



## Future Aspects of Integrated Fish Farming

Pratik Majumdar<sup>1\*</sup>, Chakrapani Pegu<sup>2</sup>, Bijay Kumar Behera<sup>1</sup> and Basanta Kumar Das<sup>1</sup>

<sup>1</sup>Biotechnology Laboratory, Central Inland Fisheries Reserach Institute, Barrackpore, West Bengal, India

<sup>2</sup>Regional center ICAR-CIFRI, GHY, Tripura

\*Corresponding Author: Pratik Majumdar, Biotechnology Laboratory, Central Inland Fisheries Reserach Institute, Barrackpore, West Bengal, India.

Received: October 09, 2018; Published: November 09, 2018

### Introduction

Integrated fish farming means a process of farming where fish is cultured along with other farm products and animal husbandry centred on the fish farm. In order to achieve fast progress in different geographical regions, we should focus on sustainable agriculture, sustainable agriculture means an integrated approach to increasing farm yield and managing resources in order to address for sustainability of all three critical aspects: economic, environmental and social. Integrated farming system (mixed farming) means a farming system with all activities of cultivation various food crops (like as corn or rice) and tree fodder which is used for animal feed, together with the raising of sheep, pigs, ducks and fish. The main objective of integrated farming is so that the farming components support one another; hence, reducing external inputs. For example, varieties crop can provide as an animal feed for livestock, and the livestock as manure for crops. Some livestock can also act as weed control. Mainly, the crop residues serve as feed to the livestock and fish, and in turn, the wastes from the livestock and fish supply as manure to the crops field. Moreover, their wastes, together with crop residues, are digested in a bio - digester to produce fuel for household facility. This kind of farming practices in numerous forms principally within the East and South East Asian countries is one in all the vital ecological balanced property technologies. The technology involves a mix of fish polyculture integrated with crop or livestock production. On farm waste use, a vital component of integrated fish farming is very advantageous to the farmers because it improves the economy of production rate and reduces the adverse environmental impact of agriculture field. Basically, this type of farming refers to the mix culture of fish, beside different culture systems. It should even be outlined because the successive linkage between two cultures practices. Fish culture is integrated with many systems for economical resource usage. The integration of cultivation with placental mammal or crop farming provides quality super molecule food, resource usage, use of farm waste,

employment generation and economic development. Integrated fish farming is well developed in China followed by Asian nation and some others country like as Hungary. In India, it is organic - based and derives inputs from agriculture and husbandry. The integrated fish farming is accepted as a property style of cultivation. Integrated fish farming serves as a model of sustainable way of production of food as integration of plants and water animal results in environmental diversity yields of various products and through biological and filtration water is re - used.

### Advantages of integrated fish farming

Advantages of integrated fish farming are clear. As far as fish production is concerned, it provides organic manure for the fish ponds and crops field, reducing the cost limit. Integrated fish farming plays a very important role for income generation of rural households.

### Different types of integrated fish farming

Generally, the integrated fish farming are two types

1. Agriculture - based fish farming
2. Live - stock fish farming.

In our country, approximately 14826322.89 acres of land are under rice cultivation but few percentages of land is now used for agriculture based fish farming. This type of fish farming has several advantages like as (a) land use for economic development, (b) low labour cost (c) improved rice production, and (d) the root for income generation for rural households and harvest many crops, vegetables and water animal such as fish and rice from water, and onion, bean, and sweet potato through cultivation on the mound. Within a year paddy fields preserve water for 3 - 8 months. Agriculture - based fish farming in India practised in the various states like as Bihar, West Bengal, Orissa and Assam where water availability is present in the paddy fields. This practice can be done in following

types of paddy plots 1. Perimeter type, 2. Central pond type and lateral trench type. For this type culture of fish in mixed with different rice varieties such as Panidhan, Tulsi, CR260 77, ADT 6, ADT 7, Rajarajan and Pattambi 15 and 16 are appropriate. These varieties not only for strong root systems but also are able of withstanding under flood condition. Additional with, their life span of 6 months and fish farming is probable for about four to five months after their transplantation. Harvesting is done when fish attain right size for marketing. The other types of integrated culture is horticulture - cum - fish farming which is another part of the agriculture based fish farming, which includes of orchard, vegetables and flowers on the mound according to ICMR version for nutritious development 85 kg fruits and 300 gm vegetables to consume daily. In rural areas the maximum women suffered in various disease like as anaemia, so the dwarf, seasonal, green, profitability and less shady like plants and vegetables are important for this type of farming like as *Carica papaya*, *Magnifera indica*, *Musa sp*, *Cocos nucifera*, *Citrus* for fruit crops and the vegetables like Brinjal, Tomato, Cucumber, Gourds, Chilli, Carrot, Radish, Turnip, Spinach, Peas, Cabbage, Cauliflower, Ladies finger. For income generation of rural household's floriculture is also profitable, the flower plantation on the bund can be used like as Rose, Jasmine, Gladiolus and Marigold. Agriculture based fish farming includes variety types of fish farming system like as mushroom - fish system, sericulture - fish system, fodder crop integration etc. Pulses and oil seeds crop can also be grown on the pond bund. Various kind of aquatic cash crops like as Makhana (*Euryale ferox*) and Singhara (*Trapa spp*) may also be done with fishes.

#### Live - stock fish farming

Integrated livestock - fish culture approach is the integration of fish farming with livestock and poultry birds in a design allowing wastes from one system to be used as inputs in another system, such as in poultry-cum-fish farming system the poultry bird's excreta provides a nutrient base for zooplankton and phytoplankton development. Approximately in 1 ha pond, 500 - 600 numbers of birds can be reared. The fish production obtained is about 5000 kg per hector with 1250 kg chicken meat and 70,000 numbers of eggs within a year. For one bird 0.3 - 0.4 square meter space are applicable. According to their age, the poultry birds (layers) are fed with starter, grower, and brooder feed. The state of Andhra Pradesh, Bihar, Haryana, Kerala, West Bengal, Uttar Pradesh, Maharashtra, Orissa, and Tamil Nadu in India practised this type of farming. In duck cum fish culture Indian runner and Khaki Campbell are more suitable for this type of farming. From this type of integrated farm-

ing system, it gives a total yield of about 3500 - 5000 kg fish, 18000 - 18500 eggs and 600 kg of duck meat. In India, such kind of farming system is commonly practised in the state viz. Tamil Nadu, Assam, Bihar, Andhra Pradesh, Tripura, Orissa, Karnataka, Kerala and Uttar Pradesh.

Rearing pig along with fish is another kind of integrated culture. 20 - 30 pigs' waste production is equivalent to 1 ton of Ammonium sulphate applied to the soil for reducing the soil fertility. Each pig spaces are requires 3 - 4 sq meter. Fish cum piggery culture are very common practiced in some European countries and china, Taiwan Vietnam, Malaysia, Thailand. The White Yorkshire, Hampshire and Landrace are important breed of pig for integrated fish farming. Rice bran, rice polish, wheat - bran, broken maize, ground - nut oil cake, fish - meal mineral mixture, salt etc are important foods for pig. 3000 - 4000 kg per hector in a year fish, 4500 kg per year pig meat and 800 no. of piglets in every year are provide from this system. Cattle and goat cum fish culture is a common practice all over the world. Cow and goat excreta are most important materials for organic farming and reduced soil fertility. For 1 hector pond About 5 - 6 cows can provide enough manure in addition to 9000 kg milk and about 3000 - 4000 kg of fish annually. For handling of cow manure cow - shed should be built near to fish pond and the 50 - 60 goats excreta contains organic carbon 60%, N: 2.7%, P - 1.78%, K - 2.88% and its urine is also equally rich in both N and P for 1 hector pond. For meat purpose the goat breeds are Jamanapari, Beetal, Barbari for milk and Bengal, Sirihi, Deccani are used. Berseem, Napier grass, Cowpea Soybean, Mulberry etc for goat's food. Without supplementary feeding and fertilizer this integration can provide 3500 - 4000 kg fish per hector in a year [1-7].

#### Conclusion

To be more economic and to retain greater profit margin in any farming system, it is always required to look for more sustainable and feasible means of culture practice. In this context, integrated farming system can be the most appropriate and suitable approach to replace the conventional methods of farming. As this form of farming system involved the utilization of different kinds of animals and plants, so it has the great scope of recycling the by - products of the organisms for production of the principal cultured species. Thus, in the process, the farming system becomes more cost effective leading to a lucrative venture and increasing higher profit margin. In a nutshell, it can be one of the best means to practice fish culture.

## Bibliography

1. Chan GL. "Integrated farming system. What Does Integrated Farming System Do". (2006.)
2. Othman K. "Integrated farming system and multi functionality of agriculture in Malaysia". *Acta Horticulture* 655 (2006): 291-296.
3. Sankhayan PL. "Introduction to the Economics of Agricultural Production". Prentice Hall of India Private Ltd., New Delhi (1998).
4. Verma AM. "Integrated fish farming with Makhana (*Eurale ferox*) Fishing chimes 14 (1994): 13.
5. Adiku., *et al.* "Assessing the performance of maize (*Zea mays* \*/ cowpea (*Vigna unguiculata*) intercrop under variable soil and climate conditions in the tropics". Proceedings of the Seventh Australian Society of Agronomy Conference, September, Adelaide, South Australia (1993): 382.
6. Naskar K. "A Short History and the Present Trends of Brackish water Fish Culture in Paddy Fields at the Kulti-Minakhan Areas of Sunderbans in West Bengal". *Journal of the Indian Society of Coastal Agricultural Research* 3 (1985): 115-124.
7. Das RN., *et al.* "Studies on Technology on Paddy-cum-Fish and Prawn Farming in Low Lying Coastal Zone of West Bengal" *Journal of the Indian Society of Coastal Agricultural Research* 14 (1996): 229-232.

**Volume 2 Issue 12 December 2018**

© All rights are reserved by Pratik Majumdar., *et al.*