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Research Article

Knowledge level and production constraints of rice in Eastern Uttar Pradesh

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SUMMARY : With the objective to find out the level of knowledge and constraints of rice farming, a study had been conducted. A sample of 80 respondents (40 resource rich and 40 resource poor) was selected from two blocks under four villages. The knowledge index was derived from obtained scores of individual respondent and primary data were used by open ended response for identification of production constraints. On the basis of ranking of knowledge, it was observed that respondents have poor knowledge about plant protection measures in rice farming. Overall, it was observed that majority of respondents (76.25 %) had low to medium level of knowledge about rice production. The prevalence of insects and diseases, scarcity of labour and lack of technical knowledge were mainly observed as the major constraints in the rice production technology. The practise wise knowledge of the respondents clearly state, if the farmers update their knowledge level, there must be a scope of enhancing the productivity. In addition, organizing demonstrations and trainings to promote the location specific crop production and protection technologies for farmers and farm women may improve the crop production and protection technology. Strategic steps should also be taken in to prime consideration to overcome the production constraints and make rice farming more profitable and sustainable.

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BACKGROUND AND OBJECTIVES

Rice and wheat are the important food crops in India in terms of area, production and consumer's preference. These two crops, together account for over 58 per cent of the area and over 77 per cent of the production of food grains in the country (Ministry of Agriculture, Govt. of India, 2010). The combined share of these two commodities reported over 90 per cent of total quantity consumption of cereals in rural India. India is the second largest producer and consumer of rice in the world. India achieved more than 100 m tonnes rice production in 2011-12 accounting for 22.81 per cent of global production. Productivity of rice has also increased from 1984 kg/ha in 2004-05 to 2372 kg/ha in 2011-12. The highest area (5.95 m ha) and production (13.53 m tonnes) come under Uttar Pradesh however, in terms of productivity West Bengal recorded the highest 2719 kg/ha followed by Uttar Pradesh (2358 kg/ha) (Ministry of Agriculture, Govt. of India, 2012). To bridge this gap, it is essential to know the elements to boost the rice productivity further.

It is interestingly to note that yields from rice-wheat cropping systems in Indo-gangetic plains are declining despite the increased use of chemical fertilizers (Sidhu *et al.*, 1998). The poor average yield may be due to the problems relate to technological appropriateness, input delivery system, soil health, intensity of biotic and abiotic stresses etc. With the advent of new technologies, it is essential to disseminate the knowledge about those practices to the end users. Knowledge has been found to be an important factor in relation to the adoption of innovations by farmers (Sobhana, 1991 and Shivrain and

Dalal, 1999). In addition, constraints in rice production may vary from state to state and area to area.

Therefore, the present investigation was undertaken with the objectives to assess the knowledge level and constraints faced by the farmers for understanding the real situations in rice production.

RESOURCES AND METHODS

Location of the study:

Krishi Vigyan Kendra, also known as Farm Science Centre situated at Sant Ravidas Nagar (Eastern Uttar Pradesh) has recently established. Eastern Uttar Pradesh classified into three agro ecological zones, namely Eastern Plain Zone, North-Eastern Plain Zone, and Vindhya Zone, and occupies one-third of the net sown area of Uttar Pradesh. To evaluate the level of knowledge the adjoining area of the KVK was selected for the study because of the dominance of rice-wheat cropping system and its convenient accessibility to the villages. Two blocks (Aurai and Bhadohi) were purposely selected and two villages from each block were selected randomly.

Selection of respondents:

A sample of 80 respondents was selected from two blocks under four villages *viz.*, Uchitpur and Bharatpur from Aurai; Dattipur and Khetalpur from Bhadohi block. From each village 10 resource rich and 10 resource poor farmers were selected for interviewing and obtaining necessary information. The data were obtained personally with the help of pre-tested interview schedule.

Variables and their measurements:

The knowledge for the purpose of the study was operationalized as the amount of understood information possessed by the farmers on rice production technology. This was measured with the help of knowledge test index. There were 20 basic questions, pertaining to principle of rice farming, prepared and asked to know the status of farmer knowledge. The score of ONE was assigned to correct reply and ZERO to incorrect reply or parts thereof. The respondents wise score obtained were summed up and mean $\pm$ standard deviation procedure of categorization was followed for computing the level of knowledge as low, medium and high.

The knowledge index was developed by following formula considering different items on 20 major practices under rice production.

$$\text{Knowledge index} = \frac{\text{Obtained knowlege score}}{\text{Actual total score}} \text{x100}$$

For identification of production constraints, primary data were used by open ended response. The major constraints were also measured in terms of frequencies, percentage and ranking for analysis and drawing inferences.

OBSERVATIONS AND ANALYSIS

The findings have been presented and inferences drawn in respect to specific objectives of the study on the basis of analysis by using relevant statistical methods.

Socio-economic study:

Socio-economic profile of the respondents has been depicted in Table 1. It reveals that most of the respondents belonged to middle (67.5 % resource rich and 65 % resource poor) and old age (20 % resource rich and 22.5 % resource poor) category. Overall 82.5 per cent respondents were literate and commonly educated up to middle school and higher secondary. Family size of the major respondents of resource rich came under medium (62.5 %) and small (32.5 %) category, however, major respondents of resource poor belonged to medium (75 %) and large (15 %) category. But overall respondents belonged to medium (6-10 members) and small (< 5 members) family size. Among resource rich respondents, 52.5 per cent held marginal farm size (< 1 ha) however, 32.5 per cent and 15 per cent held small (1-2 ha) and medium (2-4 ha) farm size, respectively. But 100 per cent respondents of resource poor belonged to marginal category.

Considering farming experience, both major group of resource rich (62.5 %) and resource poor (51 %) respondents belonged to medium (11-24 years) category followed by high (> 24 years) and low (< 10 years) categories. 75 per cent respondents of resource rich group belonged to farming as an occupation, however, 62.5 per cent respondents of resource poor adopted farming as an occupation. Farm annual income of resource rich respondents came under medium (Rs. 15000-30000) (25 %) and high (> Rs.30000) (75 %) category but 100 per cent respondents of resource poor came under low income (< Rs. 15000) group.

The contact of the respondents to extension agency as each information source is concerned, each score was measured on 7 point continuum (never, yearly, half yearly, monthly, fortnightly, weekly and daily) as 0, 1, 2, 3, 4, 5 and 6 score values were assigned to each level, respectively. According to total score value, the respondents were categorized in to three groups by the following formula (1) Mean – S.D.(2) Mean $\pm$ S.D. and (3) Mean + S.D. as low, medium and high, respectively. On that basis, over all respondents were categorized under low (62.5 %) followed by medium (27.5 %) and high (10 %) extension agency contacts.

The data derived from socio-economic status, it is clear that though the study group had farming as an occupation and

better farming experience but due to moderate education and minimum extension agency contacts, the knowledge about farming was adversely affected.

Extent of knowledge:

Important agronomic practices under nursery management and field and crop management were framed to analyze the extent of knowledge of rice growers and ranked the existing knowledge to know the scope of further improvement in farming (Fig 1). Table 2 reveals that respondents had overall maximum knowledge (81.25 %) about sowing time followed by variety (47.5 %), seed rate (43.75 %), however, poor knowledge about seed treatment (3.75 %), plant protection measures (2.5 %) and application

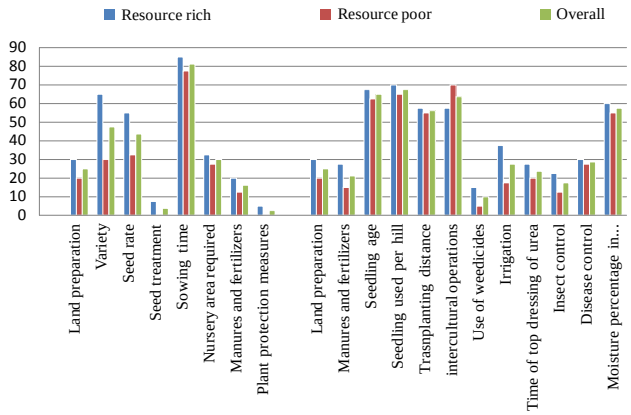

Fig. 1: Extent of knowledge of rice growers

Table 1: Distribution of respondents according to their socio-economic profile **(n=80)**

Sr. No.	Variables	Categories	Resource rich		Resource poor		Overall	
			F	P	F	P	F	P
1.	Age	Young (<35 years)	5	12.50	5	12.50	10	12.50
		Middle (35-50 years)	27	67.50	26	65.00	53	66.25
		Old (>50 years)	8	20.00	9	22.50	17	21.25
2.	Education	Illiterate	7	17.50	7	17.50	14	17.50
		Primary School	3	7.50	3	7.50	6	7.50
		Middle School	10	25.00	10	25.00	20	25.00
		Up to Higher Secondary	13	32.50	12	30.00	25	31.25
		Graduate and above	7	17.50	8	20.00	15	18.75
3.	Family size	Small (< 5 members)	13	32.50	4	10.00	17	21.25
		Medium (6-10 members)	25	62.50	30	75.00	55	68.75
		Large (> 10 members)	2	5.00	6	15.00	8	10.00
4.	Farm size	Marginal (< 1.0 ha)	21	52.50	40	100.00	61	76.25
		Small (1-2 ha)	13	32.50	0	0.00	13	16.25
		Medium (2-4 ha)	6	15.00	0	0.00	6	7.50
		Large (> 4 ha)	0	0.00	0	0.00	0	0.00
5.	Farming	Low (up to 10 years)	5	12.50	6	15.00	11	13.75
	experience	Medium (11-24 years)	25	62.50	26	65.00	51	63.75
		High (above 24 years)	10	25.00	8	20.00	18	22.50
6.	Occupation	Labour	0	0.00	5	12.50	5	6.25
		Farming	30	75.00	25	62.50	55	68.75
		Other sources	10	25.00	10	25.00	20	25.00
7.	Farm annual	Low (< Rs. 15000)	0	0.00	40	100.00	40	50.00
	income	Medium (Rs. 15000-30000)	10	25.00	0	0.00	10	12.50
		High (> Rs. 30000)	30	75.00	0	0.00	30	37.50
8.	Extension agency	Low (up to 65score value)	20	50.00	30	75.00	50	62.50
	contact	Medium (66-85 score value)	12	30.00	10	25.00	22	27.50
		High (> 86 score value)	8	20.00	0	0.00	8	10.00

(F = Frequency, P = Percentage)

Table 2: Extent of knowledge of the rice growers (n=80)

Sr. No.	Production practices	Extent of knowledge (per cent)			Ranking
		RR	RP	Overall	
(A)	Nursery management				
1.	Land preparation	30.0	20.0	25.00	12
2.	Variety	65.0	30.0	47.50	7
3.	Seed rate	55.0	32.5	43.75	8
4.	Seed treatment	7.5	0.0	3.75	18
5.	Sowing time	85.0	77.5	81.25	1
6.	Nursery area required	32.5	27.5	30.00	9
7.	Manures and fertilizer	20.0	12.5	16.25	16
8.	Plant protection measures	5.0	0.0	2.50	19
(B)	**Field and crop management**				
9.	Land preparation	30.0	20.0	25.00	12
10.	Manures and fertilizers	27.5	15.0	21.25	14
11.	Seedling age	67.5	62.5	65.00	3
12.	Seedling used per hill	70.0	65.0	67.50	2
13.	Transplanting distance	57.5	55.0	56.25	6
14.	Intercultural operations	57.5	70.0	63.75	4
15.	Use of herbicides	15.0	5.0	10.00	17
16.	Irrigation	37.5	17.5	27.50	11
17.	Time of top dressing of urea	27.5	20.0	23.75	13
18.	Insect control	22.5	12.5	17.50	15
19.	Disease control	30.0	27.5	28.75	10
20.	Moisture percentage in grain during harvesting and storage	60.0	55.0	57.50	5

RR- Resource rich, RP- Resource poor

of manures and fertilizers (16.25 %) under nursery management.

Similarly under field and crop management, the respondents attained maximum knowledge about seedling used per hill during transplanting (67.5 %), the age of seedling (65 %), intercultural operations (63.75 %), moisture percentage in grain during storage (57.5 %), transplanting distance (56.25 %), however, poor knowledge showed in use of herbicides (10 %), insect control (17.5 %), time of application of fertilizers (23.75 %) and disease control (28.75 %) practices. On the basis of ranking of knowledge, Table 2 also revealed poor knowledge about plant protection measures in rice farming.

Individual practice-wise knowledge of the farmers was observed. The resource rich farmers were categorized as low (15 %), medium (62.5 %) and high (22.5 %) (Table 3). Similarly, Table 4 reveals that resource poor respondents fell under category low (45 %), medium (30 %) and high (25 %). Overall, it was observed that majority of farmers (76.25 %) had low to medium level of knowledge about rice production. However, remaining 23.75 per cent were found to have high knowledge level (Table 5).

Table 3: Distribution of resource rich respondents (n=40)

Categories (Scores)	Respondents	
	Frequency	Percentage
Low (up to 1.44)	6	15.0
Medium (1.44 to 14.61)	25	62.5
High (above 14.61)	9	22.5

Mean = 8.03; Standard deviation = 6.58

Table 4: Distribution of resource poor respondents (n=40)

Categories (Scores)	Respondents	
	Frequency	Percentage
Low (up to 1.51)	18	45.0
Medium (1.51 to 10.99)	12	30.0
High (above 10.99)	10	25.0

Mean = 6.25; Standard deviation = 4.74

Table 5: Distribution of overall respondents (n=80)

Categories (Scores)	Respondents	
	Frequency	Percentage
Low (up to 3.04)	24	30.0
Medium (3.04 to 25.51)	37	46.25
High (above 25.51)	19	23.75

Mean = 14.28; Standard deviation = 11.23

Knowledge has been found to be an important factor contributing to the adoption of innovations by farmers. Several studies have reiterated this point (Shivrain and Dalal, 1999); Sobhana,1991; Vaish *et al.*,2003) they revealed that the maximum percentage (61%) of the respondents were observed having medium level of knowledge followed by 28 per cent and 11 per cent attained low and high extent of knowledge, respectively. The practise wise knowledge of the respondents clearly state if the farmers update their knowledge level, there must be a scope of enhancing the productivity.

Constraints faced by respondents:

The major constraints faced by rice growers are depicted in Fig. 2. There were a number of constraints like irregular supply of electricity, inadequate irrigation facilities, indiscriminate use of chemical fertilizers, scarcity of labour, heavy incidence of weeds, prevalence of khaira, sheath blight, infestation of rice root weevil under low lying areas, lack of better market return, lack of plant protection equipments, lack of quality inputs and lack of technical knowledge. Among various observed constraints, the prevalence of insect (68.75 %) and diseases (78.75 %), scarcity of labour (71.25 %), lack of technical knowledge (70 %) were observed as the major constraints in the rice production technology. Almost similar finding was obtained by Deshmukh (1981) and Desai *et al.* (1997). Fertilizer problems, plant protection constraints, weed problems, lack of labours and poor processing were found to be the constraints as perceived by farmers in rice production technology (Thanh and Singh, 2006). The problems related to rice farming may be rectified through better policy initiatives, better market facilities and development of technological skills among farming community.

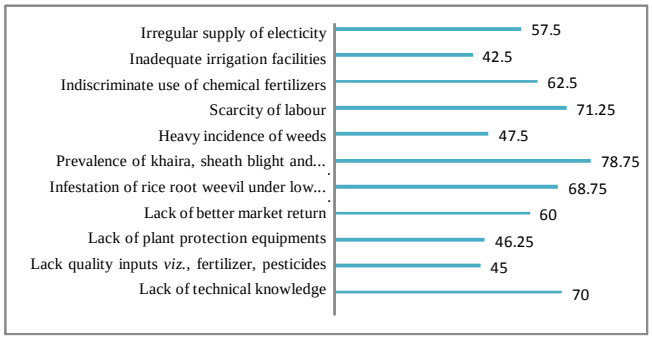

Fig. 2: Major constraints faced by rice growers

Conclusion:

The findings of the study revealed that there is a need to step up the extension efforts to motivate the farmers to adopt all the recommended improved package of practices. Low potential and pest susceptible old varieties may be replaced by new high yielding varieties with promising yield potential. Organizing demonstrations and trainings to promote the location specific crop production and protection technologies for farmers and farm women may improve the crop production and protection technology. To maintain the soil fertility, balance application of plant nutrients may be highly required through use of zinc, sulphur, neem coated urea, use of biofertilizers along with popularization of IPM system, etc. More emphasis should be given to adopt the non monetary inputs *i.e.*, seed treatment, timely sowing, maintain optimum plant population, timely irrigation, efficient use of fertilizers, need based plant protection measures and timely harvesting and proper storage. The strategic steps may also be taken to overcome the constraints faced by the farmers so that the level of production and productivity may be improved.

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