

**REVIEW OF RESEARCH** 

IMPACT FACTOR : 5.7631(UIF)

ISSN: 2249-894X

VOLUME - 1 | ISSUE - 3 | MARCH - 2019

# STATUS OF FRESHWATER AQUACULTURE AND STRATEGY FOR RURAL DEVELOPMENT

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## **ABSTRACT**:

Rural development is the process of sustained growth of rural economy and improvement of wellbeing of rural people. But it is agricultural sector which is commonly believed to provide the main impetus for reducing the poverty, hunger and ensuring food security for all. If agricultural growth takes place in the country with impoverished rural population, can rural farm incomes rise sufficiently to enable the rural poor to become more food secure.

Various types of aquaculture form an important component within agricultural and farming system development. These can contribute to alleviation of food insecurity, and poverty through the provision of food, income and employment generation, decreased risk of monoculture production failure, improved access to water and increased farm sustainability.

Aquaculture of the country in the past ten years has increased from 2.13 million tonnes in 1999 to 3.35 million tonnes in 2007. However, India utilizes only about 30 percent of the available 2.36 million ha. of ponds and tanks for freshwater aquaculture. The aquaculture technology has accepted for increasing the income, employment opportunity and food for the rural peoples of the country. The objective of this paper to analyze the different aquaculture systems used for rural development of the country.

## **INTRODUCTION**

Rural development is a process for improving the rural economy and well-being of rural men, women and children of the village .The development of the agricultural sector is widely believed to provide the main impetus not only for reducing poverty and hunger but also for ensuring food security for all. Only if more rapid agricultural growth takes place in countries with impoverished rural populations, can rural farm and non-farm incomes rise sufficiently to enable the rural poor to become more food secure. Different types of aquaculture form an important component within agricultural and farming systems development. These can contribute to the alleviation of food insecurity, malnutrition and poverty through the provision of food of high nutritional value, income and employment generation, decreased risk of monoculture production failure, improved access to water, enhanced aquatic resource management and increased farm sustainability (e.g. FAO 2000, Prein & Ahmed 2000, Halwart et al 2003).

Food security, rural development, and poverty alleviation are closely linked. The FAO State of Food Insecurity Report 2000 estimates that 792 million people in 98 developing nations are not getting enough food to lead normal, healthy and active lives. Expanding populations and changing eating habits in the urban area of the country will make a doubling of food output imperative within the next twenty years. The recent report on the right to food by the Commission on Human Rights points out that the "remarkable developments in agriculture and nutrition science over the last twenty years have clearly so far failed to reduce malnourishment and malnutrition for the poorest populations", and that "a different model of development is needed, one that is focused on local-level food security" (Ziegler2001). There are several

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fundamental reasons why the local food demand should be met by food production at local level to the greatest extent possible.

Alleviation of poverty is central to the concept of rural development. Different emphases and approaches to rural development have been followed in the past, variously focusing on the provision of basic needs, a joint social and economic sector approach, and employment creation through establishment of small enterprises in rural areas. A general consensus emerged from this experience - whatever the sectoral emphasis, rural development requires greater participation of the rural population and involvement of the people in planning for their own development. People's participation and 'bottom-up' planning were identified as essential elements of the development process. In the agricultural sector, increased participation of stakeholders in decision making and planning processes was reflected in the emergence and evolution of the Farming Systems Approach (FSA)

Poverty is a complex phenomenon, which cannot be understood in purely sectoral terms. A series of consultations on small-scale rural aquaculture concluded that aquaculture should not be viewed as an isolated technology but be considered as one aspect of rural development and form part of a holistic approach to development (e.g. Martinez-Espinosa 1996, APFIC 2000).Interdisciplinary approaches were seen as an essential prerequisite. More recently, there has been a re-evaluaton of the role of small-scale aquaculture in rural livelihoods and its importancie in poverty alleviation and household food security, particularly the mechanisms by which the rural poor can access and benefit from aquaculture. It is also increasingly realised that rural people do not depend for their livelihood on the agricultural sector alone, but rather on a range of livelihood options, which together offer their families food security and reduce vulnerability to conditions over which they have no control. Such options may be found in the diversification of activities in the agricultural sector, through the use of open access or common property resources in the natural environment and off-farm employment, whether close to home or far away in the cities. Different members of the family may be involved in each of these options, to varying degrees and at different times of the year. Rural poor people in resource poor environments tend to have a broader range of livelihood strategies, precisely because their situation is one of insecurity.

## **AQUACULTURE PRODUCTION SYSTEMS**

Aquaculture in India, in general, is practised with the utilisation of low to moderate levels of inputs, especially organic-based fertilisers and feed. India utilises only about 30 percent of the available 2.36 million hectares of ponds and tanks for freshwater aquaculture in other words there is room for both horizontal and vertical expansion of these sectors. With over 8118 km of coastline (Ayyappan 2006)there is immense potential for the development of mariculture which has taken roots only in recent years with culture of mussels and oysters. Considering the substantial contribution aquaculture makes towards socio-economic development in terms of income and employment through the use of unutilised and underutilised resources in several regions of the country, environmentally friendly aquaculture has been accepted as a vehicle for rural development, food and nutritional security for the rural masses.

The culture systems adopted in the country vary greatly depending on the input available in any particular region as well as on the investment capacities of the farmer. The extensive aquaculture is carried out in comparatively large water bodies with stocking of the fish seed as the only input beyond utilising natural productivity, elements of fertilisation and feeding have been introduced into semi-intensive culture. The different culture systems that have been standardised with optimum achievable production rates are below as per the Ayyappan (2006):

## **CARP CULTURE**

Development of low, medium and high input-based culture systems; Packages for both seasonal and perennial ponds; Species diversification and mixed farming; National mean productivity: from 0.6 t/ha/year to 2.2t/ha/year

#### **Freshwater prawn culture**

Technology for production of 1-1.5 t/ha/crop (5months) under monoculture Polyculture with carps

## **Integrated fish farming**

Integrated fish farming with poultry, pigs, ducks, horticulture, etc. (3–5 tonnes/ha/yr).

#### Pen culture in lakes

Technology for both seed rearing and grow-out production in beels; Designs of pens and material for fabrication to suit different conditions

## **Ornamental fish**

Breeding technology for live-bearers and egg layers; Rearing technology for live-bearers and egg layers

## **Aquaculture Expansion**

The current trend of increased production can be maintained, either through expansion of areas under aquaculture production. Generic technologies for intensification of existing production systems are in place, and it is mainly socio-economic and institutional issues that will be the most important constraints for a greater contribution by aquaculture to The expansion of land-based culture systems in inland areas has the greatest potential because aquaculture can be integrated with agriculture on current agricultural land in smallholder and commercial farms (Edwards 1999). Considerable potential lies in the integration of aquaculture and irrigation systems (e.g. Fernando & Halwart 2000, Moehl et al.2001). Increasing yields through intensified production requires increased use of feeds and/or fertilizers, which may be derived from on- or off-farm sources, or a combination of the two. Development of infrastructure can reduce external costs, such as feed and fertilizers, allowing farmers to intensify production. Since this requires increased investment in the production system, other enabling features include the development of markets and access to finance. As mentioned previously, many of the technical aspects of aquaculture are relatively well developed, however there is a knowledge gap between what is known globally and what is available to farmers. Weak rural extension systems and a lack of local examples of intensified aquaculture limit farmers' ability and willingness to risk intensification.

Small hatchery operations increase the local supply of fingerlings and can enable farmers to enter aquaculture as an activity. Such hatcheries are essential for the development of rural aquaculture but often have limited pond areas or water availability, hence may be unable to maintain the genetic quality of their brood stock and over a period of time lose genetic quality and performance. In such situations, intervention by government hatcheries or larger scale commercial hatcheries, are required. In each case, consideration must be given to the specific stage of rural development in a given area, extension programmes and how to integrate such activities within prevailing livelihood strategies. For increasing the sustainable contribution of aquaculture to rural development, the land-based culture systems in inland areas have the greatest potential which can be integrated with the existing agricultural practice of small-scale farming households.

#### **RECOMMENDATIONS**

The recommendations listed below, therefore, need to be seen in the context that there is no single acceptable aquaculture development strategy for all.

- Increasing awareness amongst policy makers of the role of small-scale rural aquaculture and aquatic resource management in rural livelihoods; management plans and policies in consultation with stakeholders
- Integrating aquaculture planning for water resource management as well as other economic and food security interventions for rural areas.
- Use of locally available species and materials

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## **Review of Research**

- Promote seed production and rearing of seed
- Improving culture systems for species with low inputs and that are preferred for local consumption
- Adapt and improve these systems through farmer-based learning, and promoting the results through participatory approaches.
- Providing services and facilitate access to inputs.

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