

## International Journal of Advanced Multidisciplinary Research (IJAMR)

ISSN: 2393-8870

www.ijarm.com

### Research Article

## Profitability estimation of rice varieties in wheat-rice cropping pattern in Agro ecological zone of Gujranwala

Muhammad Tahir Latif<sup>1\*</sup>, Falak Sher<sup>1</sup>, Muzzammil Hussain<sup>1</sup>, Mazher Farid Iqbal<sup>2</sup>, Masood Qadir Waqar<sup>3</sup> and Muhammad Anjum Ali<sup>4</sup>

Adaptive Research Farm, Gujranwala<sup>1</sup>

Adaptive Research Station, Sialkot<sup>2</sup>

Directorate of Agriculture (A.R.) Punjab-Lahore<sup>3</sup>

Directorate General of Agriculture (Ext. and A.R.) Punjab Lahore<sup>4</sup>

\*Corresponding Author

### Abstract

#### Keywords

Rice,  
profitability,  
varieties,  
Gujranwala.

The study was conducted to estimate the profitability of different rice varieties in wheat-rice cropping pattern in three districts (Gujranwala, Sialkot and Hafizabad due to their highest share of paddy in Punjab, Pakistan) to determine the most viable and profitable varieties. A field survey was made by randomly selecting seventy two farmers. Factors like land rent, irrigation cost, fertilizer expenses, land preparation and transplanting costs were highly contributing as 34, 31, 9, 7 and 6 percent share in total cost for producing of paddy crop. The maximum net returns per hectare was recorded by fine rice variety PS-2 (Pakistan Selection Two) i.e. (Rs. 29752 and Rs. 80140 if avoid the land rent factor) claiming highest BCR (1.20 and 1.82 if excluding land rent) followed by fine variety Basmati 515, supper basmati and coarse variety PK-386 (Pakistan-386).

### Introduction

Rice is an important food and cash crop being second staple food grain crop of Pakistan after wheat and major source of foreign exchange earnings after cotton. Rice accounts 3.1 percent of the value added in agriculture and 0.7 percent in GDP. During July-March 2013-14, rice was cultivated on an area of 2789 thousand hectares being 20.8 percent more than last year's area (2309 thousand hectares). The production stood at 6798 thousand tonnes, against the target of 6200 thousand tonnes. The rice area increased due to lucrative market prices received during 2012-13 which induced the growers to bring more area under cultivation. The production increased due to increase in area while yield remained impressive due to flood, excessive rains splashes, attack of leaf roller and bacterial leaf blight in some cultivated areas (Government of Pakistan, 2014). Pakistani fine rice commonly known as Basmati is world famous and keeps monopoly in the international market, due to its quality characteristics, strong aroma, slender and long kernel, gelatinization, temperature and high degree of grain elongation on cooking. However, the grain yield of basmati

rice varieties is very low. In order to remain in the International market, we have to further improve the quality as well as yield of basmati varieties. Rice plays a pivotal role in the agro-based and occupies a prominent position in agricultural economy of Pakistan (Anonymous, 2006). Pakistan has two major rice-producing provinces, namely Punjab and Sindh. Both provinces account for more than 88 percent of total rice production. Punjab due to its agro-climatic and soil conditions is producing 100 percent of Basmati rice in the country. Important rice producing districts in Punjab are Gujranwala, Sheikhpura, Sialkot, Okara, Hafizabad, Mandi Bahaudin Din and Jhang accounting for more than 70 percent of Basmati rice production in the country (Abedullah et al. 2007). The wheat-rice rotation is one of the world's largest agricultural production system and occupies about 14 million hectares of cultivated land in India, Pakistan, Bangladesh and Nepal (Zia et al. 2000). Wheat-rice rotation is very common in northern and some parts of the central Punjab. As with most agricultural commodity markets, the rice market also suffers from the cobweb phenomenon, where price fluctuations are

caused by the time lag between making the decision to cultivate the crop and the ultimate selling of the crop. To decrease the risk faced by farmers from fluctuating prices, the government should set support prices for various varieties of rice (Ahmed et al. 2000). Therefore due to the importance of rice crop in the economy of Pakistan and agro-climatic change overtime, a profitability comparison among rice crop varieties was need of the hour. The study will help the farmers and agriculture economists in terms of recording the cost and revenue parameters in agro-ecological zone of Gujranwala, Punjab, Pakistan.

## Materials and Methods

The field survey was conducted by the experts of Adaptive Research Farm, Gujranwala to estimate the economic determinants and profitability of mostly grown rice varieties in wheat-rice cropping system. The data was collected by purposively selecting three districts including Gujranwala, Sialkot and Hafizabad during Kharif 2013. The selected districts were claiming the highest productive area of producing rice i.e. 578, 303 and 272 thousand tonnes respectively in Punjab province (Government of Punjab, 2013). To get data from the whole district was lengthy, costly and time consuming procedure. Therefore two tehsils from each selected district were randomly selected. Then from each tehsile, 12 farmers were interviewed by randomly selecting villages and thus collected the total data of 72 farmers. A well designed and pre-tested questionnaire used to collect information from the selected respondents. The questionnaire included close ended and open ended questions in order to check the correct response of respondents. As discussed by Bamberger (2000) there are several benefits of using integrated (i.e. combining quantitative and qualitative methods) approaches in research to have in-depth, rich and meaningful research findings. The data regarding costs involved in each agronomic and plant protection function to increase the income, yield and profit

were collected for different fine and coarse varieties of rice. Economic ratios like net returns and benefit cost ratios of different rice varieties were calculated to find the most profitable rice variety in terms of total and net revenue. More specifically the Benefit Cost Ratio (BCR) for each variety was:

$$BCR = VNR / VTC$$

Where, VNR = Variety net revenue and VTC = Variety total cost of production

More and more the value of Benefit Cost Ratio more will be the net return. Furthermore, descriptive statistics was also performed by employing SPSS.

## Results and Discussion

In the light of survey, calculated mean values are given below in Table 1. Mostly surveyed farmers were educated by chance having secondary level of education. Mostly farmers were applying irrigations according to crop needs but fertilizer application was below the recommended level. Particularly use of phosphorus was applied in negligible amount (DAP and SSP were applied @ 0.20, 0.26 and 0.09, 0.20 bag per hectare for fine and coarse rice varieties respectively). Similarly use of potash in the form of SSP was @ 0.04 and 0.13 bag/ha. However urea and zinc sulphate in rice was applied significantly. Attack of Bacterial Leaf Blight, Brown Leaf Spot, Borer and Leaf Roller percentage was 12.24, 3.22, 6.31 and 16.52 for fine rice varieties while it was 13.16, 5, 8.26 and 10.26 for coarse rice varieties. Lodging was more observed in coarse varieties than fine varieties. The average days to maturity was recorded as 117 and 97 for fine and coarse rice varieties respectively.

Table 1. Descriptive Statistics of field survey information

Variables	Fine rice varieties		Coarse rice varieties	
	Mean	Std. Dev.	Mean	Std. Dev.
Education of farmer	8.96	4.29	10.05	1.81
Area of rice variety (ha)	7.48	5.33	46.67	51.01
Seed treatment cost (Rs./ha)	140.70	77.99	146.90	32.65
No. of irrigations/ha	30.88	6.35	34.32	5.52
No. of urea bag/ha	2.54	1.28	2.40	0.67
Price of urea/bag (Rs.)	1921.67	61.14	1931.67	24.07
No. of DAP bag/ha	0.20	0.61	0.26	0.52
Price of DAP/bag (Rs.)	4116.67	160.21	4150.00	57.74
No. of SSP bag/ha	0.09	0.66	0.20	0.46
Price of SSP/bag (Rs.)	1050.00	52.25	1066.67	57.74

No. of SOP bag/ha	0.04	0.23	0.13	0.39
Price of SOP/bag (Rs.)	4650.00	70.71	4675.00	35.36
Zinc Sulphate kg/ha	7.81	9.57	10.17	7.09
Cost of Zinc Sulphate/ha	1668.39	403.79	618.21	183.67
Attack of BLB (percent)	12.24	20.40	13.16	8.69
Attack of BLS (percent)	3.22	4.99	5.00	6.46
Attack of Borrer (percent)	6.31	4.21	8.26	3.20
Attack of Leaf Roller (percent)	16.52	18.48	10.26	11.36
First application cost of pesticide (Rs./ha)	2612.22	747.24	2161.25	835.91
Second application cost of pesticide (Rs./ha) if any	2805.60	818.32	2442.98	507.69
Lodging in percent	11.58	19.79	22.88	31.82
No. of days to maturity	116.91	6.61	96.84	3.42
Cost of harvesting (Rs.)	5875.07	873.23	5642.00	421.94
Land rent (Rs)/ha	50635	15815.72	48746.18	16808.09

Source: Field survey

Fine rice varieties grown in the agro-ecological zone of Gujranwala were Super Basmati, Basmati-515 and PS-2 with percent distribution of 50, 5 and 45 while coarse

varieties like PK-386, Supri and Super Fine were recorded as abundantly grown varieties with percent distribution of 60, 36 and 4 (Table 2).

**Table 2: Detail of varieties sown**

Varieties	Fine varieties				Coarse varieties			
	Super basmati	Basmati-515	PS-2	Total	PK-386	Supri	Super fine	Total
Frequency	28	3	25	56	28	17	2	47
Percent	50	5	45	100	60	36	4	100

Source: Field survey

Rice yield for Supper Basmati, Basmati 515 and PS-2 was 90.16, 93.04 and 96.33 while for PK-386, Supri and Supper

Fine it was 113.07, 114.24 and 107.86 mounds per hectare respectively (Table 3).

**Table 3: Yield and output price of varieties (mean values)**

Name of variety	Fine varieties			Coarse varieties		
	Super Basmati	Basmati-515	PS-2	PK-386	Supri	Super Fine
Yield (Mound/ha)	90.16	93.04	96.33	113.07	114.24	107.86
Standard deviation	13.883	9.351	18.569	12.525	27.384	20.117
Price (Rs./mound)	1898.93	1843.33	1847.32	1386.67	1312.5	1266.67
Standard deviation	297.014	92.916	278.416	66.054	103.078	104.083

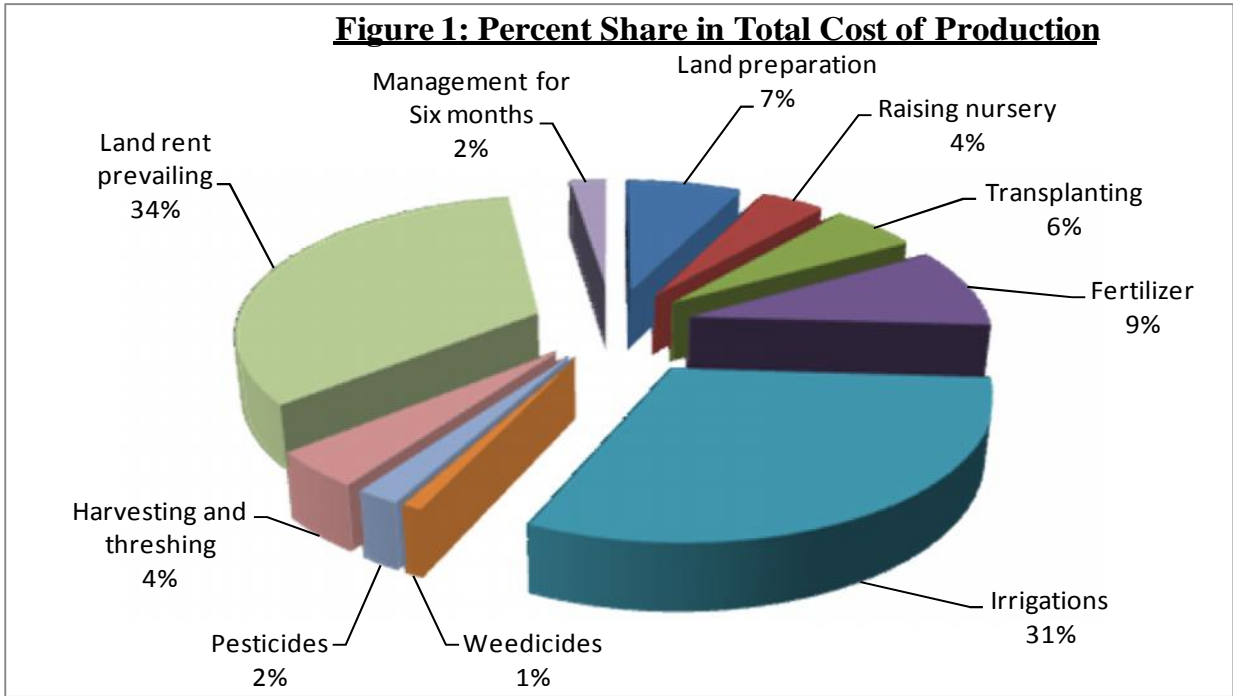
Source: Field survey

The average cost per hectare for all varieties was almost same without any significant difference. The highest total costs of production were Rs. 148200 for PS-2 fine rice variety while lowest was Rs. 133380 for super fine coarse rice variety. The mean cost of all the varieties per hectare were as land preparation (Rs.10374), raising nursery (Rs.5842), transplanting (Rs.7904), fertilizer expenses

(Rs.13978), irrigation applications (Rs.46302), weedicides (Rs.1359), pesticides (Rs.2791), harvesting and threshing (Rs.6086), land rent charges (Rs.49400) and management/other expenses (Rs.4545). The recorded costs were higher compared to per hectare cost computed by Hussain et al. (2000) and others due to the increasing trend of prices of inputs over time. The mean percent share

distribution of factors of production in total cost of production for all the varieties was also estimated. Factors like land rent, irrigation, fertilizer, land preparation, transplanting, raising nursery, harvesting and threshing,

pesticides, management and weedicides were contributing 34, 31, 9, 7, 6, 4, 4, 2, 2 and 1 percent in total cost of production respectively (Figure 1).



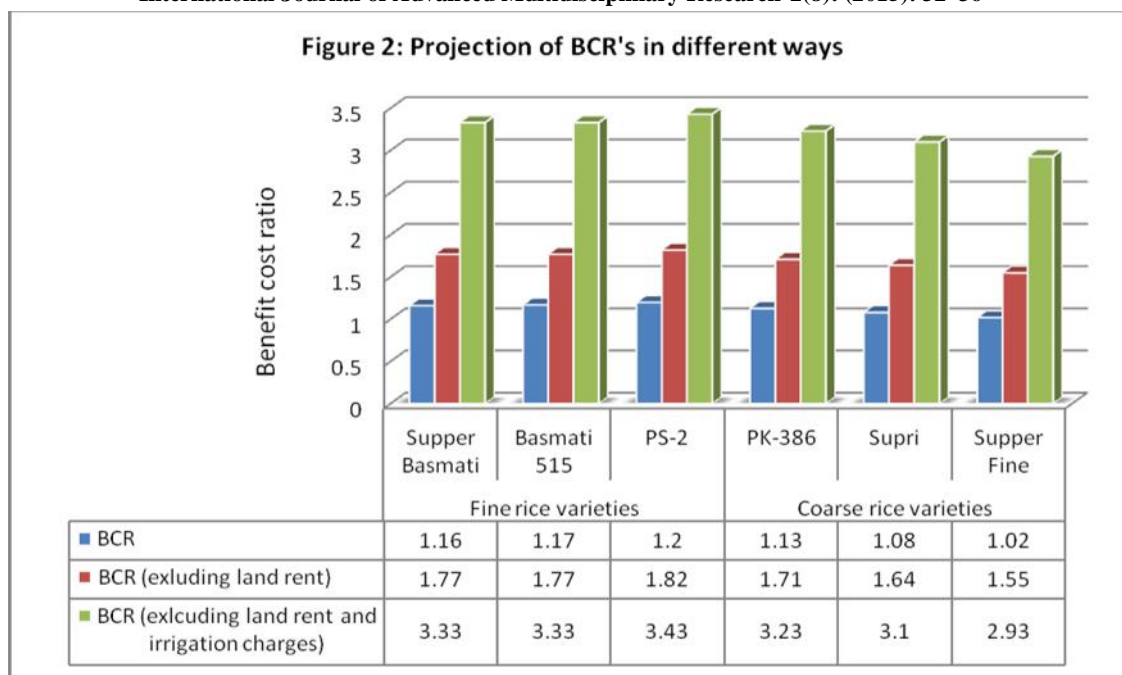
The maximum net returns per hectare was obtained by fine variety PS-2 (Rs. 29752 and Rs. 80140 if avoid the land rent factor while Rs. 126082 if ignore the irrigation charges) claiming highest BCR (1.20 and 1.82 excluding land rent while 3.43 excluding irrigation cost) followed by fine variety Basmati 515, super basmati and coarse variety PK-

386. While the minimum net returns per hectare was recorded by coarse rice variety super fine (Rs. 3243 and Rs. 48592 avoiding the land rent factor while Rs. 89940 if ignore irrigation charges) claiming lowest BCR value (1.02 and 1.55 excluding land rent while 2.93 if ignore irrigation charges) (Table 4 and Figure 2).

Table 4: Net returns and BCR s of rice varieties

Name of variety		Gross Income	Including land rent			Excluding land rent			Excluding land rent and irrigation cost		
			TC	Net Return	BCR	TC	Net Return	BCR	TC	Net Return	BCR
Fine varieties	Super Basmati	171208	146965	24243	1.16	96997	74211	1.77	51438	119770	3.33
	Basmati 515	171503	147212	24291	1.17	97160	74343	1.77	51524	119979	3.33
	PS-2	177952	148200	29752	1.20	97812	80140	1.82	51870	126082	3.43
Coarse varieties	PK-386	156791	138814	17977	1.13	91617	65174	1.71	48585	108206	3.23
	Supri	149940	138320	11620	1.08	91291	58649	1.64	48412	101528	3.10
	Super Fine	136623	133380	3243	1.02	88031	48592	1.55	46683	89940	2.93

Source: Field survey



## Conclusion

Land rent and irrigation expenses were the two main factor components (34% and 31% share in total cost of production) for profitability of rice varieties. In agro-climatic zone of Gujranwala, Punjab, Pakistan where canal water is excessive and there is less need of tube well irrigation, there the rice is the most profitable crop among all other major crops. However it is concluded that the profitability of fine rice varieties is more than coarse varieties due to the higher price besides less yield level. However the choice of variety should depend on environment, planting date, quality, marketing and harvest scheduling rather traditional methods. Therefore government should arrange extension services programs to overcome this problem.

## References

- Abedullah, S. Kouser and M. Khalid. 2007. Analysis of technical efficiency of rice production in Punjab-Pakistan, Implications for Future Investment Strategies. Pak. Econ. Soc. Rev. 45(2): 231-244.
- Ahmed, S., P. Roger and P. Martini. 2000. Agricultural Policy Analysis in Pakistan: Illustrations in the use of the Policy Analysis Matrix. Centre for Management and Economic Research, Lahore University of Management Sciences, Pakistan.
- Anonymous. 2006. Pakistan Country Office, Vulnerability Analysis and Mapping (VAM) UNIT. Early Warning Report, Monsoon Rain and Flood, United Nations world food program. pp. 6. <http://documents.wfp.org/stellent/groups/public/documents/vam/wfp173175.pdf>
- Bamberger, M. 2000. Integrating quantitative and qualitative methods in Development Research. Washington D.C World Bank.
- Government of Punjab 2013. Punjab Development Statistics, Bureau of Statistics, Government of Punjab, Lahore. [http://www.bos.gop.pk/?q=system/files/RBI\\_Report\\_2012-13.pdf](http://www.bos.gop.pk/?q=system/files/RBI_Report_2012-13.pdf)
- Government of Pakistan. 2014. Pakistan Economic Survey 2013-14 Economic Advisor s Wing, Finance Division, Islamabad, Pakistan. pp.27-28.
- Hussain, A., N. R. Khattak and A. Q. Khan. 2008. Costs benefit analysis of different rice varieties in district Swat. Sarh. J. Agric. 24 (4): 745-748.
- Zia, M., Sharif, M., Aslam, M. B., Baig and A. Ali. 2000. Fertility issues and fertilizer management in rice wheat system. Quar. Sci. Ver. 5(4):59-73.