

Original Research Article

An Economic Analysis of Rice Production: A Case Study of District Sheikhupura, Pakistan

Abstract:

Rice is the second-largest crop in Pakistan as it contributes 1.3% share in the GDP of Pakistan. For the last couple of years rice economy is caught up in a very complex situation. The present study was designed to find the yield gap, cost of production, technical efficiency and BCR (Benefit Cost Ratio) in rice production. To achieve the study objectives, data were collected from 150 respondents. These respondents were selected from eight villages of District Sheikhupura by using a purposive random sampling technique. Data were collected by using a well-developed, and pre-tested questionnaire by conducting personnel interviews.

Results of descriptive analysis showed that the average farm size of the farmers was 14.85 acres. BCR (Benefit Cost Ratio) of fine and coarse rice varieties were 1.13 and 1.11, respectively. To support rice production and to minimize the farmer's losses, the Government should announce the support price of rice. The cost of production can be reduced by imposing strict vigilance and control over the input supplier.

Keywords: Rice, production, irrigation, seeds/varieties, and Pakistan.

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Introduction

Agriculture is second largest source of the economy, so it plays a vital role in the economy of Pakistan. It consists of about 45 percent total labors of the country. It exhibits a vital role in GDP of Pakistan as it contributes about 19.8 percent in global domestic production of Pakistan. Agriculture products ~~plays a vital about~~ 70 percent approximately in foreign exchange earnings, and play a vital role in Pakistan. There are major crops in agriculture sector including, wheat, cotton, rice and sugarcane. The production of these major crops has increased about 0.6% in the world during the year 2016, but in Pakistan, the production of these major crops ~~become low down~~ decreased about 1.1 percent (FAO, 2016). FAO estimates that production of rice had increased last year about 0.8 percent in the world. While main reasons for this low production in Pakistan are lack of investment including lack of provision of better infrastructure and including deficiency of new advanced technology. As cultivation of rice faces many challenges such as decline of water facility and other dramatic climatic changes. Hence economic growth of the country is positively affected with growth of agriculture (Ali, 2000).

In term of area of cultivation, rice plays a vital role as second largest important crop in foreign exchange earning along with cotton in Pakistan. Area of cultivation of major crop wheat, rice, cotton, sugarcane and maize are 9.19, 2.89, 2.8, 0.7 and 0.69 million hectares, respectively. Pakistan plays a significant role as 4th largest country in rice production in the world. In Pakistan, rice contributes about 1.3 percent of total GDP while about 4.9 percent values added in agriculture. In the world, Pakistan comes ~~on as the~~ 5th largest exporter in rice production. During the year 2015-16, production of rice was 6.8 million tons and cultivated ~~on~~ about 2.7 million-hectare area having 60.52 mounds yield per hectares. During July 2015-16, rice earning was about \$ 1.667 billion. As production of rice has increased while yield remains low as compared excluding rest of the world. In Pakistan, rice is cultivated specifically in two provinces, Punjab and Sindh. In these two provinces of Pakistan, almost 92% of total rice is grown. Due to better climatic and agronomic conditions in Punjab, about 61% ~~total~~ good quality rice is produced in Punjab. Similarly, in Sindh, production of rice is about 31 percent. It shows essential role in foreign exchange of Pakistan and almost 13 percent of total foreign exchange comes through exportation of rice in the country. Pakistan has essential role in total rice trade of the world amounting to about 1.3 percent (GOP, 20156).

In Pakistan, rice grows about 10% of total crop area and ~~donates forms~~ 1.3 percent of total GDP and it has 4.9 % value added in ~~our~~ agriculture. Pakistan is the eleventh largest country ~~of in the~~ world for rice production. Pakistan grows the most famed varieties of rice like super kernel basmati, super basmati, Irri 9, Irri 6, Pk- 385 basmati rice and Pk-198 basmati rice. In Pakistan, Punjab ranks 1st in rice production and contributes about 58%, Sindh rank 2nd and contributes 29% in rice production, Khyber ~~P~~akhtoon ~~K~~hawan ranks 3rd and contributes about 10%, Baluchistan contributes 3% in production and rank 4th ~~and~~ in total rice production in Pakistan; (Abedullah, et al., (2007). Table 1 shows the area, production and rice yield.

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Table 1: Area, production and yield of Rice in Pakistan

Year	Area		Production		Yield	
	(000 Hectare)	% change	(000 Tons)	% Change	(Kg/Hec.)	%Change
2010-11	2,364	-	4,823	-	2,040	-
2011-12	2,572	8.7	6,161	27.7	2,397	17.6
2012-13	2,309	-10.3	5,537	-10.0	2,399	0.1
2013-14	2,790	209	6,799	22.7	2,438	16.2
2014-15	2,892	3.7	7,006	3.1	2,424	-0.6
2015-16	2,749	-4.9	6811	-2.8	2,480	2.5

Source: Pakistan Bureau of Statistics, GOP (2016)

Rice exports of Pakistan have declined due to less use of quality seed, the high cost of production, increase in competition with other countries and lack of branding. This calamity of rice affects our farmers and our economy very badly. Many factors like flood, unpredicted weather conditions, and price variations influence the farmers to adopt modern technologies such use of good quality seed and high efficient irrigation systems in Pakistan. Climate and environmental changes also have negative effects on the basmati rice processing; (Morrisey, et at., (2005).

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This reduction of production also affects on our country Pakistan's economy and reduces the export of rice in the international market. This study will identify the problems of these crises and also give some recommendations to policy makers to design suitable policies to stable stabilize the price of rice and reduce these crises of rice in national and international market and protect the farmers from losses.

Objectives:

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The main objectives of the present study are as follow:

- To ~~know about~~ assess the socio-economic physiognomies of rice producers.
- To estimate the profitability, cost of production, yield gap of rice and production efficiency.
- To recognize-explore major restriction in the rice grain production and its marketing.
- To suggest the appropriate policy recommendations.

Methodology

Study area

The nature of the problem ~~be is~~ worthy for more attention as a rice growing area of the Pakistan. However, due to some restriction like time and money the study is restricted to the Eight prominent villages of district Sheikhpura.

Data collection and analysis

Data were collected through well-developed questionnaire after pretesting. A simple random sampling technique was used to collect the data ~~of from~~ 150 respondent's farmers of rice growers on district Sheikhpura. With the help of descriptive statistics technique, data are interpreted the data, finding the mean value and frequencies needed for the analysis of the data.

Regression model

~~Causal analysis is performed using a For checking the dependence of one variable on another used~~ log-linear model. For this purpose, the yield was the dependent variable ~~and while the~~ land, sowing, irrigation, seed rate, fertilizers and chemical cost ~~were as~~ independent variables used in this model.

$$\ln Y = \beta_0 + \beta_1 X_1 - \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8$$

Where,

X ₁	=	Land holding size	X ₂	=	Sowing time
X ₃	=	No of cultivation	X ₄	=	Seed Rate
X ₅	=	No of irrigation	X ₆	=	Fertilizer
X ₇	=	Farm yard manure	X ₈	=	Chemical cost

Technical efficiency

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The economic level at which an economy can no longer produce an additional unit of good without lowering the production level of another product is called production efficiency. In this study, Data Envelopment Analysis Technique (DEA) was used to measure technical efficiency of rice production in district Sheikhpura. This is the linear programming technique which used data regarding inputs and output for a best practice production frontier over the data point.

Results and Discussion

Respondent's age

Age is an important factor that affects the decision making ability of the farmers. It is assumed that young people work hard as compared to the old people and have more knowledge and education about farming as compared to old people. Young people have more risk taking ability as compared to older people. Age group of respondents was divided into three categories and these are presented in table given below. As shown in table 2, 40% (60 out of 150) of the respondents belonged to the first age group i.e. less than 40 years comprising 40% of the sample. While 37.3% (56 out of 150) respondents belong the age group greater than 40 years and less than 50 years comprising 37.3% of the sample. While Also, 22.7% (34 out of 150) of the respondents persons out of 150 belong to the age group above 50 years in the age group, depicting percentage of this section was 22.7%. NO Need for the Table since details are presented fully.... Same with other following Tables...

Table 2: Distribution of Respondents by Age Group

Respondents age	Frequency	Percentage
Less than 40	60	40.0
>40 <50	56	37.3
Above 50	34	22.7
Total	150	100.0

Respondents Education

Education helps the respondent farmers for better understanding of the production process and also provides the opportunity to understand and adopt technological changes that are taking place in farming industry. Educated person knows about new technology, new seed varieties and new method of sowing. On the basis of education, respondents were divided into five groups. Table Results showed that 10.66% (16 persons out of 150) were lying in the first level of education

which was above matric ~~and percentage of this section was (10.66 %)~~, 37.34% (56 out of 150) the majority of respondents was lying in the matric level education, ~~56 respondents out of 150 percentage was (37.34%)~~, 19.33% (29 out of 150) of the respondents was lying in the middle level education ~~out of 150 respondents percentage was (19.33%)~~; 19.33% (29 out of 150) of the respondents belong to primary level education, ~~percentage was (19.33%)~~ and illiterate respondents ~~formed 13.34% (20 out of 150) was 20 and the percentage of this section was 13.34% which~~ they have no education in the study area.

Table 3: Distribution of Respondents by Education Level

Education level of respondents	Frequency	Percentage
Above matric	16	10.66
Matric	56	37.34
Middle	29	19.33
Primary	29	19.33
Illiterate	20	13.34
Total	150	100

Respondents Farm Size

Agricultural yield is directly linked with the size of farm; keeping in view the conditions should be favorable for crop production. There is a direct relationship between farm size and productivity. Production efficiency of farms can be highly increased due to increased farm size. Farmers ~~which who~~ have high farm area for agriculture production get high output; get more revenue and profit for their livelihood, while the farmers ~~which who~~ have less farm size produce a small amount of output and profit for their livelihood.

~~In the table 3~~ Results show that 33.3% (50 out of 150) of the respondents ~~out of 150 respondents~~ had farm size less than 12.5 acres ~~percentage was (33.3 percent)~~, 33.3% (50 respondents out of 150) had farm size 12.5-15 acres ~~percentage was (33.3 percent)~~, 31 respondents had 15-20 acres farm size ~~and percentage was~~ (20.7 percent), 13 respondents had 20-25 acres farm size ~~percentage was~~ (8.7 percent) and only 6 respondents out of 150 had more than 25 acre farm size ~~and percentage was~~ (4 percent) in the study area.

Table 4: Distribution of Respondents by Farm Size

Farm size of the respondents (acres)	Frequency	Percentage
Less than 12.5	50	33.3

12.5-15	50	33.3
15-20	31	20.7
20-25	13	8.7
Above 25	6	4.0
Total	150	100.0

Tenancy Status of Farmers

Ownership of land under cultivation of rice is the main source of excellence for high yield of rice. The farmers ~~that who~~ are using rented land ~~have their and have to pay for this as a result there~~ profit is minimized. ~~The table~~Results showed that 49.33% (74 respondents ~~out of 150~~) had ~~their~~ own area for rice cultivation, 33.33% (50 ~~out of 150~~) of the respondents had owner come tenant for the rice cultivation and 17.34% (26 ~~out of 150~~) of the respondents ~~had get~~ rented area for rice cultivation.

Table 5: Distribution of Respondents by Tenancy Status

Tenure status (acres)	Frequency	Percentage
Owner	74	49.33
Owner come tenant	50	33.33
Rented in	26	17.34
Total	150	100.0

Respondent Loan Facility

Farmers used to take loans from the banks mostly before harvesting so they are bounded to sell their crops to ~~that~~ specific sources. Some farmers get loan facility if they have no credit for agricultural production. They got loan ~~for to~~ fulfill their needs of life and agriculture production ~~purpose. In the~~ The study area showed that small farmers got more loan as compared to large and medium farmers. ~~Results Table~~ showed ~~those that~~ 40% (60 respondents out of 150) ~~have~~ taken loans for agriculture production ~~and percentage was (40 percent) and while 60%~~ (90 respondents out of 150) ~~and percentage was (60 percent) told said~~ that they need no loans facility for agriculture production.

Table 6: Distribution of respondents by availability loan facility

Loan facility	Frequency	Percentage
Yes	60	40.0
No	90	60.0

Total	150	100.0
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Different Variety of Rice by Area (Acres)

Varieties that are compatible with the soil conditions have higher chances to produce significant yield. [The table Results](#) indicates that super kernel fine variety was sown on an average area of 4.86 acres ~~percentage was~~ (45.12%), 86 fine varieties were cultivated on an average area of 3.31 acres ~~percentage was~~ (30.73%) and Kainaat variety was sown on an average area of 2.26 acres ~~percentage was~~ (20.99 %) in the study area of District Sheikhpura. Super fan coarse variety was sown on average area 0.34 acres ~~and percentage was~~ (3.16%).

Table 7: Distribution of respondents by types of rice varieties

Fine variety	Acres	Percentage
Super kernel	4.86	45.12
86	3.31	30.73
Kainaat	2.26	20.99
Coarse variety	Acres	Percentage
Super fan	0.34	3.16
Total	10.77	100

Cost of Production of Fine Rice Variety

Table 2 showed that [the](#) total cost of the Fine variety was 47206.731 and total revenue generated after sale of their product in the market was 53559.996. Profit of farmer [considering the after](#) total cost and revenue was 6353.265. The benefit cost ratio is estimated [to be](#) 1.134.

Table 28: Cost of Production of Fine Rice Variety

Sr. No	Operations	No. of oprs/unit/ acre	Rate/unit (Rs).	Cost/acre (Rs).
1	Nursery cost			
1.1	Area per marlas	4.45		
1.2	Seed (Kg)	9.2	90	828
1.3	Fertilizer (i) urea (ii) Dap	(i) 0.2 (ii) 0.12	(i)1500 (ii)2700	(i)300 (ii)300
1.4	Cultivation (plough)	0.33	900	297

1.5	Labor cost	1	600	600
2	Planting cost			
2.1	Seed bed preparation	2	700	1400
2.2	No of plough	3.193	983.299	3140
2.3	No of planking	2.667	450	1125
2.4	No of routa vetor	1.2	1490.56	1788.667
2.5	No of leveler	1.846	1000	1840
2.6	Paddling	1	3220	3220
2.7	Uprooting of nursery	1	600	600
2.8	Transportation cost			200
2.9	Planting of nursery	6.866	500.291	3435.333
2.10	Land rent for 6 month		22000	10000
3	Irrigation cost	23.6	161.533	3812.17
4	Fertilizer, weedicide and pesticide			
4.1	Urea	1.033	1500	1550
4.2	Dap	1.553	2400	3600
4.3	Ssp	1.448	1600	2317.241
4.4	Spray	2.066	1148.39	2373.333
4.5	Weedicide	1		1000
4.6	Labor cost of weedicide			600
5	Harvesting			2880
6	Total cost of fine variety			47206.731
7	Yield	44.633		
8	Revenue	44.633	1200	53559.996
9	Gross profit (8-6)			6353.265
10	BCR			1.1345

Cost of Production of Coarse Rice Variety

Table 3 showed that the total cost of production of coarse rice variety was 42750 per acre and the revenue generated by product sales in the market was 49508.2. Profit of coarse rice variety was 5012.527. The benefit cost ratio of coarse rice variety was 1.11.

Table 39: Cost of Production of Coarse Rice Variety

Sr. No	Operations	No. of oprs/unit/acre	Rate/unit (Rs).	Cost/acre (Rs).
1	Nursery cost			
1.1	Area sow in marlas/acres	2.201		
1.2	Seed (Kg)	3.043	100	304.3
1.3	Fertilizer (Urea)	0.51	1500	750
1.4	Labor cost	1	600	600
1.5	No of cultivation (plough)	1	900	900

2	Planting cost			
2.1	Seed bed preparation	2.165	746.184	1615.652
2.2	No of plough	2.582	976.094	2520.87
2.3	No of routa vetor	2.104	1486.776	3128.696
2.4	No of leveler	2.017	1347.414	2718.261
2.5	Paddling	1	3193.861	3193.86
2.6	Uprooting of nursery	2.087	647.478	1351.754
2.7	Transportation cost			200
2.8	Planting of nursery	6.850	507.426	3476.316
2.9	Land rent for 6 month		22000	10000
3	Irrigation	20.226	161.533	3266.19
4	Fertilizer, pesticide and weedicide			
4.1	Urea	1.035	1500	1552.50
4.2	Dap	1.345	2500	3362.50
4.3	Ssp	1.231	1600	1969.60
4.4	Spray	2.052	1155.508	2371.304
4.5	Weedicide	1	1000	1000
4.6	Labor cost of weedicide			600
5	Harvesting			2880.87
6	Total cost of coarse rice variety			47762.673
7	Yield	47.508		
8	Revenue	47.508	900	42750
9	Gross profit (8-6)			5012.527
10	BCR			1.11

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Yield Gap of Fine Rice Variety

The yield gap is the ratio of dividend of an equity and yield of a long term government bond. Typically equities have a higher yield thus reflecting the higher risk of holding equities. Yield gap is big problem ~~for~~ rice cultivation because ~~the yield become low~~ ~~decreases~~ due to the climate change and other factors that ~~affect~~ ~~the~~ crop yield. Average yield of fine rice was 44.27 monds per acres and high yield of fine rice which the farmer ~~told~~ ~~reported~~ that was 55 monds per acres. Table ~~4s~~ showed that 41 respondents obtained the yield less than 40 monds ~~which is less than~~ ~~or~~ average yield of rice, therefore ~~was~~ a yield gap ~~existed~~, 54 respondents obtained 41-45 mondas per acres of rice yield which was low the average yield and there was also a yield gap of rice crop, 36 respondents obtained 46-50 monds yield per acre which ~~a show~~ ~~that~~ higher yield from average yield and 19 ~~man~~ ~~respondents~~ out of 150 obtained proper high yield of fine variety of rice which was 55 and also above the average yield of fine rice ~~and there~~ ~~was~~ ~~showing~~ another yield gap.

Table 410: Yield Gap of Fine Rice Variety

Yield gap of fine variety	Frequency	Percentage
Less than 40	41	27.3
41-45	54	36.0
46-50	36	24.0
51-55	19	12.7
Total	150	100.0

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Yield Gap of Coarse Rice Variety

The yield gap is the ratio of dividend of an equity and yield of a long term government bond. Typically equities have a higher yield thus reflecting the higher risk of holding equities. Similarly, the coarse rice variety had yield gap. Average yield of coarse rice variety was 50 mound per acres and highest yield of the coarse variety which some farmers ~~told~~ responded that was 60 mound per acres. Table 5 showed that 21 respondents ~~gets~~ got less than 50 acres per mound yield which was lower ~~from~~ than average yield, 92 respondents gets 50-55 mounds per acres which was high from average yield and only 9 respondents ~~gets~~ got proper 60 mound per acre yield and there was a yield gap between average and high yield of coarse variety of rice. Furthermore, ~~and~~ 28 respondents ~~did~~ not growing the coarse variety of rice.

Table 511: Yield Gap of Coarse Rice Variety

Yield gap of coarse variety	Frequency	Percentage
Less than 50	21	14.0
50-55	92	61.3
Above 55	9	6.0
Total	122	81.3
Not growing coarse variety	28	18.7
Total	150	100.0

Production Efficiency

Production efficiency is defined as the economic level at which an economy can no longer produce additional of a good without lowering the production level of another product. In this study Data Envelopment Analysis (DEA) was used for the measurement of production efficiency for rice production farms in District Sheikhpura. This is the linear programming technique which used data regarding inputs and output for a best practice production frontier over the data

points. According to [the Coelli and Krasachat \(2003\)](#), data envelopment analysis had following advantages:

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- 1) It does not require the functional form assumption to specify the relationship between inputs and output.
- 2) It also does not require the assumption about distribution of underlying data.

Discussion of Table 6 is missing???????????????

Table 612: Distribution of farmer by production efficiency of farms

Efficiency level	Frequency	Percentage
0.41 – 0.50	18	12
0.51 – 0.60	22	14.67
0.61 – 0.70	30	20
0.71 – 0.80	20	13.33
0.81 – 0.90	25	16.67
0.91 – 1.0	35	23.33
Total	150	100

Market Problems

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Road facility

For the purpose of agriculture commodity sale in [the market](#), availability of roads [play](#) an important role because if proper roads [are](#) available [than the product is delivered to go in the market on time and with no damage is happening. Results show Table indicates that 60% \(90 respondents out of 150\) told agreed that proper road facility was available. While 40% and percentage was \(60 percent\) and \(60 respondents out of 150\) respondents expressed that poor road facility was available and percentage was \(40 percent\) for to reach the going in market regarding sales of their crop yield.](#)

Table 13: Respondents Opinion Regarding Road Facility

Road facility	Frequency	Percentage
Yes	90	60.0
No	60	40.0
Total	150	100.0

Transport Facility

Like road availability transport facility is also very important because transport facilities help the agriculture products [reach the to in market and for sale](#). When the harvesting season is going on,

and transport facility is not available on time and/or if transport facility is available, the they charges are very high a huge amount of money for going into the market. Results showed that 33.33% (50 respondents out of 150) said that transport facility was good, for going into the market. While 66.7% and (100 respondents out of 150) said that they had no transport facility or poor transport facility for going into to reach the market.

Table 14: Respondents Perception about Availability of Transport Facility

Transport facility	Frequency	Percentage
Good	50	33.3
Poor	100	66.7
Total	150	100.0

Losses of Rice Production

Rice yield is affected by various factors like diseases, poor quality of seed, rain, climate etc... these losses reduced rice yield every year. Table Results showed that these entire factors all combined affect combine the rice crop and decrease the yield of rice. 44.7% (67 respondents out of 150) said that factors like disease, poor quality of seed, rain and temperature were affected their rice crop [all combined], and 55.3% (83 respondents out of 150) expressed that factors like diseases, rain and temperature were affected their crop and decrease yield of rice.

Table 15: Respondents Perception about Losses of Rice

Losses of rice	Frequency	Percentage
Disease, Poor quality of seed, Rain, Temperature	67	44.7
Diseases, Rain, Temperature	83	55.3
Total	150	100.0

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Model Explanation for Significant of Yield

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$$\ln Y = 3.006 + 0.0029 X_1 - 0.0161 X_2 + 0.0656 X_3 + 0.184 X_4 + 0.0765 X_5 + 0.185 X_6 + 0.0634 X_7 + 0.0124 X_8$$

Table 7 showed that the value of the adjusted coefficient of determination Adj. R² value was 0.540345, is not sensitive to number of independent variables or sample size (Hejase and Hejase, 2013), which indicates that the variations in the independent variables explained 34.5% of the variation in the around 51 percent dependent variable. Overall the model was statistically

significant [\[at 90% of significance\]](#) as shown by F value which was 1.34 [with Sig P of 0.056 < \$\alpha\$ = 0.10](#).

Table 7-16: Summary Statistics for Yield Group

Variables	Coefficients (Bs)	Std. Error	T-test	Significance
Constant	3.007	0.406	7.428	0.000*
Holding size	0.00291	0.019	0.164	0.873 ^{NS}
Sowing time ¹	-0.0162	0.015	-1.141	0.269 ^{NS}
No. of cultivations	0.0657	0.060	1.12	0.016**
Seed rate	0.185	0.107	1.74	0.044**
No. of Irrigation	0.0766	0.044	1.78	0.039**
Fertilizer Nutrients	0.186	0.048	3.98	0.000***
FYM	0.0635	0.058	1.105	0.284 ^{NS}
Chemical cost	0.0125	0.011	1.25	0.115 ^{NS}

* Significant at 1%; ** Significant at 5%; *** Significant at 10% and ^{NS} Non-significant

R² 0.514

R² adjusted 0.345

Standard error of estimates 0.056

F. Ratio. 1.342

Conclusion and Recommendations

It is concluded that the cost of production of basmati rice was high as compared to the cost of production of coarse variety. Cost of production of coarse variety was low because of the [lesser lower no-number](#) of cultivations, less water applied, less fertilizer used and farmers used less area for cultivation of coarse variety. The [big-major reason of-for](#) less use of coarse variety is that the market value of the coarse variety is low as compared with the basmati rice.

The Regression Model results showed that some statistically significant factors like holding size, no. of cultivation, seed rate, and no. of irrigation, fertilizer, farm yard manure and chemical cost were effecting positively on rice yield while sowing time had negative affect on rice crop yield. Result indicates ~~that if one percent increases in holding size the rice yield increase by 0.0029 percent and showed non significant level with standard error was 0.018.~~ If one percent increases in no. of cultivation rice yield was also increases by ~~0.06566.56% percent~~ and standard error was ~~0.0590.016~~. The coefficient of seed rate was 0.184 with standard error ~~0.1060.044~~, which means that one percent increase in seed rate rice crop yield was also increase by ~~0.184 percent~~4.4%. Rice crop need more water for better crop; result of irrigation showed that one percent increase in no. of irrigations yield of rice crop was also increase by 0.07665 percent and standard error was ~~0.0430.039~~. Result of fertilizer indicates that one present increase in fertilizer quantity the yield of rice was increase by ~~0.18518.6% percent~~ with standard error ~~0.0470.000~~. ~~If one percent increases in farm yard manure the yield of rice was increase by 0.063 percent and showed non significant level with standard error was 0.057.~~ Chemical cost had a great effect on crops because insect and pest destroyed a lot of portion of crop when they attacked, if an increase one percent in chemical cost rice crop increase by 0.0124 percent and had a non significant level with standard error was 0.010. On the other side, the explanatory variables holding size, farm yard manure and chemical cost are statistically insignificant, therefore must be excluded from the model.

Farmers also faced marketing problems like poor road facility, poor transport facility, and no support price of rice, delayed payments for the produce and had no proper channel from which they can get better information about market facilities.

Suggestion Recommendation

On the basis of the conclusion some policy recommendations should be made for improvement of rice production and quality of rice with better improvement in price of rice.

- Government should announce support price of rice like wheat keeping of viewing rice cost of production.
- Majority of the farmers are small. Small farmers are always caught up with wishes circle of low investment, low output and lower profit. This circle can be broken by providing investment funds through loan.

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- Profit margin of rice production was low i.e., that is few thousands. The profit margin can be increased by increasing yield, in price of output or by reducing cost of production. Cost of production can be reduced by controlling, that is, by having a strict vigilance and control over the inputs from the suppliers/ obligance-dealers. ~~So that they~~ Therefore, better control of any charge-higher input prices in peak demand season. Similarly, subsidy on specific inputs like seed, fertilizer and energy inputs can achieve the same results.
- Low market prices are the result of gap in the supply and demand of the product, that is, of-when the product is continuously ly supplied due to the abounding-abundant production on one hand, and lower international rice price in the world market leads to huge stock of rice both with the private and public sector parties. To clear ~~these~~ stocks, new export market should be identify and rice export should be encouraged by providing incentives (tax exemption, rebate or obligatorye subsidy) to the exporter for better processing facility. In addition, and infrastructure should also be provided to improve the competences of Pakistani rice in the international market.
- Rice ~~use-consume~~ huge amounts of water that in ~~turnem~~ increases cost of production substantially. Consequently, new rice cultivation techniques are needed, that can reduce water ~~use-consumption~~ in rice cultivation. Ffor that purpose, technical knowledge and rice sowing drill should be provided to the farmer on priority bases.
- Farmers growing a number of fine rice variety that are either get mixed at the farm level or in the market, this mixing badly affects practically the exported rice and in extreme situation rejection of the exported consignments. The mixing of variety ~~weather-whether~~ intentional or unintentional should be avoided. All rice stock holders ~~that-who are is~~ either producers, market processors, and exporters should be educated to overcome this problems.

Declaration:

Ethics approval and consent to participate

The authors declare that they have processed the adequate Ethics approval and consent to participate responsible for the submitted for ssion and the BioMed Central License Agreement as detailed above.

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