

POND-BASED INTEGRATED FARMING SYSTEM

Santosh Onte*, Naveena K and Sarathjith M.C

Centre For Water Resources Development and Management, Kunnamangalam, Kozhikode
Kerala 673 571

**Corresponding author email: ontesantosh@gmail.com*

ABSTRACT

Farming is subjected to several biotic and abiotic factors. Ever increasing population and shrinking land holding is another issue of concern for food security in rural India. Adoption of the farming system based on location specificity may play a big role. Generally available farm ponds in rural areas act as a collection point of rainwater to recharge groundwater through infiltration and are also utilized for livestock and fisheries. An integrated agricultural system based on ponds may serve to boost job prospects, income, and crop yield. Consequently, integrated farming systems provide a solution to the issues of food and land crises and also help to enhance the farmers' quality of life.



INTRODUCTION

In India, the factor productivity is declining which is a serious concern resulting in a decline in per capita food availability in rural areas. This issue can be partially resolved by pond-based integrated farming. The management and conservation of soil and water resources, used for various farm needs are greatly aided by farm ponds. Farm ponds are water harvesting structures formed by the construction of a small embankment across a field waterway or by excavating a dugout. These are mainly used for farming, flood control, recreational purposes, drinking, fishing, watering livestock, fire control etc. Integrated Farming System (IFS) represents an appropriate mix of farm enterprises like horticulture, livestock, fishery, forestry, poultry *etc.* and the means available to the farmer to raise their profitability. It is a decision-making unit for a whole farm management system to deliver more sustainable agriculture to transform the land, capital and labour into useful products, which can be consumed or sold for surveillance. Integrated Farming involving aquaculture has been broadly defined as the concurrent or sequential linkage between two or more activities, of which at least one would be aquaculture. Here, the benefits of integration are synergistic rather than additive; and the fish, livestock, agriculture or other suitable components may benefit to varying degrees. In India,

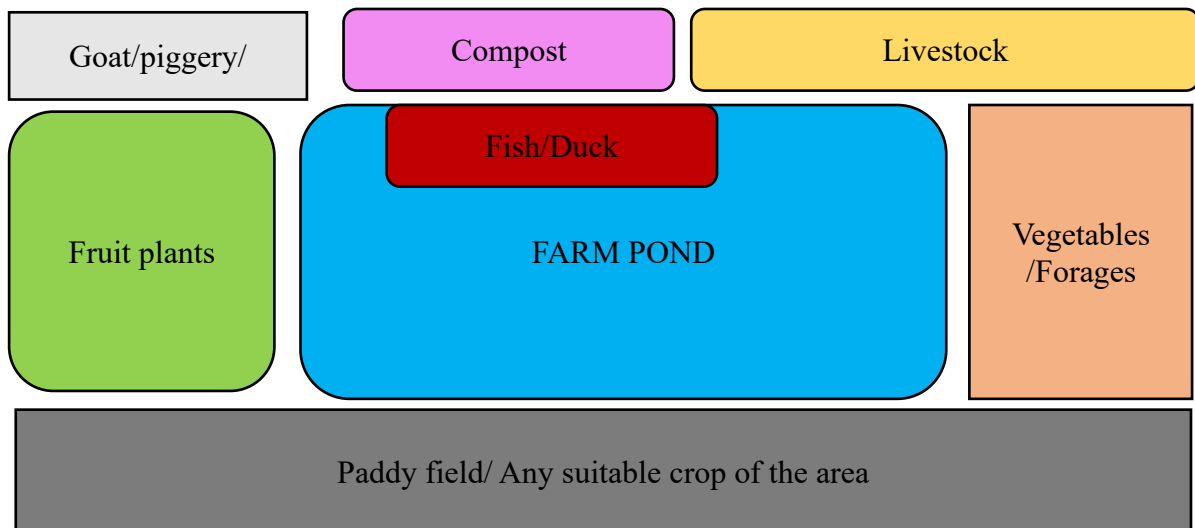
this kind of farming derives inputs chiefly from agriculture and animal husbandry which consists of the culture of fish combined with the husbandry of domesticated animals such as pigs, ducks, poultry, cattle, etc. as well as small horticulture on the dykes or over scaffolds around the ponds. In the face of the shrinking average size of landholdings, balanced growth in the state necessitates more equitable and efficient utilization of its land resources.

In terms of water storage, farm ponds are one of the best options for capturing extra runoff. They are mainly used for farming, drinking, fishing, fire control, cooking etc. By raising the water level in wells, these structures aid in groundwater conservation. Producing a variety of food crops through pond-based integrated farming helps to address the hunger issue. It also helps to improve the living standards of farmers by increasing crop production, job opportunities, high-income levels, etc. Farm ponds are considered life-saving irrigation of crops. It provides protective irrigation in times of delayed monsoons. Farm ponds have more effect on microclimate. These structures can be used in all watersheds with suitable modifications depending on soil types and slopes

SYSTEM APPROACH

A farming System is an approach to agricultural research and development that view the whole farm as a system and focus on 1) the interdependencies between the components under the control of members of the household and 2) how these components interact with each other in respect of physical, biological and socio-economic factors, not under the household's control (Shaner *et al.*, 1982). Indian economy is predominantly rural and agriculture oriented where the marginal and small farmers constitute 76.2% of the farming community. Due to the failure of the monsoon, the farmers are forced to judicious mix up agricultural enterprises like dairy, poultry, pigeon, fishery, sericulture, apiculture etc., suited to their agro-climatic and socio-economic condition.

MODELS



BENEFITS

Pond-based integrated farming, in addition to increasing production and profit, also aided in the utilisation of family labour and decrease labour costs. The bonds between family members are also strengthened as a result men and women worked together to prepare trellises, clean ponds and their surroundings, harvest and sell fish and vegetables, and other tasks. It displays gender parity. Pond-based integrated farming management provides a way to address the growing food demand and the diversification of dietary preferences. Additionally, integrated farming contributes to the sustainability of poor farmers' livelihoods. Pond-based integrated farming was a great method for generating money for rural households with limited resources and ensuring sustainable output with no labour costs.

RESEARCH EVIDENCE

Farming in the eastern Himalayan region of India is a high-risk activity due to climatic uncertainty, lack of resources for small and marginal farmers and non-adoption of improved technologies. Pond-based integrated farming system (IFS) is a whole farm approach that aims to increase production, employment and income through the integration of various farming enterprises (rice, vegetables, fruits, fish, pigs, poultry, goat and others) as per climate, social acceptability and market demand. Eleven farm pond-based IFS models were evaluated in 150 farmers' fields covering a 22.5 ha area in the South Garo Hills district of Meghalaya, India during 2009–14 in a participatory approach. The individual farming system unit considered in the present study was 0.15 ha. The study revealed that the productivity and income of farmers under pond-based IFS improved substantially over farmers' practice. The Sustainable Value Index and System Economic Efficiency of IFS models 6 and 8 (6 (pond + rice + vegetables + pig integration, 4.04 Mg) followed by model 8 (pond + vegetable + pig + fruit integration, 4.02 Mg)) were much higher than other models. The overall results revealed that pond-based IFS has the potential to provide year-round food, nutrition, and employment opportunities and substantially increase the income of resource-poor rural households of the study region in Eastern Himalayas, India (Das *et al.*, 2021)

Pond-based farming is beneficial in increasing farm income, creating employment opportunities and improving soil health. The system is useful in minimizing risk, encouraging biodiversity, and improving the ecosystem as a whole. Farmers can get fresh, nutritious and balanced food for a healthy lifestyle. The promotion of a large number of such systems may act as a series of miniature water and nutrient harvesting structures for harvesting the costly plant nutrients, organic matter, soil and water, which would otherwise be dumped into the sea. With global warming and climate change, a more departure in frequency, intensity and amount of rainfall is expected and thus, the utility of these miniature structures may assume greater importance in future, especially in tropical climatic regions (Rautaray *et al.*, 2012).

CONCLUSION

Farming is subjected to several biotic and abiotic factors. Ever increasing population and shrinking land holding is another issue of concern for food security in rural India. Adoption of the farming system based on location specificity may play a big role. Generally available farm ponds in rural areas act as a collection point of rainwater to recharge groundwater through

infiltration and are also utilized for livestock and fisheries. An integrated agricultural system based on ponds may serve to boost job prospects, income, and crop yield. Consequently, integrated farming systems provide a solution to the issues of food and land crises and also help to enhance the farmers' quality of life.

REFERENCES

- Das, A., Datta, D., Samajdar, T., Idapuganti, R. G., Islam, M., Choudhury, B. U., ... & Yadav, G. S. (2021). Livelihood security of small holder farmers in eastern Himalayas, India: Pond based integrated farming system a sustainable approach. *Current Research in Environmental Sustainability*, 3, 100076.
- Rautaray, S. K., Mishra, A., Mohanty, R. K., Verma, O. P., Behera, M. S., & Kumar, A. (2013). Pond based integrated farming system for yield stability in rainfed areas under aberrant weather conditions. *Natural Resource Conservation: Emerging Issues & Future Challenges*, 383-388.
- Singh, N. D., Sarkar, A., Biswas, P., Pal, P., & Upadhyay, A. D. (2018). Pond Niche Based Integrated Farming: A Case Study in Tripura, India. *International Journal of Bio-resource and Stress Management*, 9(3), 359-364.
- Van Brakel, M. L., Morales, E. J., Turingruang, D., & Little, D. C. (2003). Livelihood improving functions of pond based integrated agriculture and aquaculture systems. MRC Fisheries Programme (FP). Institute of Aquaculture, University of Stirling, Scotland, UK.
