

Tilapia Aquaculture – A Strategic Contribution to Food Security in Africa and Western Asia

Hunger in key regions on the rise

While global hunger has modestly declined in recent years, significant regional disparities persist particularly across West Asia and Africa. By 2024, about 300 million people in Africa and more than 39 million in Western Asia will face hunger. This underscores the difficulty of achieving SDG2: Zero Hunger. Global projections estimate that 512 million people could be chronically undernourished by 2030, nearly 60% of whom will live in Africa.

Childhood stunting remains a critical marker of undernutrition. Stunting in children under five is closely linked to lifelong health risks, cognitive impairments, and reduced economic productivity. The World Health Organization (WHO) has set a global target to reduce the number of stunted children under five by 40% by 2025. However, with the end of 2025 approaching, current trends indicate that this target is unlikely to be achieved without more urgent and targeted interventions, and decisive action.



Image: FAO/Salikat Mojumder

Aquaculture as part of the solution

Aquaculture is not a universal remedy to food insecurity, but it is a critical and scalable part of the solution. Well-planned aquaculture systems particularly small-scale tilapia ponds can significantly increase food availability, improve diet quality, and support local livelihoods.

Why tilapia?

Nutritional value: Tilapia provides high-quality protein and essential micronutrients (e.g., phosphorus, niacin, selenium, vitamin B12). Though lower in omega-3s compared to fatty marine fish, recent feed innovations are increasing omega-3 content in farmed tilapia.

Environmental resilience: Tilapia are highly adaptable, thriving in diverse water conditions, including low-oxygen and moderately polluted environments making them ideal for small-scale aquaculture systems in resource-constrained settings.

Economic potential: Global tilapia production exceeds 6.9 million metric tons annually, generating significant economic value and employment, particularly in low- and middle-income countries.

Ecological benefits: In integrated systems, for example aquaponics or rice-fish systems, tilapia help control algae and mosquitoes, contributing to broader ecosystem health.

Key challenges

Governance and contextualization: Effective contributions to the SDGs depend on local governance,

ecological conditions, and socioeconomic context. Policies must be adapted accordingly.

Inclusion and access: Many smallholder and especially female farmers face barriers to entry. Inclusive financing, training, and technical support are critical for equitable development.

Disease and biosecurity: Outbreaks such as Tilapia Lake Virus (TiLV) threaten both large and small aquaculture operations. Improved health management and genetic resilience are essential.

Nutrient profile critiques: While tilapia are rich in protein and micronutrients, their omega-3 levels are relatively low. Feed strategies incorporating plant-based omega-3 sources can improve the fish's nutritional profile.

Consumer acceptance and quality control: Occasional off-flavours, caused by compounds like geosmin, affect marketability. These can be mitigated through effective pond and harvest management.

Policy Recommendations

Invest in climate-smart aquaculture infrastructure

Support smallholder pond systems, hatcheries, cold chains, and feed supply networks that are resilient to climate shocks and aligned with sustainability goals.

Strengthen capacity of smallholder producers

Ensure access to training, extension services, and inclusive financing for rural and peri-urban farmers, especially women and youth.

Enhance innovation and biosecurity

Fund R&D on improved genetics, disease resistance, feed efficiency, and water quality. Prioritize biosecurity frameworks to prevent disease outbreaks like TiLV.

Raise consumer awareness and market access

Educate consumers on the nutritional value of tilapia, support local value-added production, and facilitate access to domestic and export markets.

Align aquaculture with SDG 2 targets

Integrate tilapia aquaculture into national and regional food security strategies. Prioritized targets such as ending hunger (2.1), improving smallholder

productivity (2.3), and building sustainable food systems (2.4).

Track equity and nutrition outcomes

Establish monitoring systems to assess nutritional impacts especially reductions in childhood stunting and ensure vulnerable groups benefit from aquaculture investments.

Conclusion

Tilapia aquaculture is a practical, scalable, and underutilized opportunity to combat food insecurity, malnutrition, and poverty in some of the world's most vulnerable regions. Strategic investments in smallholder fish farming such as those led by the Tilapia Foundation can help accelerate progress toward SDG2 and related development goals. To realize this potential, governments, development agencies, and private-sector partners must support context-sensitive, inclusive, and nutrition-focused aquaculture systems.

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The Tilapia International Foundation (TIF)

TIF is a Dutch foundation that focuses on promoting small-scale tilapia farming projects in developing countries, with the aim of combating malnutrition and poverty. The foundation supports local communities through small grants for the construction of tilapia ponds that meet technical and ecological requirements. These projects are active in various regions, including Asia (India, Sri Lanka, Thailand, Indonesia), Latin America (Brazil, Nicaragua, Venezuela), the Caribbean (Haiti), and Africa (including Benin, Chad, Kenya, Malawi, Mali, the Central African Republic, Nigeria, Uganda, Zaire, Ivory Coast, and Cameroon).



The Tilapia Foundation's contribution to the SDGs

The Tilapia Foundation plays a critical role in advancing multiple Sustainable Development Goals through its practical, community-based approach to aquaculture. By constructing small-scale fishponds, training local farmers, and promoting sustainable fish farming techniques, the Foundation directly supports SDG 2 (Zero Hunger), SDG 1 (No Poverty), and SDG 3 (Good Health and Well-being). Its activities also promote SDG 5 (Gender Equality), as special attention is given to involving women in fish farming initiatives. Through environmentally responsible practices and local capacity building, the Foundation contributes to SDG 13 (Climate Action) and SDG 15 (Life on Land), while its partnerships and knowledge-sharing model align with SDG 17 (Partnerships for the Goals). As a grassroots organization operating in high-need regions, the Tilapia Foundation exemplifies how targeted aquaculture interventions can drive inclusive, sustainable development at scale.

Example projects:

Sidoarjo, East Java, Indonesia – The Tilapia International Foundation, in partnership with Dutch 'RVO Partners for Water', supports sustainable aquaculture in Sidoarjo through the Fish Farmers Field School (FFFS) by supporting the Kedungpeluk Village fisher group and the Banjar Kemuning Village fisher group. This initiative equips fish farmers with skills in Low External Input Sustainable Agriculture (LEISA) to improve pond soil and water management. The programme promotes eco-friendly practices, such as using local micro-organisms and compost from agricultural waste and mangrove leaves, which are easy for other farmers to replicate.

Through a structured, learner-centered, and participatory learning approaches, it promotes sustainable practices, strengthens farmers understanding of ecological factors, and builds their capacity for informed decision-making and innovation. In turn, it encourages behavioral

change and supports collective efforts to enhance aquaculture in Sidoarjo

Kitui County, Kenya – In Kitui County, Kenya, the Tilapia International Foundation collaborates with Africa Wood Grow to support the Kamiti C.B.O. Farmers Organisation in developing a model tilapia fish pond for the community. This initiative aims to diversify incomes and livelihoods, while also contributing to the restoration of the deforested environment through reforestation and dryland rainwater harvesting.



Alappuzha, Kerala, India – Through the Kutanad Integrated Development Society (K.I.D.S.), women farmers' groups receive support for their aquaculture activities.



TIF collaborates with local partners and has sister organizations in various countries, including Germany, France, Belgium, the United States, England, and Italy. The foundation is registered with the Chamber of Commerce in Utrecht, the Netherlands, under number S-41152315.

If you would like to support these projects, you can make a bank transfer to IBAN: NL40 RABO 0934 7015 20. TIF is registered as an ANBI (Public Benefit Organisation), ensuring that your contribution is tax-deductible.

Father Johan Diederich Frans (Jan) Heine, founder of the Tilapia International Foundation

The Tilapia International Foundation was established by Father Johan Diederich Frans ("Jan") Heine, born on 27 June 1914 in Barger-Compascuum, The Netherlands. He passed away on 15 January 2000 in Emmen, The Netherlands.

Father Heine was a Dutch Catholic priest, ordained in 1942, and served as a missionary with the Sociëteit voor Afrikaanse Missiën (Society for African Missions) and the Mill Hill Missionaries, based in the Netherlands and Valence, France.

Throughout his life, Father Heine was a dedicated advocate for international development cooperation, recognized for his pioneering efforts in promoting small-scale community fish farming. He championed the cultivation of Tilapia as a sustainable source of protein to improve food

security and reduce malnutrition and child stunting in developing communities.

His extensive international travels inspired and supported the establishment of hundreds of Tilapia fishpond initiatives across numerous countries, often in collaboration with aquaculture specialists and organizations such as the Food and Agriculture Organization (FAO) in Rome.

In recognition of his remarkable contributions, Father Heine was elevated to the rank of Monsignor by Pope John Paul II, who appointed him as a Special Prelate.

To honor his legacy, the Mgr. J.D.F. Heine Memorial Award ("Je Dois Faire") is presented during the biannual International Symposium on Tilapia in Aquaculture (ISTA), co-sponsored by the Tilapia International Foundation, to an individual or organization for outstanding contributions to the advancement of aquaculture worldwide.