

## COMPARISON OF ECONOMICS OF APPROVED AND UNAPPROVED VARIETIES OF COARSE RICE

F. Sher, M. Hussain, M. Q. Waqar\*, M. A. Ali\*\* and M. F. Iqbal\*\*\*

Adaptive Research Farm, Gujranwala, \*Adaptive Research Punjab-Lahore

\*\*Department of Extension and Adaptive Research, Punjab Lahore

\*\*\*Adaptive Research Station, Sialkot

ssmsagronomygrw4@gmail.com

**ABSTRACT:** Survey was conducted by the researchers of Adaptive Research Farm, Gujranwala during kharif 2010 to evaluate the economic return of approved and un-approved varieties of coarse rice by selecting eighty five farmers. The selected farmers were interviewed according to a well designed questionnaire. The approved variety KSK-133 gave highest paddy yield 6453 kg $ha^{-1}$  followed by un-approved Shahkaar (6357 kg $ha^{-1}$ ) and Superi (5574 kg $ha^{-1}$ ). Income recorded for approved variety KSK-133 was Rs. 132344  $ha^{-1}$  which was slightly less as compared to unapproved Shahkaar (Rs. 136162  $ha^{-1}$ ). The result of the survey revealed that education plays a vital role in agriculture development. Moreover farmers having own machinery and easily excess to hired labour earned maximum revenue from their crops.

**Keywords.** Comparison, approved, unapproved, coarse rice, economic return, Gujranwala.

### INTRODUCTION

Rice (*Oryza sativa* L.) is the world's most important staple food crop all over the world including Pakistan. It is grown in 111 countries including flood plains of Pakistan to the rain forests of Indonesia and the desert plains of Australia (IRRI, 1995). In Asia rice is major food component after wheat of 3.5 billion people. Pakistan grows high quality rice to meet both domestic and export demands. Basmati rice is cultivated largely in the Kalar tract of Punjab which is very famous in the world for its good taste, length and aroma. In Pakistan coarse rice is cultivated on an area of 517.8 thousand hectares with annual production of 1237.6 thousand tones (Anonymous, 2011). The reports show that the trend of area and production of different paddy varieties in Punjab is not satisfactory because of increasing share of unapproved varieties. There is a threat that our rice export will suffer badly. The factors that motivate farmers to diversify their variety and crop choice are market orientation income diversification, resource endowment and rearing of livestock. A change in a single economic factor may cause farmers to change their variety and crop choice (Smale *et al.*, 1994). (Hayat *et al.*, 2003) reported that KSK-282 variety of coarse rice produced the highest paddy yield as compared to IRRI-6 and NIAB IRRI-9 when planted during second week of June under direct wet seeded culture. Although basmati rice varieties are dominant in Punjab but some coarse varieties are also being grown by the farmers. Basmati varieties have long duration and late maturity while coarse varieties have short duration, early maturity and better resistance against pests and diseases. (Ghazanfar *et al.*, 2013) concluded that

coarse rice varieties especially IRRI-6 and KSK-133 are resistant to bakanae disease as compared to fine rice varieties. Therefore, incorporation of coarse varieties in rice-wheat cropping pattern facilitates the farmers for efficient use of resources. Along with the recommended coarse rice varieties some unapproved coarse rice varieties are also being grown by the farmers. The unapproved varieties have not been examined by the experts regarding their characteristics and resistance against pest and disease, therefore, their cultivation may be risky. The study is conducted to find out the reasons due to which farmers grow unapproved varieties of coarse rice in Agro-ecological conditions of Gujranwala zone.

### MATERIALS AND METHODS

The survey was conducted in agro-ecological zone of Adaptive Research Farm Gujranwala during kharif 2010, to evaluate the economic return of approved and un-approved varieties of coarse rice. A well designed questionnaire was developed to collect information from the farmers regarding basic data of farmers; variety wise area sown; land preparation; time of sowing; fertilizer applied; agronomic practices; plant protection measures adopted; yield and price etc. The data was collected from four adjoining Tehsils i.e. Gujranwala, Noshera Virkan, Hafizabad and Pindi Bhattian, because coarse varieties are generally cultivated in these Tehsils. The other reason for selecting these four adjoining Tehsils was that these Tehsils have almost similar temperature and rain fall, as the temperature and rain fall significantly affect the crop growth and yield (Mehmood *et al.*, 2012). From each Tehsil

four union councils were randomly selected, then from each union council two villages were selected and from each village 2-3 farmers were selected randomly. As a whole a sample of 85 farmers was selected. The selected farmers were interviewed by personal contact. The data thus collected was analyzed and presented as descriptive statistics like mean, percentages and regression analysis. In regression analysis multiple regression models were used and reliability of the individual regression coefficient was estimated on the basis of their standard error. Overall reliability of the model was checked by using co-efficient of multiple determinations ( $R^2$ ). The economic returns were calculated by multiplying average yield with average price. Cobb Douglas production function was found to be the most appropriate method for manipulation of the data. This method was used for the analysis of rice (Hussain, 2013).

## RESULTS AND DISCUSSION

Table-1 showed that the mean value of years of schooling of respondents who grew approved variety of coarse rice KSK-133 was 13 years which was highest as compared to unapproved varieties i.e. PK-386, Shahkaar,

Super fine and Superi for which it ranged from 8.3 -10.5 years. It indicated that educated farmers are early adopter of new varieties. The mean value of cultivated land (own land + hired land) was highest (26.4 ha) for approved KSK-133 variety while it ranged from 13 to 19 hectares for unapproved varieties. It means that progressive (advanced) farmers having sufficient land were more likely to grow new approved varieties. The mean value of total area under rice varieties showed higher land under unapproved rice varieties namely PK-386, Shahkaar and Superi as compared to lower land under approved rice variety because it was a new variety. The nitrogen application from various fertilizers i.e. urea and DAP ranged from 95 to 109 kg per hectare for both approved and unapproved varieties. The quantity of nitrogen applied by the farmers was in accordance with the recommendation given by (Chaudhary *et al.*, 2009) for minimizing paddy yield losses due to bacterial leaf blight disease. While the phosphorous application by means of different fertilizers i.e. SSP and DAP ranged from 20 to 23 kg  $P_2O_5$   $ha^{-1}$  for approved and unapproved varieties except for unapproved superfine and Superi varieties for which it ranged from 5 to 8 kg per hectare. Main reason for less use of phosphorous was high prices of phosphatic fertilizers.

**Table 1. Showing Farm and farmers related characteristics**

Varieties	Approved Coarse Varieties		Unapproved coarse rice		
	KSK-133	PK-386	Shahkaar	Super fine	Superi
Year of Schooling	13	9.76	10.5	8.29	9.33
Cultivated land (ha)	26.4	13.28	15.53	17.49	18.76
Area under variety (ha)	1.82	4.18	7.37	2.28	5.37
Nitrogen (kgs N/ha)	106.57	109.49	99.46	95.41	99.85
Phosphorous(kgs $P_2O_5$ /ha)	22.24	20.48	20.48	5.39	8.35

Results regarding output and returns of approved and unapproved coarse rice varieties are presented in table-2. It was evident that maximum yield was recorded from approved new variety KSK-133 i.e. 6453  $kg\ ha^{-1}$  followed by unapproved variety Shahkaar which yielded 6357  $kg\ ha^{-1}$  while minimum yield (5361  $kg\ ha^{-1}$ ) was recorded in case of un-approved variety PK-386. Along with other factors, varietal selection was key factor, affecting rice yield as concluded by (Khan *et al.*, 2006). Regarding the price per 100 kg, it was maximum for un-

approved variety Pk-386 (Rs.2395.64) and minimum for approved variety KSK-133 (Rs.2050.89). On the other hand maximum revenue was generated by un-approved variety Shahkaar (Rs.136162  $ha^{-1}$ ) followed by approved variety KSK-133 (Rs.132344  $ha^{-1}$ ) and minimum revenue (Rs.118411  $ha^{-1}$ ) was gained by the un-approved variety superfine. Even though this variety was cultivated due to its earliest ripening character due to which it facilitated the farmers to grow vegetables and fodder crops in early season after harvesting the rice.

**Table 2. showing Output and Returns of approved and un-approved varieties of coarse Rice**

Varieties	Approved Coarse Varieties		Unapproved coarse rice		
	KSK-133	PK-386	Shahkaar	Super fine	Superi

Yield Kg ha <sup>-1</sup>	6453.00	5362	6357	5411	5574
Price (Rs. 100Kg <sup>-1</sup> )	2050.89	2395.64	2141.92	2188.34	2269.77
Revenue (Rs.Ha <sup>-1</sup> )	132344	128430	136162	118411	126517

Average of the prices given by the respondents in 2010

Results regarding allocation of resources to approved and unapproved coarse varieties revealed that KSK-133, Shahkaar and Superfine varieties were allocated 100 % medium fertile soil followed by PK-386(91.2%) and Superi (95.3%). On the other hand 8.8% fertile land was covered by PK-386 followed by Superi (4.7%). Highest loam soil (93.8%) was covered by Shahkaar while the highest clay loam (23.3%) was covered by Superi and maximum sandy soil was also under this variety (14.3%). Maximum (75%) farmers grew wheat after Shahkaar while 60.5% farmers grew wheat and fodder crops after Superi. Maximum other crops 14.3% were grown after early ripening variety superfine. The 64.3% labour was easily available for approved KSK-133 while only 23.3 % labour was easily available for un-approved Superi. The percentage of respondents using hired tractor for approved and un-approved varieties was about 14 except for un-approved PK-386 for which it was about 20 while the respondents having own tractor made a higher percentage which ranged from 80-87 for both approved and un-approved varieties. The farmers who irrigated the crops by tube well and canal were 100% for un-approved Shahkaar variety. The value of diesel and electric tube wells was highest (50%) for approved variety. The farmers who did not apply seed treatment before sowing were 25% for approved and 29-50% for un-approved varieties. On the other hand farmers who had applied seed treatment

were 75% for approved and 50-71% for un-approved varieties. The early transplantation was maximum (57%) for unapproved superfine which was early ripening variety. Medium transplantation for un-approved PK-386 was maximum (65%) while approved KSK-133 and un-approved Shahkaar were transplanted late (78.6 and 75%). The farmers who did not use weedicides in un-approved superfine and Superi were 7.1% and 4.7% while 100% farmers used weedicides in approved variety KSK-133 and un-approved varieties PK-386 and Shahkaar. However farmers who had used pesticides were 79% (highest) for PK-386 while 50% for approved variety KSK-133.

It showed that education had a positive impact on the rice yield pointing towards the reality that illiterate farmers were reluctant in adopting new varieties and technologies which would enhance crop yield (Table 3). Easily availability of hired labour for performing various cultural practices in rice production had a positive effect on the rice yield, showing that as the farmers had an easy access to hired labour would have more rice yield. The farmers who had their own tractor, enjoyed higher output of their crops. Similarly, farmers who had applied seed treatments, were benefited from higher yield of rice while positive sign of variety status showed that farmers who had gone for new approved rice varieties obtained higher rice yield (Table-2). The table 3 also showed R<sup>2</sup> and significant F-value of the regression model.

**Table 3 showing Regression results.**

Variables	Co-efficient	Std.Error
Constant	7.809***	0.149
LN Education	0.039**	0.018
LN Area	0.002	0.016
Soil Fertility	0.044	0.065
Availability of hired labour	0.042*	0.030
Members involved in Agriculture	0.002	0.012
Tractor ownership	0.098***	0.040
Approved variety	0.059*	0.037
Seed Treatment	0.013	0.027
LN-N	0.024	0.039
D_Pesti	0.010	0.028
LN_P <sub>2</sub> O <sub>5</sub>	0.010	0.010
R <sup>2</sup>	0.25	
F-Value	3.3***	

\*\*\*, \*\* and \* show significance level at 1, 5 and 10% respectively.

LN means Natural Log; N mean Nitrogen; P<sub>2</sub>O<sub>5</sub> means Phosphorous; D\_ pesticide means Dummy variable for pesticide use

**Conclusion:** The approved variety KSK-133 gave higher yield 6453 kg ha<sup>-1</sup> as compared to un-approved varieties i.e. Shahkaar (6357 kg ha<sup>-1</sup>) and Superi (5574 kg ha<sup>-1</sup>). Regarding the income approved variety KSK-133 was at

second position with the return of Rs.132344 ha<sup>-1</sup> due to low price while un-approved variety Shahkaar gave maximum income i.e. Rs.136162 ha<sup>-1</sup>. That was why farmers cultivated the unapproved varieties. Rice variety

Superfine was cultivated due to its unique character of earliest ripening which facilitated the farmers for growing vegetables and fodder crops in early season. Education also plays positive role in agricultural production pointing towards the reality that illiterate farmers were reluctant in adopting new technologies. Hired labor for performing various cultural practices affected the rice production adversely. Farmers who possessed their own tractors earned maximum revenue from their crops. Similarly farmers who applied seed treatment got maximum economic returns.

#### **RECOMMENDATIONS**

1. Farmers should be educated about the weak points of unapproved varieties and to adopt latest technologies.
2. Literacy rate should be increased as the education promotes the agriculture.
3. Research activities should be enhanced to develop new high yielding, disease resistant and early ripening coarse rice varieties.
4. Agriculture machinery should be provided to the farmers at cheaper rates to enhance mechanized farming.

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