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Economics of Machine Transplanting in Rice Cultivation in Tamil Nadu, India

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***Abstract* – The study was conducted in Thanjavur, Thiruvarur, Nagapattinam, Trichy, Ariyalur and Cuddalore are the Delta districts covered under Cauvery Delta Zone of Tamil Nadu, in which Government of Tamil Nadu has implemented the Kuruvai Package for the farmers to boost up the production in Kuruvai cultivation during 2015. The major objective of the study is to assess the economics of machine transplanting in Cauvery delta region of Thiruvarur District of Tamil Nadu. The study shows that the gross return and net return were significantly higher in gross return and almost doubled in net return. This mainly because of more tiller per hill was report almost all the farmers who have adopted the mechanical transplanting. Farmers reported that almost 40 to 50 per cent increase in number of tillers per hill. This would increase the over increase in the yield / productivity of the crop.**

***Keywords* – Economics, Machine Transplanting, Cost and Return, Productivity.**

I. INTRODUCTION

In Tamil Nadu, Thanjavur, Thiruvarur, Nagapattinam, Trichy, Ariyalur and Cuddalore are the Delta districts covered under Cauvery Delta Zone, in which Government of Tamil Nadu has implemented the Kuruvai Package for the farmers to boost up the production in Kuruvai cultivation during 2015. Thiruvarur district having 10 blocks namely, Needamanagalam, Valangaiman, Kodavasal, Nannilam, Thiruvarur, Kottur, Mannarkudi, Koradachery, Thiruthuraipoondi and Muthupettai. Except Thiruthuraipoondi and Muthupettai blocks remaining eight blocks has been covered under Kuruvai Package 2015. Based on the number beneficiaries of the program in each block, proportionate random sampling procedure was followed to select sample of respondents. In Thiruvarur district, the Govt. of Tamil Nadu has implemented the Kuruvai Package 2015.

II. OBJECTIVES

The major objective of the study is to assess the economics of machine transplanting in Cauvery delta region of Thiruvarur District of Tamil Nadu, India.

III. METHODOLOGY

During the year 2015, 1006 farmers received Kuruvai package of the Govt of Tamil Nadu. In Thiruvarur district, 564 farmers received Kuruvai Package. It has been decided to select 25 per cent of the population as sample, and accordingly the sample size has been fixed as 250 respondents from the above districts by adopting proportionate random sampling method. Accordingly, from Thiruvarur district 120 farmers have been selected for the study. Beneficiary farmers list has been obtained from the office of Joint District of Agriculture, Thiruvarur and by employing simple random sampling procedure, 120 farmers were selected. The primary data were collected from the sample respondents during the month of last week July to First week August 2015 and Last week of October 2015. The simple percentage analyses were used for analyzing the data.

IV. RESULTS AND DISCUSSION

Annual Income

Annual income of the family is directly related to the adoption of new technologies, investment opportunities in the farm venture and risk taking ability. Annual income of sample farmers was divided into 3 categories less than Rs. 1, 00, 000, Rs. 1, 00, 000 - Rs. 2, 00, 000 and more than Rs. 2, 00, 000. The annual income of the sample farmers is presented in the Table 1.

Table 1: Annual Income Level of the Sample Farmers

S. No	Annual income [Rs]	Thiruvarur	
		Number of farmers	Per cent
1	< 1,00,000	55	45.83
2	100000-2,00,000	41	34.17
3	>2,00,000	24	20.00
Total		**120**	**100**

It could be observed from Table 1 that in Thiruvarur district, 45.83 per cent of the farmers were earning an income of less one lakh rupees per year, followed by the income category of less than one to two lakh rupees per year which constituted 34.17 per cent and 20.00 per cent of the beneficiaries reported their annual income of more than two lakh rupees per year.

Comparative Economics in Seedling Production per acre

The comparative economics of seedling production per acre is given in Table 2. In this part of analysis three situations of seedling production were taken for working out the economics of seedlings namely convention method of seedling production for conventional planting mat nursery method of seedling production for mechanical transplanting by farmers themselves and third one is out write purchase of seedlings from nurseries owned by agri-preneurs.

With regard to the human labour employed in conventional nursery was on average seven man days with an average labour cost of Rs.1500/- per acre and in case of mat nursery seedling production total number human labour employed was only three labour man days. The net

difference in human labour employed between conventional and mat nursery methods was four man days, which intern monitor terms it worked to saving of Rs. 900/- per acre. Similarly, use of machine power in nursery both in conventional and mat system also had difference in terms of monitor terms with a saving of s. 300/- in mat nursery system over the traditional system.

There was no difference in the cost of seeds, but there was significant difference in quantity of seeds used in conventional and mat system of seedling production. Under conventional method of seedling production, on an average 45 to 55 kgs of seeds were used for one acre of land rice planting through conventional method. Whereas, seedlings requirement for one acre of main field planting needs only 20 kgs of seeds, seedlings produced through mat nurseries. The net difference in seed rate was 25 to 35 kgs per acre, which was worked to monitor terms about Rs. 1050/- per acre.

Value of manures and fertilizers applied in rice nursery was ranging between Rs. 50 to Rs. 250 per mat and conventional nurseries. Moreover an average quantity of 10 kgs of DAP was used in conventional nursery and in mat nursery method very minimum [two kgs] fertilizer was used. Use of plant protection chemicals on average 100 ml of insecticides/fungicides was used in conventional nursery by spending an average cost of Rs.100 and in mat nursery method the farmers used only 50 ml of insecticides/fungicides with an average cost of Rs.50. Finally, estimation of interest on working capital in conventional nursery was Rs.32/- and in mat nursery it was Rs. 12/- respectively.

It is concluded from the Table 2 that total cost of seedling under three different sources was estimated. For traditional method of planting seedlings were produced under conventional nursery in which cost of seedling per acre was Rs. 6100/- per acre. The cost of seedlings for machine transplanting was estimated to Rs. 5492/- per acre.

Coming to the expenses incurred on plant protection was slightly high in case of conventionally planted fields [Rs. 1067/-], as compared to the mechanically transplanted fields [Rs.943/-]. There was less incidence of pest and diseases in case of mechanical transplanted fields compared to the conventionally planted field, this mainly because of the perfect maintenance of ventilation due to proper spacing between plants and rows.

Table 2: Comparative Economics of Rice Seedling Production per acre

S. No	Particulars	Conventional Transplanting		Mechanical Transplanting	
		Physical Quantity	Cost [Rs.]	Physical Quantity	Cost [Rs.]
I	Up to Nursery costs incurred		2133	-	2367
	Pulling out and transporting the seedling + transplanting+gap filling	8+18 male and female labour	3967	1labour +machine hiring cost	3125
			6100		5492
II	Main Field Operational costs				
	Operational Cost	Tractor Ploughing+bund trimming+manual levelling	2323	Tractor Ploughing+ lazer guided levelling bund trimming	1896*
	Manures and Fertilizers	1bag DAP+2bag Urea+1bag MOP+2labour	2682	1bag DAP+ 2bag Urea+ 1bag MOP+ 2labour	2682
	Plant protection	1labour +chemicals	1067	1 labour+ chemicals	943
	Weed management	3labour+weedicide	1217	6 labour+ weedicide	1307
	Harvest	1labour +machine hiring cost	2318	1labour +machine hiring cost	2136
	Interest on working capital @ 7%		576		567
III	Total Cost [after planting]		9227		8382
IV	[Grand] Total cost of cultivation		16096		14837
	Productive tillers per square meter		219		275
	Yield [Kg/acre]		1852		2339

* Excluding the subsidy amount of Rs. 2375/- for machine transplantation.

In case of expenses incurred on weed management was comparatively higher [Rs. 1307/-] in case of mechanical transplanted fields, this is mainly because of practicing Cono weeder [one or two times]. Farmers were reported that use of cono weeders would increase the sprouting more tillers per hill through providing more aeration to the roots and also increase the nutrients uptake. But in case of conventionally planted fields weeding expenses reported only Rs. 1217/- .

There would not be significant difference on expenses incurred on harvesting expenditures since all farmers were used combined harvester for harvesting of the crop.

Table 3: Cost and Return in Rice Cultivation

S. No	Particulars	Conventional	Machine planting*
1	Yield [productivity] in kgs	1852	2339
2	Average Price [per kg]	Rs. 14.60/-	Rs. 14.60/-
3	Cost of Cultivation [Rs. per acre]	Rs. 16096/-	Rs. 14837/-
4	Gross return [per acre]	Rs.27040/-	Rs.34150/-
5	Net return [per acre]	Rs.10944/-	Rs.19313/-

* Excluding the subsidy amount of Rs. 2375/- for machine transplantation.

It could be seen from the table 3 that yield increase was report in case of mechanically transplanted fields as compared to the conventional planted fields. Cost of cultivation was almost 20 per cent lesser in case of mechanically transplanted fields as compare to conventional planted fields, this mainly due to reduction in seed cost, reduction in manures and fertilizer application and plant protection. Because of reduction or saving in the

cost of cultivation automatically resulted in fall in cost of production.

Finally, it was very well demonstrated and reported by the study farmers that gross return and net return were significantly higher in gross return and almost doubled in net return. This mainly because of more tiller per hill was report almost all the farmers who have adopted the mechanical transplanting. Farmers reported that almost 40 to 50 per cent increase in number of tillers per hill. This would increase the over increase in the yield / productivity of the crop.

V. CONCLUSION

The study shows that the gross return and net return were significantly higher in gross return and almost doubled in net return. This mainly because of more tiller per hill was report almost all the farmers who have adopted the mechanical transplanting. Farmers reported that almost 40 to 50 per cent increase in number of tillers per hill. This would increase the over increase in the yield / productivity of the crop.

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