in weight, easy to operate and more area can be covered by a single man. The seeds are dropped in 8 rows @ 20 cm row to row spacing and the seed rate is about 37.5 kg per hectare of variety of rice.</li> <li>• The cost of the unit is Rs 4200/-.</li> </ul>	
03	Rice Transplanter	<ul style="list-style-type: none"> <li>• It is a self-propelled machine driven by diesel engine and achieves uniform spacing and plant density.</li> <li>• Proper plant spacing makes uniform growth of plants and makes weeding (mechanical weeding), spraying, and fertilizer application operations are more efficient and easier.</li> <li>• It facilitates uniform depth of transplanting and fast recovery of seedling, vigorous growth. This machine reduces about 40% of the labour requirement.</li> <li>• It requires mat type nursery through which it reduces the seed rate and cost of nursery raising.</li> </ul>	

**WEEDING/INTERCULTURAL OPERATIONS**

01	ConoWeeder	<ul style="list-style-type: none"> <li>• Conoweeder found most suitable implement for weeding in rice. Mechanical weeding alone increased the plant height and enhanced the grain yield by 10.9% as compared to manual weeding.</li> <li>• The manual cono weeding in rice is a tedious job that require more energy.</li> <li>• This problem was solved with the development of power operated weeder. Conoweeder can be used extensively in SRI</li> </ul>	
02	Single row Power Weeder	<ul style="list-style-type: none"> <li>• 2 Acres per day</li> <li>• One / Two person can operate</li> <li>• Only 2.5 litres of Petrol/ acre</li> <li>• Removes weeds &amp; Develops Root System</li> <li>• Saves Time &amp; Cost</li> </ul>	

### PIANT PROTECTION (DRONESPRAYING)

01	Drone Spraying	<ul style="list-style-type: none"> <li>• Initial cost is High</li> <li>• Charges Rs-450-500/acre</li> <li>• Labour and water saving</li> <li>• Skilled technician can operated</li> <li>• Lagging in Battery payload</li> <li>• Before operating , Need to check the climatic conditions and non flying zone.</li> </ul>	
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### HARVESTING

01	Paddy Vertical conveyor Repear	<ul style="list-style-type: none"> <li>• It can be used for harvesting wheat and paddy. The reaper is front mounted on the power tiller.</li> <li>• Power is transmitted from the engine fly wheel to the reaper either through V belt or by providing gear box and propeller shafts.</li> <li>• Crop is guided by the star wheels to the cutter bar and held in vertical position by the springs.</li> <li>• The crop is conveyed to the side by the conveyor belt Cutter bar length may be 100-160cm. The capacity may be 0.25-0.35 ha/h.</li> </ul>	
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### THRESHING

01	Paddy Thresher	<p>After being cut, paddy is commonly sun-dried in the field for two weeks or more causing preventable losses, quality deterioration of grains and delays in sowing of next Rabi crop. But, with the Axial-Flow Thresher farmers can thresh paddy right after cutting thus avoiding losses, saving residual soil moisture and creating opportunity for early sowing of Rabi crops by 8-10 days.</p>	
02	Combine Harvester	<ul style="list-style-type: none"> <li>• This is a self propelled machine which cuts, conveys, threshes, cleans and bags the produce from the field.</li> <li>• It can harvest even a lodged crop. Wheel and chain combines are available.</li> <li>• It has a working width of about 4.2m. It can harvest 0.8-1.2 ha/h of paddy.</li> <li>• Use of combined harvest will ensure the timely harvest of rice. During the peak time of harvest, availability of labour is a major problem. Delay harvesting causes shattering of grain in the field.</li> </ul>	

03	Straw Baler	<ul style="list-style-type: none"> <li>• The straw baler can be operated in the combine-harvested field where loose straw is picked up and there after baled</li> <li>• It can form bales of varying length from 40 to 110 cm.</li> <li>• The height and width of bales are generally fixed at 45cm. The weight of bales varies from 15 to 45 kg depending on moisture content of straw and length of bales.</li> </ul>	
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### References:

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