

## A Study on Community Based Aquaculture Promoted by KVK-Khordha, Odisha, India

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<http://dx.doi.org/10.12944/CWE.9.3.47>

(Received: July 18, 2014; Accepted: September 27, 2014)

### ABSTRACT

Since 1960s Community aquaculture gained its importance in India through the attempts of Research and Development agencies. Demonstration of fish culture practices in community ponds are challenged by its nature as water bodies are common property resources which requires substantial support from communities, local bodies and other agencies. Krishi Vigyan Kendra (KVK) - Khordha, the Farm Science Centre under Central Institute of Freshwater Aquaculture of Indian Council of Agricultural Research (ICAR) works on Front Line Demonstration of community aquaculture in Khordha district. Promotion of community aquaculture by KVK is through the identified ponds and also requests from interested communities. Technical inputs and one time provision of fingerlings of Indian Major Carps viz., Catla, Rohu and Mrigal are supplied for the farmers to adopt the practice. A participatory approach is envisaged for mobilizing communities, stocking ponds and adopting all Scientific Management Practices. During 2011-13, KVK demonstrated fish culture in five community ponds covering an area of 6 ha. An average production was 22.41 q/ha realized against the farmers practice of 15.46 q/ha. High production costs, risks of poaching and other constraints were also elicited by members who adopted the practice. This paper presents the works done by KVK in promoting community aquaculture and its impact in fish production.

**Key words:** Community Aquaculture, KVK, Composite fish culture, Khordha district.

### INTRODUCTION

Freshwater Aquaculture contributes to poverty alleviation and an employment source to millions of people, both in the sector itself as well as in support services. The practice of aquaculture is farming of aquatic organisms including fish, prawn, commercially important aquatic plants and poly culture. Community based aquaculture is identified as a proven practice towards satisfying community needs in using water resources effectively and to provide protein source for communities in rural sector promoted by different agencies. Composite fish culture, which was developed by Central Inland Fisheries Research Institute (CIFRI), Cuttack Centre in 1960, has come long way through the efforts

of various research and extension projects of the ICAR, Central/State governments and agricultural universities (Mandal *et al.*, 2011). Practicing aquaculture in community ponds has several issues as community ponds are common property resources and most commonly used for drinking and other domestic purposes by villagers. Community-based aquaculture founded on the principles of common interest groups working together regardless of sex and age has been an effective tool for implementing scientific aquaculture programs in India. Water bodies that do not interest villagers are targeted for use to avoid communal problems (Radheyshyam, 2001). A study on the community aquaculture in Orissa reveals that a low level of technological adoption of aquaculture with very traditional and

extensive methods of carp culture, which may be termed as rural aquaculture (Radeyshyam *et al.*, 2013).

Krishi Vigyan Kendra (KVK) - Khordha the "Farm Science Centre" of Indian Council of Agricultural Research (ICAR), New Delhi was established in 1977 under the administrative control of Central Institute of Freshwater Aquaculture (CIFA) Bhubaneswar, Odisha. Since inception this KVK has been working with community water bodies to introduce composite fish culture through a participatory mode. This paper presents the attempts of KVK in adoption of community aquaculture in different parts of the operational area, Khordha district. With this background the study was conducted with the following specific objectives

1. To document the process of demonstration in community based aquaculture
2. To evaluate demonstration of composite fish culture in community ponds and
3. To elicit the problems perceived by community members in the adoption of community based aquaculture

#### MATERIALS AND METHODS

The present investigation was based on the Frontline Demonstration conducted on composite fish culture in community ponds of Khordha district by KVK. The investigation is confined to purposively selected Khordha district of Odisha because it is the jurisdiction area of KVK. Khordha is one of the 30 districts of Odisha State, India with abundant natural resources to support livelihood of rural and urban population. Agriculture and allied sector like animal husbandry and fisheries play a vital role in the economic development of the district. Fisheries in particular serve as a major livelihood option for the rural community in three blocks of the district where fisheries resources are prominent. Area

under freshwater aquaculture was 1929.24 ha which comprised of tanks and ponds producing about 15,760 MT. Inferences for this study was drawn from five adopted community ponds for fish culture by KVK in three blocks of Khordha district comprising of 50 members. Primary and secondary data pertaining to all the community ponds were collected. Primary data were collected from the participant communities and secondary data pertaining to the demonstrations were collected from the Annual Reports of KVK. A pre-tested structured interview schedule was used as a tool for data collection and simple percentage analysis was used to interpret the data. The data for this study was collected during the period 2012-13 supported by KVK. In the present investigation the role of KVK was assessed in terms of yield and adoption by the members as a result of demonstration and training imparted.

#### RESULTS AND DISCUSSIONS

##### Process of Demonstration

Front-Line Demonstration (FLD) is the new concept of field demonstration evolved by the Indian Council of Agricultural Research. The FLD is conducted under the close supervision of scientists of the National Agriculture Research System are called Front-Line Demonstrations because the technologies are demonstrated for the first time by the scientists themselves before being fed into the main extension system of the State Departments. Since inception, the KVK has taken initiatives to work on demonstrating aquaculture in community ponds through the mandatory works viz., technology transfer, refinement and training. For interventions, community ponds are identified by KVK and also requests from interested communities for fish culture from villages are also encouraged. The works starts with participatory planning for effective implementation of activities. The members of the community are mobilized and sensitized towards adopting the practice by making them understanding

**Table 1: Details of Demonstration conducted by KVK on composite fish culture during the period 2011-13**

Front Line Demonstration	Area (in ha)	No of community ponds	No of Beneficiaries	No of Blocks	No of Villages
Composite fish culture	6	5	50	3	4

about composite fish culture, benefits and impacts. Upon preliminary sensitizing and knowledge building activities like demonstration and trainings the process of adoption starts. The details of the community ponds intervened by KVK is presented in Table: 1.

The technology demonstrated by KVK was on the scientific management practices for adoption of composite fish culture in community ponds. The general practices can be categorized as Pre-stocking, stocking and post-stocking management. The major steps followed in pre-stocking management were aquatic weed clearance by manual effort, eradication of predatory and weed fish by repeated netting, manuring by using cow dung  $1000 \text{ kg ha}^{-1}\text{month}^{-1}$  and liming with quick lime @  $200 \text{ kg ha}^{-1}\text{yr}^{-1}$  for regulating pH of pond water. The ponds were stocked with Indian Major Carps viz., Catla, Rohu and Mrigal fingerlings in 30:40:30 ratio, supplementary feeding with rice bran and Ground Nut Oil Cake (GNOC) at 1:1 by weight.

The results as in Table: 2 indicated that fish production in the community ponds through demonstration was found to be  $22.41 \text{ q ha}^{-1}$  against the farmer's practice of  $15.46 \text{ q ha}^{-1}$ . The results

indicated that the community ponds demonstrated by KVK have potential to realize the expected fish production with a change compared to that of the farmer's practice of 43.2 per cent. This production level was achieved due to the adoption of Scientific Management Practices as prescribed and the acceptance of communities to invest for inputs in time. The results are in line with study of Goswami and Sathiadhas (2000) that the community tanks have the potential for increasing fish production through community participatory fish culture. These tanks are generally not used for fish production due to inadequate financial and technical resources. KVK in these interventions have provided two important resources technical and financial resources for communities to use the water bodies effectively. The lessons learnt are that all the community ponds intervened by KVK has provided inputs for one time and it has been observed that members of the community have not discontinued. A successful case of KVK in promoting community based aquaculture is presented below:

#### A case of Study of community success

One such community pond was selected by the KVK for demonstrating composite fish culture in the Schedule Tribe dominated village Diniary of

**Table. 2: Results of the demonstration of community aquaculture**

Front Line Demonstration	Area in ha	Results ( q/ha)		% of change	B: C Ratio	
		Demo	Farmers Practice		Demo	Farmers Practice
Composite fish culture	6	22.41	15.46	43.2	2.13	1.67

**Table. 3: Perceived problems on adoption of community based aquaculture**

S. No	Problems	Rank
1	High cost of Inputs	1
2	Poaching of fish	2
3	Possibilities of poisoning	3
4	High cost of lease	4
5	Less period of lease	5
6	Lack of follow up action	6
7	Marketing of harvested fish	7
8	Availability of fingerlings	8

Begunia block, Khordha district. The community had a success in different dimensions through such an initiation by KVK in terms of fish production and utilization of resources. The group consisted of 30 members from the village were practicing composite fish culture by leasing the pond since 2004. Traditional culture practices of using rice bran as a supplementary feed, lack of pond fertilization and liming were practiced regularly and this caused for low yield and subsequently little incomes. The KVK intervened through trainings and advisory support for the group. Initial reluctance of adoption of advanced packages existed as of other groups.

Hence, the KVK supported the group initially to provide them some critical inputs as the reluctance for non adoption of scientific management practices was due to the cost to be incurred in the purchase of inputs. KVK demonstrated the scientific management practices of composite fish culture, supplementary feed management, recommendation of fertilization schedule and liming through water quality testing. The farmers were also taught about the practice of "single stocking and multiple harvesting" to increase fish production and generate more income. Feeding fishes in perforated gunny bags reduced the wastage of feed and maintained the water quality and the group developed positive attitude towards adoption of scientific management practices. The group was also advantageous in getting financial assistance for pond renovation through the Food for Work Programme under the guidance and supervision of Assistant Fisheries Officer, Begunia, Block.

The community was convinced towards adoption of scientific practices in composite fish culture. The yield and continuation of stocking the ponds with management practices has become a continuous activity. The outcome of the intervention by the KVK was towards the yield increase tuning to 22.41 q ha<sup>-1</sup> against 21q ha<sup>-1</sup> before KVK's involvement, increased income level to Rs. 1.5 lakh ha<sup>-1</sup>. Due to this the farmers extended lease period through auction with higher price. The lessons learned by the KVK over the period of time is that scientific management practices (SMP) in composite fish culture needs systematic approach to communicate the members, identify the cohesiveness of the group, motivation and to provide hands on training and support with critical inputs towards adoption of SMP. By extension principle "Seeing is believing" the other community tanks owned by other groups have started practicing composite fish culture.

#### **Perceived problems in community aquaculture**

The study of Mandal *et al.*, (2011) on the perceived problems of communities in adopting composite fish culture as rising cost of inputs and weather related mass mortalities. Another study by Sasmal *et al.*, (2006) informs that the major constraints perceived by the fish farmers were high cost of pond preparation, eradication of weeds, fertilizers feeds, and dragnet. Lack of knowledge, lack of available of sources, lack of

efficient marketing structure, lack of finance, high cost of lease, and restriction posed by the village community regarding the use of some of aspect of recommended technology are some other major constraints reported by the respondents in adoption of recommended composite fish culture technology. Maximum fish farmer were adopting the traditional practices of fish farming as a result the adoption rate of recommended technology was low (28.37%).

In the present study The perceived problems in adoption of community aquaculture perceived by the community were towards the high cost of inputs, poaching of fish, possibilities of poisoning ponds, high cost of leasing the ponds, less period of lease, lack of follow up action, marketing of harvested fish and non availability of fingerlings. The major inferences on the constraints faced by community towards adoption of composite aquaculture is presented in Table: 3. However, the interventions of KVK towards reducing the cost by supply of fingerlings in time with reasonable rates and the one time support in providing critical inputs helped the communities to sustain the practices.

### **CONCLUSIONS**

The attempts of KVK in promoting community aquaculture have proved to be successful in the process keeping social, economical and political situations in the rural villages as community ponds are common property resources. The participatory approach adopted in the process of joint implementation of the demonstration was the success point that KVK learnt lesson in promoting such community initiatives. In all the cases it was observed that stocking community ponds will be successful with the community cohesiveness as active participation is pre-requisite for adoption of community aquaculture. Joining in hands with the World Bank supported Orissa Community Tank Management Project (OCTMP) the KVK is working on promoting community aquaculture in 52 ha of small reservoirs in Khordha district. The utmost critical factor for such activities to be successful also depends on the availability of fingerlings for mass propagation of this practice. The KVK has taken steps to produce fingerlings at its instructional farm to supply quality fingerlings for the interested communities.

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