



Integrated fish cum duck farming for sustainable livelihood of small and marginal farmers

Abhed Pandey and Abhishek Srivastava

Department of Aquaculture, College of Fisheries, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana (Punjab) India
(Email : pandeyabhed@yahoo.com)

Integrated fish farming is a combination of two or more farming systems such as fish-livestock farming, fish-agriculture/horticulture farming etc. The basic principle involved in integrated fish farming is complete utilization of farm wastes, which are recycled into the fish pond (as manure/fertilizer) to enhance its primary productivity. However, it has been found that recycling of wastes from dairy, poultry and piggery into fish ponds enhances the natural food of fish in the pond and it reduces the expenditure on supplementary feed by 25-100 per cent. Hence, there is an urgent need to create awareness among farmers to integrated fish farming with livestock and poultry to raise their income. Among the different integrated fish farming systems, fish-duck farming is one of the input cost system, suitable for small and marginal farmers. In integrated fish-cum-duck farming system, farmers can get enhanced productivity and additional food/nutritional security through fish/duck meat and egg production, higher income per unit area (economic benefits) and strengthening of rural economy involving small and marginal farmers. This type of low input practice provides regular income, risk coverage, food diversity and can help in doubling small and marginal farmer's income and for sustainable livelihood with due environmental considerations.

Fisheries sector has been recognised as a powerful income and employment generator besides providing nutritional security for the growing population of world. Integrated fish farming is a combination of two or more farming systems such as fish-livestock farming, fish-agriculture/horticulture farming etc. The basic principle involved in integrated fish farming is complete utilization of farm wastes, which are recycled into the fish pond (as manure/fertilizer) to enhance its primary productivity. It is a low input practice for achieving sustainable biomass harvest per unit area with due environmental considerations. In fish farming, supplementary feed costs more than 50 per cent of the input cost. However, it has been found that recycling of wastes from dairy, poultry and piggery into fish ponds enhances the natural food of fish in the pond and it reduces the expenditure on supplementary feed by 25-100 per cent. Hence, there is an urgent need to create awareness among farmers to integrated fish farming with livestock and poultry to raise their income. Among the different integrated fish farming systems, fish-duck farming is one of the input cost system, suitable for small and marginal farmers. In the integrated fish-cum-duck farming system both fish and ducks are benefitted, ducks make their way into the ponds during day time and release the droppings into the water. These droppings contain undigested grains that can be consumed by the fish and which is rich in nutrients and improves the

plankton production (ultimately fish production) through nutrient accumulation over a period of time. No additional fertilization/manuring and supplementary feeding is required for fish which reduces the fish production cost. Moreover, duck prey upon insects, tadpoles, larvae and small vegetation present in the fish pond water, which helps in cleaning the pond hence reduces the cost of duck feed. Ducks also act as bio-aerators, while swimming ducks aerate the pond water by the movement of their wings and webbed feet/palmate (paddling movement) thus helps in increasing the dissolved oxygen level in the pond water. In addition to fish, duck eggs and duck meat will also become available to the farmers as an additional source of income and provides economic as well as nutritional security to his family.

Fish farming technology:

Pre-stocking management: Fish pond is prepared by following the standard pre-stocking management practices such as dewatering, drying, removal of weed and predatory fishes and liming initially as well as at regular intervals, according to the pH of soil and water.

Stocking of fish seed and post stocking management:

- Culture requirements:
- Production/grow out pond: 1-5 acre
- Water source: Underground (tube well) or canal water
- Water depth:

- Production pond - 5-6 feet
- *Liming*: Depending upon pH of water
- Manuring/ fertilization: not required
- Culture system: semi-intensive poly culture
- *Species* : Indian major carps - catla, rohu, mrigal and exotic carps – silver crap, grass carp and common carp
- *Stocking size*: > 5 inches (fingerlings)
- *Stocking time*: April
- Fish rearing (without feeding)
- Carps [catla/silver carp (3): Rohu/grass carp (4): Mrigal/Common carp (3)] @ 4000- 5000 fingerlings /acre
- Water depth: 5-6 feet.

Duck rearing and management:

Duck house construction and management:

Duck house is generally constructed on the pond dyke in such a way that duck droppings fall directly into the pond. Ducks normally do not need elaborated house, as most of the time they remain in the pond and rest in the house only during the night. Ducks are quite intelligent and can be tamed easily to go to the pond and come back in duck house in the evening, of their own. Duck house may be made up of bamboo planks or any low cost locally available light material. Ramp is provided in house towards pond side, for ducks to go inside the pond and to come back in the duck house. There should be proper light arrangement in the duck house as ducks generally require 14-16 hrs light for good production. Proper ventilation and sanitation arrangements should also be provided in duck house. Duck house should be properly cleaned everyday and lime should be used regularly.

Selection of duck variety and stocking of ducks:

Around 80-120 good variety ducks are sufficient to fertilize one acre of fish pond. Khaki Campbell and Indian Runner are two important layer duck varieties having an egg laying

capability upto 300 and 250 eggs per year, respectively. The size of the duck house depends on the number of ducks to be stocked, housing 3-4 ducks/m² area.

Feed and feeding of ducks: Duck feed can be formulated by using locally available ingredients such as broken wheat (50%), millet/ barley (15%), oil cake (15%), rice bran (5%), fish meal (10%), lime stone (3%) mineral mixture (2%) for layers. In addition to this, vitamin and calcium supplements are provided regularly. Fresh *Azolla*/ duck weed (aquatic plants) can also be provided directly to the ducks as partial feed substitute. The protein level in the supplementary feed given to ducks depends on age/ stage of duck and accordingly, the quantities of ingredients are changed. Under integrated system, duck feed may be provided @ 80-100 g/bird/day, depending upon the rate of egg production and availability of *Azolla*/duck weed. Water should always be provided with duck feed, as duck feel difficulty in taking dry feed. For this, proper feeders and drinkers should be kept in duck house in adequate numbers and these should be kept clean and hygienic.

Egg laying: Ducks starts laying eggs after attaining age of 5 months. Generally ducks lay 95–98 per cent eggs in the morning, before 9.00 am, hence, after that duck are allowed to go into the pond.

Fish and duck health management: Following fish health management practices should be adopted.

- To check the fish health, fish sampling should be done regularly.
- Lime should be applied regularly, as per the pH of pond water. It prevents the infection and also maintains the water quality.
- In case of any symptom of fish disease, contact the expert immediately.
- Dead fish should be immediately removed from the pond and disposed off properly.



Fig. 1: Fish-cum-duck farming unit



Fig. 2: Male and female of Khaki Campbell



Fig. 3 : Duck egg

Ducks are quite hardy and more easily brooded. Few common duck disease are duck plague, duck viral hepatitis, duck cholera etc. To avoid any disease outbreak following precautions should be taken into the consideration.

- Maintain proper hygiene and stress free conditions
- Check entry of rodents, wild birds etc. in duck house
- Use lime regularly at the entrance of duck house
- Proper medication and vaccination of ducks
- Proper disposal of dead birds.

Precautions:

- Procure fish / ducklings from a reliable hatchery/ source
- Stock the pond with advanced fingerlings ($\geq 5''$) only
- Stock recommended number of ducks and fish
- Feed the ducks as per recommended regime
- Do not over feed and over manure /fertilize the pond. Follow scientific recommendations with special reference to suspension of manuring during winters, cloudy weather, low dissolved oxygen level and disease outbreak.
- Use commercial products (medicines, antibiotics, disinfectants etc.) only after expert advice
- Maintain proper water quality in terms of depth, pH, dissolved oxygen and HN_3 levels
- Get water samples of the pond checked from the nearest recognized water testing lab for managing the



Fig. 4 : Fish harvesting

water quality

- Keep proper hygiene for maintaining fish/duck health.

Production and economics:

- *Egg laying*: From the age of 5 months upto 3 years (250-300 eggs/year).
- *Duck culling age*: 3 years onwards.
- Water exchange for maintaining water quality.
- Profitability in integrated fish cum duck farming (without fish feeding).
- Fish production - 1.25-1.5 t/acre/year.
- Duck eggs - 7200-8800 eggs/acre/year.
- Duck meat - 180-240 kg duck meat/acre/year.

Conclusion: In integrated fish-cum-duck farming system, famers can get enhanced productivity (vertical expansion) and additional food/nutritional security through fish/duck meat and egg production (social benefits), higher income per unit area (economic benefits) and strengthening of rural economy involving small and marginal farmers. This type of low input practice provides regular income, risk coverage, food diversity and can help in doubling small and marginal farmer's income and for sustainable livelihood with due environmental considerations.

Received : 22.09.2018

Revised : 16.11.2018

Accepted : 24.11.2018

AGRICULTURE UPDATE

An International Journal of Agricultural Extension

RNI :UPENG/2006/16372

ISSN : 0973-1520

Accredited By NAAS : NAAS Rating : 4.39

visit : www.hindagrihorticulturalsociety.co.in; www.researchjournal.co.in