

### Phase 2: Stocking and Feeding

Focus on culture of fish fingerlings into the raceway at an optimal stocking density of 15,000 per raceway (~63 fish/m<sup>3</sup>). Feeding will be done using a high-protein floating feed (>28% protein fish feed) with an estimated Feed Conversion Ratio (FCR) of 1.0-1.5 to ensure efficient growth. Regular monitoring of water quality parameters such as dissolved oxygen, pH, and ammonia levels will be conducted, along with routine health checks to prevent any disease outbreaks.

### Phase 3: Growth and Harvesting

Daily monitoring of water quality will continue to maintain optimal growth conditions. Parameters such as dissolved oxygen levels, pH balance, and ammonia concentrations will be assessed weekly. Once the fish reach a marketable size of 1.0-1.5 kg per fish, harvesting will commence to ensure maximum profitability. The harvested fish will be processed and marketed through local fish markets and wholesale buyers, ensuring a steady revenue stream. This phase will be repeated in the second year, maintaining the production cycle for continuous fish supply and financial sustainability.

**Conclusion:** By encouraging the adoption of advanced fish farming techniques, IPRS will contribute to the long-term growth of Manipur's aquaculture industry while aligning with government in modernizing fish farming, ensuring higher efficiency, environmental sustainability, and economic benefits for the region.

## Introduction of in Pond Recirculatory/Raceways (IPRS) of Fish Farming

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## Introduction

Aquaculture is an important food sector in India, contributing significantly to food security, employment, and economic development. However, traditional pond-based fish farming faces challenges such as low production rates, inefficient feed utilization, poor water quality management, and disease outbreaks. To overcome these challenges, the In-Pond Raceway System (IPRS) has emerged as an advanced aquaculture model that maximizes fish production while ensuring optimal water and feed management.

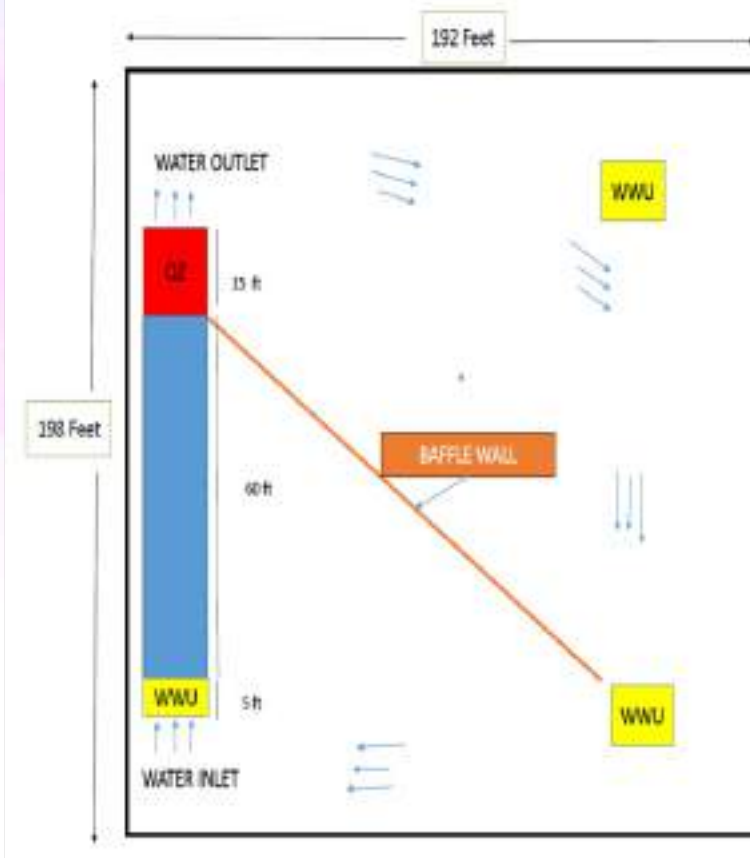
### *In-Pond Raceway System (IPRS): An Overview*

The In-Pond Raceway System (IPRS) is a modern aquaculture technology that enables high-density fish culture by utilizing controlled water flow, aeration, and waste removal systems. Unlike traditional pond culture, IPRS ensures better water quality, improved feed conversion, and higher survival rates through its White Water Unit (WWU) and Quiescent Zone (QZ), which help in waste removal and water recirculation. This system is cost-effective, environmentally sustainable, and highly productive, making it ideal for boosting aquaculture in Manipur.

### *Importance of IPRS in Manipur*

, Manipur has abundant water resources and a rising demand for fish, making it an ideal location for IPRS-based aquaculture.

Traditional pond farming in the region often results in low productivity, high mortality, and inefficient resource utilization, limiting economic potential. IPRS can increase fish production by more than 10 times compared to conventional methods while ensuring better water quality management and reduced environmental impact. The use of WWU and QZ in IPRS enhances waste removal efficiency, reduces disease outbreaks, and improves feed conversion, ensuring higher profitability. Additionally, IPRS aligns with future aquaculture development programs, making it a viable and sustainable investment.



## Implementation Plan

The plan may be implemented in three-phased manner over the stipulated period to ensure smooth execution and optimal results.

### **Phase 1: Site Selection and Construction**

Land preparation and pond excavation will be carried out to create a suitable environment for the In-Pond Raceway System (IPRS). The IPRS farm for a single raceway constructed within an existing one-acre pond (around 2, 328, 096 cubic meters at with 6.0 feet depth). The raceway will have dimensions of approximately 60 ft × 15 ft x 6 ft (5400 cubic feet), providing an optimal depth for fish culture. The structure may be built using reinforced concrete and HDPE lining to prevent seepage and ensure durability. A continuous water flow system will be maintained using paddlewheel aerators and diffused aeration units, providing oxygenation and waste removal. The White Water Unit (WWU) will facilitate solid waste separation, while the Quiescent Zone (QZ) at the outlet will allow further sedimentation of waste before the water is re circulated in the main pond or discharged outside. The pond surrounding the raceway will act as a secondary production area, where species such as tilapia or filter feeder carps will be stocked to utilize the nutrients from the effluent water and for secondary fish production.