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A low cost precision farming technologies for small, marginal paddy farmers - A way to change the innovation

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Abstract

The cost and drudgery of a labour in paddy cultivation has a major input and its saving was quantitatively reduced in PVC Bhat lavani Choukat over the rope method is about 33.33 % especially two male labours. There is less labour required in conventional method over PVC Choukat on contrary to loss of seed and fertilizers. Overall the PVC Bhat Lavani Choukat has improved the yield by 35.48 % and 12.89% over conventional and rope method respectively due to higher productive tillers over other treatment. Due to application of this PVC Bhat Lavani Choukat for transplanting indicates projected saving for Maharashtra is likely to be labour saving of 51.29 crores and additional income of 322.6 crores from additional yield due to improved method of technology.

Keywords: Paddy, Drudgery, Transplanting, Labour saving, PVC Bhat lavanichoukat

Introduction

Rice is the staple food of more than 50 percent population of the world. About 90 percent rice area exists in Asia (Das, 2012). The average rice yield in India is only 2.09 t ha⁻¹, as compared to 6.58 t/ha in Japan and world average of 3.91 t/ha (Dinesh and Shivay, 2007) ^[1]. In Maharashtra rice is grown over an area of 14.99 lakh hectares with an annual rice production of 32.37 lakh tones and average productivity of the state is 2.01 t ha⁻¹ ranks 13th place in rice production in country. The gap can have reduced by only adopting modern rice production technology of Four fold i.e., "Charsutri Technology". This envisages the use of Urea-Dap briquette as slow releasing fertilizers for better fertilizer use efficiency (70 %) and increasing in yield (20%). The success of this technology is relies spaced transplanting at a spacing of 15 X 25 cm² with rope and marker guided tool. But during the peak period due to non availability of labours especially male labours makes the failure of the technology.

In paddy cultivation transplanting is very drudgerious operation in overall paddy cultivation processes and 22.3 percent of total time is spent in this operation (Gite, 2012). From these about 50 percent would be women against 42% at present. In addition, the migration from rural to urban areas in Asia has decreased substantially the labour resource in agriculture. In addition to the adoption of high-yielding and early maturing rice varieties, the application of combinations of existing technologies would save time, land and water for intensification of rice production in the future:

Keeping this in view, the present experiment was conducted to compare economic cost and quantum of drudgery with conventional and improved method of paddy transplanting (Mondaland Basu, 2009) ^[2]. This research was aimed to know the cost cutting on labour and fertilizer without reduction in production potential by using low cost precision implement against the conventional and previous improved methods for their physiological fatigue, human drudgery and ergonomical evaluation of both the methods.

Objectives

The experiment was planned with following objectives to develop manually operated paddy transplanting marker for maintaining proper plant geometry of paddy crop. To conduct the performance evaluation of the developed paddy transplanting marker in comparison with conventional method. To compare the yield and cost economics of paddy transplanting marker with conventional methods.

Methodology

A field experiment was conducted during Kharif 2014 at Zonal Agricultural Research Station, Western Ghat Zone, Igatpuri, Dist. Nasik (M.S.) in randomized block design with three treatments replicated on 30 farmers field.

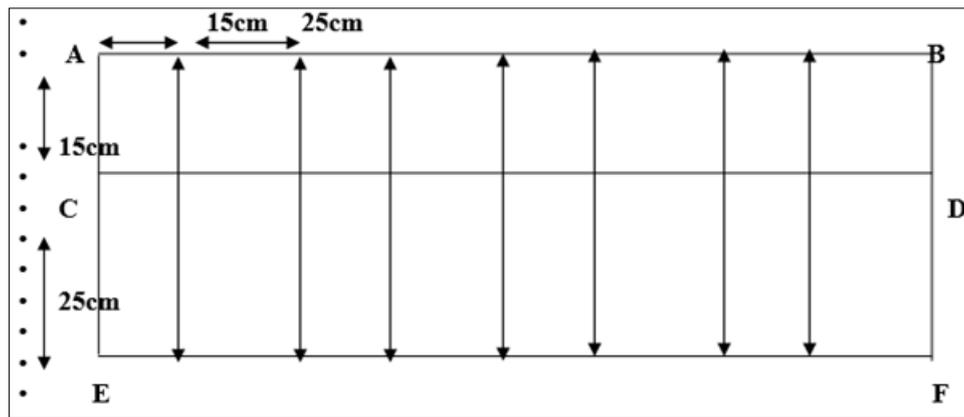
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The low cost precision farming *Phule PVC Bhat lavaniChokat* (Paddy transplanting marker frame) was designed and developed technically for spaced transplanting. An on station

and on farm ergonomic evaluation was conducted at 5 locations and 30 farmers field with The design of the frame is as follows:



The treatments are comprised of 1. Conventional method of transplanting. 2. Rope and marker method and 3. *Phule PVC Bhat lavanichoukat* were undertaken. The data on ergonomics study including, Body mass Index (BMI), Discomfort scale, Time of operation, Area covered with implement were collected and all the relevant data were statistically analyzed.

Results and Discussion

The results of 12 Male and 18 female farmers were under study. The results revealed that the BMI was ranged from 17.33 to 28.88. The area covered in a stipulated period of 30 min time has ranged from 22 to 29 m² area. Table 1 shows that labour requirement were lowered down than rope method but higher than conventional with less reliance on male

labours. The ergonomics study shows that the discomfort scale of this implement has ranged from 1 to 2 having no to low discomfort.

It was indicated in Table 1 that the plant population in the *PVC bhatlavanichoukat* and rope method are remains the same but 32.5 % more seedlings with higher seed rate was recorded in conventional method. The 31.25 % and 38.88% more no of tillers were recorded in rope and PVC *Chokat* transplanting over conventional method. The direct effect of PVC Bhat *lavanichoukat* on reduction in seed rate and improvement in tillers over conventional method is statistically significant. Similar results were observed by Wang ZaiMan and *et al.* 2010 [4].

Table 1: Comparative Labour required, Labour saving, No. of plants/m², Yield (q/ha)

Sr. No.	Particulars	Labour required /ha	Labour saving /ha	No. of plants / m ²	No. of plants/m ²	Yield (q/ha)	Per cent Yield increase
1	Conventional Method (Farmers practice)	24	0 %	195	11	31	100% (base fig.)
2	Rope and Marker method	36	+9 (133.33%)	147	16	38	122.58%
3	<i>Phule PVC Bhat LavaniChoukat</i>	27	100% (base fig.)	147	18	41	135.48 %

The major aspect of labour saving was quantitatively reduced in *PVC Bhat lavanichoukat* over the rope method is 33.33 % especially two male labours. There is less labour required in conventional method over *PVC chokaton* contrary to loss of seed and fertilizers. Overall the *PVC Bhat Lavanichoukat* has improved the yield by 35.48 % and 12.89% over conventional and rope method respectively due to higher productive tillers

over other treatment.

The Table 2. indicates that the projected saving for Maharashtra is likely to be labour saving of 51.29 crores and additional income of 322.6 crores from additional yield due to improved method of technology. The cost of frame is Rs.275/- per unit.

Table 2: Projected cost saving in Maharashtra paddy growers.

Sl. No.	Particulars	Labour required /ha	Labour cost saving	Additional yield (t)
1	Conventional Method (Farmers practice)	24	--	--
2	Roap and Marker method	36	--	--
3	<i>Phule PVC Bhat Lavani Choukat</i>	27	51.29/- Crores	129040/- 322.6 Crores additional returns (Avg rate:Rs.2500/-per tonnes)

Conclusions

This is a resource conservation technology which saves seed rate, fertilizers and labour. Easy to adopt the improved *charsutri* technology of spaced planting and use of briquette. Save fertilizers than conventional method Saves the seed quantity Can be used from single to multi persons easily. The *choukatis* light in weight and can be transported to any corner of the field easily. Very low in cost and can be made locally.

The *Phule PVC Bhat Lavani Choukat* (Paddy transplanting marker) will be beneficial to small and marginal farmers for successful implementation of improved *charsutri* rice production technology with labour saving and increase in yield. The use of this frame will enable the in national goal of food security as well as pollution control and climate change effects.

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