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## Aquariculture and Sustainable Rural Development: Studies from West Bengal, India

**Indranil Ghosh**

Lecturer, West Bengal University of Animal and Fishery Sciences, Kolkata, West Bengal, India

### **Abstract:**

*Poverty can be considered as a curse for any society that adversely interferes with the overall development of the community. It skeletonizes the physical and mental health of human being and also ruins the progressive outlook of any society. Within this purview it is emancipated that if habit of ornamental fish-keeping and fish culture in aquarium can be introduced as hobby especially in rural populace it may strike as home based industry within no time to offer a comparatively new avenue for employment generation to quell the subsequent poverty alleviation in rural West Bengal. In this study; apart from conventional activities of agriculture and food fish aquaculture, rural men, women as well as children are found to be interested to take up the other such part time activities, as they could realize that it will help them to experience 'morning light' to earn their livelihood in the 'amidst of dark' future ensuring sustainable economic growth and development.*

**Keywords:** Aquariculture, Rural development, Sustainable development, Poverty alleviation, Ornamental fish culture, Socio-economic improvement, Women and aquariculture

### **1. Introduction**

Though Agriculture is the main source of livelihood for the rural communities in West Bengal, it is a fact that, Aquaculture or "Aquatic Agriculture", with the advent of Science and Technology, is also approaching towards the ultimate goal, utilizing the vast wet-land available in India at optimum level, thereby resulting into the maximum sustainable development. "AQUARICULTURE", a branch of aquaculture, strictly means the "Culture of Ornamental Aquatic Organisms within the Aquarium Systems"<sup>1</sup> is comparatively new and attractive as well as alternative income generating avenue<sup>2</sup> especially for the rural women to convert themselves from traditional house-wives to self-earning professionals through the formation of 'Self-Help Groups' (SHGs). It brings more return against a relatively small investment in terms of space, time and money. In West Bengal, more than 1, 00,000 SHGs have been formed<sup>3</sup> for self income generation. The present export turnover is about INR 10-12 Crores [1 US \$= 68.00 INR, Indian National Rupee] with a vast average annual domestic market turnover of **about** INR 80-100 Crores, comprising of an ever-increasing demand for aquarium, ornamental animals and plants and other ancillary items. To ensure the demand-related-supply of ornamental fish and its accessories in the domestic market of West Bengal, extensive training programs were undertaken for the rural people of districts of 'Bankura' (22° 38' N and 23° 38' N; 86° 36' E and 87° 46' E) and 'Puruliya' (22° 60' N and 23° 50' N; 85° 75' E and 86° 65' E), situated in southern West Bengal<sup>4</sup>. The training programs were organized by "The Science Association of Bengal" (SAB), with **the** financial assistance of 'Department of Science and Technology, Govt. of West Bengal', India. It was assumed that they will be able to share a part of their family expenditure with other earning member/s of the family and spread the hobby of 'Fish-keeping' amongst the common people. The present study points out the outcome of the programs indicating a possible way for sustainable rural development.

### **2. Materials and Methods**

The training programs on "Ornamental Fish Culture and Aquarium Management" were of 3 months duration where the trainees were specially skilled about different aspects of ornamental fish culture including Aquarium construction, identification of both indigenous and exotic ornamental fishes, breeding and rearing, food and feeding in aquarium, cement cisterns and in pond, live food collection and culture method, disease diagnosis and control procedures, marketing strategies, ornamental plants suitable for aquarium and their propagation, aquarium decoration, maintenance and management. Special emphasis was given on biological filtration and re-use of the water in aquarium, as these districts occasionally experience very dry weather at times. Initially the programs were centered with the rural women (Figure 3), but it was a surprising fact that the men being inspired also approached to get incorporated (Figure 4) in the said programmes. Above all, it was really amazing that some 'school-goers' also wanted to participate (Figure 5). The author was the trainer, on behalf of SAB. The scientific facts were explained in vernacular along with practical demonstrations. The bankers were

also present in the occasions to pursue the trainees for future financial support. Successful trainees were awarded certificates after final assessment.

### 3. Results

Three categories of people were identified with simulated monthly benefit (Figure 1) depending upon the area utilization and species for culture –

- CATEGORY-I - comprising of rural men (37%) who would be taking up ornamental fish culture activities as their primary source of income (full time) with INR 10,000 – 15,000/month (approx.).
- CATEGORY-II - comprising of rural men (21%) who would be taking up ornamental fish culture activities as their secondary source of income (part time) with INR 6,000 – 8,000/month (approx.).
- CATEGORY-III - comprising of rural women (49%), who have become 'earning members' of the families otherwise being the traditional house-wives, with INR 5,000 – 9,000/month (approx.).

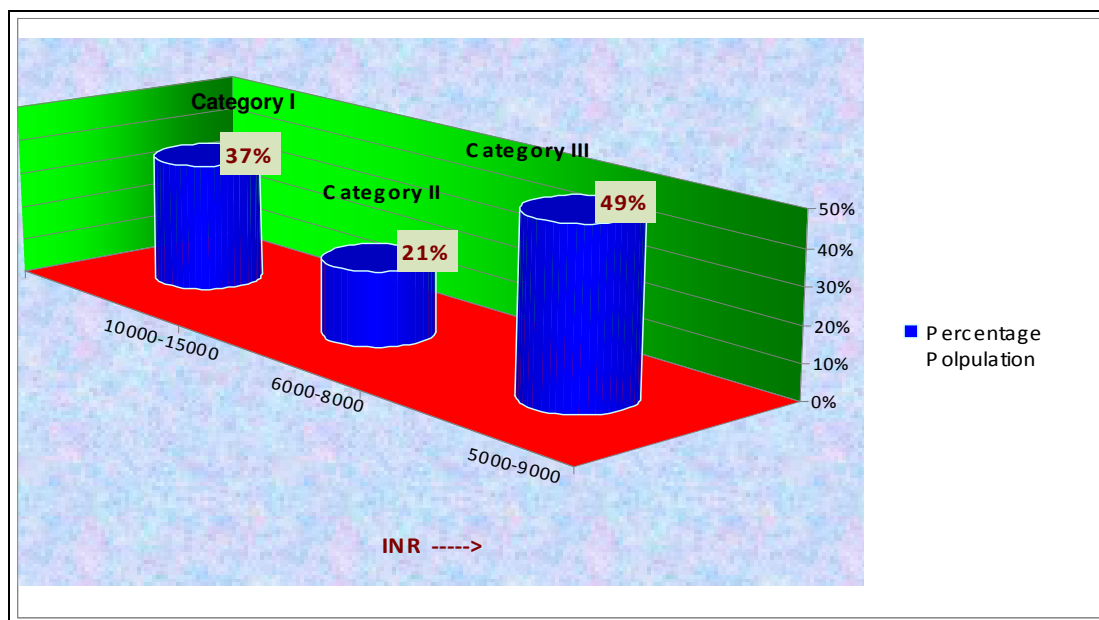


Figure 1: % categories of people and monthly benefit.

All categories of people were also responsible for rising up of more number of amateurs/hobbyists in urban areas, and to some extent also in rural areas, definitely to boost up the trade itself.

### 4. Conclusion

Socio-economic improvement of rural men, women and children with the process of sustained economic growth is the basis of rural development<sup>5</sup>. The core concept of rural economic growth and development hovers around the proper utilization and management of the time in everyday livelihood of every man and woman. In the training imparted rural areas of West Bengal, the aquaculture activities had been proved to be suitable for employment generation protocol to achieve self-sufficiency, financial stability to achieve the poverty alleviating opportunity hence alleviate the poverty for better livelihood. The women, in particular, were found to manage their own time to spend for additional income generating purpose from day to day 'home-making' duties & devote for their small culture units in back yard with a view to run their family with comparative ease<sup>1</sup>. In some areas, people have built up clusters of ornamental fish farms leading to area development, being promoted by the respective authorities like rural sector banks, District Rural Development Agency, Fish Farmers Development Agency etc. These units are comprised of nucleus seed farm, which encourage a number of satellite rearing units along with other ancillary units.

Thus, aquaculture practices adopted by the rural people have been proved to be equitable with respect to rural society and its economy; bearable for the society and environment; and the technology is viable with respect to environment and rural economy, means the technology itself with its economic viability and acceptability can lead to the 'Sustainable Development' (SD) of rural sector (Figure 2), "mitigating the needs of the present generations without compromising the ability of future generations to meet their own needs"<sup>6</sup>.

Finally, in addition to above socio-economic achievement, there should be a matter of concerned about the change in environment, which may lead to fresh water scarcity as an inevitable factor to appear in near future in the districts of West Bengal that occasionally face extreme water crisis during summer. To maintain sustainable aquaculture for intact rural economic flow even in that extreme condition of dry to very dry summer, adoption of the technique of reusing of water in aquaria with proper biological filtration, will definitely be a better practice, probably with no other options left.

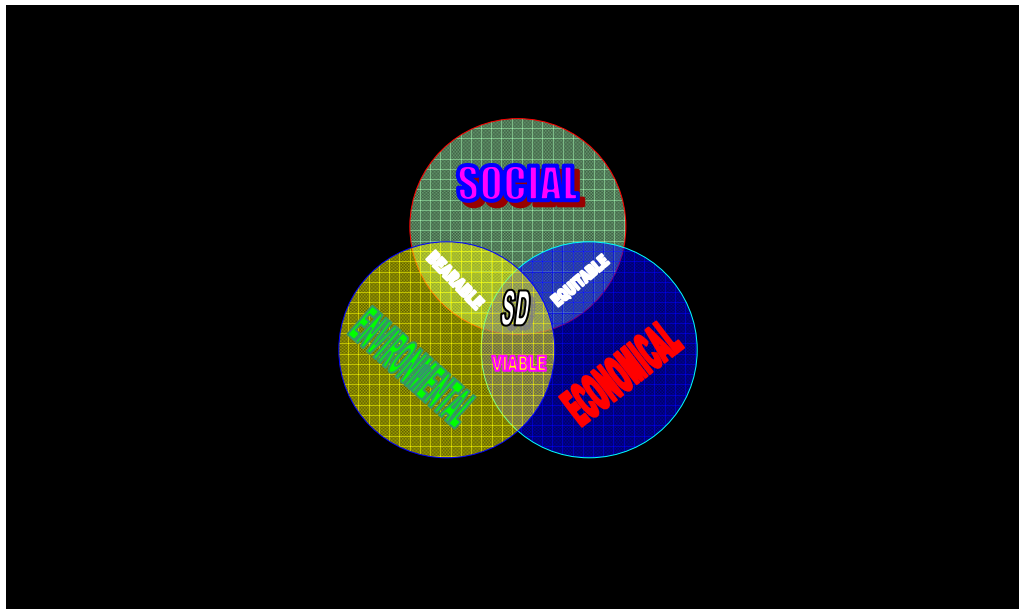


Figure 2: Basic concept of Sustainable Development (SD)

### 5. Acknowledgements

1. The Science Association of Bengal, Kolkata, West Bengal, India.
2. Department of Science and Technology, Govt. of West Bengal, Salt Lake, Kolkata, India.
3. Dr. Satyendranath Maitra; Deptt. of Zoology, A.P.C. College, New Barrackpore, West Bengal, India.

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Annexure



Figure 3: Rural women in training



Figure 4: Rural men in training.



Figure 5: Rural children in training.



Figure 6: People are learning how to set up aquarium.



Figure 7: An ornamental fish culture unit showing cement cisterns and aquarium.



Figure 8: Model home aquarium fully constructed and decorated by rural people.



Figure 9: Well planted aquarium with fish.