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## CASE STUDY

# Hybrid paddy and drum seeder combination revolutionize paddy cultivation

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Paddy is an important food crop in Mandya district of Cauvery command area cultivated mainly by small and marginal holding farmers. The paddy is cultivated in an area of 58,487 hectares in the district having total production of 1,73,548 tons with an average productivity of 3635 kg per hectare. Use of old varieties, delayed planting, reduced plant population and inefficient weed control due to non availability of skilled labours at critical stages of farm operations affecting the crop yield. Thus making paddy cultivation cumbersome and less remunerative in turn making the farmers to think agriculture as a non profitable enterprise and migrating to cities in search of better livelihood.

Hybrid paddy with higher yield potential and machineries for small holding is the need of the hour which can solve the crisis of the paddy farmers at this stage KVK, Mandya intervened and basket of technologies like Drum Seeding, hybrid paddy, cono weeder (manual / power operated) along with recommended package of practices. Drum seeder is the simple tool most suitable for farmers with small landholding which is cost effective, durable, easy for transportation. It is a manually operated tool which drops 5-6 pre germinated seeds at 4" spacing in 9" rows. The other advantages of drum seeding is that drudgery and cost of raising seedling / transplanting is completely avoided. Saving 50 percent of recommended seed material (67.5 kg / ha). However care should be taken to level the land as much as possible and open small drains in field to drain standing water up to 10 days to facilitate germination. Other cultivation aspects remain same as of normal practice. The hybrid paddy with medium crop duration (130-135 days) and high yield (85 q/ha) was another intervention for better yield and income.

Initially, both the technologies were not compatible as the drum seeder need 40 kg paddy to cover an hectare area where as the recommended seed rate for hybrid paddy is 20 kg per hectare. To make these two interventions compatible On farm testing (OFT) was conducted for three years (2009-10 to 2011-12) Later the technology was demonstrated in larger area as Frontline demonstration (FLD) for three years (2012-13 to 2014-15) in Mandya and Maddur taluk with 21 farmers in 11 hectare area. Other Extension activities for effective adoption and spread of the technology were also employed (Table-1). V Further, large scale demonstrations on drum seeding were conducted in 123 hectares in association with RKVY-Water Technology Centre and Karnataka State Department of Agriculture.

### Out put

The results of the three years OFT revealed that drum seeding of hybrid paddy technique resulted in increased crop yield, save labour and enhance the profit (Table-2). The district average productivity of paddy with existing varieties is 36.35 q / ha and with the introduction of hybrid paddy (KRH-2) and manual planting it increased to 61.05 q / ha. Further with drum seeding the yield realised was higher by 13.5 percent (69.29 /ha) (Fig. 1). The technology has been accepted and included in the package of practice in field crops of UAS (B).

Introduction of paddy hybrid KRH-4 during FLD further enhanced the yield to 75.6 q/ha. The results of demonstration indicated that drum seeding of hybrid paddy yielded 10.12 per cent higher yield compared

to hand transplanting. There was 107 per cent increased yield with drum seeded hybrid paddy compared district average yield with varieties and manual planting from 36.35 q/ha to 75.6 /ha (Table-3).

Drum seeding technique considerably decrease the labour requirement i.e 37.5 man days per hectare (Table-4) which reduced the dependency on labours.

The economic analysis of paddy cultivation shows that average returns per rupee invested under regular paddy variety and transplanting method is one rupee forty paise (B:C ratio 1.4). The results of the FLD (2012-13 to 2014-15) with drum seeded KRH-4 hybrid paddy showed the average returns per rupee invested was higher i.e. three rupees fifty one paise (B:C ratio 3.51). The increase in returns per rupee invested is rupees 2.11 (Table-3) (fig.2). This could be attributed to lower cost of production i.e. for crop establishment (no investment on nursery raising and transplanting ), reduced labour force for weeding, reduce cost on fertilizers (balanced nutrition) and plant protection activities (lesser incidence of pest and diseases) coupled with higher returns due to increase in the crop yield.

The drum seeding of hybrid paddy technology demonstrated clearly indicate that there could be possibility of increasing grain yield to the tune of 39.25 q per hectare compared to present district average yield with conventional method.

### **Out come**

The technology demonstrated in 21 farmers with 11 hectare area for three years by KVK. Later the technology spread to neighbouring farmers and the whole village Chandagalu/ Kurikoppalu villages were known as "Drum Seeder villages". Further the technology spread to neighbouring taluks of the district. other district farmers who visited Mandya during Krishi Mela have express willingness to adopt drum seeding. The technology is being adopted in an area of 3360 ha by nearly 8125 farmer over three years. On an average additional yield realised by a farmer is 39.25q/ha. It sums up to an extra monetary benefit of Rs. 54,950 per hectare to his annual income with the saving of seeds upto 1,12,560 kg for the district

### **Impact**

Large number of farmers are adopting the technology in the district. The trend analysis of area, production and productivity showed that even though the area under paddy is decreased by 22153 ha and production by 111999 tons, the productivity has improved by 271 kg per hectare. One of the reason for productivity increase could be use of hybrid paddy and drum seeding. There was a steep increase in demand for drum seeder. At initial stage KVK was sparing the drum seeder. Later each farmer's co-operative societies were having 1-2 drum seeder at their disposal. Now it was available at custom hiring centres KSDA and many farmers owning drum seeder. On an average there are about 650 drum seeders available in the district. It is evident from the data that there is acceptance for the hybrid paddy (KRH-4) (Table. 5). Positive change can be observed in varietal replacement if sufficient and timely availability of hybrid seed (public & private) is ensured. The additional yield realised by this technology was 1.32 lakh quintal and the additional income was 18.48 crore rupees towards district agricultural economy.

Mr. Puttaswamy from Kurikoppalu village of Mandya taluk is practicing the drum seeder technology for the past 6 years. He feels proud to purchase a bike and put his children to convent school with the income got by adopting the technology. He is also popularly referred as "Drum seeder guru". Mr. Andani gowda, farmer from Chandagalu opines that drum seeder technology should be adopted by all paddy farmers as it reduces drudgery and cost of production and increases the profit. He upgraded his house from tile roof to RCC home. The additional family income generated was effectively used for purchase of farm machineries and input without depending on borrowed money. Mr. Puttaswamy of Mathada doddi village feels that this technology not only gives higher returns but also it is eco-friendly. The practice of passing cono weeder effectively control the weed, without use of weedicide and also improve soil health as the weed biomass got incorporated in to the soil. Likewise many farmers have been benefitted by this technology promoted by KVK Mandya.

**Table 1: Extension activities implemented by KVK, Mandya on drum seeding of Hybrid paddy**

Sl. No.	Activity	Number	Number of farmers
1.	On farm testing	13	13
2.	Front line demonstration	21	21
3.	Training		
	On campus	13	421
	Extension functionaries	2	68
	Off campus	28	454
4.	Group discussion / meetings	14	178
5.	Field visits	29	452
6.	Field day	7	642
7.	Method demonstration	22	1881
8.	Farmer-Scientist interaction	2	135
9.	Exhibitions	19	-
10.	News paper coverage	10	-
11.	Folder/ poster/ manual	5	-
12.	CD-Short film	1	-
13.	Radion programme	1	-
14.	TV programme	2	-

**Table 2: Performance of drum seeding of Hybrid paddy in comparison to recommended practice (Hand transplanting) under OFT.**

Year	No. of trials	Recommended practice (Hand transplanting)					Alternate practice (Drum seeding)				
		Yield (q/ha)	Gross cost (Rs.)	Gross return (Rs.)	Net Return (Rs.)	BC Ratio	Yield (q/ha)	Gross cost (Rs.)	Gross return (Rs.)	Net Return (Rs.)	BC Ratio
2009-10	3	52.36	23150	57596	34446	2.49	58.89	22100	64779	42679	2.93
2010-11	5	62.00	22693	62000	39307	1.73	70	20053	70000	49947	2.49
2011-12	5	64.93	27314	71423	44109	2.61	74.14	21464	81554	60090	3.79
<b>Average</b>		<b>61.055</b>	<b>25117.8</b>	<b>65610.5</b>	<b>40492.8</b>	<b>2.36</b>	<b>69.29</b>	<b>21270.3</b>	<b>74471.75</b>	<b>53201.5</b>	<b>3.25</b>

**Table 3: Yield and economics of demonstration on drum seeding in comparison to hand transplanting of Hybrid paddy.**

Year	Yield (q/ha)			*Economics (Rs./ha)							
	Demo	Check	% Increase	Demonstration (Drum seeding)				Check (Hand transplanting)			
				Gross Cost	Gross Return	Net Return	BCR	Gross Cost	Gross Return	Net Return	BCR
2012-13	67.2	62.26	7.93	24953.0	96220.0	71267.0	3.85	31453.0	89051.0	57598.0	2.83
2013-14	76.25	67	13.81	29004.5	108575.0	79570.5	3.74	36159.5	95060.0	58900.5	2.63
2014-15	83.3	76.7	8.63	32003.0	131480.0	99477.0	3.10	37050.0	120757.5	83687.5	2.25
<b>Average</b>	<b>75.6</b>	<b>68.7</b>	<b>10.12</b>	<b>28653.5</b>	<b>112091.7</b>	<b>83438.2</b>	<b>3.56</b>	<b>34887.5</b>	<b>101622.8</b>	<b>66728.7</b>	<b>2.57</b>

**Table 4: labour saving as influenced by drum seeding of hybrid paddy.**

Treatments	Labour saving (No./ ha)
Demo (Drum seeding)	37.5
Check (Hand transplanting)	0

**Table 5: Trends in Area, Production and Productivity of paddy in Mandya district.**

Year	Area (ha.)	Production (t)	Productivity (kg/ha)
2010-11	80640	285547	3364
2015-16	58487	173548	3635

Source: Mandya at a glance, Dept of statistics

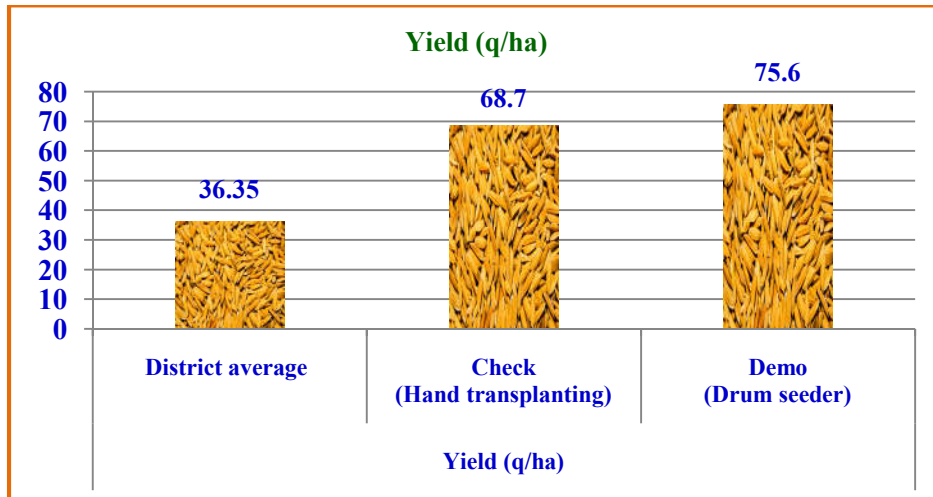


Fig 1: Comparison of paddy Yield in drum seeding

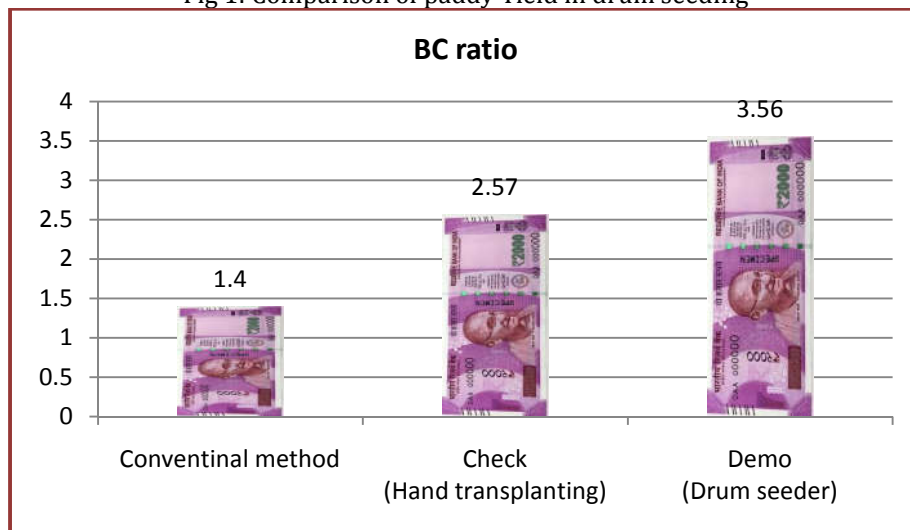


Fig 2: Economics of drum seeding

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