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AN ECONOMIC STUDY ON PADDY CULTIVATION IN VELLORE DISTRICT OF TAMIL NADU, INDIA: A COMPARATIVE ANALYSIS

Dr.A.Saravanan.

Assistant Professor

PG & Research Department of Economics
Pachaiyappas College for Men Kanchipuram.

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Abstract

The present study aimed to compare farmer's efficiency of paddy production and hurdles faced in paddy cultivation in Gudiyatham and Vellore Taluk. The present study area is chosen two blocks namely Gudiyatham block in Vellore District. of Tamil Nadu. The study based on information collected from block in each blocks namely Bhuvaneswaripet, Dharanampet, Gudiyattam Cutcherry, Gudiyattam South, Kamalapuram, Kokkalur, Kosavanpudur, Kottamitta, Vellore Block, and it covers 180 farmer respondents from each block, therefore, the total sample size is 360 used stratified random sampling techniques. The study found that the Gudiyatham block farmers have slightly more efficiency than Vellore Block. But the same time in sampa, kuruvai seasons and both traditional and modern methods the Vellore Block famers shown sustainably increased yields than Gudiyatham block. Whereas, Gudiyatham block block farmers shown fluctuated efficiency to produce in the paddy production. Although the study found that the both block farmer respondents are agreed the certified seed given more productivity than uncertified seeds. Further, the study found that the both blocks farmers having moderate technical efficiency in paddy cultivation. The farmer respondents from both the blocks reported that the constraints to rice productivity included shrinking labour availability, late planting due to delayed water supply from canals, water scarcity, increasing salinity/alkalinity and high incidence of pests and diseases are faced by the farmers while the cultivation.

Key words: Productivity, Profitability, Sustainability, System of Rice Intensification, Technical Efficiency.

Introduction

Agriculture constitutes the nerve centre of all economic activities in countries - both developed and under-developed - all over the world. In fact the very survival of mankind depends exclusively on the myriad varieties of food grains produced. Of the many kinds of food grain available, paddy (rice) is the most important one, especially in countries like India. Paddy is cultivated in more than 20 states of India for about 400 lakh hectares. The major rice producing states are West Bengal, Uttar Pradesh, Andhra Pradesh, Punjab and Tamil Nadu and the state is one of the rice growing states in India. In Tamil Nadu, Paddy is the principal crop extensively cultivated in all the districts of the state having a unique three-season pattern viz., Major efforts are required to increase the productivity of rainfed crops by overcoming the various challenges such as; erratic monsoon rains, soil with low nutrient and organic contents / poor water holding capacity, soil and water erosion, etc. The labour scarcity especially during the peak cropping season is also causing difficulty to the farmers to take-up timely field operations. In respect of agricultural crops, the crop cultivation is taken up in two to three seasons annually. Hence to achieve sustainable development and break-through in agricultural production, continuous concentration on technical advancement, input supply, credit and market supports are required.

Review of Literature

Saravanadurai, et. al., (2010) examined the growth actions of area, production and yield of selected cereal crops in the Tamil Nadu state. Using the data from 1993-94 to 2007-08. The study found that the paddy holds good performances in absolute terms, among the other cereal crops are concerned. But the compound growth rate reveals that the maize was found to be positive and records a highest growth rate among other cereal crops in terms of area of cultivation, production and yield in Tamil Nadu over the study period.

Karunakaran, N., (2014) studied on “Paddy Cultivation in Kerala – Trends, Determinants and Effects on Food Security”, analyzed the trends and determinants of paddy cultivation in Kerala and the effects on food security. The study was gathered data from secondary data which was collected from various publications of the Government of Kerala like Economic Review, Statistics for Planning and Agricultural Statistics. The found that production of major food crop, rice, reached negative growth rates due to the declining trend of their area. The diversification of crops in terms of variation in acreage allocation has taken place due to price and non-price factors like agro climatic conditions, labour availability, irrigation facilities, soil fertility, cost of cultivation, price levels, profitability, mechanization etc.

Guptha Chandra, et. al., (2014) examined the trends in the cost of cultivation of paddy and its profitability in three Indian states of Kerala, Odisha and Tamil Nadu during the period 1999-2011. The study found that the factors like hired machine and labour, fertilizer, are all

growing in varying proportions leading to an increase in the cost of cultivation. In the years showing profits, Profitability seemed to be averaging around ten percent and while in most of the year's loss was reported. Over the years, the increase in cost of cultivation seems to be stable in contrast with the increase in value of paddy produced by farmers. Study stated that Profitability in paddy cultivation shows a variable trend across Kerala, Odisha and Tamil Nadu.

Objectives of the Study

1. To examine comparatively traditional and modern methods of Paddy Production in Gudiyatham and Vellore Taluks
2. To analyses the farmers opinion towards certified seeds used to production of paddy in the study areas
3. To find out the effects of hurdles on productivity of paddy in the study areas

Methodology

The present study area is chosen two blocks namely Gudiyatham and Vellore Taluks in district Vellore of Tamil Nadu, India. The study based on information collected from two villages in each blocks namely Bhuvanewaripet, Dharanampet, Gudiyattam Cutcherry, Gudiyattam South, Kamalapuram, Kokkalur, Kosavanpudur, Kottamitta, block, and it covers 180 farmer respondents from each block, therefore, the total sample size is 360 used stratified random sampling techniques. The study has been basically a non-experimental and descriptive study in nature. The study period has been from 2021 to 2022.

Analysis and Discussion

Table No. 1

Comparative Economic analysis of Paddy Production in Koradcheri and Vellore Blocks

S.No	Year	Gudiyatham block				Vellore Block				TOTAL
		Yield obtained (kg/ha)								
		Kuruvai		Samba		Kuruvai		Samba		
		SRI	CCE	SRI	CCE	SRI	CCE	SRI	CCE	
1	2017-18	7120	5815	1458	516	6890	4585	1258	280	27922
2	2018-19	7498	5685	1296	1090	7353	5702	1535	991	31150
3	2019-20	6200	5360	1458	4506	6580	5150	1258	3830	34342

4	2020-21	6250	4676	4850	1147	7160	5241	2560	1346	33230
5	2021-22	8950	6391	8450	6620	9850	7066	8950	6750	63027
	Total	36018	27927	17512	13879	37833	27744	15561	13197	162671

Source: Computed from Primary data

Note: SRI-System of Rice Intensification (i.e) Scientific / modern method of rice cultivation

CCE- refers to Traditional method of rice cultivation.

From the above table clearly inferred that Comparative Economic analysis of Paddy Production in Gudiyatham block and Vellore Blocks during 2010-11 to 2021-22. Total yield in case of SRI method in 2 blocks of Gudiyatham block and Vellore Block in Vellore District is 36018, 37833 kg/ha in kuruvai season in Gudiyatham block and Vellore Block respectively, and it is 17512, 15561 kg/ha in samba season in the same blocks, whereas the total yield in CCE method in same area in kuruvai season is 27927 and 27744 kg/ha in Gudiyatham block and Vellore Block respectively and it is 13879 and 13197 kg/ha in the same areas in samba season. The excessive yield obtained in SRI method in kuruvai seasons are 8091 kg/ha and 10089 kg/ha respectively in study blocks and in samba season are 3633kg/ha and 2364. It found that SRI method produced more yield than the CCE method. Further the analysis found that Vellore Block got more yield in kuruvai seasons whereas Gudiyatham block got more yield in samba in both methods respectively than Vellore Block. . But the same time in sampa, kuruvai seasons and both traditional and modern methods the Vellore Block famers shown sustainably increased yields than Gudiyatham block. Whereas, Gudiyatham block block farmers shown fluctuated efficiency to produce in the paddy production.

Table No.2
Farmers Opinion towards Certified Seeds

Quality testing of Seed	Government Certified Seeds increase the output					Total
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
Yes	143(39.8%)	149(41.5%)	6(1.5%)	15(4.2%)	28(7.7%)	341(94.6%)
No	3(0.8%)	0	1(0.2%)	16(4.4%)	0	19 (5.4%)
Total	146 (40.6%)	149 (41.5%)	7 (1.7%)	31 (8.5%)	28 (7.7%)	360 (100.0%)

Calculated Chi-Square Value	Degree of Freedom	Level of Significance
0.187	4	0.001**

Source: Computed from Primary data,

Ho 1: There is no association between certified and uncertified agricultural seeds and their quality testing of seed.

Ho 1 (a): There is no association between certified agricultural seeds increase the output and their quality testing of seed.

Table 1 shows that. Chi-square test for certified agricultural seeds increases the output on the basis of their quality testing of seed in both Gudiyatham block and Vellore Block. It is observed from the table that Out of 360 farmers from both two blocks, 94.6 per cent of them are positive (yes) and 5.4 per cent of them are negative answer (no). Hence, it is concluded that the majority of them are positive answer compare than the other groups. The calculated chi -square value 0.1865 is significant at 1 per cent level. Therefore, the formulated hypothesis of certified agricultural seeds increase the output on the basis of their quality testing of seed is rejected.

Table No.3
Frequency Distribution of Technical Efficiency

Technical Efficiency percent	Gudiyatham block		Vellore Block	
	Farmers in number	%	Farmers in number	%
Up to 60	90	50.0	105	58.3
61- 70	35	19.4	32	17.8
71-80	38	21.1	30	16.7
81-90	10	5.6	09	5.0
91 and above	07	3.9	04	2.2
Total	180	100	180	100

Source: Computed from primary data

The result of output related to technical efficiency in percentage of the paddy producing farmers in both blocks were displayed in the table 3. The average technical efficiency estimated here is 80.42 %. There are 99 farmers fall in the range up to 60% technical efficiency which is 55% where as 105 farmers fall in the range up to 60% technical efficiency which is 58.3%. It shows that both Gudiyatham block and Vellore Block farmers having less technical efficiency than average technical efficiency estimated in the study area. Among the two blocks of study areas in Vellore Block farmers having less efficiency than Gudiyatham block. 35 and 32 farmers from both Gudiyatham block and Vellore Block (19.4 and 17.8 %) farmers are having in the range of 61 -70% and 38 and 30 (21.1and 16.7%) farmers having 71-80% efficiency both two blocks respectively. 10 and 9 farmers (5.6 and 5.0 %) are producing paddy at 80-90% efficient level of technical efficiency and 50 farmers producing paddy at more than 90% technical efficiency which is about 3.9 and 2.2 % to the total samples. It is evident from the result that approximately 92 % of the producers are ranged from less than the average technical efficiency and 8 % of the producers are ranged to have more than the average technical efficiency.

Effect of Hurdles on Productivity of Paddy in Study areas

Ho: The curdles such as Water scarcity, Late planting due to delayed water supply from canals, Increasing soil salinity/alkalinity, Shrinking labour availability, High incidence of pests and diseases, weed incidence, Technology efficiency and Limited availability of improved seeds on productivity of Rice in Study areas.

Table No. 4

Effects of Hurdles on Productivity of Paddy in the study areas

R value	R square value	Adjusted R square value	Std. error	F-value	p-value
0.748	0.300	0.483	2.02504	17.609	0.001*

Source: Computed Primary data, * significant at one percent level

Variables	B-Value	Beta	t-value	p-value
Constant	19.685		5.729	0.001
Water scarcity	-0.414	-.298	-5.793	0.001
Late planting due to delayed water supply from canals	-1.036	-.217	-4.568	0.001
Shrinking labour availability	-0.136	-.299	-5.674	0.001
Technology efficiency	0.302	.177	3.664	0.001
Increasing soil salinity/alkalinity	-0.220	-.161	-3.168	0.002
High incidence of pests and diseases	-0.289	-.176	-3.422	0.001
Weed incidence	-0.211	-.116	-2.446	0.015
Limited availability of improved seeds	-0.059	-.110	-1.976	0.049

Source: Computed Primary data, significant at one percent level-

Table explains the influence of water scarcity, late planting due to delayed water supply from canals, increasing soil salinity/alkalinity, shrinking labour availability, high incidence of pests and diseases, weed incidence, technology efficiency and limited availability of improved seeds on productivity of Rice is considered as a dependent variable in the Study areas. In order to examine the above said hypothesis, a step wise multiple regressions was applied. The measure of the strength of association in the regression analysis is given by the co-efficient of regression determination by R² value. Here adjusted R² value is found to be 0.483 which implies that 48.3 % of productivity of Rice is explained by eight variables. Among the independent variables the following eight variables have been identified contributing significantly viz., water scarcity, late planting due to delayed water supply from canals, increasing soil salinity/alkalinity, shrinking labour availability, high incidence of pests and diseases, weed incidence, technology efficiency and limited availability of improved seeds F- value (17.609) and p-value (0.001) which is significant. It shows that independent variables have significant influence on the dependent

variable. The standardized co-efficient β -value indicates the relative importance of the predictors of productivity of Rice. Therefore, productivity of Rice = $19.68 + (0.414) \text{ Water scarcity} + (1.036) \text{ Late planting due to delayed water supply from canals} + (0.136) \text{ Shrinking labour availability} + (0.302) \text{ Technology efficiency} + (0.220) \text{ Increasing soil salinity/alkalinity} + (0.289) \text{ High incidence of pests and diseases} + (0.211) \text{ Weed incidence} + (0.059) \text{ Limited availability of improved seeds}$. The equation clearly indicates that to have one unit decrease in productivity of Rice, the Water scarcity level need to increase by 0.414 levels when other factors remain constant. Similarly, to have one unit of productivity of Rice decrease in, late planting due to delayed water supply from canals is to increase by 0.302 levels. Like wise to have one unit productivity of Rice increase in, technology efficiency is to increase by 0.302 levels.

Table No. 5
Farmers Opinion towards Different types of hurdles in production of Rice

S.No	Hurdles in Production of Rice	Percentage of Respondents in Gudiyatham block (n=180)	Percentage of Respondents in Vellore Block (n=180)
1	Water scarcity	91.67%	94.53%
2	water supply from canals	95.75%	99.42%
3	Increasing soil salinity/alkalinity	76.67%	83.40%
4	Shrinking labour availability	98.16%	98.04%
5	High incidence of pests and diseases	76.67%	76.00%
6	Weed incidence	37.00%	36.94%
7	Technology efficiency	93.78%	95.32%
8	Limited availability of improved seeds	20.83%	15.79%

Source: Computed from Primary data

Hurdles to rice productivity as reported by the respondents of the study in both Gudiyatham block and Vellore Blocks in Vellore District are presented in Table 5. The Table 5 revealed that Late planting due to delayed water supply from canals for carrying out different operations in rice cultivation and Shrinking labour availability was the foremost constraint to rice

productivity as reported by almost all the respondents in Vellore Block (99.42%) and (98.04%) and similar opinion reflected by the respondents from Gudiyatham block. But the same Shrinking labour availability for carrying out different operations in rice cultivation was the foremost constraint to rice productivity than Late planting due to delayed water supply from canals (95.75) in Gudiyatham block. In Gudiyatham block, all areas are having alternative water supply such as ground water, tube well water supply etc. in case of Vellore Block some of the areas are located nearby sea. Therefore Vellore Block has more water scarcity than Gudiyatham block. Migration of labour force from rural areas to urban areas for better employment and higher wage might be the reason in both Vellore Block and Gudiyatham block and level of usage of Mechanization is less in Vellore Block than Gudiyatham block it leads heavy labour demand while peak cultivation time. It calls for selective mechanisation for land preparation, transplanting, harvesting, etc. Water scarcity was reported by 91.67 % in Gudiyatham block and 94.53% is in Vellore Block. In case of Vellore Block most of the areas depend water supply from canals and there no alternative sources. Similar finding was reported by Siddiq (2000). Water management employing System of Rice Intensification (SRI) Technology in the Cauvery Delta Zone has already yielded positive results in managing these constraints (Balakrishnan and Vasanthakumar, 2010). It may be scaled up. Increasing soil salinity or alkalinity as well as high incidence of pests and diseases were reported a constraint by 76.67 % of the respondents in both blocks but in Vellore Block farmers worried on increasing soil salinity or alkalinity and 83.40% of farmers told that their productivity reduced due to increasing soil salinity or alkalinity. It reiterates the finding of Siddiq (2000). Over mining of nutrients and faulty irrigation might have caused salinity and alkalinity. Technology dissemination approaches need special attention (Nirmala et al., 2016). Limited availability of improved seeds was reported by 20.83 % of the respondents. This is a matter of serious concern because improved seeds play a critical role in bridging yield gap (Thyagarajan and Vasanthakumar, 1998).

Conclusion

Modern method like SRI is the solution for increase in rice production and productivity. Resources like water, soil and environment can be saved. Awareness about modern technology should be created and traditional mind set. The constraints to rice productivity included shrinking labour availability, late planting due to delayed water supply from canals, water scarcity, increasing salinity/alkalinity and high incidence of pests and diseases. The study concluded that System of Rice Intensification (SRI) may be adopted to alleviate water related constraints and selective mechanization may be attempted for managing labour scarcity. Appropriate fertilizer management especially bio fertilizer is needed to address the constraints like salinity/alkalinity and high incidence of pests and diseases. The government is to create awareness in canals encroachment.

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