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# ***Improved Rainfed Paddy Cultivation Practices - A Climatic Resilient Package for Higher Productivity in Paddy***

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## **ABSTRACT**

**Paddy is the main food crop for 60 % of the world population. Asian countries presently accounts for nearly 60% of the world population and 92% of world rice production. Asian population consume 90 % of the rice in the world. 30 % of paddy production in India comes under the rainfed cultivation. In Tamil Nadu, 30 % of total rice production under rainfed condition. Particularly southern part of Tamil Nadu. More than 90 % of paddy growers in the rainfed cultivation getting lower yield than average yield. This yield gap was due to production constrains like economical status of the farmer, availability of technologies. Ramanatahapuram, Sivagangai and Viridhunagar district of Tamil Nadu are the major districts cultivating paddy under rainfed situation. Onset of north east monsoon is the best season for cultivation with shorter duration and high yielding paddy varieties. Summer ploughing and seed hardening are the prime factor for drought tolerance. Sowing with improved paddy seeder save the seed cost and labour cost. Weed management with**

**bispyribac -sodium during 3- 4 leaf stage followed by hand weeding at 40 – 45 days after sowing recorded weed free condition under rainfed paddy. Application of Nano urea along with recommended dose of fertilizers leads to higher plant growth and yield.**

## **INTRODUCTION**

Paddy is the main food crop for 60 % of the world population. Asian countries presently accounts for nearly 60% of the world population and 92% of world Rice Production. Asian population consume 90 % of the Rice in the world. 30 % of Paddy Production in India comes under the rainfed cultivation. Paddy is economically and nutritionally important crop to many small farmers who having millions of hectares of rainfed paddy cultivation for the past seven decades in the southern part of India as well as Tamil Nadu. Rice is the nutritionally important and economically viable in the millions of farmers in southern part of India. India is the major rice-growing country in the South Asia. Rainfed paddy production accounts for 30% of the rice production in India and supports the nutrition of some of India's poorest farmers (Singh *et al.*, 2012). 14.4 million ha area under the rainfed rice cultivation in India. This area occupy the 32 % of total Paddy area in India (Hossain *et al.*, 2013). In Tamil Nadu approximately 30 % of paddy area under rainfed paddy cultivation (Singh *et al.*, 2012).

In Tamil Nadu, 30 % of total rice production under rainfed condition. Particularly southern part of Tamil Nadu. More than 90 % of paddy growers in the rainfed cultivation getting lower yield than average yield. This yield gap was due to combination of production constraints like economic status of the farmer and technology availability. Lack of adoption of suitable technologies *viz.*, seed hardening, Weed management, INM practices and water management to support yield and income which are identified for rainfed condition of southern part of Tamil Nadu. Paddy is one of the major crop in Tamil Nadu. Paddy was predominantly cultivating in high water resource areas with good fertile soils. But in the case of rainfed Paddy cultivation the major area comes under the Ramanatahapuram, Sivagangai and Viridhunagar district of Tamil Nadu with the use of rain water only. It's also known as 'puluthi nel' cultivation in these areas. In this situation availability of water at critical stage of crop cultivation is not possible. Whenever rains received, we must do all the cultural practices. In this context timely application of fertilizer and other inputs not possible. This will lead to lower productivity. But lot of scope for implementation of improved paddy production management practices which leads to higher yield and income.

## **SUITABLE SEASON**

The best season for rainfed paddy cultivation in southern part of Tamil Nadu is September-October to January. This season getting much amount of rainfall during north east monsoon which will help cultivate the Paddy crop in rainfed situation.

## **SUITABLE VARIETIES**

The varieties which are short duration (90-120) in nature are highly preferable. Drought tolerance also the specific character of Paddy variety for rainfed cultivation.

## **ANNA 4**

Duration: 100-105 days.

Average Yield: 14.80 q/acre.

Most suitable for Ramanathapuram, Sivagangai and Virudhunagar district.

### **TKM 15**

Duration: 115-120 days.

Average yield: 16.80 q/Acre.

Mostly suitable for all rainfed paddy cultivation area in Tamil Nadu.

### **FIELD PREPARATION**

Summer ploughing 2 to 3 times during April to May months helps to control the weed population and increase the water holding capacity of soil. Mid of June immediately after getting rainfall plough one time for hard clods breaking which will help to make fine tilth condition for proper seed germination. Application of 40 kg gypsum per acre during last ploughing help to prevent the clod formation and help to easier germination. Sowing was taken during pre-monsoon time. If sowing was delayed water shortage during maturity period cause the yield and income.

### **SEED TREATMENT AND SOWING**

The paddy seeds were treated with 1 % KCl in the ratio of 1:1 and drying in shade at 16 hours. This will create the tolerance for drought during early growth period. The recommended seed rate for broadcasting is 40 kg/acre.

Improved direct paddy seeder also used for labour efficiency and proper spacing with low seed rate. The sowing was taken during the pre-monsoon season. This will help to fully utilize the monsoon rainfall. Thinning and gap filling was taken 12-15 Days after sowing for proper plant density and judicious utilization of natural resources under the rainfed condition.

### **DIRECT PADDY SEEDER FOR REDUCE DRUDGERY**

Direct paddy seeder is highly useful for direct sown paddy under puddled land as well as dry sowing. By using direct Paddy seeder in rainfed situation save the labour and seed. This is one of the old method of sowing like place the seeds behind the plough. After refinement of this method Tamil Nadu Agricultural University, Coimbatore has innovated the Improved Direct paddy seeder for rainfed situation.

### **SPECIAL FEATURES**

- Labour cost reduced.
- Uniform seed placement and ideal plant population.
- Seed rate reduced and thinning cost also reduced.
- Crop duration reduced 7- 10 days due to proper placement of seeds.
- Easy to handle due to less weight.

### **Performance Comparison of Improved Direct Paddy Seeder**

<b>Characteristics</b>	<b>Seed rate /acre</b>	<b>Efficiency</b>	<b>Man days saved for sowing and weeding</b>	<b>Cost reduction for sowing and weeding</b>
Improved paddy seeder	15 kg	78 %	28	6700

Farmers Practice	30-40 kg	-	-	-
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### WEED MANAGEMENT

The common weed flora in the rainfed paddy ecosystem is *Echinochloa colona*, *Chloris barbata*, *Panicum sp*, *Commelina benghalensis*, *Cyperus difformis*, *Fimbristylis milliacea* and *Eclipta prostrata*. Weed management in rainfed paddy is integrated one for better adoption and low cost. Due to the non-availability of the labour on time single mode management of weed paddy field was highly difficult. Application of bispyribac -sodium during 3-4 leaf stage followed by hand weeding at 40-45 days after sowing is the best way to control all the types of weed in rainfed paddy ecosystem with low cost (Badal verma *et al.*, 2020).

### NUTRIENT MANAGEMENT PRACTICES

Integrated use of fertilizer under rainfed condition leads to higher economic returns as compared to chemical fertilizer alone. Combined use of 75 % of Recommended Dose of Nitrogen (RDN) through FYM and 25 % of Recommended Dose of Nitrogen (RDN) through vermicompost produced more number of productive tillers and yield. (Borah. D *et al.*, 2016). Apart from these technologies goat manure plays an important role in enrich the soil health and nutrient availability of Paddy under rainfed situation. Application of goat manure or place a shed for goat during night time at field during summer or before ploughing increase the fertility status of the soil under rainfed condition. Many farmers from southern part of Tamil Nadu doing this practices for paddy cultivation to get higher economic return with minimum usage of chemical fertilizer. Application of 50 kg Single Super Phosphate and 50 kg of murate of potash along with 2 tonnes of FYM during field preparation and application of 40 kg Urea 25 kg Single Super Phosphate and 25 kg of murate of potash during 40- 45 Days After Sowing recommended for higher yield.

### USAGE OF NANO UREA

Implementation of application of recommended dose of fertilizer in the rainfed condition is not possible. Whenever rainfall receive the fertilizer to be applied. For better growth and yield application of nano urea is an essential and need of the hour. Nano urea is the liquid nitrogen that will applied through foliar spray at different stages of crop growth. Application of 2% nano urea during 25 Days after sowing and 4 % of nan urea during 45 days after sowing registered higher plant height, maximum number of productive tillers and yield (Chaitanya Dhamankar *et al.*, 2023).

### CONCLUSION

Maximum economic return in the minimum investment is main objective for rainfed cultivation. Paddy is the more critical crop as compare to other field crops under rainfed situation. Adoption of improved packages of practiced along with suitable varieties with the help of drudgery reduction implements leads to higher yield and economical return is proven. Choice of varieties and fertilizer management practices play the vital role in the rainfed paddy production. Farmers are aware about the rainfall pattern and availability of resources for better utilization and yield.

**REFERENCES**

Badal Verma, Manish Bhan, V.K. Shukla, M.L. Kewat, V.B. Upadhyay and Bheru Lal Kumhar, Weed management strategies in rainfed rice production in central india – A review., p.no 20 Proceedings of ISWS Biennial Conference on “Weed Management for Enhancing Farmers' Income and Food Security”, 5-7 February 2020, ICAR-CCARI, Goa, Indian Society of Weed Science, India.

Borah, D M.ghosh, D.C ghogh and T.gohain., 2016.,integrated nutrient management in rainfed upland rice in the north east region of India., Agricultural research(5), 2 PP52-260.,

Chaitanya Dhamankar, Dhanraj Mankar, Vaishali Pusdekar, Santosh Mane, Samiksha Nakat and Prajwal Dodewar., The effect of nano urea on growth of drilled paddy., The Pharma Innovation Journal 2023; SP-12(8): 441-443.

Hossain, M. and Fischer, K.S. (1995), “Rice Research for Food Security and Sustainable Agricultural Development in Asia: Achievements and Future Challenges”, Geo Journal, (3):286-298.

<http://improved-direct-paddy-seeder.pdf> (imimg.com)

Singh, Krishna M, Jha, A. K., Meena, M. S. and Singh, R. K. P., Constraints of Rainfed Rice Production in Eastern India: An Overview (May 18, 2012). Available at SSRN: <http://ssrn.com/abstract=2061953> or <http://dx.doi.org/10.2139/ssrn.2061953>