

Socio-economic Dynamics of Farmers and Economics of Certified Seed Production of Paddy in Karimnagar District, Telangana

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Authors' contributions

This work was carried out in collaboration among all authors. Author GP designed the study, wrote the methodology, performed the statistical analysis and wrote the first draft of the manuscript. Authors KUB, SPJK, KVS, KVR and DKA managed the analyses of data and information, literature searches and provided support in drafting the manuscript of the study. All authors read and approved the final manuscript.

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ABSTRACT

Paddy plays a vital role in the national food security and principal food crop cultivated throughout the Telangana state providing food for its population, fodder to the cattle and employment to the rural masses. The present study was based on primary data in Karimnagar district of Telangana during the agricultural year 2014-15. Analysis of data shows that majority of seed farmers belongs to small category (1-2 ha) followed by semi-medium (2-4 ha) and marginal (< 1 ha) category. The overall average land holding size of paddy seed farmers was 2.04 ha followed by grain farmers (1.27 ha) and district average (1.03 ha). Study area was dominated by paddy, cotton and maize with a cropping intensity of 159. Net irrigated area of paddy grain producer, certified seed producer and

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district average was 71.00, 90.60 and 73.95% respectively. Non-availability of labour was the most important constraints hindering adoption of paddy seed production technology. The seed production area is dominated by variety BPT- 5204 which covers 31.57% area under paddy seed production. Current study illustrates a ratio of 32:68 towards fixed and variable costs in paddy certified seed production with a total cost of Rs. 57315 per hectare and the gross and net returns were Rs. 83150 and Rs. 25835 per hectare respectively. The total cost of cultivation in paddy seed production was around 13.63% higher than grain production while, gross return was about 28.42% higher in seed production. Consequently, net return from seed production of paddy was 80.56% higher than grain production. Hence, production of certified seed has resulted in a win-win situation for the farmers with higher yield and increased returns. Higher yield and profitability associated with certified seed production can be effectively popularized among farmers, results in increased certified seed production. Farmers can be promoted in this endeavour by providing required quantity of foundation seed along with technical guidance.

Keywords: Paddy; seed production; economic analysis; Telangana.

1. INTRODUCTION

Paddy is one of the most important cereal crops of India occupying an area of 43.79 million hectare with the production of 112.91 million tons with an average productivity of 25.78 quintal/ha during 2017-18 (4th advance estimates). It plays a vital role in the national food security and would continue to remain so because of its wider adaptability to grow under diverse ecosystems. Paddy alone contributes 39.64% of total food grains production [1]. This crop providing 30% of calorie requirement for more than 70% of Indian population [2].

Paddy is the principal food crop cultivated throughout the Telangana state providing food for its population, fodder to the cattle and employment to the rural masses. Any decline in its area and production will have a perceivable impact on the state's economy and food security. In Telangana paddy is the major food crop grown in 16.80 lakh hectares producing 51.70 lakh tons in both kharif and rabi seasons with an average productivity of 3.075 tons/ha during 2016-17 (4th advance estimates). At national level Telangana is contributing 4.70% of paddy production with 3.89% paddy area [3]. The increase in paddy area, production and productivity mainly depends on the rainfall and availability of irrigation. The main paddy growing season of the state is kharif (Wet season) with 65 % of total rice being cultivated during the season and 35% of paddy is grown in rabi/summer season. It is also reported that about 80% of the paddy hybrid seed requirement in the country is provided by Andhra Pradesh and Telangana states of India [4].

Seed is a crucial, vital, basic and important input for attaining sustained growth in agriculture

production and productivity. A sustained increase in agriculture production and productivity has dependent on the development of new improved variety, timely and adequate supply of quality seed to the farmers. It is estimated that the direct contribution of quality seed alone to the total production is about 15-20% depending upon the crop and it can be further raised up to 40% with effective management of other inputs [5]. A superior quality seed not only increases productivity per unit area, but it also helps in producing uniform crops without any admixtures which is important for obtaining high prices on the market.

Quality seed production is a specialized activity. The general farm produce retained for seed cannot be substituted for quality seed; farm saved seed generally lacks genetic vigour and has poor germination [6]. Seed of paddy has significant share in its cost of cultivation; therefore the economics of paddy seed production has impacted both seed producers as well as its users. There are several studies pertaining to economics of paddy cultivation for grain production [7,8,9,10,11,12,13] and [14] and seed production in other crops [15,16] and [17]. But only a few studies related to economics of paddy seed production [18 and 19]. Considering these facts, the present study was taken with the objectives to study the socio-economic parameter of seed growers and to examine the economics of certified seed production of paddy with comparison to grain production.

2. MATERIALS AND METHODS

The study is based on primary data collected from Karimnagar district of Telangana. The district Karimnagar has been selected

purposely as it is one of the important district under paddy cultivation in the state which has around 15.54% of total area under paddy in the state during 2015-16 [20]. The list of certified seed growers of paddy in Karimnagar district have been obtained from Telangana State Seed Certification Agency, Hyderabad. From the list, fifty certified seed growers of paddy have been selected randomly from five villages. For comparison study with grain production of paddy again fifty grain producers of paddy selected randomly from the above selected villages. Thus, the total number of selected farmers (grain and certified seed producer of paddy) was one hundred. Primary data were collected by personnel interview with the respondents using a well-structured and pre-tested interview schedule. Data on various socio-economic parameters, input used in the grain and seed production of paddy and their costs and returns were collected for the agricultural year 2014-15. Simple tabular and partial budgeting analysis has been conducted in the present study.

3. RESULTS AND DISCUSSION

3.1 Land Holding

The data pertaining to average land holding of sample paddy farmers have been given in Table 1. The analysis of data shows that majority of seed farmers belongs to small category (1-2 ha) followed by semi-medium (2-4 ha) and marginal (< 1 ha) category. The overall average land holding size of paddy seed farmers was 2.04 ha followed by grain farmers (1.27 ha) and district average (1.03 ha).

3.2 Cropping Pattern

The study area is dominated by paddy, cotton and maize. Cropping pattern of the study area has been presented in Fig. 1. The area under different crops shows that paddy ranked 1st (46.98% of gross cropped area) followed by cotton (28.99%), maize (11.23%), pulses (3.46%), oilseeds (2.32%) and others (7.02%). The cropping intensity of the study area was 159.

Table 1. Average land holding of sample paddy farmers

Land holding particulars	Karimnagar district*	Sample paddy farmers		
		Grain farmers	Seed farmers	Overall
Marginal (< 1 ha)	0.43 (66.19)	0.59 (42)	0.66 (26)	0.62(34)
Small (1-2 ha)	1.38 (21.25)	1.29 (34)	1.42 (36)	1.36 (35)
Semi-medium (2-4 ha)	2.65 (9.56)	2.11 (20)	2.42 (26)	2.28 (23)
Medium (4-10 ha)	5.50 (2.72)	4.10 (4)	4.88 (10)	4.66 (7)
Large (10 ha and above)	15.85 (0.28)	0 (-)	12.00 (2)	12.00 (1)
Average/Total	1.03 (100)	1.27 (100)	2.04 (100)	1.66 (100)

Source: Handbook of Statistics, Karimnagar district- 2011, CPO, Karimnagar

Note: Figures within the parentheses are percentage of farmers belonging to respective group

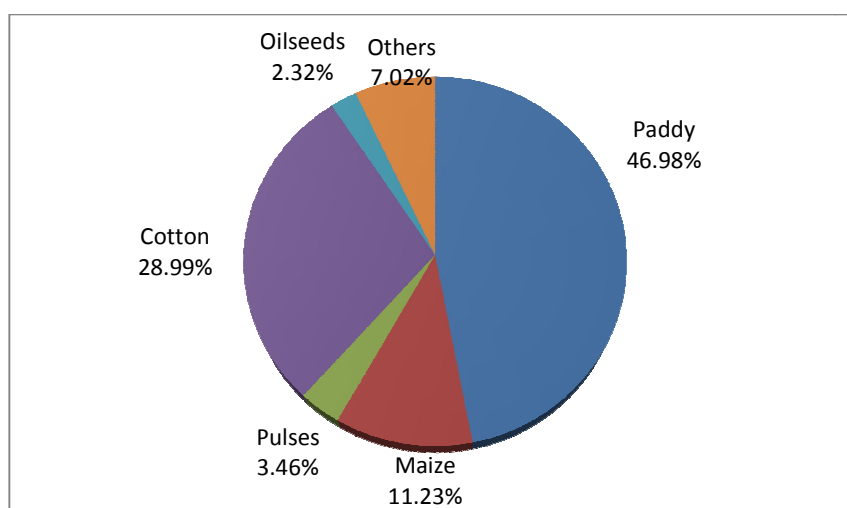


Fig. 1. Cropping pattern of study area

3.3 Irrigation

Irrigated area in the study area has been presented in Fig. 2 and source-wise average irrigated area of farmers has been presented in Table 2. In the Karimnagar district only 73.95% area is irrigated while net irrigated area at paddy grain and certified seed producer have 71.00 and 90.60%, respectively. The major source of irrigation was digging wells and canals (around 79% of irrigated area).

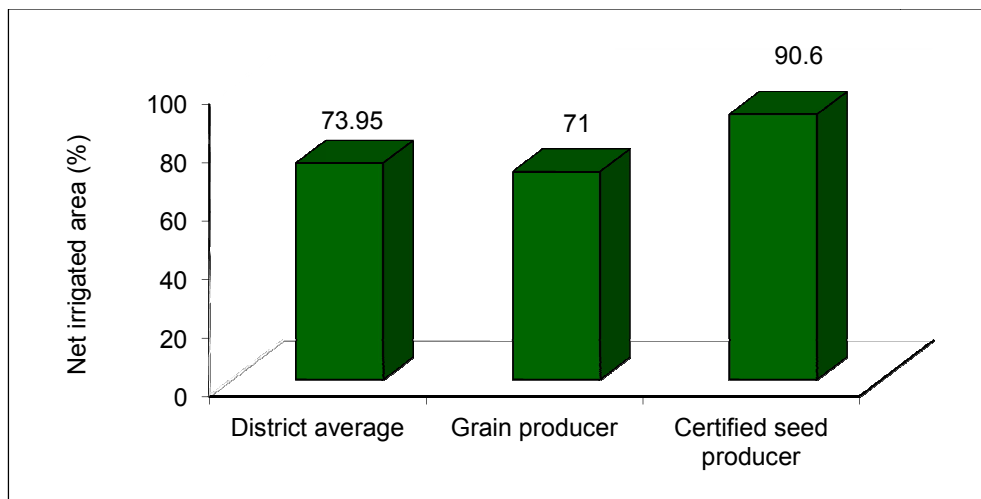


Fig. 2. Irrigation in study area

Table 2. Source-wise average irrigated area (in percentage) at sample paddy farmers

Irrigation source	Karimnagar district*	Sample paddy farmers	
		Grain farmers	Seed farmers
Canals	20.86	14.64	26.38
Tanks	8.72	0.89	3.03
Tube wells	11.99	9.12	12.33
Dug wells	58.43	75.35	58.26
Total	100.00	100.00	100.00

Source: Handbook of Statistics, Karimnagar district- 2011, CPO, Karimnagar

Table 3. Factors constraining adoption of paddy seed production technology

Particulars	Number of farmers	Percentage
Lack of irrigation water	16	32
Lack of awareness / knowledge	22	44
Non-availability of basic seed	23	46
Marketing of product	24	48
Small holding size	24	48
High cost of cultivation	26	52
Non-availability of labour	29	58

3.4 Reasons for Not Producing Certified Seeds

The factors constraining adoption of paddy seed production technology as perceived by grain producers, are presented in Table 3. Non-availability of labour was the most important constraints hindering adoption of paddy seed production technology, as opined by 58% of the farmers respondents. The other reasons constraining seed production technology were lack of irrigation water, lack of awareness / knowledge, non-availability of basic seed, marketing of product, small holding size and high cost of cultivation.

3.5 Reasons for Adopting Paddy Seed Production Technology

The major reasons for choosing the seed production are presented in Table 4. Farmers

select enterprises based on several criteria; one of the most important criterions was higher profit as the surveyed farmers have assigned first rank. The other reasons for adoption of paddy seed production technology were better yield, suitability of climate, easy marketability of produce and technical know-how.

Table 4. Reasons for adoption of paddy seed production technology

Particulars	Number of farmers	Percentage
Higher profit	38	76
Better yield	32	64
Suitability of climate	26	52
Easy marketability of produce	24	48
Technical know-how	21	42

3.6 Paddy Varieties

The varieties used by seed growers in the study area for seed production have been presented in Fig. 3. The paddy seed production area is dominated by variety BPT- 5204 which covers 31.57% area under paddy seed production. The other varieties used for seed production were MTU- 1010 (29.22%), IR- 64 (10.60%), MTU-7029 (5.76%), NLR- 34449 (4.58 %), IET- 4786 (3.57%), JGL- 1798 (3.38%), ADT- 43 (3.37%) and others (7.95%).

3.7 Experience of Sample Farmers in Seed Production

Experience of farmers in the seed production plays an important role in producing the quality seeds. The experience of sample seed growers in seed production is presented in Table 5. The table shows that 60% farmers had less than five

years experience in the seed production followed by 24% farmers had 5-10 years experience and 16% farmers have more than 10 years of experience in seed production.

Table 5. Experience of sample farmers in paddy seed production

Experience of farmers (years)	Number of farmers	Percentage
< 5 years	30	60
5-10 years	12	24
>10 years	8	16

3.8 Sources of Information to the Seed Growers

The sources of information about knowledge on quality seed production among the sample seed growers are presented in Table 6. Majority of farmers (76.0%) received information about the quality seed production from Government officials. The other important sources of information to farmers were fellow farmer (46.0%) followed by electronic and print media (40.0%), seed companies (38.0%) and others (32.0%).

Table 6. Sources of information to the seed growers

Sources	Number of farmers	Percentage
Fellow Farmer	23	46
Government officials	38	76
Electronic and print media	20	40
Seed companies	19	38
Others	16	32

Note: Percentage total is more than 100 because the sample farmers have given more than one response

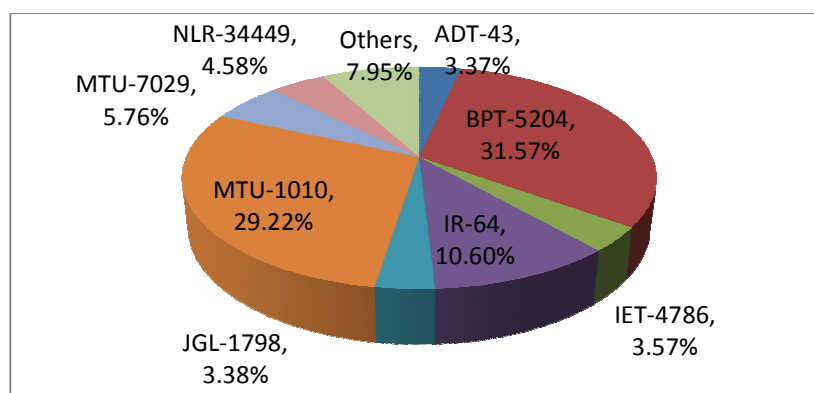


Fig. 3. Area under different varieties used for paddy seed production

3.9 Economics of Paddy Certified Seed Production

The cost and return of certified seed production of paddy have been provided in Table 7. The ratio of fixed and variable cost in paddy certified seed production was 32:68. Human labour was the major component of cost on inputs applied for seed production of paddy. Its share in total costs was about 38.21%. It was followed by bullock & machine labour accounting for about 11.87% of the total cost of paddy seed production. The share of seed cost to total input was about 1.64%. Cost of manures and fertilizers used for crop accounted for about 5.99%. Cost of plant protection measures accounted for about 3.22%. The total cost in certified seed production of paddy was Rs. 57315 per hectare. The average yield of paddy quality seed and rejected seed was 40.0 quintal and 4.0 quintal and by-product was 25.0 quintal. The gross return and net return was Rs. 83150 and Rs. 25835 per hectare respectively.

Table 7. Cost and return in certified seed production of paddy (Rs. /ha)

Sl.	Particulars	Amount (Rs.)	Percentage
1	Human labour	21900	38.21
2	Bullock & Machine labour	6800	11.87
3	Seed	940	1.64
4	Irrigation	1200	2.09
5	Manures & Fertilizers	3435	5.99
6	Plant protection chemicals	1847	3.22
7	Seed certification charges	1200	2.09
8	Interest on working capital	1493	2.61
9	Total variable cost (Rs.)	38815	67.72
10	Total fixed cost (Rs.)	18500	32.28
11	Total cost	57315	100.00
12	Yield		
a	Seed (q)	40.00	
b	Rejected seed (q)	4.00	
c	By-product (q)	25.00	
13	Gross return (Rs.)	83150	
14	Net return (Rs.)	25835	
15	BC ratio	1.45	

3.10 Comparison in Paddy Grain and Certified Seed Production

Economic comparison is essential to test the profitability and viability of any activity. Therefore, economics of seed production *vis-à-vis* grain production has been calculated and compared, so as to analyze the feasibility of seed production over grain production. The present analysis on cost of cultivation was worked out on per hectare basis separately for seed and grain production of paddy.

The total cost of cultivation in paddy certified seed production was around 13.63% higher than

grain production while, gross return was about 28.42% higher in certified seed production (Rs. 83150 /ha) than grain production (Rs. 64750/ha). Consequently, net return from seed production of paddy was 80.56% (Rs. 25835/ha) higher than grain production (Rs. 14308/ha). Hence, production of certified seed has resulted in win-win situation for the farmers with higher yield and better quality of output. Because of seed production, seed producer fetched higher price that the grain in the marketing of produce. Graphical presentation of cost and return in paddy grain and certified seed production has been presented in Fig. 4.

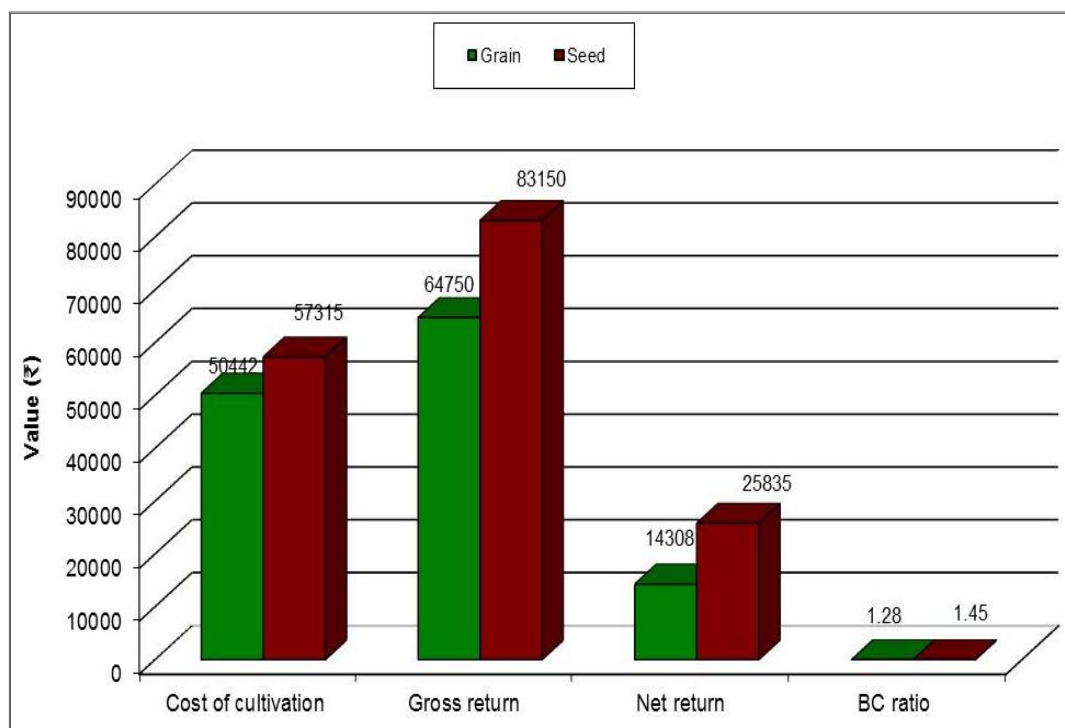


Fig. 4. Cost and return in paddy grain and certified seed production

3.11 Partial Budgeting

The additional costs and returns incurred in the paddy certified seed production over grain production has been presented in Table 8. Table reveals that the increment in profit realized in paddy certified seed production was Rs. 11527.0/ha. The cost on human labour, seed certification charges etc. mainly contributed to

the increase in cost of certified seed production. The added return in paddy certified seed production were attributed mainly through the increased productivity in certified seed production and higher price realization of certified seed over grain. It can be concluded from the partial budgeting analysis that the adoption of certified seed production technology would provide an additional profit to the farmers.

Table 8. Partial budgeting of certified seed production

Debit		Amount (Rs.)	Credit		Amount (Rs.)
A	Increase in cost		A	Decrease in cost	0
i	Human labour cost	3800			
ii	Seed	230			
iii	Irrigation	300			
iv	Manures & Fertilizers	65			
v	Plant protection chemicals	52			
vi	Seed certification charges	1200			
vii	Others	1226			
Total		6873			
B	Decrease in return	0	B	Increase in return	18400
Total Debit		6873	Total credit		18400
Profit					11527

4. CONCLUSION

The present analysis showed that majority of seed farmers belongs to small category and average land holding size was 2.04. The cropping intensity of the study area was 159 and paddy was the important crop with 46.98% of gross cropped area. Net irrigated area at paddy grain and seed producer have 71.00 and 90.60%, respectively. Non-availability of labour was the most important constraints hindering adoption of paddy seed production technology and higher profit is the main reason for adopting paddy seed production technology. Area is dominated by variety BPT- 5204 which covers 31.57% of total area. Majority of farmers received information about the quality seed production from Government officials. The total cost in certified seed production of paddy was Rs. 57315 per hectare. The gross return and net return was Rs. 83150 and Rs. 25835 per hectare respectively. The total cost of cultivation in paddy certified seed production was around 13.63% higher than grain production while, gross return was about 28.42% higher. Consequently, net return from seed production of paddy was 80.56% higher than grain production. This study suggests that higher yield and profitability in seed production may be popularized among the farming community through more extension efforts. This study also reveals that adoption of certified seed production of paddy in farmers' fields is helpful in providing a profitable enterprise for increasing the net farm income.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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