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A SURVEY REPORT: FARMER AWARENESS TOWARDS RICE FISH FARMING SYSTEM IN THE INDIAN VILLAGE

Abhinav Kisore [1], A. Pathak [1], S. K. Pathak [2] and Sunil Kumar[3]

[1]High School Student, [2]Science Teacher, [3]Assistant Professor (BAU Sabour, Bhagalpur)

[1,2] Mount Assisi School Senior Section, Bhagalpur, Bihar, India

Abstract

The survey was conducted (2018-2019) to identify the consequences and awareness among the farmer for using non-conventional approach towards Rice -Fish farming system so as to naturally balance our ecosystem in order to get varied benefits.

Rice growing village area Goradih block, Bhagalpur district (Bihar, India) was selected for survey. During the survey (2018-2019) it was observed that whenever water is stagnated within bunds as for rice growing, fish which naturally occur in the irrigation water and water tanks enters the paddy fields and grow there until harvest along with Paddy. But this happens naturally and none of the farmers in this region were aware of this nor do they take interest in harvesting fish as crop. Survey data conclude that the farmers mostly adapt rice as monoculture (93.3%) and use of nonconventional methods along with some chemical pesticide (53.3%) due to which causes ill effect on fingerlings. Rice monoculture cannot alone provide a sustainable food supply while rice fish farming is the best in terms of resources utilisation, productivity and food supply. However number of significant challenges exist for the adaptation of rice fish farming particularly the lack of technical knowledge of farmers. Thus it is necessary to provide technical support and training facilities for sustainable rice farming.

So attempts was been made to explore the potentiality of organic rice fish farming from seasonally water logged areas for overall improvement of water and to draw attention for strong Government support to it in the form of subsidies and research. By this means of farming no pesticides, fungicides or any sort of chemicals are used. Rice Fish farming is a duo culture farming system in which rice is sole enterprise and fishes are taken to initiate an additional extra income in form of animal protein.

Key words: Rice, fish, conventional and nonconventional method of farming

INTRODUCTION

Rice fish duo culture farming system is a popular practice in many countries of the world, particularly Asia (Pullin 1989; Halwart M. 2003). The potential of rice fish farming in fighting the poverty and malnutrition has been globally recognized (Ruddle K.1982; Das and Saikia 2007). As rice and fish are the staple foods of India which is an agro based developed country. The future development of the country is very much related to the agricultural sector. Fisheries as in the major sub sectors has been playing a significant vital role in terms of nutrition, employment, foreign exchange earnings, good supply and more importantly socio economic stability in the rural areas. India is the land of water with several rivers and the country is very rich in natural water resources in the form of rivers, reservoirs, ditches, lakes, ponds flood plains and large areas of rice fields etc. The rice fish farming culture involves the simultaneous production of fish in irrigated rice fish fields so as to obtain an added production of fish with rice. Production of fish in the rice field is almost as primitive as the practice of rice culture itself. Rearing of fish along with rice is an older farming practice adopted in India. It has largely been practiced in a nonconventional primitive way in the coastal area of the country. Thus fish grown in the rice fields will be ideal use of land and would also be an easy source of cheap and fresh animal proteins. Rice is grown in 37 districts of Bihar in which Bhagalpur comes under low productivity group despite of cultivated land area. Thus fish culture can greatly contribute to the social economic welfare of rural populations. An added advantage also is that unlike sea fish or other animal proteins, the fish cause no transport problem as it can be sold in the local market and would be most fresh and healthy.

Traditionally wild fish have been harvested from the rice field as many fish species prefer rice fields for reproduction. The natural aggregation of fish in the rice field inspired the combination of rice fish farming to increase productivity. Many reports suggest that integrated rice fish farming is ecologically sound because fish improve soil fertility by increasing availability of nitrogen and phosphorus (Giap etal 2005, Dugan etal 2006). The feeding behaviour of fish in rice fields causes aeration of water. Fish play a significant role in controlling aquatic weeds and algae that carry diseases, act as a host for pests and compete with rice nutrients. Moreover fish eat flies, snails and insects and help to control waterborne disease. On the other hand rice fields provide fish with planktonic and benthic food. Shading by rice plants also maintains the water temperature favourable to fish during summer. So the aim of the study was to access the awareness among farmers about rice fish farming using a nonconventional methods.

OBJECTIVES

To study about farmer's awareness towards non-conventional rice fish farming system following objectives were taken during survey:

1. To study the profile characteristic of farmers using nonconventional methods of rice farming.

2. To study the knowledge level of farmers towards different farming practices.

3. To study the knowledge level of farmers towards rice fish farming.

4. To elicit the problem and suggestion in nonconventional farming systems and strategies to promote organic farming.

SURVEY METHODOLOGY

The survey was done through questionnaire in the rice growing areas of Goradih block Bhagalpur (Bihar, India Fig 1). During the survey it was observed that most of the rice fields flooded with water and small fish as fingerlings and prawns snails etc were found in the field where rice seedlings were transplanted.

Fig.1. Team member collecting survey data

2.1 To study the profile characteristic of farmers using nonconventional methods of rice farming. For the survey 30 number of respondents (N=30) were selected.

2.1.1 Age:

The respondents were categorised in three groups as young, middle and old. The maximum and minimum age were 55 and 24 respectively.

2.1.2 Education level of the respondents:

The respondents were classified into 7 categories as follows-

1. Illiterate

2. Can read and write only

3. Primary school level

4. High school level

5. Intermediate level

6. Diploma level

7. Graduation level

2.1.3 Farm size:

The respondents were grouped under four categories namely

1. Marginal (below 1 hectare)

2. Small (1-2 hectares)

3. Medium (2-4 hectare)

4. Large (4 hectares and above)

The grouping was done to have a clear picture about the land holding size of the respondents.

2.1.4 Farming experience:

The respondents had been doing farming for a number of years. The maximum and minimum years of farming were 30 and 6 respectively. The respondents were grouped into three categories on the basis of farming experience as below:

1. Low farming experience (5-10yrs)

2. Medium farming experience (10-15yrs)

3. High farming experience (15-30yrs)

2.2 To study the knowledge level of farmers towards different farming practices:

Respondents were asked the method of farming techniques used during rice cultivation and were categorised under the following heads:

1. Conventional method

2. Nonconventional method

3. Both conventional and nonconventional method

2.3 To study the knowledge level of farmers towards rice fish farming:

The respondents were asked about rice fish farming practices and their interest in the duo farming culture system was categorised as follows:

1. Only rice as monoculture

2. Rice and fish as duo farming culture

3. Rice and fish as alternate farming culture

2.4 To elicit the problem and suggestion in a nonconventional farming system and strategies to promote organic farming:

The respondents were asked to express the problem faced by them in using nonconventional farming. Respondents were also requested to give their suggestions in order to improve their existing knowledge and adaptation of chemical free organic farming in order to promote the natural balance of the ecosystem.

EXPERIMENTAL METHODOLOGY

Soil samples were collected from the two different fields where conventional and non-conventional farming systems were adapted (using the Coning and quartering method, Analytical chemistry 2007) and further soil tests were done with the help of soil chemical testing kit reagents (N, P, K and pH) provided by soil science department, Bihar Agriculture University, Bhagalpur under the supervision of soil scientist Dr. Sunil Kumar (Assistant Professor).

Procedure: Soil samples were mixed in distilled water and left to settle. Then supernatant liquids were taken in four different beakers for both the soil samples. Soil testing reagents for testing NPK and pH, were added to the supernatant liquids and changed colour of the liquid were compared with the colour chart and observations were recorded.

OBSERVATIONS

Survey data is based on total no of respondent ie. N=30

Table1. Age of respondents:

Sl.No.	Category	Class Interval	Frequency N	Percentage %
1.	Young age farmer	24-35 yrs	3	10
2.	Mid age farmer	36-50 yrs	12	40
3.	Old age farmer	51-60 yrs	15	50

Table 2. Education level of respondents:

Sl.No.	Category	Frequency	Percentage %
1.	Illiterate	3	10
2.	Can read and write only	8	26.6
3.	Primary school	10	33.3
4.	High school	4	13.3
5.	Intermediate	3	10
6.	Diploma	1	3.3
7.	Graduation	1	3.3

Table 3. Farm size of respondents:

Sl.No.	Category	Frequency	Percentage %
1.	Marginal farmer	8	26
2.	Small farmer	12	40
3.	Medium farmer	7	23.3
4.	Large farmer	3	10

Table 4. Farming experience of respondents:

Sl.No.	Category	Class interval	Frequency	Percentage %
1.	Low farming experience	5-10 yrs	10	33.3
2.	Medium farming experience	10-15 yrs	16	53.3
3.	High farming experience	15-25 yrs	4	13.3

Table 5. Farming system adapted by respondents:

Sl.No.	Category	Frequency	Percentage %
1.	Conventional farming	9	30
2.	Nonconventional farming	5	16.6
3.	Both	16	53.3

Table 6. Knowledge level of respondents regarding rice fish duo culture:

Sl.No.	Category	Frequency	Percentage %
1.	Rice as monoculture	28	93.3
2.	Rice fish duo culture	1	3.3
3.	Rice and fish as alternate farming	1	3.3

Table 7. Soil sample testing done in laboratory using soil chemical test kit reagent

Experiment	Observation		Inference	
	Conventional Farming	Nonconventional Farming	Conventional Farming	Nonconventional Farming
1. Nitrate	Light pink color	Dark pink color	Deficient	Surplus
2. Phosphate	Light blue color	Dark blue color	Deficient	Surplus
3. Potash	Pale yellow	Orange	Adequate	Sufficient
4. pH	6.3	6.8-7	acidic	Neutral

RESULTS AND DISCUSSION

As per the objective of the study the data obtained through survey/ questionnaire report, the results of the study were presented under the following headings:

3.1 To study the profile characteristic of farmers using nonconventional methods of rice farming

3.1.1 Age:

Regarding the distribution of farmers according to their age, it was observed from **Table 1** that the majority of the rice growing farmers belong to old age (50%) followed by middle age (40%) and the young age (10%) respectively. Hence from the result it could be concluded that the majority of rice growing farmers were of the old age group moreover the young generation did not show more interest in the farming profession because of low profitability and they moved towards the government job sector.

3.1.2 Education:

About education of the respondent it could be observed from **Table 2** that the majority of farmers were educated up to primary school level (33.3%) followed by Read and write (26.6%) only, and high school level (13.3%). Very few farmers were diploma and graduation (3.3%) respectively. Mostly they were educated up to primary level school.

3.1.3 Farm size:

The findings regarding farm size of respondents in **Table 3** revealed that the majority of the farmers had a small farm (40%) followed by marginal (26%), medium (23.3%) and large (10%) respectively.

If the farmers use nonconventional methods of farming practices result can be observed with minimum risk. The finding also reveals that farm size is one of the important factors which influence the adoption behaviour of the farmers.

3.1.4 Farming experience:

The result in **Table 4** indicates that the majority of the farmers have medium farming experience (53.3%) followed by low (33.3%) and high farming experience (13.3%). Most of the farmers have medium farming experience which influences the farming system to accept and evaluate the innovative technologies in the farm.

The profile characteristics of the farmer reveals that old and middle age farmers with primary school level of education, were engaged in farming. So their level of farming experience was medium. The farming experience is definitely an important factor to accept the innovative technologies in the farm.

3.2 The knowledge level of farmers towards farming practices:

The respondents were asked the method adopted in the farming during rice cultivation. The result in **Table 5** reveals that 53.3% farmers were using both conventional and nonconventional methods where as 30% farmers were using only conventional method of farming. Very few farmers ie 16.6% adapt nonconventional method. This shows that farmers are having lack of awareness of the hazardous effect of chemicals. Research and extension workers should contact the farmers and organise special training programs on nonconventional farming practices to encourage all groups of farmers and to participate in seminars, study tours and gain knowledge on organic farming.

3.3 To study the knowledge level of farmers towards rice fish farming:

The result in the **Table 6** reveals that respondents growing rice has less knowledge about rice fish farming, though fish were present in the rice field but due to lack of knowledge of the rice fish farming system, they just ignored the presence of the fish on the farm. The majority of farmers (93.3%) use rice as a mono culture farming system followed by rice fish as duo farming or alternate rice and fish farming system (3.3%) respectively.

The farmers had enough knowledge regarding nonconventional methods ie. Organic farming but it seems they have limited knowledge of bio pesticide. Some respondents don't know the method of application of bio pesticide or use of neem cake, vermi compost as less number of training facilities given by Government so as to make aware of nonconventional farming system and interest in producing rice fish together. This type of farming system declines in recent years because of the use of toxic pesticides that kill the fish in the rice field.

3.4 To elicit the problem and suggestion in nonconventional farming systems and strategies to promote organic farming:

It was observed that 93.3% of responded prefer rice monoculture along with 3.3% both conventional and nonconventional methods of farming. So we have to motivate farmers towards nonconventional farming practices which is a sustainable farming system without adversely affecting soil health and the environment. This duo farming system allows the production of fish from the same rice field area without causing reduction in the rice yield. This source of animal protein may be important for household nutrition and farm income.

Soil testing shows (**Table 7, Fig 2**) that conventional farming system, soil pH was 6.3 (acidic) with reduced amount of major nutrients (NPK) which may be due to nutrients leaching and runoff which are serious contributors of groundwater pollution or formation of volatile gas.

In non-conventional farming where soil is managed organically having sufficient amount of available major nutrients (NPK with ideal pH).The soil is rich in organic matter, high water holding capacity, higher microbial biomass which decomposes organic matter and leads to a higher nutritional level through long term biomass. At the ideal pH (6.7 to 7) essential nutrients are more available to

the plants as compared to acidic or basic soil. Thus organic farming or non-conventional farming systems help to maintain the soil fertility without degrading soil texture and ecosystem.

Fig2. Soil testing done in the supervision of Dr Sunil Kumar (Asst. Professor, B.A.U., Sabour Bhagalpur)

CONCLUSION

In order to meet the soaring demand for natural balance of ecosystem and ecosystem services, there is a need to adapt to a nonconventional farming system. Our survey data and result analysis conclude that the farmers mostly adapt rice as a mono culture and use a nonconventional method along with chemical pesticide due to which causes ill effect on fingerlings. Rice monoculture cannot alone provide a sustainable food supply, while rice fish farming is the best in terms of resources utilisation, productivity and food supply. However a number of significant challenges exist for the adaptation of rice fish farming particularly the lack of technical knowledge of farmers. Thus it is necessary to provide technical support and training facilities for sustainable rice fish farming.

SOLUTIONS TO PROBLEMS

Bhagalpur (Bihar, India) comes under a low productivity district (1000 to 1500 kg per hectare) in terms of rice production and productivity is approx 1240 kg per hectare (source –PA-Table-04 Bihar). As this production per unit area is very less due to lack of awareness of nonconventional farming systems and imbalanced dose of fertilizer for the rice cultivation which gradually deteriorates soil fertility and the productivity. So there is need to change the farming system from conventional to nonconventional farming. Farmers should be sensitized by awareness, training demonstrations, exposure to visit organic farming procedure.

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