



# Multiponics System

## Technical Brief

Ref No: TechBrief/2025/12

### Technology Summary

The Multiponics System is an automated integration of aquaponics (fish farming) and hydroponics (soil-less cultivation) designed to create a sustainable ecosystem for both aquatic animals and plants. The system uses an array of sensors and controllers to maintain optimal conditions, automate feeding, regulate water flow, and prevent pollution. Powered by solar energy, it reduces manual effort and ensures efficient use of resources. The system is under the patent process.

### Background

Conventional agriculture often relies on excessive water use, chemical fertilizers, and labor-intensive practices. At the same time, aquaculture and hydroponics are typically developed in isolation, limiting their efficiency. The Multiponics approach combines both systems to maximize resource recycling, reduce input costs, and minimize environmental impact. This integrated model addresses challenges of urban farming, resource scarcity, and sustainable food production.

### Technology Description

The Multiponics system uses sensors for pH, water flow, temperature, water level, and nitrate concentration to continuously monitor environmental conditions. Based on sensor feedback, actuators automatically adjust fish feeding, water circulation, and pumping rates. A real-time alerting and display system informs users of critical changes. Solar panels provide the required power for motors and processors, making the system energy-efficient and sustainable. Both soil and soil-less modules can be integrated for plant cultivation, creating a versatile farming solution.

### Market Potential / Proposed Deployment

- Global Hydroponics Market: USD 12B+ by 2030 | CAGR > 11%
- Target Sectors: Urban farming startups, agri-tech companies, universities, FPOs.
- Socio-Economic Impact:
- Efficient food production in resource-scarce urban areas.
- Reduced dependency on chemical fertilizers.
- Empowerment of small-scale farmers and households with sustainable farming models.



### Applications

- Urban Farming: Sustainable production of vegetables and fish in small urban spaces.
- Agriculture R&D: Model system for studying sustainable cultivation practices.
- Education & Training: Demonstration tool for universities and skill-development programs.
- Household/Farm Use: Small-scale food production system for homes and communities.

### Value Proposition

- Integrated Solution: Combines aquaponics and hydroponics in one system.
- Automation: Reduces manual effort through real-time monitoring and automated control.
- Resource-Efficient: Recycles water and nutrients for sustainable farming.
- Renewable Power: Solar-powered design lowers operating costs.
- Scalable: Can be adapted for both small and large-scale operations.

### Technology Status

- Technology Readiness Level (TRL): 6-7 (Prototype with patent filed)
- Testing: Functional prototype developed and validated in controlled conditions.
- IP Status: Patent under process.

