

# A success story of ornamental fish farming as a tool for alternative livelihood of tribal women in Keonjhar District, Odisha, India

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Pragati Self Help Group Ornamental Fish Breeding Unit at Bhatunia Village, Keonjhar District, Odisha.

The ornamental fish industry represents an essential section of international trade, expanding in all dimensions and providing aesthetic pleasure and financial openings. About 7.2 million houses in the USA and 3.2 million in the European Union have an aquarium and the number is increasing day by day throughout the world. Ornamental fish farming is also growing to meet this demand. The fact is that USA, Europe and Japan are the largest markets for ornamental fish but more than 65% of the exports come from Asia (Ghosh et. al., 2003). Day by day, ornamental fish culture is becoming an increasingly important source of income for rural people. Some people in Odisha, and more broadly in India, are maintaining their livelihood through this practice. Ornamental fish keeping is the most popular hobby in the world and it is considered to be easy and stress relieving. At the dawn of the 21st century aquaria feature as an integral part of modern interior decoration (Katia Oliver, 2001). Ornamental fish farming, culture and seed production are included as different





Scientists, Senior Research Fellows and ornamental trader owner interacting with self help groups.

activities of self help groups and also play an important role in maintaining the livelihoods of poor people. The objective of self help groups is to bring poor families above the poverty line by ensuring an appreciable sustained level of income over a period of time through the process of social mobilisation, training and capacity building, and provision of income generating assets. India's share in the global ornamental fish trade is 0.008 percent. The major part of the export trade is based on wild collection from the north eastern states. These capture based exports are not sustainable and are a matter of concern. Hence, the focus should be on culture based production systems. There is a very good domestic market based on domestic breeding exotic species. The overall domestic trade in this field crosses Rs.100,000,000 and is growing at the rate of 20 per cent annually (Susan, 2014). The earning potential of this sector is hardly understood and under exploited. Considering the relatively simple techniques involved, this activity has the potential to create substantial employment opportunities in rural areas, including for women, as well as generating additional income with minimal risk and time. With the inception of the National Agriculture Innovation Project (NAIP) in Keonjhar District, ornamental fish culture was introduced with an initial investment from the project by supply of FRP tanks and some inputs, while cement tanks were constructed with their own savings money. Women self help groups were trained and visits to gain experience



were arranged by ICAR-Central Institute of Fresh water Aquaculture, Kausalyaganga, Bhubaneswar, to establish ornamental fish farming units. This study discusses the role of tribal women involved in the popularisation of ornamental fish farming in Bhatunia Village. Self help groups have been effective in popularising ornamental fish farming and marketing and in improving livelihood security for rural tribal women. Knowledge dissemination through capacity building programmes and demonstrations in the field have helped many women in Keonjhar District adopt improved technologies.

## Approach

Pragati Self Help Group, a group of seven women and three men in Bhatunia Village, was established in 2005. Members of this group are from tribal communities and most of them are housewives of farmers. The elected president is Mrs Mamata Dehury and the secretary is Mrs Basanti Dehury. Initially this self-help group was provided with some financial aid from the block headquarters to run activities in microfinance and agriculture. With the arduous efforts of the members, this group became one of the active in the district.



Ornamental fish breeding unit and live bearers fish tank.





*Above, below: Live food collection from nearby village ponds with demonstration by Senior Research Fellow.*

## Outcomes

In order to create awareness of ornamental fish breeding and culture techniques to improve and sustain livelihoods, a combined effort of NAIP and CIFA (ICAR) was made under the livelihood project (Component 3). Several village level training activities were conducted through screening of films on successful farming practices. Meetings and other related activities were carried out for capacity building among the villagers, especially the self-help groups. A two day exposure visit to CIFA was facilitated on 28th and 29th September, 2010 for members with the main aim to familiarise them with the field work and practical aspects of ornamental fish farming. In addition, lectures were also delivered in simple way to create interest in ornamental fish breeding and culture. The self-help group members had opportunity to interact with the scientists, and Senior Research Fellow field demonstrations of breeding techniques were also conducted in order to encourage them to take up ornamental fish farming.

The efforts of NAIP-CIFA catalysed the members of Pragati Self Help Group to establish an ornamental unit in the Bhatunia Village. Prior to establishing the unit a meeting was conducted among the scientists, Senior Research Fellows (SRFs) and members of the self-help group, and detailed discussion was made on the know-how of setting up an ornamental unit. Each and every aspect from initial preparations to marketing of the produce was discussed threadbare and a layout diagram of the unit was provided. The owner of



the AQUA WORLD shop at Keonjhar market, Mr Sachikanta Behera, who deals with all the necessities for ornamental fishes was introduced to the members. He promised to purchase their produce at a remunerative price.

### Breeding and culture

In the meeting it was also decided that initially the self-help group on their own expense had to invest some amount for a cement platform and a few tanks. To make them involved and develop ownership of the project, as a public-private



Self help group members packing fishes for market.

partnership, the self-help groups were advised to construct a cement platform of 7.5 x 5 metres and six tanks each of 1.5 x 1 x 0.6 metres. The members agreed to it readily without any reservation. Similarly, NAIP-CIFA provided eight rectangular FRP tanks of 450 litres capacity and a circular hatchery was specially designed for breeding of live bearers and some egg laying species. At first, the site for setting up the unit was selected and the SRFs were simultaneously asked to monitor the work. The construction work as per the required size was completed at a total expense of Rs. 10,000/- (US\$ 158) drawn from the savings of the self-help group.

Once the facility was ready the scientists visited the unit to provide technical guidance for stocking of fish. The unit was provided with livebearers such as guppy (*Poecilia reticulata*); molly (*Poecilia latipinna*), swordtail (*Xiphophorus helleri*) and platy (*Xiphophorus maculatus*). Livebearers release advanced young in batches and are easy to breed throughout the year except the winter months and the members were then taught about the breeding behaviour and rearing. Prior to release of fish in the tanks the members of the self help group were asked to fill the tanks and plant *Hydrilla* twigs in pots inside the tanks. This work was supervised by the SRFs. CIFA provided shade nets and accessories like nets, sieves, pipes for siphoning purpose, plastic ware such as mugs, buckets, feed containers etc. When the full unit was ready, fish and feeds were provided to them by the institute. The SRFs supervised all the activities including breeding and feeding, method of siphoning, health and hygiene care. With

the effort of self help group members and constant supervision the ornamental fishes started to breed. After seeing the fry the members were excited and started taking all possible care as per instructions. The group members were performing efficiently. All of them take utmost care of the fishes and the production. The details of the production and other activities are monitored by SRF and noted in reports. Apart from this the group members also keep a record of their activities.

### Feeding

Live food is essential for achieving good survival rates of larvae. In addition to live food like cladocerans collected from nearby ponds, they were provided with powdered prepared feed made from groundnut oilcake and rice polish.

Once the larvae reach 10 mm in size they were provided with live food like *Tubifex* or sludge worm, mosquito larvae and chopped earthworm. Records of feed use, frequency of feeding, growth, feed intake, mortality and the labour put by the women farmers on the job were recorded in note books. The details of the production and other activities were monitored by Senior Research Fellows engaged under the project. They were asked to use feeds provided by CIFA and were also taught on producing feeds at a cheaper cost using ingredients such as rice bran, groundnut oil cake, soya bean and fish meal. In the meantime they were also trained to collect plankton from the pond as live food for the fish larvae, and earthworms were also given as food. By following the

**Table 1. Average cost and return of a breeding and rearing unit of live bearers.**

| Cost (Rs)  | Rate (Rs)   | Total value (Rs) |
|--|---|------------------|
| <b>Capital cost</b>  |   |                  |
| Cement platform 7.5 × 5 m  |   | 3,500            |
| 6 cement cistern 1.5 × 1 × 0.6 m   | 1,000   | 6,000            |
| 8 numbers FRP tanks 450 litres   | Supplied by the project fund                            |                  |
| Shade nets, aerator, pipe, other equipments like hand nets, buckets & mugs | Supplied by the project fund                            |                  |
| Total  |   | 9,500            |
| <b>Culture cost</b>  |   |                  |
| 400 hundred females  | Supplied by the project fund                            |                  |
| 100 hundred males  | Supplied by the project fund                            |                  |
| Feed   | Supplied by the project fund                            |                  |
|  | Natural food collection by SHG members from local ponds |                  |
| Others   |   | 500              |
| <b>Total cost (Rs)</b>   |   | 10,000           |
| Production:  |   |                  |
| Monthly production 2,600 pieces  |   |                  |
| Yearly production (average) 37,500 pieces                                  |   |                  |
| <b>Sale</b>  |   |                  |
| 37,500 fishes  | 5   | 187,500          |
| <b>Total sale</b>  |   | 187,500          |
| Annual profit = Rs. 187,500 – Rs. 10,000) = Rs. 177,500                    |   |                  |
| <b>Monthly profit = Rs. 14,792</b>   |   |                  |

proper rearing and management practices, two crops were harvested by the self-help group members in the first year. Dull-coloured fishes were generally culled from time to time as one of the management practices.

### Marketing and economics

Once the fry attain a marketable size, members contact the trader to market the ornamental fish. The fishes are sold per piece at a remunerative price. For delivering the fish to the market, the members have appointed a villager Mr Sanatan Dehury who takes their produce for sale to Mr Behera at AQUA WORLD shop. The fishes fetch a good price and this has created even more interest among the members. The profit depends on the carrying capacity, candidate species and infrastructure. In an average month production is about 2,600 young and the yearly average is 37,500 pieces. The expected revenue from the ornamental fish breeding unit is estimated at Rs.177,500/unit/year during the first year. The average cost and return of a minimal breeding and rearing unit of live bearers is in Table 1.

More income could be generated in subsequent years. The amount of money generated from the sale of fishes is deposited in the joint bank account of self-help group members.

There are a number of indigenous fish species which can be cultured as ornamental fish (Panigrahi et. al., 2009). A few works have been done regarding the involvement of women in ornamental fish culture, breeding, management and marketing, such as Ako et. al., 2000, Sinha et. al.2004, and Patra, et. al., 2006. Women nurture the tiny fish with care and have shown interest in different activities of backyard culture of ornamental fish (Sinha et. al., 2012). Now women from different self help groups are engaged in this small scale industry. The State Government has taken a policy decision to set up self help groups as a major poverty alleviation initiative with a view to ensuring a robust economic growth that would be labour intensive and equitable, combined with

development of the social sectors, and specially directed towards the groups living below the poverty line. Various programmes administered by different departments of the Central and the State Government, such as the Self Help Group Bank Linkage Programme initiated by NABARD, and the social intermediation programme followed by NGOs have accelerated the process of organising the poor, and particularly women, into self help groups. Now the State and Central Government are giving a special emphasis to ornamental fish farming through different self help groups for socio economic development. In India, many women have taken up ornamental fish breeding or farming as a backyard activity especially in rural areas (Sahoo et al. 2011). From this investigation we have found that the self help group is a process-oriented scheme which involves organisation of rural poor, their training and capacity building, to enable them to evolve into a self managed organisation. In the present investigation we found that ornamental fish farming can be a viable alternative livelihood for rural tribal women. The main influencing factors were community norms and social hierarchy, and capacity building.

### Needs of self help groups

In our experience, to establish ornamental fish culture operations, a self help group requires:

- Training on breeding techniques of egg laying fishes.
- Field training and demonstrations.
- Exposure visits.
- Technical support from the authorities for efficient production and propagation.
- Better marketing facilities.

Factors contributing to success were:

- Technical support and co-operation of the NAIP-CIFA team.
- Timely supply of inputs and, from time to time, suggestions and motivation.
- Co-ordination and keenness among the self help group members.
- Ready availability of suitable water.
- Growing demand for aquaria in urban areas.

## Lessons learnt

The ornamental fish unit has proved to be a boon as livelihood option for the economically challenged tribal community. This endeavour has led to capacity building as well as income generation of the less privileged members of society. The skills learned assure them of self employment and have secured their financial status.

## Future strategies

Looking forward, our ongoing work to improve the initiative include:

- Capacity building of farmers for technological improvement in production of egg layers has been initiated and successful farmers have been encouraged with technical support for large scale production.
- New interested farmers are being encouraged for adopting the technology through horizontal expansion under the NAIP programme.
- The farmers are encouraged to take the benefits prevailing under existing government schemes and linkages with State Fisheries, ATMA, and KVK for improved support and income.
- Better marketing linkages with the pet shops in the local and distant towns have been envisaged. A buyback trade linkage with local traders has proved profitable for farmers. An aquarium making capacity building programme has been initiated for more income generation.

## Conclusion

Ornamental fish farming can be adopted anywhere in Odisha as an option to enhance and support livelihoods. The development of local farms will assist with adaptation of ornamental fish farming to suit local conditions and help to establish commercial small scale farming under a harsh environmental regime (low and high temperatures) with low investment requirements.

More opportunities must be created for women, predominantly through collection and dissemination of information and transfer of technology between different districts of our state and country. Ornamental fish farming can be a promising alternative for many self help groups due to the low

space and capital requirements. The success of women in developing homestead ornamental fish farming businesses is encouraging other self help groups to initiate such enterprise. The government has also recently declared that special packages may be provided to unemployed women to assist them to adopt ornamental fish farming.

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