



Integration of Fish with Poultry Farming for Increasing Production, Maximization of Profit and Resource Conservation

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Abstract

Integrated Fish cum Poultry Farming emerges as a sustainable and synergistic agricultural approach, blending over 1500 years of Asian history with modern practices. Rooted in the concept of waste as a misplaced resource, this integrated farming system optimizes the relationship between diverse agricultural activities, enhancing the efficiency of marginal and small farmers. The integration of poultry and fish farming, where poultry droppings become feed materials for fish, have a mutually beneficial mechanism. This method not only saves on fertilizer and supplementary feed costs but also addresses waste management through the effective recycling of by-products. The system contributes to rural development by generating income, empowering women and ensuring livelihood security. Housing structures, bird selection, feeding practices and health care measures are intricately woven into this model, fostering efficient resource utilization. This integrated model stands as a promising solution for resource-poor rural communities, combining nutritional security with sustainable livelihood.

Keywords: Farmer, Integrated Fish cum Poultry Farming, Rural Development, Sustainable

Introduction

Integrated agriculture-aquaculture boasts a rich history spanning over 1500 years in Asia, particularly in India. At its core, the principle on which the integrated farming operates is that 'there is no waste'. It means that waste can be repurposed as valuable input for other components. The fundamental tenets of the integrated farming system revolve around harnessing the synergistic effects of interrelated farm activities and conserving resources, emphasizing the comprehensive utilization of farm wastes. It has been observed that, Fish cum Poultry farming enhances the efficiency of marginal and small farms. Poultry constitutes a rapidly growing segment of India's agricultural sector, with a total poultry population of 851.81 million (Anonymous, 2023). The demand for poultry and its products is remarkably high in India, devoid of ethical concerns. The launch of improved breeds, strains and varieties of poultry indicates a rising trend in its production (Bharali *et al.*, 2020). Poultry has evolved into a popular rural enterprise across various

states due to its multifaceted benefits, producing not only eggs and meat but also high-value manure. Integrated poultry based farming shows great potential in offering substantial opportunities for increased returns, empowering women, and ensuring livelihood security for rural families. This farming approach showcases remarkable efficiency in utilizing resources, ensuring that waste or by-products from one component are efficiently recycled. Moreover, it promotes optimal utilization of the existing farming space, thereby improving overall production.

Poultry cum Fish Farming

Fish and Poultry Farming is a comprehensive system that amalgamates fish farming and poultry farming. In this arrangement, fish rely on poultry droppings or deep litter materials as their primary feed. The underlying concept of integrated poultry and fish farming aims to establish a symbiotic system that maximizes productivity through optimal resource utilization (Figure 1). In the Indian

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Figure 1: Photograph representing Integrated Fish cum Poultry Farm unit

context, this freshwater fish culture system has gained prominence due to its potential contributions to organic waste recycling, income generation, meeting human nutritional needs and fostering overall rural development. The significant advantages of poultry and fish farming include cost savings on fertilizer and supplementary fish feed, simultaneous production of fish, eggs and meat at the same location and time, fulfilling both nutritional requirements and serving as a source of income for farmers. Poultry manure plays a crucial role as an excellent support system for the growth of photosynthetic organisms. With high phosphorus and nitrogen content, poultry manure serves as an effective fertilizer. According to Banerjee *et al.* (2014) the presence of poultry manure in ponds creates a nutrient-rich environment, fostering the development of phytoplankton and nano plankton, which, in turn, supports intense zooplankton growth. In the integrated system, fish directly consume animal wastes, undigested food particles and spilled food, with the leftover waste serving as nutrients for microorganisms, subsequently consumed by the fish or invertebrate fish food organisms (Misra *et al.*, 2019). The semi-digested excreta of the fish become the food for bottom feeders. Prior to restocking the pond, proper detoxification is essential. Integrated poultry and fish farming can be carried out in two methods. The first method, "Direct integration," entails raising poultry birds in pens positioned over the pond, with perforated floors that enable poultry droppings to directly fall into the pond where fish are cultivated. On the other hand, the second method, "Indirect integration," involves raising poultry birds using a deep litter or wire floor system in pens situated over the pond embankment (Anonymous, 2017). The deep litter droppings are collected and applied to the pond each day at a predetermined dose by manual means.

Housing System

The construction of the poultry shed presents flexible options, whether positioned over the pond or on its embankment. Various roofing materials, such as thatches, bamboo, tin, or asbestos sheets can be employed for the construction of the poultry shed. Maintaining effective cross-ventilation is crucial, necessitating a width not exceeding 9 m. The recommended height ranges from 2.1-2.4 m at the sides to 3.0-3.3 m at the centre. To ensure proper hygiene and ventilation, the floor of the house requires perforation

with a mesh size of 4-6 cm², positioned at 1.2-1.5 m above the highest water level of the pond. The space requirement is approximately 0.3-0.5 m² bird⁻¹ (Anonymous, 2017).

Stocking Rates of Birds and Fingerlings

Maintaining 500 to 600 birds is sufficient to fertilize a one-hectare fish pond (Anonymous, 2017). For meat and egg production, dual-purpose birds like Vanaraja, Gramapriya, or kuroiler are suitable, while the white leghorn is recommended for egg production within this integrated system. Fish stocking rates vary, with a suggested ratio including Silver carp 20%, Catla 20%, Rohu 25%, Grass carp 10%, Mrigal 20% and Common carp 5% (Anonymous, 2017). Farmers must diligently manage stocking rates and ratios to minimize pond overcrowding.

Feeding

A carefully planned feeding regimen includes providing grower mash to the 9-20 week age group at a rate of 50-70 g bird⁻¹day⁻¹, while birds above 20 weeks receive layer mash at 80-120 g bird⁻¹day⁻¹. A constant supply of feed and water should be available to all birds at all times. Layer birds are fed with starter ration for 0-8 weeks, grower ration for 8-20 weeks and brooder ration from 20 weeks onwards. Broilers are reared with starter ration for 0-4 weeks and finisher ration from 4-6 weeks.

Health Care

To maintain a healthy environment, disinfection of the poultry shed and equipment is essential before introducing a new flock. Birds should be vaccinated against some common diseases such as Marek's Disease, Ranikhet disease and Infectious Bursal Disease at the appropriate age. Ensuring proper hygiene in and around the farm complex helps control bacterial diseases like Salmonellosis, Coryza and fowl cholera. In cases of mild infection, the administration of broad-spectrum antibiotics may be applicable.

Production

Integrated Poultry cum Fish Farming has the potential to yield approximately 4500-5000 kg of fish, 690 kg of meat and over 120,000 eggs with a Benefit Cost Ratio (BCR) of 1.43 hectare⁻¹ of water body (Anonymous, 2017).

Conclusion

Rural folk are usually under-nourished, unemployed and under developed. They not only need large supplement of animal protein in their diet, but also need a new sources of profitable employment for their overall development. In rural areas, our approach must focus on sustaining their natural resources, increasing resources efficiency, boosting productivity and profitability, improving quality and competitiveness by reducing the unit cost of production from their agricultural and allied activities. In this context the integrated poultry cum fish farming offers opportunities to resource poor families at marginal financial investments. This type of farming system can help rural people to tackle with the issues related to livelihood generation and nutritional security at the gross root level. This integration contributes to meeting human demand for meat, egg and fish as a food source, mitigating poverty through income generation,

thereby promoting rural development.

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