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## **Sustainability and Safety in India's Fish Supply Chain: A Case Study on Vridhi Techno Farms Pvt. Ltd.**

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### **Abstract**

Fish has long been a key source of affordable, high-quality protein in India, particularly in coastal and riverine regions (FAO, 2022). However, the rapid expansion of inland fisheries and intensive aquaculture driven by urban demand, population growth, and export orientation has disrupted traditional production systems (Government of India, Ministry of Fisheries, 2020). The increased use of artificial inputs, including antibiotics and commercial feeds, combined with rising contamination of water bodies, has raised serious concerns regarding food safety, public health, and environmental sustainability (FSSAI, 2021; CPCB, 2020). Evidence of food-borne infections, toxin bioaccumulation, and antibiotic resistance has intensified scrutiny of aquaculture practices, creating a paradox in which fish remains nutritionally essential yet increasingly distrusted by consumers (WHO, 2022; FAO, 2021).

This case examines the challenges arising from a non-transparent fish supply chain and their implications for human health, livelihoods, and sustainability. It analyses the response of Vridhi Techno Farms Pvt. Ltd., a social impact startup implementing a fully traceable, residue-free fish supply model, and invites discussion on the economic scalability and strategic viability of such interventions in India's highly price-sensitive food market (Porter and Kramer, 2011; McKinsey & Company, 2021). The case is based on primary data collected through interviews with Mr. Vasukumar, Founder of Vridhi Techno Farms Pvt. Ltd.

**Keywords:** *Fish supply chain; Food safety; Traceability; Aquaculture; Social entrepreneurship; India*

### **Introduction: When Food Systems Drift from Health**

For centuries, food functioned as humanity's first line of medicine. In India, traditional diets were closely aligned with local ecology, seasonal availability, and nutritional balance. However, over the past few decades, food systems have undergone a structural transformation driven by urbanisation, industrialisation, and scale-oriented production. This shift has coincided with a rise in lifestyle-related non-communicable diseases (NCDs) such as diabetes, cardiovascular ailments, obesity, and thyroid disorders. According to public health estimates, nearly 68 percent of deaths in India are now attributed to NCDs, many of which are linked to nutrition and food quality (WHO, 2022; ICMR).

Fish presents a striking paradox within this context. Traditionally regarded as one of India's most affordable and nutritious protein sources rich in omega-3 fatty acids, essential vitamins, and high-quality protein it is widely recommended across age groups. Simultaneously, growing concerns

regarding contamination, antibiotic residues, heavy metals, and microplastics have weakened consumer trust. The issue lies not with fish as a food source, but with fragmented and opaque supply chains that transport fish from water bodies to urban households. It is within this contradiction between nutritional necessity and food safety anxiety that **Vridhi Techno Farms Pvt. Ltd. (VTF) emerged.**

Founded in 2020 in Coimbatore, Tamil Nadu, Vridhi Techno Farms positions itself as a purpose-driven agri-enterprise seeking to restore trust in food systems. Supported by the **Ministry of Fisheries and Animal Husbandry through the National Fisheries Development Board and registered under the Department for Promotion of Industry and Internal Trade (DPIIT)**, the company addresses a systemic challenge often overlooked in Indian agri-business discourse: consumer trust in food safety.

### **The Founder's Lens: Identifying The Right Problem**

At the centre of Vridhi Techno Farms is its co-founder, Mr. Vasukumar, whose entrepreneurial philosophy is grounded in problem identification rather than solution mimicry. According to the founder, entrepreneurship is less about finding sophisticated solutions and more about defining the correct problem. Once a problem is clearly articulated, solutions can emerge through people, processes, or accessible technologies.

Rather than replicating popular business models, Mr. Vasukumar focused on addressing root causes within the food and agriculture ecosystem. In his assessment, issues such as pricing inefficiencies or logistics bottlenecks are secondary to deeper structural problems contaminated ecosystems, broken supply chains, and the gradual normalisation of unsafe food practices. Equally central to his philosophy is the belief that organisational values shape customer outcomes. As articulated by the founder, protecting employees and partners is a prerequisite to protecting consumers, positioning trust and ethics as strategic assets rather than abstract ideals.

### **The Problem Space: A Public Health and Trust Deficit**

VTF was conceived not in response to an agricultural productivity gap, but to what its leadership identifies as a public health and trust deficit. Rapid urbanisation, population growth, and export-driven incentives have accelerated intensive aquaculture practices across India. Inland fisheries increasingly rely on artificial feeds, antibiotics, pesticides, and growth enhancers, while water bodies face mounting pollution from industrial effluents, agricultural runoff, untreated sewage, and plastic waste (CPCB, 2020; FAO, 2021).

These conditions result in the accumulation of toxic residues within aquatic organisms, which subsequently enter human food chains. Concerns related to food-borne infections, antibiotic resistance, and long-term exposure to heavy metals have been highlighted by health and food safety authorities (FSSAI, 2021; FAO, 2021). Despite these risks, consumers remain largely disconnected from the origins of their food. Fish often travels through extended networks of intermediaries, characterised by limited traceability and inconsistent quality checks.

This disconnect produces a fundamental contradiction. Fish continues to play a critical role in addressing protein deficiencies, particularly among urban populations, yet its safety is increasingly questioned by health-conscious consumers. For VTF's leadership, the erosion of trust rather than competitive intensity or price pressure represents the most significant long-term threat to the food sector.

### **Why Techno Farming? Sustainability Through Control and Traceability:**

Vridhi Techno Farms deliberately moved away from conventional aquaculture models in favour of techno-farming systems. The leadership contends that traditional practices face declining viability over the next decade due to climate volatility, water scarcity, and ecosystem degradation (FAO, 2021). Techno farming enables controlled production environments, optimised resource utilisation, reduced contamination risks, and improved yield predictability.

More critically, it enables end-to-end traceability. Each stage from breeding and feed management to harvest and last-mile delivery can be documented, monitored, and audited. For VTF, traceability functions not merely as a compliance mechanism but as the foundation of consumer trust. The company's strategic assumption is that as healthcare costs rise and awareness of lifestyle diseases increases; consumers will prioritise food safety and nutritional integrity over short-term price considerations.

### **Industry Structure and Latent Demand**

Contrary to common assumptions, VTF's leadership argues that the principal barriers to building safe food systems are neither technology nor capital, but limited problem comprehension. Many new entrants replicate visible formats such as organic brands, cafés, or premium food labels without addressing underlying concerns of contamination, traceability, or nutrition.

As a result, the market remains underserved rather than saturated. The lack of explicit demand reflects limited consumer awareness rather than absence of need. Early indicators of change are visible among young, urban consumers in cities such as Bengaluru and Chennai, who increasingly question food origins, pricing logic, and safety standards. This emerging consciousness signals a potential structural shift in the food industry.

### **Operations, Cost Structures, And Execution Challenges**

Operating a techno-farming enterprise in India presents significant operational and financial challenges. Key cost drivers for VTF include land acquisition, electricity, specialised technology, and skilled labour. To remain economically viable, techno farming must deliver yields that are substantially higher than traditional methods, while simultaneously reducing wastage and intermediary margins.

Daily operations involve managing power reliability, infrastructure constraints, logistics coordination, and talent acquisition. Despite rising educational attainment, skill readiness remains uneven, necessitating continuous workforce training. Biological variability further complicates quality consistency, reinforcing operational risk.

During periods of heightened uncertainty, the founder relies on a structured crisis-response approach Think, Plan, Act, Execute prioritising stabilisation before strategic recalibration. These experiences underscore the fragility of agri-entrepreneurship and the emotional dimensions of financial risk.

### **Trust, Consumers, And the Direct-To-Consumer Strategy**

VTF has adopted a direct-to-consumer (D2C) model to shorten the distance between producer and consumer. The leadership believes systemic change in food systems can occur only when consumers actively demand transparency and safety. Early adopters of VTF's offerings include medical professionals, researchers, and informed consumers who value evidence-based nutrition over price sensitivity.

Building trust in a low-trust environment requires consistency over time. For VTF, trust is cultivated through reliable quality, transparent communication, and service dependability rather than marketing narratives.

### **Strategic Tensions and the Decision Point**

As Vridhi Techno Farms scales its operations, it faces a strategic crossroads. Scaling rapidly could reduce unit costs and expand access but may strain quality controls and consumer education efforts. Conversely, prioritising deeper consumer engagement and technological refinement could strengthen trust but slow expansion in a price-sensitive market.

The central decision confronting the firm is whether to pursue growth-led cost efficiencies or trust-led market development and whether it can balance both without compromising its core purpose.

### **Case Discussion**

Vridhi Techno Farms represents more than a commercial venture; it reflects an attempt to rebuild trust in food systems through technology, ethics, and transparency. The case invites discussion on whether purpose-driven agri-enterprises can scale sustainably within emerging markets characterised by cost sensitivity and institutional complexity. Ultimately, the case challenges readers to evaluate entrepreneurship not solely through financial outcomes, but through its capacity to address systemic societal problems.

How should Vridhi Techno Farms balance its commitment to food safety and traceability with the need to scale operations in a highly price-sensitive Indian market?

To what extent can consumer education and trust-building act as a competitive advantage for VTF, and how sustainable is this advantage as competitors adopt similar narratives?

What strategic trade-offs does VTF face between rapid expansion, technological investment, and maintaining consistent quality standards across its supply chain?

In a low-trust institutional environment, what role should entrepreneurs, policymakers, and consumers each play in rebuilding trust in food systems?

Should VTF prioritise deepening its direct-to-consumer model or explore partnerships with institutional buyers (such as hospitals, hotels, or retailers) to accelerate growth? Why?

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