Aqua Hatch: Climate-Resilient Aquaculture in Pakistan

Every year, aquaculture farmers in Southern Sindh face an uphill battle. Floods, temperature swings, water scarcity, and disease outbreaks threaten their livelihoods. Many rely on imported fish seedlings, which often fail to survive, leaving families with unstable incomes and communities with reduced access to local protein sources.

Pakistan produces around 200 million fish seedlings annually, but local demand is 330 million. The shortfall forces farmers to depend on low-survival imports, with small seedlings experiencing ~60% mortality and taking over 16 months to reach marketable size. Aquaculture directly supports ~1 million people, especially along the 352 km Sindh coastal belt, making this sector critical for both livelihoods and food security.

The Solution - Aqua Hatch Model

Aqua Hatch was launched to provide a climate-smart, flood-protected solution. The hatchery combines:

- Engineered water reservoirs, broodstock ponds, nursing and fingerling ponds
- Laboratories and storage facilities
- Renewable energy installations and wastewater recycling
- Modern hatchery management practices

The hatchery produces Tilapia and Pangasius fingerlings, which experience ~30% mortality and reach marketable size in just 8 months. Using organic feeds eliminates approximately 90 tons of antibiotics and chemicals per year, reducing environmental impact.

"Aqua Hatch is an innovative hatchery concept… It will enable local fish farms to purchase 4–5 inch fingerlings and will add to protein consumption across the region," says Stuart Beavis, Regional Lead WWF DFCD Asia.

Managing Biodiversity Risk

WWF recognises that non-native species such as tilapia can pose risks to freshwater biodiversity if released into natural ecosystems. Aqua Hatch addresses this risk through a fully controlled, biosecure, and flood-protected hatchery system, with no intentional release into open water bodies. The project uses Genetically Improved Farmed Tilapia (GIFT), predominantly monosex, and implements secure pond infrastructure, netted inlets/outlets, strict standard operating procedures (SOPs), continuous monitoring, and partner compliance requirements to prevent escape. These measures are documented in the project's Environmental and Social Impact Assessment (ESIA) and Environmental and Social Safeguards (ESS) compliance assessment.

Importantly, the absence of local hatcheries has previously led to unregulated imports and informal breeding of exotic species, a major biodiversity threat. By providing a regulated, monitored, and safe

source of fingerlings, Aqua Hatch reduces these risks while supporting farmer livelihoods and sustainable aquaculture.

Role of DFCD and WWF-Pakistan

With support from the Dutch Fund for Climate and Development (DFCD), WWF-Pakistan provides technical assistance, business structuring guidance, and ensures alignment with environmental and social safeguards (ESS). The pilot hatchery received a €349,415 grant, with a potential €5.9 million investment to expand operations to 66.7 hectares, increasing production capacity and impact.

Impact and Outcomes

Aqua Hatch has already started transforming aquaculture systems:

- Farmers now access reliable, high-quality fingerlings, improving productivity and income stability
- Local employment opportunities have increased, supporting community livelihoods
- Fingerlings reduce mortality rates from 60% to 30%, reaching marketable size faster
- Organic feed and renewable energy use reduce environmental footprint
- The project aligns with climate adaptation goals (Rio Marker 2) and integrates ESS measures, including community engagement and a grievance redress mechanism

Community and Sustainability Focus

Beyond infrastructure, Aqua Hatch emphasizes social and environmental responsibility:

- Community consultations ensure local needs are considered
- Indigenous trees are planted to create green cover and support biodiversity
- Improved access infrastructure enhances farm operations
- Regular monitoring and grievance mechanisms maintain social accountability and long-term sustainability

Scaling and Outlook

With DFCD support, Aqua Hatch offers a replicable, scalable model for climate-resilient aquaculture across Pakistan. By combining climate-smart infrastructure, sustainable practices, and strong community engagement, the project enhances food security, livelihoods, and ecosystem resilience, demonstrating how innovative solutions can meet the challenges of a changing climate.