Smart Aquaculture - The Way Forward

Vinod Kumar Yadav*

Department of Social Science, ICAR-Central Institute of Fisheries Education, India

*Corresponding Author: Vinod Kumar Yadav, Department of Social Science, ICAR-Central Institute of Fisheries Education, India.

Introduction

Aquaculture is a globally fast-growing food sector, and its economic significance is increasing consistently. India has massive potential in aquaculture resources, but the overall production is not impressive as, in most places, traditional farming practices are commonly used (Kathia et al., 2005). The disease management approach in traditional farming is very poor. Earlier studies found that, on average, 10-15% of the total production was destroyed due to the disease occurrence in freshwater farms (Geetha et al., 2022).

Also, water quality parameters including temperature, DO, pH, ammonia, total dissolved solids (TDS), nitrates, salinity, and alkalinity play a crucial role in monitoring the fish health, feed utilization, growth rates, and carrying capacities and ultimately reducing the production cost and improve product quality (Hart and Reynolds, 2008). Regardless of the kind of water available or the species chosen, all fish depends entirely on the water to live, eat, grow and perform other bodily functions. A proper study on water parameters gives a clear idea that a specific fish can be grown in a particular season. Aquaculture planning is one of the key ideas which drive farmers and vendors to plan for culturing the fishes. Currently, the entities like monitoring, site selection, data gathering, and analysis provide complete information to have an aquaculture resource planning (ARP) system.

Also, the Pradhan Mantri Matsya Sampada Yojana (PMMSY) schemes have recently been launched to bring the "Blue Revolution" in India and sustainable development of the fisheries sector. The major objectives of this scheme are the followings.

1. Increase the fish production from 13.75 MMT (2018-19) to 22 MMT by 2025.
2. Increase the total Gross value added (GVA) contribution from 7.28% to 9%.
3. Doubling the export earnings from Rs 46,589 crores to Rs 1 Lakh crore.
4. Decrease the post-harvest loss from 25 % to 10%.
5. Increase the domestic fish consumption from 5 kg to 12 kg.
6. Increase the fisherman's income.

For fulfillment of these objectives, traditional farming practices are unable to meet the future demand, and intervention of smart aquaculture practices is highly required (Kathia et al., 2005). To cope with providing increased yields while maintaining sustainable fish populations, Artificial Intelligence (AI) and the Internet of Things (IoT) create both new opportunities and a series of challenges for information and data processing in aquaculture. Digital platforms based on AI and IoT is aiming to change the current scenario of aquaculture. The platform integrates wireless sensor network (WSN) nodes to extract the data and connect it to a cloud data server. A centralized database is created to store the information/data, which is analyzed using different machine learning techniques. The platform monitors farm operations and works in real-time for culture analysis. Real-time aquaculture monitoring can minimize economic losses due to mismanagement and disease spreading. Also, aqua farmers will be benefited in managing the optimized food, disease prediction, managing environmental risks, and in turn, increasing business revenues.

References

1. Geetha R., et al. "Farm-level economic cost of *Enterocytozoon hepatopenaei* (EHP) to Indian Penaeus vannamei shrimp farming". Aquaculture 548 (2022): 737685.
2. Hart PJ and Reynolds JD. "Handbook of fish biology and fisheries: fisheries". John Wiley & Sons (2008).
3. Pradeep Katiha., et al. "Inland aquaculture in India: Past trend, present status, and future prospects". Aquaculture Economics & Management 9.1-2 (2005): 237-264.

Volume 3 Issue 1 July 2022