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Disease problem identification in rice and priority setting in agricultural research

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ABSTRACT
The disease of rice was studied based on their priority according to the farmers of block Akaltara of district Janjgir -Champa of Chhattisgarh. 12 randomly selected villages were visited to determine most serious disease of rice based on qualitative data collected on farm level and analyzed as result Bacterial Leaf Blight, Brown Spot, Tungro and Khaira disease is found to be most serious disease of rice while Blast, Sheath Blight, Sheath Rot, and Stem Rot some what important disease of Rice while False Smut is the disease of minor importance.

Introduction

Rice production in India is an important part of the national economy India is the world's second largest producer of white rice, accounting for 80% of all world rice production. Rice is India's preeminent crop, and is the staple food of the people of the eastern and southern parts of the country. Production increased from 53.6 million tons in FY 1980 to 74.6 million tons in FY 1990, a 39 percent increase over the decade. By FY 1992, rice production had reached 111 million tons, second in the world only to China with its 182 million tons. Since 1950 the increase has been more than 350 percent. Most of this increase was the result of an increase in yields; the number of hectares increased only 40 percent during this period. Yields increased from 1,336 kilograms per hectare in FY 1980 to 1,751 kilograms per hectare in FY 1990. The per-hectare yield increased more than 262 percent between 1950 and 1992.

Methodology

The study focused on farm-level data collection and analysis including objective, qualitative data on the rice diseases. In consideration of the characteristics of the target area, both quantitative and qualitative open-ended questions were used to gather such data from the farmers. There is a block in the study area, in which 52 villages, and 5200 households. A total of 12 randomly selected villages were visited to determine whether or not the population was homogenous. The study area and its population appear to be largely homogenous in terms of climate, soil type, crop pattern, cultivation practices, family composition, institutional support, family size, land tenure, capital assets and existing technology. The total sample size was 200 farmers. The sample size was kept high so that variations between households could be recorded. The diagnostic data were used to describe the circumstances and practices of representative farmers to identify problems limiting the productivity of rice due to disease, understand the causes of these problems, and to consider possible solutions. The methodology used to prioritize the problems was adapted from Tripp and Woolley. The method is based on a series of steps, corresponding to the distinctions between problems, causes, and solutions. Step 1 is for identification of the number of disease in rice.

In Step 2, a rough order of priority is assigned to each problem according to the number of farmers affected, the importance of the crops, and the seriousness of the problem. Step 3 involves identifying the causes of the problems.

Therefore, possible solutions will be sought to each problem for which there is sufficient evidence in step 4.

The possible solutions given in step 4 are evaluated according to the following criteria:

1. Probability that the technology will function, 2. Profitability, 3. Compatibility with the farming system, 4. Contribution to reducing risk, 5. Need for institutional support, 6. Ease of testing by farmers, and 7.

Ease of carrying out the experimental program. And finally, the list of possible solutions is narrowed by evaluating each one for potential benefit, ease of adoptionby farmers, and ease of investigation in step 5.

Result and discussion

Analysis of data collected form the farmers resulting in table 1 shows that diseases like Blast, Bacterial Leaf Blight, Brown Spot, False Smut is common occurrence in that region of Chhattisgarh based on evidence of farmer interview, experimental results and no additional evidence is required while the disease like Sheath Blight, Stem Rot, Sheath Rot, Khaira and Tungro disease rarely occur in that region based on evidence of farmer interviews this disease were identified while keen observation is required for more evidence.

The diseases like Sheath Blight, Stem Rot, Sheath Rot, Khaira and Tungro occurs in half of the farmers fields. Based on data collected most serious and relative importance. Specific regional development policies are required to remove the existing inequities in opportunities for advancement and the standard of the living of rural communities

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Table -2 shows that distribution of disease among farmers field disease like Bacterial Leaf Blight, Brown Spot and Blast occurs in most of the farmers fields. of disease were identified in table -2 disease like Bacterial Leaf Blight, Brown Spot, Khaira and Tungro is very serious disease of rice and their relative importance is 1 while diseases Blast, Sheath Blight, Stem Rot, Sheath Rot, and False Smut is less serious than other disease and their relative importance is 2 except for False Smut of Rice is 3.

In table -3 causes of disease according to analysis were identified diseases like Blast, Bacterial Leaf Blight and Brown Spot is caused by fungus, colleteral host (wild grasses) and unbalanced use of fertilizers specially nitrogenous fertilizers like urea etc. and the diseases like Sheath Blight, Stem Rot, Sheath Rot and False Smut caused by fungus, plant debris of previous crops of rice, some what unbalanced uses of fertilizer. But for disease like Khaira is caused by deficiency of zinc in plant. Tungro disease is caused by virus and vectors like Green leaf hoppers.

Based on analysis of data collected from farmers various possible solution suggested shown in table 4 for Blast, Bacterial Leaf Blight, and Brown Spot destruction of colleteral host (wild grasses), balance use of fertilizer, growing of resistant varieties is common for most of the farmers while spray of Kitazin 48% EC, copperoxycloride 0.25% and Dithane Z-78 0.25% respectively. For Sheath Blight, Stem Rot, Sheath Rot and False Smut, clean cultivation, balanced fertilizer application is common for most of the farmers while spray of Dithane Z-78 0.25%, for Sheath Blight, Stem Rot, and for Sheath Rot spray of Henason 0.01%, and spray of copperoxycloride 0.25% for False Smut. Diseases like Khaira spray of Zinc Sulphate and Tungro disease spray of Metasystox 0.25%.

In table-5 all the possible solution analyzed for profitability that technology would function, profitability, compatibility with system, contributing to reducing risk, ease of testing farmers and ease of carrying out experiment. The results are shown in magnitude of high, medium and low in table -5.

Conclusion

Much of the difficulty in adopting newly developed technologies and manage the disease of rice from the fact that researchers and extension agents have not worked together to ensure that researchers ask appropriate questions and extension agents are not provided with relevant research results. Increasing the average grain yields of the Rice crops grown in this region of Chhattisgarh seems very possible by increasing the adoption rate of recommended management practices among farmers.

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Table -1

S.No	Disease problems	Evidence available	Additional avidence requried
1	Blast	Experimental results farmers interview	No more evidence required
2	Bacterial leaf blight	Experimental results farmers interview	No more evidence required
3	Brown spot	Experimental results farmers interview	No more evidence required
4	Sheath blight	Farmers interview	More observation required
5	Sheath rot	Farmers interview	More observation required
6	Stem rot	Farmers interview	More observation required
7	Khaira	Farmers interview	More observation required
8	Tungro disease	Farmers interview	More observation required
9	False smut	Experimental results farmers interview	No more evidence required

Table -2

S.No	Disease problems	Distribution of problems	Seriousness of problems	Relative importance of problems
1	blast	Most of the farmers	(x)	2
2	bacterial leaf blight	Most of the farmers	(xx)	1
3	brown spot	Most of the farmers	(xx)	1
4	sheath blight	Half of the farmers	(x)	2
5	sheath rot	Half of the farmers	(x)	2
6	stem rot	Half of the farmers	(x)	2
7	khaira	Half of the farmers	(xx)	1
8	tungro disease	Half of the farmers	(xx)	1
9	false smut	Half of the farmers	(x)	3

xx: very important, x: somewhat important

Table-3

S.No	Disease problems	Causes
1	Blast	Fungus, colletral host unblanced use fertiliser
2	Bacterial leaf blight	Bacterial, colletral host unblanced use fertiliser
3	Brown spot	Fungus, colletral host unblanced use fertiliser
4	Sheath blight	Fungus, plant deberis in soil,
5	Sheath rot	Fungus, plant deberis in soil,
6	Stem rot	Fungus, plant deberis in soil, unblanced use fertiliser
7	Khaira	Zinc deficiency
8	Tungro disease	Viral, vector green leaf hopper
9	False smut	Fungus, plant deberis in soil,

Table-4

S.No	Disease problems	Possible solutions
1	Blast	a) Destruction of Colleteral Host b) Balance use of fertilizers c) Growing of resistant varieties d) Spray of Kitazin 48% EC
2	Bacterial Leaf Blight	a) Destruction of Colleteral Host b) Balance use of fertilizers c) Growing of resistant varieties d) Spray of Copper-oxycloride 0.25%
3	Brown Spot	a) Destruction of Colleteral Host b) Balance use of fertilizers c) Growing of resistant varieties d) Spray of Dithane Z 78 0.25%
4	Sheath Blight	a) Clean cultivation b) Balance use of fertilizers c) Spray of Dithane Z 78 0.25%
5	Sheath Rot	a) Clean cultivation b) Balance use of fertilizers **c)** Spray of Henason 0.01%
6	Stem Rot	a) Clean cultivation b) Balance use of fertilizers **c)** Spray of Dithane Z 78 0.25%
7	Khaira	a) Spray Of Zinc Sulphate
8	Tungro disease	a) Spray Of Metasystox 0.25%
9	False smut	a) Destruction of Colleteral Host Spray of Copper-oxycloride 0.25%

Table-5

possible solution	profitibility that technology would function	profitibility	compatibility with system	contibuting to reducing risk	ease of testing farmers	ease of carrying out experiments
1(a).	H	H	H	M	H	H
(b).	H	H	H	M	H	H
(c).	H	H	H	M	H	H
(d).	H	H	M	M	H	H
2(a).	H	H	H	M	H	H
(b).	H	H	H	M	H	H
(c).	H	H	H	M	H	H
(d).	H	H	M	M	H	H
3(a).	H	H	H	M	H	H
(b).	H	H	H	M	H	H
(c).	H	H	H	M	H	H
(d).	H	H	M	M	H	H
4(a).	H	H	H	M	H	H
(b).	H	H	H	M	H	H
(c).	H	H	M	M	H	H
5(a).	H	H	H	M	H	H
(b).	H	H	H	M	H	H
(c).	H	H	M	M	H	H
6(a).	H	H	H	M	H	H
(b).	H	H	H	M	H	H
(c).	H	H	M	M	H	H
7(a).	H	H	M	M	H	H
8(a).	H	H	M	M	H	H
6(a).	H	H	H	M	H	H
(b).	H	H	M	M	H	H

H: High, M: Medium, L: Low;