

An approach to Organic Fish Farming for sustainable aquaculture system

Yogesh Chandra Rikhari, Senior Technical Officer (Fisheries),
Krishi Vigyan Kendra Shivpuri (M.P.)

Satendra Kumar, Scientist (Fisheries) KVK Dindori (M.P.)

Puneet Kumar & Mukesh Kumar Bhargava, Senior Scientist, KVK Shivpuri (M.P.)

ABSTRACT

Organic fish farming emphasizes environment sustainable, quality and chemical free fish production system, by which we can develop an alternative to resolve the environmental constraints by restricting the introduction of inorganic substances that can adversely affected the aquatic ecosystem. But, the transformation from commercially developed aquaculture system to organic aquaculture system is not an easy task because some issues have to be confirmed for setting up standards for the seed, feed, medicines, soil and water that plays an important role in production. However, converting to organic fish farming brings a wide change not only in environmental conditions but also affects the yields which are significantly lower than production of modern fish farming system which can affect the global food security by reduction its contribution. To meet out this demand of fish for increasing population production must be enhanced from capture fisheries which is remained stable. During this modern fisheries era fish farming will face various environmental challenges but, organic fish farming will support to overcome these challenges by sustaining the ecosystem of farming. Besides its organic fish farming alone would be a multidimensional, complex and expensive farming system so, instead of adoption of organic farming alone suggestion can be given is combination with integrated approach with organic farming will give better returns in term of monetary and production. On other side this organic fish farming can also help in improving the ecosystem, soil condition and biological activities to develop sustainable farming system and better quality of yield.

Key words: Organic fish farming, Aquatic ecosystem, sustainable fish farming, Aquaculture system

INTRODUCTION

Fresh water fish farming plays an important role in contribution to total fish production in India. There are so many aquaculture practices are in trend to get higher production from water bodies. Nowadays Organic fish farming is a demanding technology of fish production system under the banner of Organic farming technology from the health point of view. It has received much attention because people are very much aware about their health and well known about the adverse effects of inorganic substances on their body. The principle of organic fish farming is "Production of high-quality fish foods in a stable aquatic ecosystem by managing the natural resources and environment without any negative effects and to secure the genetic diversity and richness of species in a native system." Organic fish farming system rely on practices such as cultural and biological disease management and virtually prohibit utilization of synthetic chemicals in fish

production. Organic farming favors lower input costs, conserve nonrenewable resources, high value markets and boost farm income, besides improving quality of the product.

Organic fish farming plays an important role in minimizing input costs and producing safer products. In Conventional fish farming farmers use Chemical or inorganic fertilizers which leave harmful residual effects in ponds. Long-term use of such inorganic materials can lead to deterioration and contaminate both soils and the water. Instead of these inorganic fertilizers use of organic manures reduces the input cost that results high value fish food liked by a large number of consumers at present time. Such organic products have a great demand in market and have a large number of consumers who are familiar for fish products but due to some of the health issues cannot accept the fish or fish products prepared commercially.

As well as organic fish farming is also

attracting the attention of researchers, culturists, entrepreneurs to look at the advantages of it and do some work to produce the required quantity which meet out the requirement of national and global market of fish.

This article focused on the challenges, limitations and the scope of the organic fish farming has significant potential for growth in future.

Organic fish farming

Organic aquaculture is a holistic approach to farm management and food production that combines best environmental practices, maintains biodiversity, conserves natural resources, and requires high fish welfare with the preference of certain consumers (Lembo and Mente 2019; Mente *et al.* 2019). It is an attempt to farming of fish or aquatic animals by the use of local natural resources without using antibiotics, chemicals, and fertilizers by preserving the ecosystem and biodiversity. Traditional organic farming systems "rely on ecologically based practices, such as cultural and biological pest management, and virtually exclude the use of synthetic chemicals in crop production and prohibit the use of antibiotics and hormones in livestock production." (Kiran Dube and Thongam I. Chanu. 2012 in *Advances in Fish Research*, Pages 219–229). Organic fish culture is an ecosystem-based management farming method, which aims at environmental sustainability and prohibits use of synthetic chemical inputs to reduce environmental impacts (IFOAM 2014). Although organic aquaculture production has not been developed as rapidly as organic agriculture. One of the most important reasons of this is the absence of international standards issued for organic aquaculture production. Modern aquaculture production system cannot agree with the requirements of an organic system plan, for implementing health care monitoring and management, for acceptance of seed stock management, for organic feed requirements, for controlled post-harvest processing, for nutrient management and for required record-keeping. Because there are different standards for different management systems for organic farmers which

must be follow to increase the yield.

Why Organic Fish Farming needed

Nowadays organic fish farming is very important because consumers are much conscious about the health hazards, environment, sustainability and harmful impacts of highly-intensive or modern fish farming system. This aims to provide fish and fishery products that are ecologically, economically and socially viable. Besides it there are so many medicines and antibiotics in fish farming system are injudiciously using to prevent the diseases and their residues remined in the products are creating problems in human beings in due course of time. Organic fish farming provides the safe side for the human health by creating no side effects of any product used in farming system. It also promotes and enhances biodiversity, biological cycles and soil biological activity. Organic fish farming is an earth friendly method of farming and processing food which keeps both biological and ecological aspects of environment and provide sustainability to the production system.

Principles of Organic Fish Farming

The principle of organic aquaculture includes:

- Absence of GMOs (genetically modified organisms) in stocks and feed material
- Limitation of stocking density – considering the ecological capacity of the site and species-specific behaviour of animals
- Use of organic feed and fertilizer from certified sources, no use of artificial feed ingredients.
- No use of inorganic fertilizer
- No use of synthetic pesticides
- Preference for natural medicines, no use of antibiotics.
- Processing according to organically certified principles required for a final product.

(Mipa Industries, 2020, ORGANIC AQUACULTURE IN INDIA, ORGANIC FISH FARMING, Organic Aquaculture in India, Organic Fish Farming)

Certification of Organic Fish Farming

The International Federation of Organic Agricultural movement (IFOAM) is a global umbrella body for organic food and farming. IFOAM's goals are the worldwide adoption of ecologically, socially and economically sound systems that are based on the Principles of Organic Agriculture. IFOAM's Organic Guarantee System (OGS) is designed to facilitate the development of organic standards and third-party certification. IFOAM Certification bodies are accredited by the International Organic Accreditation Service Inc. (IOAS) on the contract base. (IFOAM EU Group, 2010)

Standards for organic fish Farming

I. Aquatic environment

The environment should be non polluted by any external substances like industrial or sewage water. Not overdosed by feeds causing pollution in the fish pond. Pond should not be over exploited and must preserve the natural quality of water.

II. Fish Species

Fish species should be used are adoptable to local condition. Species should be taken from large seed producing farms or broodstock should come from natural system. Triploid, genetically modified organisms should not be used.

III. Feed and feeding

Feed provided to the fish should be prepared from organic raw materials without including any chemical growth promoter, hormones etc. Feeding practice should be followed in a way of waste less.

IV. Nutrition

Organic aquaculture system provides a good quality diet balanced according to the nutritional needs. The feed is offered to the organisms in a way that allows natural feeding behaviour, with minimum loss of feed.

V. Post harvest technology

After harvesting fish should be preserved or transport in a manner that there will be no stressed environment. No any anaesthetic drug or medicine should be given to the fish during transport.

VI. Disease related issue

“Prevention is better than cure” concept must be followed so that there will no need for medication. If there is still a sign of disease, appropriate preventive measures shall be adopted immediately.

Possibility of Organic fish farming in India

Fish as a food is a good source of protein for human beings. People are very much aware about their food from the health point of view. Various Inorganic chemicals, medicines antibiotics which are used in fish culture practices have residual effects for some extent for some days in the fish or fish products, which may cause dangerous effect for human health. Nowadays view of various consumers has changed for foods from the health point of view. They liked the material that is good for their health also not only feasible or tasty. In this regard organic food that is free from all hazards, chemicals, antibiotics is a better option for them to adopt it. Organic food products have some Benefits and some limitations which are given below:

Benefits of Organic Fish Farming:

Organic fish farming has several benefits either from consumers or environment point of view. Some of the important benefits are given below:

Quality Fish Products:

Quality of fish cultured in organic farming system has a high quality because of the culturing in pollution free or natural environment. Fish cultured in this system is completely fed with the feed which has no any artificial additives, free from residues of antibiotics and chemical.

Environmental safety:

One of the benefits of organic fish farming is

its sound environmental effects. Organic farms conserve aquatic ecosystems by minimizing chemicals and adopting eco-friendly practices. Reduced water pollution and preserving natural habitats enhance biodiversity and promote a healthier balance within aquatic environments.

Consumer Health Benefits:

Consumers get the fish free from any antibiotic and medicinal effects that may be harmful in future for their health. Fish they got are free from all pollutants which received from industries.

Sustainability:

Organic fish farming ensures responsible resource management. Lower seed stock, organic feed in optimum quantity secures the no wastage of food and no stress environment in ponds. Such type of conditions provides sustainable conditions and aligns with the responsible farming system. (GRC, SB Group Nepal, Sustainable Practices in Organic Fish Farming: Nurturing Healthier Aquatic Ecosystems)

Limitations of organic farming:

- I. Organic fish farming requires a big capital investment to establish the infrastructure and to follow the technology for it.
- II. No certified seed stock is available to stock the seed under organic farming system, that is a big challenge to get the fish seed available free from hormonal injected brooders.
- III. Organic fish feed producers are not available in the market for organic fish culture.
- IV. Farm management can be very tedious without use of chemicals. Control of aquatic blooms, insects and diseases is not easy in fish pond if once occur.
- V. Post harvest management of fish is not easy because only by icing of fish it cannot be preserved for days. There is a limitation to preserve the processed products for months without the use of chemicals.

VI. Economic feasibility of organic fish is not secure due to the availability and rates of products in market. Although consumers preferred the organic materials but there is no any fix market is present to sale or to buy the organic products.

VII. Complete knowledge can be a big barrier for organic fish farming because specialized person is required to provide the skills of organic fish farming to the farmers. Farmers are not aware about the benefits and harms of the organic fish farming. They aim for production for their good income.

Hope for organic fish farming

Organic fish farming is not as simple as organic agriculture system. There is no any doubt in increasing demand of fish as animal protein source at national or international level. Growing demand of organic food from the consumers for better health point of view provides better chances to grow this technology. But, due to the limitations of it alone organic fish farming is not easy to adopt by the fish farmers because of its initial capital investment, non-availability of suitable inputs and risk in marketing. So, one suggestion can be submitted here is that if organic farming practice combined with integrated fish farming system technology, then, there may be some chances for risk management by failure in crop production or marketing by complementation of income of other enterprise than fish. In integrated fish farming system waste of second enterprise can be an organic input for fish culture either as food or manure which can reduce the cost of cultivation up to some extent.

CONCLUSION

Organic fish farming alone would be a multidimensional, enigmatic and costly farming system so, instead of adoption of organic farming alone suggestion can be given is combination with integrated approach with organic farming will give better returns in term of monetary and production. On other side this organic fish farming can also help in improving the ecosystem, soil condition and biological activities to develop sustainable farming

system and better quality of yield. There is no doubt in that, organic fish farming can improve the sustainability of the fish farming system but, there are many folds of complexities in it which should be resolved. There is a need to plan some of the research work on organic farming by the experts which can provide valuable data for the extension personnels to spread this technology among the fish farmers.

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