

Perception of Farmers Regarding Rice Technology Adoption

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Abstract: Rice is one of the important cash crop of Pakistan. To improve rice production, farmers must be aware of recommended practices. Different sources of information are used for dissemination of information and it was assumed that farmers would be able to understand new technology for rice production and will employ this technology at their fields. Therefore, this study sought to describe farmers level of knowledge regarding the recommended technology for rice production and to assess the effectiveness of the sources of information. The study used a sample survey method and identifies through a simple random sampling technique 150 rice growers of Larkana district of Sindh Province of Pakistan. The study found that more than 70% rice growers were following recommended technology which was considered under the moderate level. Radio and Agricultural Extension were found significant sources in helping farmers to adopt new technology. Farmers were of the opinion that the government should held Aconferences for farmers which is helpful in understanding new and improved technological advancement in the field of agriculture. The majority of the respondents perceived that agricultural extension agents should pay visit to their farm/field on a regular basis.

Key Words: Rice- Technology- Perception-Adoption

Introduction

Rice (*Oryza sativa*) is one of the principal food grains. It is a staple in diets of the majority of people of Pakistan as well as Asia. In Sindh, rice is grown in two distinct areas; upper Sindh and lower Sindh, occupying an approximate area of 0.75 million hectares with total production of about 1.58 million tons. It is a major commodity exported and contributes approximately 15% to the total foreign exchange earnings Mallah, (1987). Coarse varieties of the rice are also used for bread making purposes by a large number of people in rice growing tracks of Sindh, while rice husks and straw are mainly used for feeding livestock as dry fodder during the shortage of green fodder. Table 1 reports annual rice production for Pakistan and Table 2 reports Sindh province and Larkana division production data.

Table 1: Annual Rice Production of Pakistan: 1992 - 1999

Years	Pro. (MT)
1992	4,674,150
1993	5,992,050
1994	5,169,750
1995	5,949,750
1996	6,457,200
1997	6,499,500
1998	7,010,700
1999	6,900,000

There are a number of factors which may influence the adoption of innovation Kashem and Jones, (1988), Zinyama, (1988), Abdelmagid and Hassan, (1996), Igodan, Ohaji, and Ekpere, (1988), Shakya and Flinn, (1985), Nkonya, (1997), Mbata, (1997), and Voh, (1982). These factors include lack of money (poverty) with which to purchase seasonal agricultural inputs such as seed and fertilizer, the lack of basic farming implements, notably the ox-drawn single furrow plough, the lack of draught cattle, farm size, inadequate family labor for agricultural work, level of education, social participation, contact with extension, access to credit, empathy and leadership roles, lack of inputs in the

market at the right time, shortage of irrigation. In spite of favorable climate, soil condition and availability of irrigation water, rice yield in Pakistan is far below the yield obtained in advanced rice producing countries of the world. Thailand and the United States are currently two top rice-exporting countries and have been since 1987. However, they only contribute 4-5% and 1-2%, respectively, to the total world crop Marshall and Wadsworth, (1994). Given the unrealized potential increase in rice production in Pakistan may be attributed to the fact that farmers are not adopting a full package of rice production technology and still follow traditional methods of rice cultivation. It is imperative to transfer modern technology to the farmers and motivate them to adopt it. For rice technology to be effective, it is essential that the technology transferred to the farmers be appropriate under their own circumstances. It is therefore essential to know what type of technology the rice growers are using that is not helping them to increase their per acre yield. The purpose of this study was to identify Larkana District farmers perceptions about the use of recommended practices/technology for rice production i.e. (i) the proportion of the farmers who apply recommended number of plowings, appropriate seed rate, fertilizer dose, and amount of irrigation, (ii) the ranking for the perceived importance of selected sources of information (Agricultural Extension Agents, Radio, TV, and Newspaper) regarding adoption of recommend technologies for rice production, and (iii) farmers opinion regarding services provided by the Extension staff, agricultural education programs, and government plans.

Materials and Methods

The study used a sample survey method. A descriptive survey design was used. Descriptive research is a method that involves making careful description of educational phenomena Gall, Borg, and Gall, (1996). The population of this study was all the rice growers of the Larkana district. The total population was more than 3000 farmers. An appropriate sample size of 384 Wunsch, 1986; Fitz-Gibbon and Morris, 1987; Stockdill,

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Table 2: Rice Production for Sindh Province and Larkana Division

	Area 000 ha		Production 000 ha		Yield kg/ha	
	1992-93	1993-94	1992-93	1993-94	1992-93	1993-94
SINDH	568.79	702.89	1272.83	1954.89	2238	2781
Larkana Div.	394.84	447.52	1059.89	1419.83	2684	2532
Jackobabad	116.82	137.56	291.56	393.56	2496	2861
Shikarpur	88.69	100.62	243.37	320.09	2744	3181
Larkana	189.33	209.34	524.96	706.08	2773	3373

(1993) at 5% sampling error rate was determined. However due to time and financial constraints, only 150 farmers were randomly drawn and interviewed due to which the error rate was increased up to 8% Wunsch, (1986). The sample was taken using a simple random sampling technique. A random number table Cochran, (1977) was used. A detailed survey guide was developed after the careful study of objectives and literature review. The survey interview guide was divided into three sections: demographic characteristics, farmers knowledge regarding new practices of rice (whether they apply recommended number of plowings, seed rate, fertilizer dose, and irrigation water or not) and farmers perceived value of information sources, and suggestions for adoption of new practices. The responses were recorded on the interview survey guide. Perception responses regarding helpfulness of selected sources of information (agricultural extension, radio, TV, and newspapers) were gathered on a Likert-type scale ranked 1 to 10 (1 being unsatisfactory, 5 being average and 10 being excellent). Farmers opinions and suggestion were recorded. Farmers responses regarding number of plowings, seed rate, fertilizer dose and, irrigation water were compared with the recommended number of plowings, seed rate, fertilizer dose and, irrigation water for rice from the contemporary book, ACrops of Sindh, (1994) Khoso, (1994). The wrong answers were coded A0 and right answers were coded A1. The collected data were analyzed using a statistical package SPSS/PC 9.0 version. Descriptive statistics were calculated and one-way ANOVA was performed to test the hypotheses. The hypotheses were tested with a predetermined significance level set at 0.05.

Results and Discussion

Demographic Characteristics of Larkana Rice Farmers
The demographic characteristics of the rice growers in the present study were age, dependent family members, tenancy status, total area holding, area under rice, farming experience, and educational level. The average age of the farmers was 36 years, while the average farming experience was 15.5 years. The average dependent family members were 7.0. The average area of holding was 17.1 acres, while the average area under rice was 15.7 acres. Tenancy was 35.1% landlords, 37.8% peasant proprietor, and 27.0% tenants. Farmers educational levels were 31.8% illiterate, 25.0% primary and middle, 27.7% matric and intermediate, 8.8% graduate, and 6.8% postgraduate farmers. The results are presented in Tables 3 and 4.

Table 3: Descriptive Statistics for the Demographic Characteristics

Description	No.	Mini.	Maxi.	Mean	Std.Dev.
Age	148	20	70	36.0	8.2
Dependent Family Member	148	0	15	6.7	3.3
Total Area Holding	148	2	80	17.1	13.3
Area Under Rice Farming Experience	148	2	70	15.7	12.0
	148	3	42	15.5	7.8

Table 4: Frequency Distribution for the Demographic Characteristics

Description	Frequency	Percent
Tenancy Status		
Land lord	52	35.10
Peasant Proprietor	56	37.80
Tenant	40	27.00
Educational Level		
Illiterate	47	31.80
Primary	28	18.90
Middle	09	06.10
Matric	29	19.60
Intermediate	12	08.10
Graduate	13	08.80
Post graduate	10	06.80

To Determine the Proportion of the Farmers Who Apply Appropriate Number of Plowings of Rice, Seed Rate, Fertilizer, and Irrigation
The proportion of the farmers who apply appropriate number of plowings, seed rate, fertilizer, and irrigation was found under moderate level (73%, 82%, 73%, and 84% respectively). Results are given in Table 5.

Table 5: Frequency Distribution for Right or Wrong Responses

Item	Response	Frequency	%
Plowing the land for rice	Right	108	73.0
	Wrong	40	27.0
	Total	148	100.0
Recommended 2-3 Out of range	Right	108	73.0
	Wrong	40	27.0
	Total	148	100.0
Appropriate seed rate for rice	Right	125	84.5
	Wrong	23	15.5
	Total	148	100.0
Recommended 30-40 kg/hectare	Right	125	84.5
	Wrong	23	15.5
	Total	148	100.0
Appropriate amount of fertilizer dose for rice	Right	125	84.5
	Wrong	23	15.5
	Total	148	100.0
Recommended 1.5-2 bags/hectare	Right	125	84.5
	Wrong	23	15.5
	Total	148	100.0
Irrigation water rate for rice	Right	125	84.5
	Wrong	23	15.5
	Total	148	100.0
Recommended 3-4 inches	Right	125	84.5
	Wrong	23	15.5
	Total	148	100.0
Out of range			

Note: - Below 70% Low, 71 to 90% Moderate, 90% and above High.

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To Determine the Ranking for the Perceived Selected Sources of Information (Agriculture Extension Agent, Radio, TV, and Newspaper) in Adoption of an Appropriate Number of Plowing

The Agricultural Extension Agents and radio were perceived above the average and ranked 1. Following this, TV was ranked 2, and Newspaper was least perceived sources of information and ranked 3 for disseminating the information on appropriate number of plowings of rice. Tables 6 and 7 report the results.

Table 6: Analysis of Variance for Rankings of Selected Information Sources on Plowing for Rice

S.V	SS	Df	MS	F	Sig.
Between Group	2095.6	3	698.5	98.2	.0
Within Group	4181.2	588	7.1	-	-
Total	6276.8	591	-	-	-

Table 7: Rankings of Selected Information Sources on Plowing for Rice

Source of Information	Number	G1	G2	G3
Agricultural	148	6.82	-	-
Extension	148	7.18	-	-
Radio	148	-	3.68	-
TV	148	-	-	2.89
Newspaper	148	-	-	2.89
Significance level		0.25	0.0	0.0

Note:- A 1 to 10 Likert-type scale was used, where 1 for unsatisfactory, 5 for average, and 10 for excellent.

To Determine the Ranking for the Perceived Selected Sources of Information (Agriculture Extension Agent, Radio, TV, and Newspaper) in Adoption of Seed Rate Table 5 and 6 indicate that the Agricultural Extension Agents were perceived average and ranked 1 and next perceived source of information was radio and ranked 2. TV was ranked 3. Newspaper was least perceived source of information and ranked 4 for disseminating the information on appropriate seed rate of rice.

Table 8: Analysis of Variance for Rankings of Selected Sources of Information on the Appropriate Seed Rate for Rice.

S.V	S. S	Df	M. S	F	Sig.
Between Group	595.6	3	198.5	50.1	0.00
Within Group	2330.6	588	4.0	-	-
Total	2926.3	591	-	-	-

Table 9: Rankings of Selected Sources of Information on the Appropriate Seed Rate for Rice

Source of Information	Number	G1	G2	G3	G4
Agricultural	148	5.27	-	-	-
Extension	148	-	4.78	-	-
Radio	148	-	-	3.35	-
TV	148	-	-	-	2.82
Newspaper	148	-	-	-	2.82
Significance level		0.00	.00	.00	0.00

Note:- A 1 to 10 Likert-type scale was used, where 1 for unsatisfactory, 5 for average, and 10 for excellent.

To Determine the Ranking for the Perceived Selected Sources of Information (Agriculture Extension Agent, Radio, TV, and Newspaper) in Adoption of Appropriate Fertilizer Dose

The Agricultural Extension Agents and radio were

perceived average and ranked 1. Following this, TV was ranked 2, while Newspaper was least perceived sources of information and ranked under 3 for disseminating the information on appropriate fertilizer dose of rice. Tables 10 and 11 presented the results.

Table 10: Analysis of Variance for Rankings of Selected Sources of Information on the Appropriate Fertilizer Dose of Rice

S.V	S. S	Df	M. S	F	Sig.
Between Group	941.3	3	313.8	63.9	0.00
Within Group	2887.9	588	5.0	-	-
Total	3829.2	591	-	-	-

Table 11: Rankings of Selected Sources of Information on the Appropriate Fertilizer Dose for Rice

Source of Information	Number	G1	G2	G3
Agricultural	148	5.51	-	-
Extension	148	5.55	-	-
Radio	148	-	3.37	-
TV	148	-	-	2.27
Newspaper	148	-	-	2.27
Significance level		0.87	0.00	0.00

Note:- A 1 to 10 Likert-type scale was used, where 1 for unsatisfactory, 5 for average, and 10 for excellent.

To Determine the Ranking for the Perceived Selected Sources of Information (Agriculture Extension Agent, Radio, TV, and Newspaper) in Adoption of Irrigation Rate The Agricultural Extension Agents was perceived average and ranked 1. Next perceived source of information was radio ranked 2. Newspaper and TV were least perceived ranked 3 for disseminating the information on Irrigation Rate of rice. Results are given in Tables 12 and 13.

Table 12: Analysis of Variance for Rankings of Selected Sources of Information on the Appropriate Irrigation Rate for Rice

S.V	S. S	Df	M. S	F	Sig.
Between Group	483.0	3	161.0	48.0	0.00
Within Group	1976.4	588	3.4	-	-
Total	2459.4	591	-	-	-

Table 13: Rankings of Selected Sources of Information on the Appropriate Irrigation Rate for Rice

Source of Information	Number	G1	G2	G3
Agricultural	148	4.87	-	-
Extension	148	-	4.18	-
Radio	148	-	-	2.70
TV	148	-	-	2.89
Newspaper	148	-	-	2.89
Significance level		0.0	0.0	0.375

Opinion Survey: Frequency distribution and corresponding percentages were calculated for farmers responses for selected questions of opinion survey. Farmers responses for each question were reported. Regarding the most useful of selected sources of information in the field of agriculture, majority (61.5%) of the farmers perceived Radio as the best source of information (Table-14). Regarding the agricultural education programs, majority (62.2%) of the farmers responded that Aconferences for farmers are the most beneficial programs for the farmers (Table-15). Majority (63.5%) of the farmers perceived that Agricultural

Extension Agents should visit their agricultural farms on a regular basis (Table-16).

Table 14: Most Useful of Selected Sources of Information in the Field of Agriculture as Perceived by Farmers

Sources	Frequency	Percent
Agricultural Extension worker	42	28.4
Radio	91	61.5
TV	7	4.7
Newspaper	5	3.4
Pamphlet	3	2.0

Table 15: The Most Beneficial Educational Programs for the Farmers as Perceived by Farmers

Programs	Frequency	Percent
Conferences for Farmers	92	62.2
Short Courses	26	17.6
Adult Evening of Day Classes	24	16.2
No Response	6	04.0

Table 16: Selected Services Agricultural Extension Agents Should Perform as Perceived by Farmers

Services	Frequency	Percent
Regular Agriculture Farm Visit	94	63.5
Home Visit	6	4.1
Information about New Technology	8	5.4
Group Discussion	3	2.0
No Response	37	25.0

Regarding government plans for the farmers benefits, 27.7% of the farmers responded that government should plan and organized Agricultural educational programs for their welfare (Table-17).

Table 17: The Most Beneficial Government Plans as Perceived by Farmers

Plans	Frequency	Percent
Certified Seed	17	11.5
Agriculture Educational Programs	41	27.7
Loan Facilities	33	22.3
Shortage of Irrigation Water and Fertilizer	3	2.0
Restore the Drainage System	11	7.4
Research on Rice	11	7.4
Women's Health Program	04	2.7
No Response	28	18.9

Conclusions

Based on the aforesaid results, it was concluded that more than 70% (Moderate) rice growing farmers are using recommended practices for rice crop. However, there still is a need to use the recommended technology for rice crop in order to get maximum output from the available resources. Farmers are in need of a little more help from government agencies involved in dissemination of innovation as the farmers showed their interest in the conferences for farmers which help them to understand the changes occurring in the field of agriculture. If Extension Services have to maximize their efficiency, they must employ Radio and Extension worker more effectively as these sources were found satisfactory source of information as perceived by rice growers. Khooharo, *et al.*, (1999) also found these sources as effective mean for dissemination of innovation used by the Extension Service in Sindh.

Educational importance: Agriculture remains backbone of Pakistans economy. Agriculture is a source of income and majority of the people depends upon the growth in agriculture sector. Potential to increase crop production does exist in Pakistan if the developed technologies be adopted and used properly. Technology

has increased crop production of many crops such as wheat, sugarcane, and rice. However, there exist a need for dissemination of appropriate technology from research stations to farmers through extension service. As such, this study was primarily designed to provide baseline data to the extension agents involved in dissemination of recommended practices for rice crop. This study will help extension agents in improving contact system with farmers through the use of different sources of information such as Radio, TV, and personal contacts as these sources were found to have significant impact on farmers adoption of new technologies.

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