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PROBLEMS IN AQUACULTURE DEVELOPMENT IN ODISHA : A PARTICIPATORY ASSESSMENT

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The present study was conducted in Paribasudeipur village of Khurda district of Odisha in May, 2012. A simple random sample of 30 farmers was selected and the participatory rural appraisal tool was applied in order to enable them for identification of their problems relating to fish farming in that village. Six key informants were also selected. Rank Based Quotient (RBQ) was estimated both for the farmers and the key informants for the identified problems. The study reveals that the farmers are facing technological as well as infrastructural problems. High cost of feed, non-availability of quality seeds and biological hazards are the main technological problems. Infrastructural problems include problem of credit, marketing, ownership of pond, poor technical skill and weak extension linkage. Scientists may investigate more about the locational problems relating to technology and accordingly suggest for designing the experiment by providing need based solutions. Infrastructure facility for the farmers is equally important for proper implementation of scientific aquaculture practices.

INTRODUCTION

Agricultural researchers often have little knowledge or understanding of the farmers' problem and also the farming situation in which he operates. As a consequence technologies developed fail to fit into the farming system. Farming system is a unique combination of farm enterprise that a household manages in response to the physical, biological and socio-economic environment in accordance with the household goals, preferences and resources. These factor combine to influence both output and production methods. Technology development process must incorporate farmers' active participation that would ensure appropriate technology development and the process starts with problem identification by the farmers.

The Indian Council of Agricultural Research has embarked upon "farmer first" to bridge this disconnect between researchers and farmers. It envisages 20% time of a scientist be spent in farmer's field (http://zpdk.org.in/sites/default/files/Farmers%20First%20Book.pdf). Problem identification and its prioritization with farmers involvement goes a long way in ensuring research efforts more result oriented. The present study is an attempt to engage farmers in identifying and prioritizing their problems/constraints that hinder aquaculture development.

MATERIAL AND METHODS

The survey was conducted in Paribasudeipur village of Khurda district of Odisha in May, 2012. Six key informants were identified and asked to enlist the problems related to fish farming in that village. They were also asked to rank the problems. A simple random sample of 30 farmers was selected and they were asked to rank the problems while culturing fish farming. Weightage given for the rank e.g. I, II,III,IV,V,VI, VII and VIII was 8,7,6,5,4,3,2 and 1 respectively. Rank based quotient (RBQ) was estimated for both the key informants and the farmers by following the formula of Sabarathnam (1998, 2002). In order to identify critical factors for adoption of indigenous shrimp feed on the basis of assessment using RBQ method, research work was carried out by Ponnusamy and Swathilakshami (2011). A study was also carried out by Roy and Hassan, 2013 to identify the factors, that hinders pen culture technology adoption in the Wetlands of West Bengal through PRA method and calculating RBQ.

Estimation of RBQ

$$\text{RBQ}=\frac{\sum_{i=1}^{n}[F_i(n-1)-i]}{N*n}*100$$

Where

F_i= no. of farmers/ key informants reporting the particular problem under i^{th} rank (i.e. frequency for the ith rank problem)

N= no. of farmers/ key informants
n = no. of ranks

RESULTS AND DISCUSSION

Based on the formula of Sabarathnam (1998, 2002), ranks by the key informants are worked out and given in Table 1. Frequency distribution of ranks given by the farmers is presented in Table 2. and ranks given by key informants and farmers are presented in Table 3.

Table1: Ranks identified by the key informants

Sl. No	Problems	KI-1	KI-2	KI-3	KI-4	KI-5	KI-6	RBQ
1	High cost of feed	1	4	1	2	6	1	81.2
2	Non availability of good quality seed	3	2	4	4	3	2	75.0
3	Biological hazards	5	1	2	5	7	3	64.6
4	Multi ownership of pond	4	8	6	1	4	4	56.2
5	Absence of organized market	6	3	5	3	8	5	50.0
6	Paucity of credit	2	7	3	7	1	8	54.2
7	Poor technical skill	8	5	8	8	5	6	29.2
8	Weak extension linkage	7	6	7	6	2	7	39.6

Table 2: Frequency distribution of ranks given by farmers (n=30)

Sl. No.	Problems	Rank								RBQ
		I	II	III	IV	V	VI	VII	VIII	
		8	7	6	5	4	3	2	1	
1	High cost of feed	14	8	3	4		1			78.7
2	Non availability of good quality seed	10	8	6	4	2				83.3
3	Biological hazards		6	4	10	6	2	2		62.5
4	Multi ownership of pond				4	2	7	12	5	32.5
5	Absence of organized market			1	3	5	4	9	8	32.9
6	Paucity of credit			3	4	2	12	6	3	36.7
7	Poor technical skill			6	8	6	4	6		51.6
8	Weak extension linkage		3	8	9	4	6			61.7

The study reveals that the farmers of the village are facing problems which can be categorized into two viz. technological and infrastructural. Technological problems include problems related to feed, seed and biological hazards. Infrastructural problems include problem of credit, marketing, ownership of pond, poor technical skill and weak extension linkage. Scientist may investigate more about the locational problems and accordingly suggest for designing the experiment by providing need based solutions. It is equally important for facilitation of infrastructure for the farmers to utilize fully the technology of the farming. Thus, the policy makers may be provided with proper feedback from the farmers so that corrective remedial measures could be taken for addressing the location specific problems. Individual problems along with suggested solutions are given below:

Technological problems

High cost of feed was ranked as major technological problems by the farmers (Table 3)

There is a need to find out cheap sources of feed which will be affordable to majority of the fish farmers. Deduction in cost of feed alone can boost fish culture practices. Rural fish farmers follow the system of broadcasting of feed over the water body and hence a considerable portion of feed goes waste, besides creating problem of Biological Oxygen Demand loss due to settling down of feed at the bottom. A concerted effort is required to make available fish feed in pelleted form at an affordable price to the farmers.

Non-availability of quality seeds was ranked as second major problem

Non-availability of quality seed is another stumbling block in the way of speedy development of fish culture. Insufficient (in terms of species, size and quality) and uncertain

supply of this critical input may also hinder the growth of aquaculture. Today's aquaculturists need bigger size fingerlings. Dissemination of fibre reinforced plastic (FRP) hatchery technology to remote and distant places would help improving the situation.

Biological hazards was ranked as third by the selected farmers of Khurda district of Odisha (Table 3)

The improved technology envisages complete removal of weeds, predatory fishes, insects and animals like frog and snake from the pond environment. Though initially, the unwanted animals can be eradicated through application of biocides, there is no guarantee that these will not reappear posing a biological hazard in the way of successful operation of composite fish culture. Another problem in fish culture is with regard to algal blooms occurring in the ponds which create super saturation in oxygen level during day and oxygen depletion during night at times leading to mass mortality. In case of oxygen depletion fishes get distressed in the early hours of morning when oxygen content touches it's lowest and fishes start surfacing to gulp air and if suitable measures are not taken in time, the fishes die.

Table 3: Ranks given by key informants and farmers

Sl. No.	Problems	KI		Farmers		Difference in rank	Avg. RBQ	Rank
		RBQ	Rank	RBQ	Rank			
1	High cost of feed	81.2	I	78.7	II	1	79.95	I
2	Non availability of good quality seed	75.0	II	83.3	I	1	79.15	II
3	Biological hazards	64.6	III	62.5	III	0	63.55	III
4	Multi-ownership of pond	56.2	IV	32.5	VIII	4	44.35	VI
5	Absence of organized market	50.0	VI	32.9	VII	1	41.45	VII
6	Paucity of credit	54.2	V	36.7	VI	1	45.45	V
7	Poor technical skill	29.2	VIII	51.6	V	3	40.40	VIII
8	Weak extension linkage	39.6	VII	61.7	IV	3	50.65	IV

Infrastructural problem

Weak extension linkage was as ranked fourth (Table 3)

For dissemination of any technology from laboratory to the farmers' field an effective extension agency is of utmost importance. Fisheries extension wing operates at the block level under the state fisheries department. The fisheries extension service requires to be strengthened by way of additional man power suitably trained in scientific fish culture technology. There should be continuous flow of information in form of extension literature in local language as a means of educating the farmers about new/ improved practices, emerging problems and the ways to tackle them.

Paucity of credit was ranked as fifth by the farmers (Table3)

The introduction of scientific fish farming necessitates certain inputs which call for substantial amount of credit. Fish Farmers' Development Agency (FFDA) which is responsible for promoting aquaculture also extends financial assistance to farmers. However, the extent of support falls far below the demand. So it is recommended that institutional credit is extended to fish farmers. The micro-financing organizations can do better in this respect.

Multiple ownership of water bodies is also a key issue and was ranked as sixth (Table 3)

Multi-ownership is considered another constraint in the development of aquaculture in the country as sizable number of owners is unwilling for its use for fish culture or share initial investment for improving the pond. As joint owners get all the benefits without any effort leads to conflict. Legal provision should be made to transfer the multi-ownership of water bodies to interested parties. Another hurdle is third party rights for Gram Panchayat tanks. Improved tenurial arrangements, allocation of Panchayat tanks directly to the farmers and long term lease (5-10 years) of coastal belt to small scale farmers are some of the solution for the development of aquaculture and thereby improving the economically weaker section of the society. It is recommended that the community tanks to be leased out to women self-help groups on priority.

Absence of organized market is also an important problem faced by the farmers and it was ranked as seventh by the farmers (Table 3)

Fish is a highly perishable commodity. Market for its quick disposal is a prerequisite for fish farming. In the absence of organized market farmers sell their produce to middle men. At times they are being deprived of remunerative price. Due to lack of refrigeration/preservation facilities a major portion of fish catch at the village level is sold as fresh. As fish marketed though middle men, fish farmers are unable to get major share of the consumer price since all the intermediaries have profit margin. There is a wide spread gap between what consumer pay and what the farmers (producer) receives. Fishermen cooperatives at the level of village, district and state would help fish farmers to gain collective bargaining power and as a consequence remunerative price. Moreover, cold chain facility should be developed by the Government.

Poor technical skill of the farmers was also identified as a crucial problem and was ranked eighth by the farmers (Table3)

Technical knowledge and skill level of majority of fish farmers is found to be poor. Survey indicated that majority of fish farmers follow old practices and as a consequence they get very low yield (sometimes below 1 ton/ha/yr). Informal education, group discussions, community video, method as well as result demonstration would help in reinforcing skills for practicing improved technologies.

CONCLUSION

Farmers' participatory rural appraisal tool gives accurate and precise information about the ground reality. The tool was applied successfully for learning problems in aquaculture development. Problems identified make the farmers consciously recognize it and elicit their participation for solving them. This makes the farmers feel accountable for key information. It is a location specific exercise; however, it helps in precise identification of intervention areas. The PRA exercise and their commitment expressed in the interaction which makes it evident that with little external support; problems can be eradicated.

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