CGIAR

INITIATIVE ON
Aquatic Foods

*Credit: WorldFish*

# CGIAR Research Initiative on
# **Aquatic Foods**

Annual Technical Report

**Author:** CGIAR Research Initiative on Aquatic Food

**Title:** Annual Technical Report 2024: CGIAR Research Initiative on Aquatic Food

**Suggested citation:** CGIAR Research Initiative on Aquatic Food. 2025. Annual Technical Report 2024: CGIAR Research Initiative on Aquatic Food. Montpellier, France: CGIAR System Organization. https://hdl.handle.net/10568/174128



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The Artificial Intelligence (AI) software ChatGPT was used to support the editing of parts of this report, specifically to improve clarity, grammar, and style. ChatGPT was not used to generate the content of the report. All edits made with AI assistance were reviewed and validated by the authors to ensure accuracy, coherence, and alignment with the original intent.

**Acknowledgements**

This work is part of the CGIAR Research Initiative on Aquatic Food. We would like to thank all funders who supported this research through their contributions to the CGIAR Trust Fund: https://www.cgiar.org/funders.

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# CGIAR Technical Reporting 2024

CGIAR Technical Reporting has been developed in alignment with CGIAR's Technical Reporting Arrangement. This annual report ("Type 1" Report) constitutes part of the broader CGIAR Technical Report. Each CGIAR Research Initiative/Impact Platform/Science Group Project (SGP) submits an annual "Type 1" Report, which provides assurance on progress towards end of Initiative/Impact Platform/SGP outcomes.

As 2024 marks the final year of this CGIAR Portfolio and the 2022-24 business cycle, this Type 1 Report takes a dual approach to its analysis and reporting. Alongside highlighting key achievements for 2024, the report also provides a cumulative overview of the 2022-24 business cycle, where relevant. This perspective captures the evolution of efforts over the three-year period. By presenting both annual and multi-year insights, the report underscores the cumulative impact of CGIAR's work and sets the stage for the transition to the 2025-30 Portfolio.

The 2024 CGIAR Technical Report comprises:

- **Type 1 Initiative, Impact Platform, and SGP Reports:** These annual reports present progress towards end of Initiative/Impact Platform/SGP outcomes and provide quality-assured results accessible via the CGIAR Results Dashboard.
- **Type 3 CGIAR Portfolio Practice Change Report:** This report provides insights into CGIAR's progress in Performance Management and Project Coordination.
- **Portfolio Narrative:** Drawing on the Type 1 and Type 3 reports, as well as data from the CGIAR Results Dashboard, the Portfolio Narrative synthesizes insights to provide an overall view of Portfolio coherence. It highlights synergies, partnerships, country and regional engagement, and collective progress.
- **Type 2 CGIAR Contributions to Impact in Agrifood Systems: evidence and learnings from 2022 to 2024:** This report offers a high-level summary of CGIAR's contributions to its impact targets and Science Group outcomes, aligned with the Sustainable Development Goals (SDGs), for the three-year business cycle.

The Portfolio Narrative informs the 2024 CGIAR Annual Report – a comprehensive summary of the organization's collective achievements, impacts, and strategic outlook.

Elements of the Type 2 report are integrated into the CGIAR Flagship Report, released in April 2025 at CGIAR Science Week. The Flagship Report synthesizes CGIAR research in an accessible format designed specifically to provide policy- and decision-makers at national, regional, and global levels with the evidence they require to formulate, develop, and negotiate evidence-based policies and investments.

The diagram below illustrates these relationships.

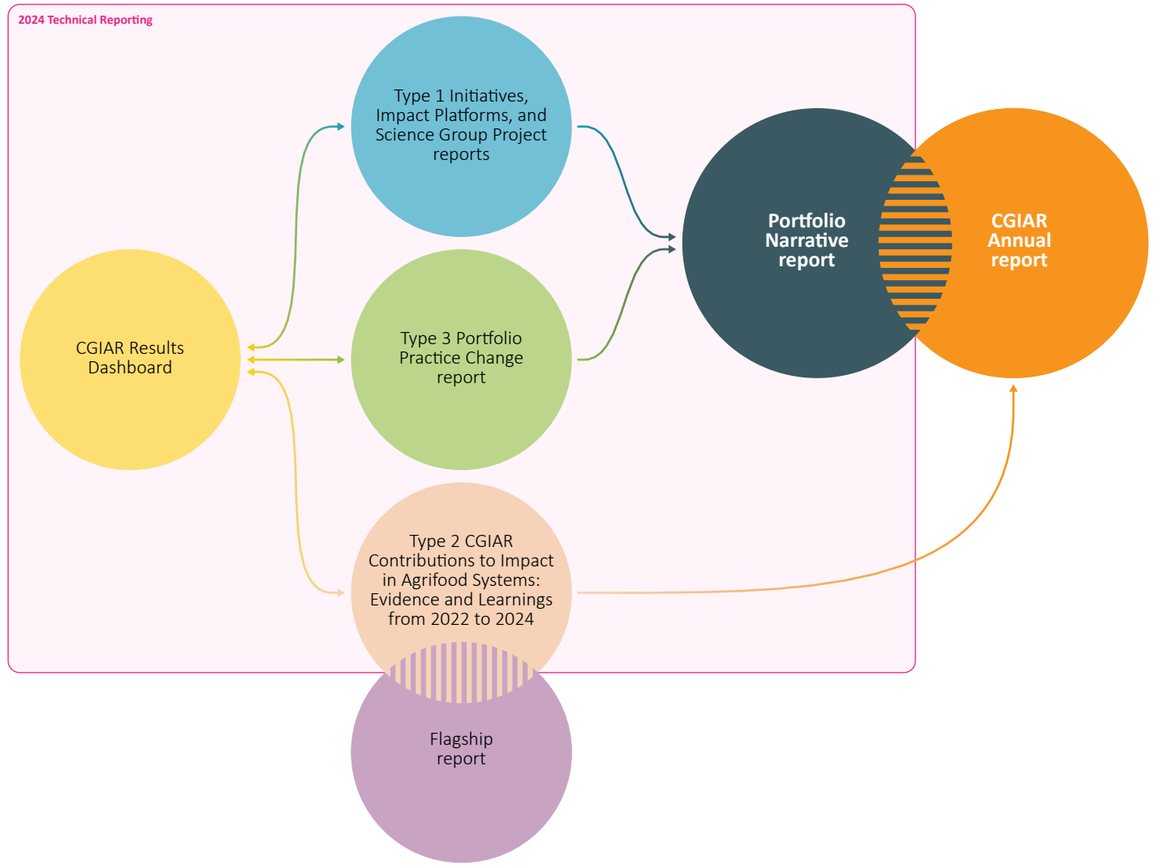



Figure 1. CGIAR's 2024 Technical Reporting components and their integration with other CGIAR reporting products.

# Section 1: **Fact sheet, executive summary and budget**

| | |
|---|---|
| **Initiative name** | Resilient Aquatic Food Systems for Healthy People and Planet |
| **Initiative short name** | Aquatic Food |
| **Initiative Lead** | Rossignoli Cristiano (Rossignoli@cgiar.org) |
| **Initiative Co-lead** | Marie-Charlotte Buisson (M.Buisson@cgiar.org) |
| **Science Group** | Resilient Agrifood Systems |
| **Start – end date** | 01 April 2022 – 31 December 2024 |
| **Geographic scope** | **Regions**<br>East and Southern Africa · South Asia · Southeast Asia and the Pacific · West and Central Africa<br><br>**Countries**<br>Bangladesh · Cambodia · Ghana · India · Myanmar · Nigeria · Solomon Islands · Timor-Leste · Zambia |
| **OECD DAC Climate marker adaptation score**[1] | **Score 1 Significant**<br>The activity contributes in a significant way to any of the three CGIAR climate-related strategy objectives – namely, climate mitigation, climate adaptation and climate policy, even though it is not the principal focus of the activity. |
| **OECD DAC Climate marker mitigation score**[1] | **Score 1: Significant**<br>The activity contributes in a significant way to any of the three CGIAR climate-related strategy objectives – namely, climate mitigation, climate adaptation and climate policy, even though it is not the principal focus of the activity. |
| **OECD DAC Gender equity marker score**[2] | **Score 1A: Gender accommodative/aware**<br>Gender equality is an objective, but not the main one. The Initiative/project includes at least two explicit gender specific outputs and (adequate) funding and resources are available. Data and indicators are disaggregated by gender and analyzed to explain potential gender variations and inequalities. |
| **Website link** | https://www.cgiar.org/initiative/aquatic-foods/ |

[1] The Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) markers refer to the OECD DAC Rio Markers for Climate and the gender equality policy marker. For climate adaptation and mitigation, scores are: 0 = Not targeted; 1 = Significant; and 2 = Principal.
[2] The CGIAR Gender Impact Platform has adapted the OECD gender marker, splitting the 1 score into 1A and 1B. For gender equality, scores are: 0 = Not targeted; 1A = Gender accommodative/aware; 1B = Gender responsive; and 2 = Principal.
These scores are derived from Initiative proposals, and refer to the score given to the Initiative overall based on their proposal.

## EXECUTIVE SUMMARY


From 2022 to 2024, the CGIAR Research Initiative on Aquatic Foods (AqFI) catalyzed transformative change in aquatic food systems across Africa, Asia, and the Pacific. Through four integrated Work Packages (WPs)—AquaData, Aqua+Partners, AquaPlans, and AquaGenetics—the Initiative delivered innovations, partnerships, and policy contributions aligned with CGIAR's five Impact Areas and multiple Sustainable Development Goals (SDGs), including No Poverty, Zero Hunger, Gender Equality, Climate Action, and Life Below Water.

Spanning 10 countries—Bangladesh, India, Ghana, Cambodia, Myanmar, Nigeria, Kenya, Zambia, Timor-Leste, and Solomon Islands—AqFI maintained its focus on science for impact, despite significant budget constraints.

AqFI produced more than 375 knowledge products, including nearly 100 peer-reviewed journal articles. More than 70 percent were open access, and at least 15 had Altmetric scores above 100, demonstrating influence in both academic and policy spheres. A 2023 publication on net-negative food systems and a 2024 Nature article on small-scale fisheries received exceptional global attention.

Breakthroughs in genetics research included the development of Generation 3 (G3) rohu carp in Bangladesh, which showed more than 30 percent faster growth. Dissemination of Genetically Improved Farmed Tilapia (GIFT) also advanced across Nigeria, Egypt, Timor-Leste, India, and Malaysia, supported by new strains and improved management practices.

More than 100 datasets were made publicly available through data repositories. Flagship platforms such as FishBase sustained more than 700,000 unique monthly users, while tools such as PeskAAS, Shwe Ngar, and Macher Gari enabled local digital transformation across fisheries and aquaculture.

By 2024, the Initiative had developed more than 68 innovations, 22 of which were adopted by more than 314,000 users—primarily farmers and fishers. In Bangladesh, G3 rohu carp was adopted by 61 hatcheries, benefiting more than 231,000 farmers. Innovations such as the Aquatic Food Ontology (AQFO), AquaIndex, and the Monitoring, Evaluation and Learning (MEL) framework for small-scale fisheries enhanced knowledge systems globally.

AqFI helped drive 26 policy and investment shifts that embedded aquatic food innovations into national strategies and institutional frameworks. In Nigeria, it supported the revision of the National Fisheries and Aquaculture Policy. In India, it helped pioneer the use of small fish powder in child nutrition efforts across Assam and Odisha, laying the groundwork for broader policy uptake. In Timor-Leste, sustained collaboration led to the full integration of aquatic foods into the national school meals program, with fish powder reaching 35,000 schoolchildren. The Initiative also informed policy development in Liberia, where the Seeds4Liberia initiative adopted an aquaculture seed systems model inspired by Nigeria's GIFT dissemination strategy.

In Ghana, AqFI evidence supported the incorporation of aquaculture into the government's flagship "One Village, One Dam" program and enabled scaling of fish cage farming in small reservoirs through the Aquaculture for Food and Jobs initiative. In Malawi and Zambia, digital fisheries governance was strengthened, and multistakeholder platforms established to support co-management of aquatic resources.

These outcomes were enabled by more than 350 strategic partnerships with government, academia, civil society, and private sector actors. Approximately one-third of partnerships in 2024 focused on scaling, ensuring that AqFI's innovations were embedded in national systems and development pathways.

Development and use of tools such as the Women's Empowerment in Fisheries Index (WEFI) and the Project-level (Pro)-WEFI toolkit helped ensure gender and inclusion were embedded across AqFI's work, while social protection and market access interventions, especially in India, Kenya, Zambia, and Timor-Leste, targeted women and youth. Inclusive governance platforms were established in Ghana and Solomon Islands to support local decision-making and co-management.

AqFI also trained nearly 5,000 individuals—36 percent of them women. Key highlights include:

- Technical training in Zambia and Ghana on climate-resilient aquaculture and small reservoir systems
- Workshops in Kenya, Myanmar, and Solomon Islands on governance, digital adoption, and youth engagement
- Reactivation of the Nusatupe Innovation Hub in Solomon Islands as a regional knowledge and demonstration center for seaweed, aquaponics, and coral restoration

AqFI worked with the CGIAR Research Initiatives on Asian Mega-Deltas (AMD), Diversification in East and Southern Africa (Ukama Utsawi), and National Policies and Strategies (NPS), as well as the Nutrition and Gender Impact Platforms. Collaborations with the Food and Agriculture Organization of the United Nations (FAO), the Australian Centre for Ocean Resources and Security (ANCORS), the Pacific Community (SPC), the Institute for Global and Environmental Strategies, and Planetek extended AqFI's reach, particularly in policy influence, digital tools, and system characterization.

AqFI laid the groundwork for large-scale transformation in aquatic food systems. Its legacy includes a network of functioning innovation hubs, institutionalized policies, and scalable science. These accomplishments are now embedded in the CGIAR Sustainable Animal and Aquatic Foods (SAAF) Science Program and will continue to inform CGIAR's global agenda on sustainable, inclusive, and resilient food systems.


| | 2022 | 2023 | **2024** |
|---|---|---|---|
| **PROPOSAL BUDGET** | $7.50M | $12.50M | **$15.00M** |
| **APPROVED BUDGET** [1] | $5.65M | $5.84M [2] | **$6.91M** [2] |

[1] The approved budget amounts correspond to the figures available for public access through the Financing Plan dashboard.
[2] These amounts include carry-over and commitments.

## Initiative-level theory of change diagram

This is a simple, linear, and static representation of a complex, non-linear, and dynamic reality. Feedback loops and connections between this Initiative and other Initiatives' theories of change are excluded for clarity.

### CHALLENGE STATEMENT

- Aquatic foods are a vital and expanding component of the global food system, contributing to all five CGIAR Impact Areas. They offer benefits in nutrition, livelihoods, climate mitigation, and biodiversity. However, these benefits are increasingly threatened by multiple stressors, including: overharvesting of wild stocks and poor governance of aquatic commons, which marginalize traditional and indigenous fishers; inequities in supply chains exacerbated by global market demands; and vulnerabilities of coastal and riparian communities to climate change. Additional challenges include pollution, land-use change, and competition for water and resources, all of which degrade aquatic ecosystems and their productivity, biodiversity, and carbon-sequestering functions. Other issues, such as aquatic animal diseases, antimicrobial resistance, supply chain inefficiencies, and underinvestment in breeding programs for climate-resilient and efficient aquatic species, further undermine the sector's potential.
- Research-informed governance can address these challenges, creating a just, nutritious, lower-carbon, and climate-resilient food system. Building on 30 years of CGIAR work, five systemic challenges have been identified: (1) limited data for informed decision-making, resulting in underinvestment in aquatic foods; (2) power asymmetries in partnerships that exclude aquatic commons stewards and broader food systems actors; (3) insufficient integration of aquatic foods in water resource management, risking lost opportunities for nutrition and livelihoods; (4) limited investment in genetic improvement programs for farmed fish; and (5) underutilized national Agricultural Innovation Systems (AIS) for scaling aquatic innovations.
- To overcome these challenges, we propose a systems-science research program leveraging data-driven decision-making, cross-sectoral partnerships, integrated land-water planning, productivity-enhancing technologies, and innovation laboratories. The initiative will strengthen national innovation systems, enabling aquatic foods to deliver a triple win for nature, people, and climate while addressing their current undervaluation in the global food system.

### SPHERE OF **CONTROL**

Work Packages

**Work Package 1**

AquaData: Unlocking the potential of aquatic foods through data and digital tools.

**Work Package 2**

Aqua+Partners: Partnering to realize the benefits of aquatic foods in sustainable development.

**Work Package 3**

AquaPlans: Integrated Aquatic Food Systems in Water and Land Foodscapes.

**Work Package 4**

AquaGenetics: Delivering gains from genetic improvements in farmed fish through public-private partnerships.

### SPHERE OF **INFLUENCE**

End-of-Initiative Outcomes

**End-of-Initiative Outcome 1** (1)

Scaling partners and stakeholders in 2 countries use improved knowledge systems and data to inform at least five evidence-based investments supporting aquatic food systems transformation.

**End-of-Initiative Outcome 2** (2)

Improved management and co-production of sustainable development pathways secure rights and livelihood benefits for 50,000 small-scale actors in aquatic food systems in Asia-Pacific and bring more nutritious diets to 300,000.

**End-of-Initiative Outcome 3** (3)

Improved food, livelihood, water and environmental performance in multifunctional land and water systems in Myanmar, Cambodia, Ghana and Zambia.

**End-of-Initiative Outcome 4** (4)

At least 1 of tilapia and carp strains demonstrate increased productivity (+30%) and environmental performance (-25% GHG emission reduction) in 1 African & 2 Asian countries.

**End-of-Initiative Outcome 5** (2)

Aquatic food system labs in Solomon Islands and Zambia increase national innovation systems' ability to identify, evaluate and scale socio-technical innovations.

Action Area Outcomes

**Resilient Agrifood Systems**

**1** · CGIAR-NARS-SME networks use market segments, target product profiles to orient variety development and deployment towards those that provide larger scale benefits across the 5 Impact Areas.

**2** · National and private seed company breeding programs accelerate the development of varieties that provide larger scale benefits across the 5 Impact Areas.

**Systems Transformation**

**3** · National and local multi-stakeholder platforms are strengthened to become more effective and sustainable, addressing development trade-offs and generating strategies for effective food, land, and water systems transformation.

**4** · Research institutions, government analytical units, and scaling partners in the Global South have improved knowledge, skills, access to data, capacity to develop tools, innovations, and undertake research to support transformation of food, land and water systems contributing to livelihood, inclusion, nutrition, environmental and climate objectives.

**5** · Implementation partners (e.g. NARES, NGOs, private companies) actively support dissemination, uptake, and implementation of CGIAR innovations.

**Genetic Innovation**

**6** · CGIAR-NARS-SME networks use market segments, target product profiles to orient variety development and deployment towards those that provide larger scale benefits across the 5 Impact Areas.

### SPHERE OF **INTEREST**

Impact Areas

**Nutrition, Health & Food Security**

· End hunger for all and enable affordable health diets for the 3 billion people who do not currently have access to safe and nutritious food.

**Poverty Reduction, Livelihoods & Jobs**

· Lift at least 500 million people living in rural areas above the extreme poverty line of US $1.90 per day (2011 PPP).

**Gender equality, Youth & Social Inclusion**

· Close the gender gap in rights to economic resources, access to ownership and control over land and natural resources for over 500 million women who work in food, land and water systems.

**Climate Adaptation & Mitigation**

· Turn agriculture and forest systems into a net sink for carbon by 2050, with emissions from agriculture decreasing by 1 Gt per year by 2030 and reaching a floor of 5 Gt per year by 2050.

· Equip 500 million small-scale producers to be more resilient to climate shocks, with climate adaptation solutions available through national innovation systems.

**Environmental Health & Biodiversity**

· Stay within planetary and regional environmental boundaries: consumptive water use in food production of less than 2500 km3 per year (with a focus on the most stressed basins), zero net deforestation, nitrogen application of 90 Tg per year (with redistribution towards low-input farming systems) and increased use efficiency, and phosphorus application of 10 Tg per year.

*Mobile fingerling trader (Patilwala) selling fingerlings.*
*Credit: Harun/Rashid*

Credit: WorldFish

## Summary of progress against the theory of change

Implemented from 2022 to 2024, AqFI supported CGIAR's five Impact Areas by advancing sustainable aquatic food systems across Africa, Asia, and the Pacific. Through its four WPs—AquaData, Aqua+Partners, AquaPlans, and AquaGenetics—AqFI contributed to several SDGs including No Poverty, Zero Hunger, Gender Equality, Climate Action, and Life Below Water.

Focused on Bangladesh, India, Ghana, Cambodia, Myanmar, Nigeria, Kenya, Solomon Islands, Timor-Leste, and Zambia, AqFI consistently delivered high-quality research, strengthened multisectoral partnerships, and set the foundation for scaling innovations. This work now informs CGIAR's SAAF Program, ensuring continuity in research and impact.

Despite significant budget reductions, AqFI successfully adapted its strategy. Its theory of change (TOC) was revised, refocusing on priority outcomes while remaining aligned with CGIAR's impact goals. Targets were adjusted, and activities streamlined across WPs accordingly. Initially, AqFI included a fifth WP (AquaLabs), designed to create innovation hubs in Africa and the Pacific. However, due to budget constraints, WP5 was formally deactivated at the end of the first year. Elements of its scaling and capacity development agenda were integrated into other work streams to maintain continuity and impact.

**Research outputs and scientific contributions**

AqFI produced more than 375 knowledge products, including almost 100 peer-reviewed publications (32 in 2024 alone), with 86 percent indexed by ISI. Almost 70 percent of publications were open access. More than 15 publications achieved Altmetric scores above 100, indicating high policy and academic relevance. A 2023 article on net-negative emissions in food systems exceeded an Altmetric score of 330, while a 2024 Nature publication, scoring more than 240, drew attention to the multifaceted role of small-scale fisheries.

AqFI also advanced genetics science. Research on the G3 rohu carp strain, released in Bangladesh, demonstrated that it had more than 30 percent faster growth than existing breeds, offering major contributions to the country's US$950 million rohu market. In addition, genetic improvement of tilapia through the GIFT strain demonstrated significant growth performance and adaptability, supporting the development of genetic programs in Nigeria, Timor-Leste, and Malaysia.

In addition to scientific publications, AqFI delivered more than 100 datasets, published on platforms such as WorldFish Dataverse. Multimedia resources, including videos, blogs, and briefs, were tailored to reach decision-makers, researchers, civil society, and the private sector in many different languages.

**Capacity development**

Nearly 5,000 individuals (36 percent women) were trained under AqFI between 2022 and 2024. In 2022, 1,244 individuals were reached through training on sustainable aquaculture, dissemination systems, and community engagement. In 2023, 1,784 people participated in training in Africa, especially in Zambia, Nigeria, Kenya, and Ghana. In 2024, almost 1,900 individuals were trained on topics including gender, digital tools, improved management practices, and climate-smart aquaculture.

Zambia led efforts in training on climate information systems and social inclusion. In Ghana, small reservoir aquaculture and youth group support were prioritized. Myanmar advanced decision-making through Rice-Fish Suitability training. Kenya benefited from workshops and the WEFI toolkit, while technical training was offered in Solomon Islands, Nigeria, and Zambia. The innovation hub at Nusatupe Station, Solomon Islands, was reactivated, supporting regional knowledge exchange, youth training, and demonstration of seaweed farming, aquaponics, and coral restoration. Students from many countries were trained in food system governance and nutrition. Capacity development reached stakeholders across policy, research, private sector, and local communities, positioning them to sustain innovation uptake and adaptation beyond AqFI's lifespan.



**Innovations**

AqFI developed and reported more than 68 innovations covering a range of priorities, including sustainable production, digital transformation, inclusive governance, economic resilience, and nutrition. By 2024, 42 innovations remained under active development. Among those, WP1 focused mostly on digital tools and data ecosystems such as AquaIndex, AQFO, AquaData Portal, and upgraded PeskAAS (now including nutrition and economic modules). WP2 worked on tools to assess nutrient intake and social inclusion. The Island Food Systems concept and Nusatupe Innovation Hub were launched in Solomon Islands. WP3 worked on decision support tools for aquaculture planning and ecosystem mapping in small reservoirs. WP4 focused on major advances in selective breeding and genomics for GIFT tilapia and rohu, catla, and silver carp, tailored to diverse farming environments in India, Bangladesh, Nigeria, and Egypt.

By 2024, 22 innovations had been adopted by more than 314,000 users, 311,000 of whom were farmers and fishers. In Timor-Leste, more than 6 tons of fish powder were delivered by partners to 35,000 children through a school meal program. In India, fish-based products were promoted under Mission Shakti, boosting women's access to aquatic foods. In partnership, WorldFish and IWMI supported the adoption of climate-smart aquaculture practices by more than 15,700 farmers, including the development of flood- and drought-resilient fishponds tailored to climate-vulnerable landscapes. Tools such as FishBase (700,000 monthly users) and PeskAAS (>4,800 unique users across 65 countries) were scaled rapidly. PeskAAS was also adapted for use in Kenya, Mozambique, and Tanzania, supported by the United Kingdom's Foreign, Commonwealth and Development Office. Tools such as Shwe Ngar (Myanmar), The Right Haat and Macher Gari (Bangladesh) facilitated fish transport and market access. The consistent uptake and adaptation of innovations across geographies demonstrate strong relevance, user ownership, and the potential for continued scaling under national and regional platforms.

In Bangladesh, 61 hatcheries adopted G3 rohu carp, producing nearly 7,000 kg of spawn in 2024 and benefiting more than 230,000 farmers. GIFT tilapia fry (G18 and G19) were disseminated to Malaysia and produced in Penang. Timor-Leste farmers adopted best management practices (BMPs) for tilapia, with manuals published in English and Tetum. Inclusive business models in Timor-Leste connected producers with services and markets. In Myanmar, BMPs were also adopted by farmers. These achievements reflect AqFI's shift from piloting to scaling, with system-level impact across diverse regions.

**Policy contributions**

AqFI contributed to 26 policy and investment shifts in Africa and Asia, supporting enabling environments for aquatic food systems transformation. Notable highlights include:

- Nigeria: Contribution to the review and update of the National Fisheries and Aquaculture Policy
- India: Adoption of small fish powder into the Supplementary Nutrition Program (Integrated Child Development Scheme [ICDS]) in Assam, benefiting 7,000 children
- Ghana: Review of the fisheries and aquaculture policy, and integration of aquaculture into the "One Village, One Dam" program
- Timor-Leste: Institutionalization of fish-based products in the national school meals program

In 2024, additional achievements included:

- Cambodia: Support for national dialogue on integrated food system governance and the operationalization of policy shifts toward integrated management of water, fisheries, agriculture, and rural development by establishing two district-level technical working groups (TWGs)
- Liberia: Embrace of an aquaculture seed model by the Ministry of Agriculture, based on Nigeria's success with GIFT tilapia
- Ghana: Enabling of aquaculture expansion in small reservoirs under the Aquaculture for Food and Jobs Programme
- Malawi: Strengthening of fisheries data management through digital capacity development
- Zambia: Convening of stakeholders to commit to co-management of aquatic food systems in the Lower Kafue Basin
- India: National endorsement of small fish powder through the ICDS

These policy achievements reflect the Initiative's deep engagement with government systems and its ability to link evidence to reform processes. Across these cases, AqFI's technical briefs, policy engagement, and capacity building underpinned impact at scale.

Gender and social inclusion

AqFI embedded gender equality and social inclusion (GESI) across all components. From India to Zambia, the Initiative advanced evidence and tools to empower women and address structural barriers to their equitable involvement in aquatic food systems.

Achievements from 2022 to 2024 included:

- Co-development of the GESI Strategy
- Scaling of the WEFI
- Development of a toolbox to assess gender norms in aquatic food systems transformation
- Global research on enabling conditions for gender-transformative approaches (GTAs)
- Identification and scaling of innovations across climate change, gender, and food security

Gender integration was embedded across innovations, including the production and consumption of fish powder, BMPs, and community engagement models. WEFI training and GTA workshops were held in multiple countries, and gender considerations were mainstreamed in digital, nutrition, and production innovations. AqFI demonstrated how social inclusion and gender equity can be embedded into innovation design, capacity development, and scaling strategies.

Throughout implementation, AqFI used its revised TOC to strengthen learning loops and outcome tracking, ensuring timely adaptation across diverse geographies. Evidence generated under AqFI fed directly into action-oriented policy processes and informed future investment decisions. Progress markers linked to innovation adoption, capacity development, and stakeholder engagement demonstrated positive trajectories in all outcome pathways, and the Initiative's strong MEL system supported both internal reflection and external accountability.

In conclusion, AqFI made important progress in addressing the interconnected challenges of sustainable food systems, environmental resilience, and social equity. By embedding systems thinking and participatory research throughout its work, AqFI laid the groundwork for long-term transformation in aquatic food systems. It advanced inclusive and data-driven approaches that empower smallholders, align with national priorities, and strengthen innovation ecosystems. As CGIAR transitions to new research programs, the legacy of AqFI offers a robust foundation for continued progress, ensuring that aquatic foods contribute meaningfully to healthier people, resilient livelihoods, and a more sustainable planet.

# Progress against End of Initiative Outcomes

This infographic provides a concise summary of the Initiative's progress toward achieving its Theory of Change End-of-Initiative outcomes for the 2022-2024 period. By drawing on reported results, it offers a comprehensive synthesis of progress made against the established outcome targets, highlighting the Initiative's overall impact and key achievements at the conclusion of this three-year cycle.

## EOIO 1

Scaling partners and stakeholders in two countries use improved knowledge systems and data to inform at least five evidence-based investments supporting aquatic food systems transformation.

AqFI innovations, particularly through its AquaData work, enabled governments and partners in six countries to drive smarter, evidence-based investments in aquatic food systems. The PeskAAS digital fisheries monitoring platform scaled from Timor-Leste to Malaysia, Malawi, Kenya, Tanzania, and Mozambique, supporting real-time governance across 15,000 square km of marine territory. In Malawi, 19 fisheries officers were trained in R programming and data analytics, contributing to the development of a new national dashboard for small-scale fisheries.

In Nigeria, AqFI supported the review and validation of the national fisheries policy. In Liberia, it inspired a new aquaculture seed system under the national Seeds4Liberia initiative. In Bangladesh, Egypt, India, Kenya, Myanmar, Nigeria, and Zambia, AquaData tools were used to map key data gaps, assess sustainability indicators, and guide investments in digital aquaculture systems.

FishBase continues to reach more than 700,000 monthly users, while the Data for Action Portal is emerging as a global hub for aquatic food system evidence. A co-developed MEL framework for small-scale fisheries, now promoted with the FAO, is guiding sustainable governance worldwide.

AqFI did not simply build tools—it helped reshape national strategies, mobilized investments, and set new standards for data-driven aquatic food systems transformation.

## EOIO 2

Improved management and co-production of sustainable development pathways secure rights and livelihood benefits for 50,000 small-scale actors in aquatic food systems in Asia-Pacific and bring more nutritious diets to 300,000.

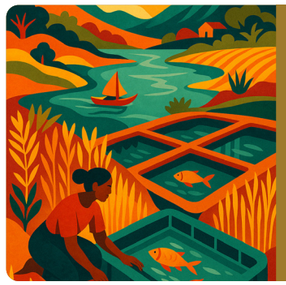
AqFI, mostly through Aqua+Partners, made meaningful progress in advancing inclusive and resilient aquatic food systems across Asia-Pacific. While the anticipated scale of direct beneficiaries has not yet been reached, the Initiative laid solid foundations for long-term impact by aligning closely with national priorities and development plans.

In Solomon Islands, the establishment of the Nusatupe Innovation Hub, developed in partnership with provincial and national agencies, became a national center for island food systems innovation. The hub demonstration sites in seaweed farming, aquaponics, and coral restoration now serve as practical models for youth engagement, nutrition-sensitive planning, and climate resilience.

In Timor-Leste, the successful integration of fish powder into the national school meal program directly supported the government's food and nutrition strategy, enhancing dietary diversity for tens of thousands of children. In India, small fish-based interventions in Odisha and Assam gained recognition for addressing childhood malnutrition and sparked policy discussions for broader uptake.

In Zambia, Bangladesh, and India, inclusive business models were developed with local actors to expand access to quality seed, climate-smart aquaculture technologies, and premium markets. These efforts enabled smallholders—especially women—to increase incomes and adapt to climate risks.

The alignment with national strategies and local systems ensures that these initiatives are catalysts for broader transformation. By co-developing solutions with stakeholders, AqFI created momentum for sustained policy action, investment, and inclusive development across aquatic food systems.



## EOIO 3

Improved food, livelihood, water, and environmental performance in multifunctional land and water systems in Myanmar, Cambodia, Ghana, and Zambia.

From 2022 to 2024, AqFI strengthened the sustainability and productivity of land and water systems across Ghana, Zambia, Myanmar, and Cambodia through integrated innovations, tools, and governance models. In Ghana, pilots in four small reservoirs demonstrated the potential of fish cage farming to enhance local food and income security. The success of these pilots led to the Ministry of Fisheries and Aquaculture Development's commitment to expand the Aquaculture for Food and Jobs Programme to 20 more reservoirs under the "One Village, One Dam" strategy.

In Zambia, a multistakeholder platform was launched in the Lower Kafue Basin, now guiding the co-management of critical aquatic food systems. In Cambodia, new TWGs brought together multiple layers of local government and sectoral agencies to support integrated planning across water, fisheries, and rural development. In Myanmar and Cambodia, rice-fish suitability tools were used to promote climate-resilient aquaculture integration, supported by training and outreach.

A range of decision support tools and inclusive governance platforms enabled national institutions to better manage multifunctional landscapes. These efforts helped transform multifunctional landscapes into sustainable food and livelihood systems, balancing nutrition, water governance, and environmental resilience.

## EOIO 4

At least one of tilapia and carp strains demonstrate increased productivity (+30 percent) and environmental performance (25 percent reduction in GHG emissions) in one African and two Asian countries.

AqFI delivered, through AquaGenetics, major breakthroughs in genetic improvement and sustainable aquaculture. In Bangladesh, the faster-growing G3 rohu carp was adopted by 61 hatcheries—including 18 public and 41 private facilities—and demonstrated more than 30 percent higher growth than conventional strains. Seed output rose dramatically from 246 kg in 2022 to 6,938 kg in 2024, enabling access to improved seed for more than 231,000 farmers. With rohu production valued at more than US$950 million annually, this innovation marks a step change in both productivity and environmental efficiency, with the potential to significantly boost Bangladesh's economic development and food security.

In Africa, the rollout of GIFT in Nigeria began in 2022 with the transfer of 50,000 fry to the country's largest hatchery. By 2024, GIFT 18 seed had been co-developed and disseminated to SME hatcheries, accompanied by training for 198 farmers in breeding and grow-out systems. In Malaysia, GIFT Generation 19 broodstock were produced to support future scaling efforts across Asia.

Meanwhile, BMPs were validated with 200 farmers in Timor-Leste and are now scaling across Zambia and Malawi under the AICCRA project, with a projected reach of more than 45,000 producers. These practices are reinforcing sustainable productivity gains and contributing to lower emissions and climate resilience across regions.

## EOIO 5

Aquatic food system labs in Solomon Islands and Zambia increase national innovation systems' ability to identify, evaluate, and scale socio-technical innovations.

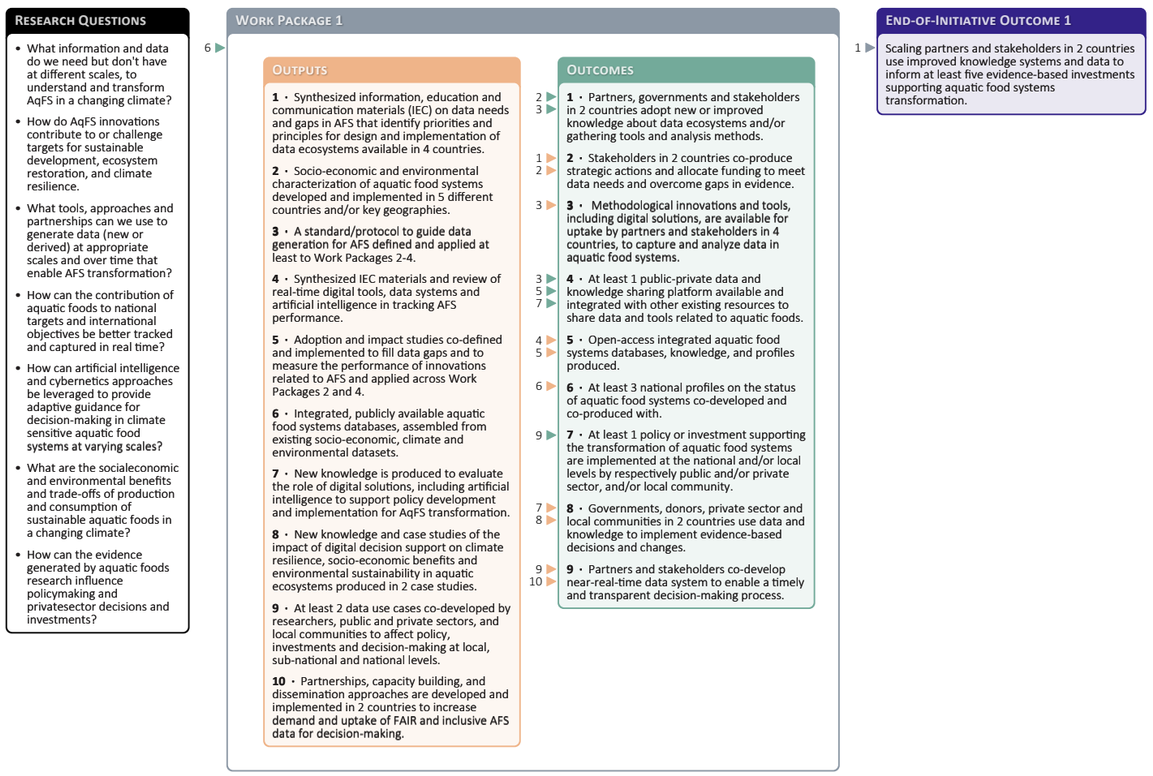
From 2022 to 2024, AqFI helped operationalize aquatic food system innovation labs in Solomon Islands and Zambia, significantly enhancing national capacity to identify, evaluate, and scale context-relevant innovations.

In Solomon Islands, the Nusatupe Innovation Hub was co-developed with government, academia, and local communities. It hosts demonstration sites for seaweed farming, aquaponics, coral restoration, and organic food gardening. Beyond technical demonstrations, the hub functions as a national training and knowledge exchange center, hosting internships, forums, and multisectoral learning. It is accelerating the uptake of climate-resilient, nutrition-sensitive innovations while supporting policy dialogue and institutional reform.

In Zambia, the Initiative facilitated the creation of a multistakeholder platform in the Lower Kafue Basin, endorsed by national ministries. This platform enables joint governance of land and water systems, connecting government, civil society, and the private sector. It became a national mechanism for developing and scaling inclusive, climate-smart aquaculture and fisheries solutions.

These efforts laid the foundation for sustainable aquatic food system labs in both the Pacific and Africa—locally anchored, nationally aligned, and built to foster capacity, learning, and innovation at scale.

## WP1: AquaData




## Work Package 1 progress against the theory of change

AquaData (WP1) significantly advanced digital innovation and evidence generation to strengthen data ecosystems for aquatic food systems across Asia, Africa, and the Pacific. Over the three years, it developed and scaled 30 innovations that improved how aquatic food systems are understood, governed, and supported. These innovations range from real-time monitoring platforms and mobile apps to decision support tools.

Flagship platforms such as FishBase consistently attracted 700,000 monthly users, providing public access to data on more than 40,000 aquatic species. PeskAAS, the near real-time catch documentation system originally adopted by Timor-Leste, was expanded to five additional countries, including Tanzania, Kenya, Malawi, and Mozambique. By 2024, the system covered 15,690 square km of marine territory and received more than 4,800 dashboard visits from users in 65 countries.

Other digital tools were also scaled. In Myanmar, Shwe Ngar reached 11,646 users with aquaculture and nutrition guidance. In Bangladesh, Macher Gari helped coordinate the transport of 172 tons of fish, generating US$225,240 in sales. The KIU Bookkeeping App and The Right Haat also supported tens of thousands of users in value chain transactions and decision-making. Across platforms, AquaData supported more than 60,000 farmers and private sector actors—many of whom were women—by increasing access to timely, actionable data.

Finally, AquaData supported national governments in building data-driven policy. In Nigeria, it facilitated a multistakeholder consultation to revise the National Fisheries and Aquaculture Policy, and in Malawi, it trained fisheries officers in the computer programming language R to support national digital dashboard development. Liberia's new seed policy also drew from WorldFish's GIFT model to integrate aquatic seed systems into a national investment framework.

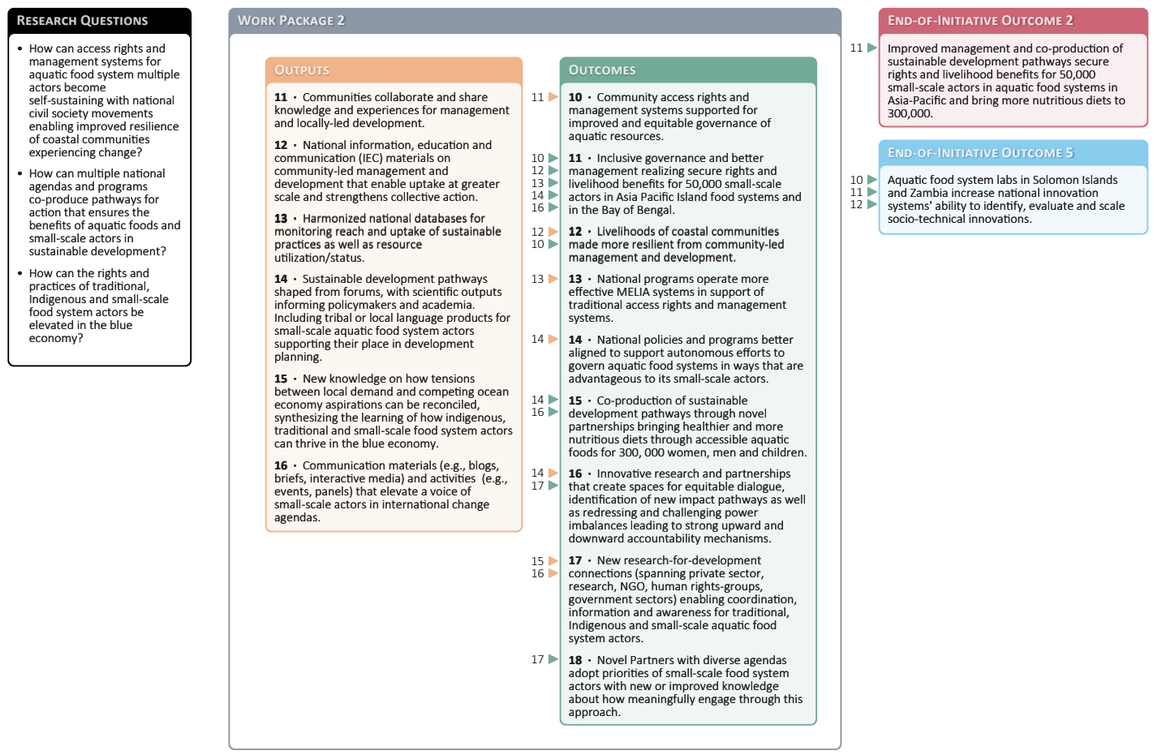
The AQFO, now hosted on AgroPortal, enables harmonization of aquatic food data for improved interoperability across initiatives. This was applied in Bangladesh, India, and Nigeria. The AquaIndex sustainability indicator framework and an AquaData Portal were developed and tested with stakeholders in various countries. The integration of environmental DNA (eDNA) technologies and digital survey tools now enable more cost-effective, scalable characterization of systems and biodiversity. Characterization of aquatic food system sustainability was carried out in Bangladesh, Egypt, India, Myanmar, Kenya, Nigeria, and Zambia.

AquaData also introduced an innovative systems-based theory of change approach, applied in five countries to inform monitoring and adaptive management in aquatic food interventions.

Over three years, AquaData produced more than 114 knowledge products, implemented 39 capacity-building activities, and supported at least 13 policy and investment shifts. It directly contributed to building evidence-informed aquatic food systems that are transparent, inclusive, and better positioned to meet sustainability goals.



## WP2: Aqua+Partners




## Work Package 2 progress against the theory of change

Aqua+Partners (WP2) contributed to strengthening partnerships, building inclusive institutions, and enhancing policy responsiveness for aquatic food systems transformation across Africa, Asia, and the Pacific. It delivered tangible progress by generating tools to evaluate nutrient intake, social inclusion, and investment readiness.

In Solomon Islands, the WP developed the island food systems concept and established the Nusatupe Innovation Hub, a national center for knowledge exchange, inclusive governance, and youth engagement. Demonstration sites were established for coral restoration, aquaponics, seaweed farming, and backyard gardening. The hub also completed its first youth internship program and hosted a regional forum on community-based resource management.

Also in Solomon Islands, WP2 research contributed to a new investment of US$150,000 for planning the integration of social protection with fisheries management and created novel spaces for a series of Indigenous foods dialogues to address dietary transitions. In addition, it worked with ANCORS and SPC to address malnutrition.

In Timor-Leste, aquatic foods were integrated into the national school meals program, with fish powder delivered by partners to 35,000 children. In India, efforts focused on enhancing women's access to aquatic foods through the Mission Shakti platform and scaling up the use of fish powder in child nutrition, which saw more than 9,000 children consume fish at school.

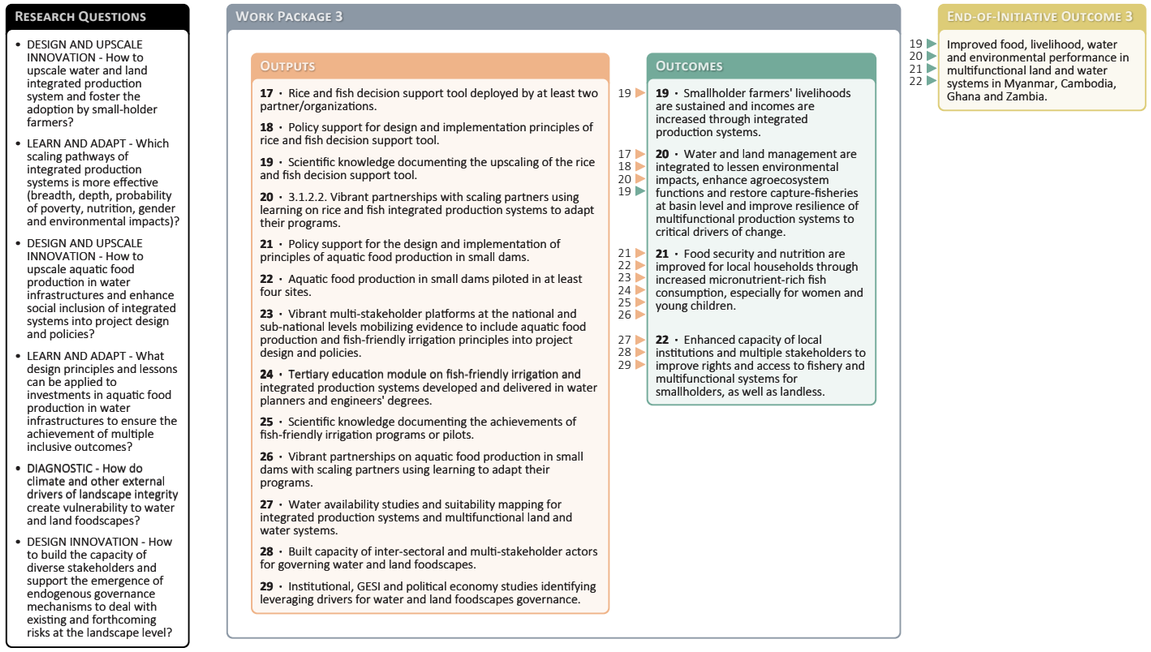
Building on earlier achievements in Assam, policy discussions explored broader integration under India's Pradhan Mantri Matsya Sampada Yojana scheme, with an estimated US$120,000 investment proposal to expand fish-based nutrition through the ICDS.

WP2 supported participatory assessments of aquatic food consumption, fish powder acceptability studies, and collaborative design of social protection programs. This co-production model helped align national strategies with small-scale actors' needs.

In Zambia, Aqua+Partners developed an inclusive business model in partnership with the private sector to scale climate-smart aquaculture. A public-private accelerator grant program supported six small- and medium-sized enterprises (SMEs) integrating climate-smart aquaculture practices with climate information system (CIS) extension. By the end of the Initiative's three-year cycle, these SMEs served more than 45,000 smallholder farmers (36 percent women), improving access to quality seed, modern pond designs resilient to climate shocks, and timely weather updates via WhatsApp and radio. Farmers are now better linked to premium markets and receive tailored technical support.

Aqua+Partners produced more than 72 knowledge products, including journal articles (27), briefs, and reports. It leaves a strong legacy of novel partnerships, national policy dialogue, and place-based innovations that can now be taken forward by future programs. WP2 was a starting point for CGIAR's new Area of Work on Island Food Systems, as part of its Food Frontiers and Security Program.

## WP3: AquaPlans




## Work Package 3 progress against the theory of change

AquaPlans (WP3) advanced the design and scaling of integrated aquatic food innovations across multifunctional land and water systems in Ghana, Zambia, Myanmar, and Cambodia. Through a combination of decision support tools, governance innovations, impact assessments, and inclusive stakeholder engagement, the WP contributed to improved food, nutrition, livelihood, and environmental outcomes.

AquaPlans produced more than 51 knowledge products, including peer-reviewed articles, manuals, briefs, and reports. These outputs supported the development and application of five key innovations: (1) the Rice-Fish Suitability Decision Support System (Myanmar and Cambodia); (2) a tool for scaling aquaculture in small reservoirs (Ghana); (3) a decision support tool for sustainable aquaculture (Myanmar); (4) inclusive governance models for fish cage production (Ghana); and (5) a multistakeholder platform model for landscape governance (Zambia and Cambodia).

In Cambodia, AquaPlans supported the operationalization of the policy shift toward integrated management of water, fisheries, agriculture, and rural development through two district-level TWGs, which, for the first time, brought together multiple local government layers, relevant sector agencies and community-based organizations mandated to manage food production systems. Related capacity sharing and engagement events on integrated production and land-water governance engaged more than 200 farmers, policymakers, and civil society representatives.

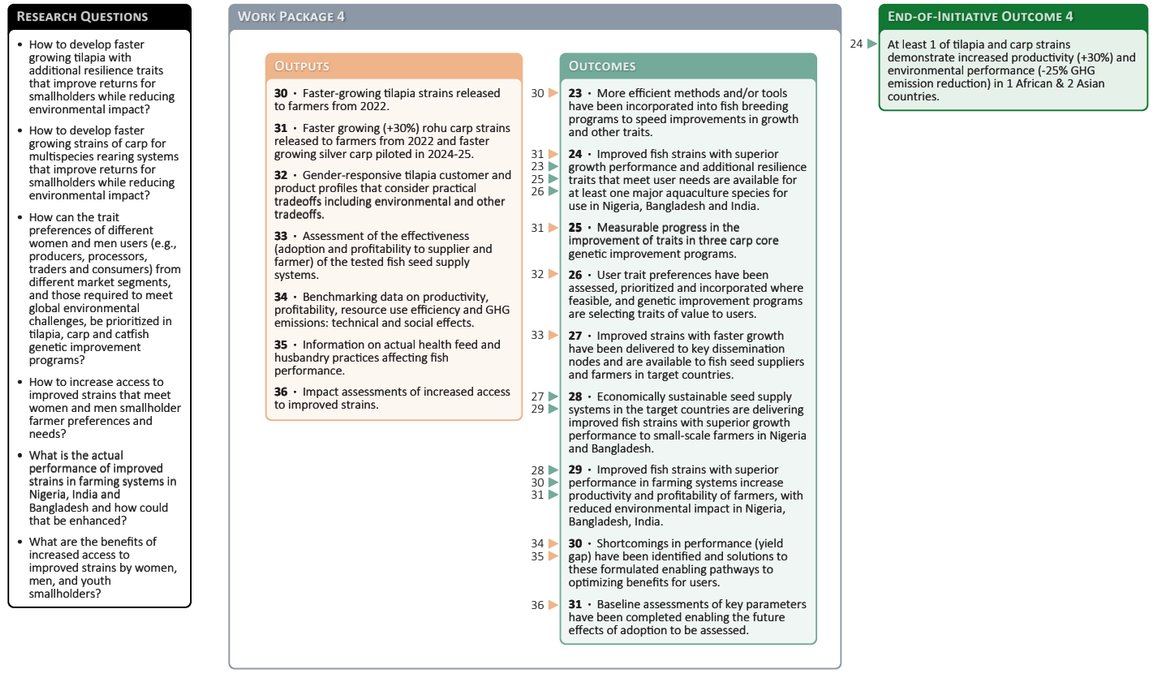
In Ghana, AquaPlans tested and piloted fish cage production in small reservoirs in four communities. The success of the first production cycle led to reinvestment in a second cycle and catalyzed a policy change: the Ministry of Fisheries and Aquaculture Development committed to scale the Aquaculture for Food and Jobs program to 20 additional reservoirs. This expansion aims to increase domestic fish production, youth employment, and food security.

In Zambia, the multistakeholder platform for the Lower Kafue Basin was launched in 2023 and formally endorsed by the Ministry of Fisheries and Livestock. Ongoing participation in the platform throughout 2024 enabled collective management of water and aquatic food systems. The multistakeholder platform became a space for inclusive planning, technical collaboration, and integration of environmental and food system goals.

In Myanmar and Cambodia, capacity development focused on government and community-level actors. Myanmar's Rice-Fish Suitability Tool was supported through a training-of-trainers program targeting Ministry of Agriculture staff. Cambodia hosted learning events on integrated production and land-water governance, engaging more than 200 farmers, policymakers, and civil society representatives.

AquaPlans work enabled uptake of science-based innovations, strengthened national institutions, and informed inclusive policy dialogue. It contributed to the improved integration of aquaculture into multifunctional landscapes, especially in small reservoirs, and promoted climate-resilient practices. By aligning technical innovation with participatory governance and local capacity development, WP 3 helped create the enabling conditions for more sustainable aquatic food systems in diverse geographies.

## WP4: AquaGenetics




## Work Package 4 progress against the theory of change

AquaGenetics (WP4) delivered consistent progress toward transforming aquaculture productivity and sustainability through the development, dissemination, and adoption of improved fish strains and better management practices.

Over the Initiative's three years, AquaGenetics focused on advancing strains of genetically improved tilapia and carp, supporting sustainable seed systems, and delivering robust scientific evidence to guide breeding programs. Partnerships with national research institutes, the private sector, and government agencies strengthened localized production and delivery.

In Bangladesh, the faster-growing G3 rohu carp strain was adopted by 61 hatcheries, including 18 under the Department of Fisheries, 1 academic institution, and 41 private facilities. By 2024, 29 of these produced seed, raising annual spawn output from 246 kg (2022) to 6,938 kg (2024), and supporting more than 231,000 farmers. Trials confirmed 30 percent higher growth performance as compared to traditional strains.

GIFT tilapia dissemination advanced significantly. In Nigeria, more than 50,000 fry were transferred to the country's largest hatchery in 2022, forming the basis of a GIFT-based aquaculture sector. In 2023, WorldFish and Premium Aquaculture Limited (PAL) co-developed GIFT 18 seed and began dissemination to SME hatcheries, training 198 farmers. This effort expanded in 2024 with the delivery of 35,000 G18 fry to the Malaysian Department of Fisheries, while G19 broodstock were retained in Penang for future dissemination activities.

In Timor-Leste, partnerships and memorandums of understanding supported the scaling of aquaculture. Four private hatcheries and eight nurseries began working with GIFT strains. BMPs for tilapia were validated with around 200 farmers. In Zambia and Malawi, BMPs reached broader adoption under the AICCRA (Accelerating the Impact of CGIAR Climate Research in Africa) project, with scaling to more than 45,000 farmers expected.

In Egypt and Bangladesh, additional improved fish strains were developed: Generation 17 of Abbassa tilapia, Generation 3 of silver carp, and the first batch of Generation 2 catla carp. A TiLV-resistant GIFT line (G19) was produced in 2024 following investment in genomic tools and breeding infrastructure.

The WP also contributed to policies for seed and aquaculture system development. In Timor-Leste, aquaculture is now prioritized in national food security strategies. In Nigeria, a legal agreement established the GIFT platform with PAL, enabling private sector growth. Studies also informed policy and farm-level decisions on performance, gender preferences, value-based trait selection and access and benefits sharing.

WP4 delivered critical tools for better breeding and improved aquaculture performance, generating dozens of knowledge products (89), including 23 journal articles. Together, these actions helped embed genetics and BMPs in national systems and positioned improved strains to benefit smallholders and ecosystems across Africa and Asia.

*Tilapia fry pens in Nigeria.*
*Credit: Rohana Subasinghe, WorldFish*



## Work Package progress rating summary

| WORK PACKAGE | PROGRESS RATING & RATIONALE |
|---|---|
| 1 | On track<br>WP1 delivered consistent outputs across three years, meeting or exceeding its targets related to digital tool development, data availability, capacity development, and policy support. Key systems such as FishBase (>700,000 monthly users) and PeskAAS (scaled to six countries) show high adoption. AquaIndex, AQFO, eDNA, and MEL frameworks have advanced. Policy and capacity building in Malawi, Nigeria, and Liberia reinforced impact. Innovations and evidence were widely used, showing clear alignment with the TOC and WP outcomes. |
| 2 | Delayed<br>As a whole, the WP is making progress in the intended direction. WP2 maintained strong progress, particularly in Timor-Leste, Solomon Islands, and India. It supported inclusive innovations (such as fish powder integration into national nutrition programs), established the Nusatupe Innovation Hub, and piloted investment-readiness models in Zambia. Though the WP did not reach the expected number of direct beneficiaries due to its reduced budget, it laid a robust foundation aligned with national policies and co-created pathways for scaling. Innovations, policies, and partnerships are in place to deliver future impact. |
| 3 | On track<br>AquaPlans consistently advanced innovations such as aquaculture suitability tools, rice-fish integration, and fish-friendly irrigation. These were supported by 40 knowledge products and strong capacity building. The multistakeholder platform in Zambia became a national platform for landscape co-management; Ghana's pilots influenced the expansion of the Aquaculture for Food and Jobs program. Though budget cuts caused some streamlining, WP3 still delivered outputs in alignment with its TOC and supported policy impact in four countries. |
| 4 | On track<br>AquaGenetics made consistent progress from 2022 to 2024 in enhancing productivity and sustainability in aquaculture systems through genetic improvement and BMP adoption. In Bangladesh, G3 rohu demonstrated more than 30 percent faster growth, with seed adoption by 61 hatcheries supporting more than 231,000 farmers, setting a new benchmark for economic and food security impact. GIFT tilapia was disseminated to Nigeria, Timor-Leste, and Malaysia, where it showed faster growth rates than local strains. The introduction and scaling of BMPs, validated in Timor-Leste and Myanmar, and now scaling through AICCRA in Zambia and Malawi, supported improved environmental performance and climate resilience. Key policy shifts occurred in Nigeria and Timor-Leste. Research outputs and breeding program milestones were achieved across multiple strains (rohu, catla, tilapia, silver Carp), confirming productivity and scaling readiness. Alignment with the TOC and EOIO was strong. |

## Definitions

**On track**

- Progress largely aligns with Plan of Results and Budget and Work Package theory of change.
- Can include small deviations/issues/delays/risks that do not jeopardize success of Work Package.

**Delayed**

- Progress slightly falls behind Plan of Results and Budget and Work Package theory of change in key areas.
- Deviations/issues/delays/risks could jeopardize success of Work Package if not managed appropriately.

**Off track**

- Progress clearly falls behind Plan of Results and Budget and Work Package theory of change in most/all areas.
- Deviations/issues/delays/risks do jeopardize success of Work Package.

# Section 4: **Quantitative overview of key results**

This section provides an overview of results reported and contributed to, by the CGIAR Initiative on Aquatic Food from 2022 to 2024. These results align with the CGIAR Results Framework and Aquatic Food's theory of change. Further information on these results is available through the CGIAR Results Dashboard.

The data used to create the graphics in this section were sourced from the CGIAR Results Dashboard on 04 Aprili 2025. These results are accurate as of this date and may differ from information in previous Technical Reports. Such differences may be due to data updates throughout the reporting year, revisions to previously reported results, or updates to the theory of change.

## Overview of results by category

**Outputs**

- Knowledge products 375
- Capacity sharing for development 102
- Innovation development 46
- Other outputs 25

**Outcomes**

- Policy change 26
- Innovation use 22
- Other outcomes 2

Aquatic Foods Initiative reported and/or contributed to a total of 598 results including 375 knowledge products, 46 innovation development, 102 capacity-sharing activities, and 26 policy changes.

The total number of results per category reflects unique results reported between 2022 and 2024. Results reported in multiple years are only counted once.

## Breakdown of Aquatic Foods' outputs and outcomes by year

2022

**Outputs**

- Knowledge products 149
- Capacity sharing for development 27
- Innovation development 23

**Outcomes**

- Policy change 10
- Innovation use 8

2023

**Outputs**

- Knowledge products 80
- Capacity sharing for development 42
- Other outputs 10
- Innovation development 39

**Outcomes**

- Policy change 13
- Innovation use 8
- Other outcomes 1

2024

**Outputs**

- Knowledge products 146
- Innovation development 42
- Capacity sharing for development 33
- Other outputs 15

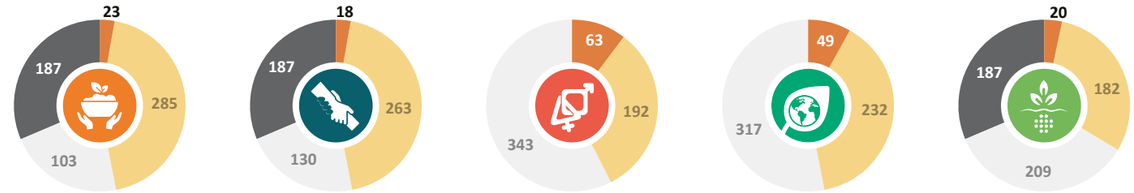
**Outcomes**

- Policy change 13
- Innovation use 13
- Other outcomes 1

This figure presents a breakdown of Aquatic Foods Initiative's outputs and outcomes from 2022 to 2024. It shows consistent growth in innovation development (rising from 23 in 2022 to 42 in 2024), and steady progress in policy influence, with policy changes increasing from 10 in 2022 to 13 each in 2023 and 2024. Capacity-sharing activities peaked in 2023 (42 events) and remained strong in 2024 (33 events), reflecting continued investment in stakeholder engagement. While the number of knowledge products declined in 2023 due to strategic streamlining, it rebounded in 2024, maintaining a high output across the three years. Innovation use steadily rose, reaching 13 instances in 2024. Overall, the trend demonstrates the growing uptake of innovations and increasing policy engagement.

The graphs with yearly data include both new results reported for that specific year and updated results from previous years.

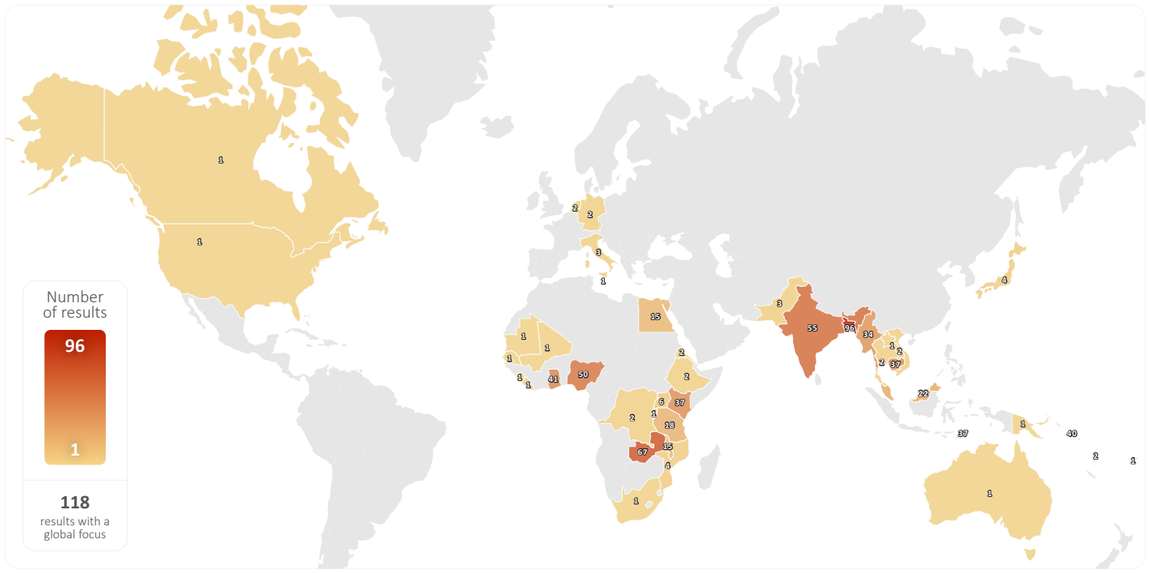
## Number of results by Impact Area contribution




- **2 = Principal:** Contributing to one or more aspects of the Impact Area is the principal objective of the result. The Impact Area is fundamental to the design of the activity leading to the result; the activity would not have been undertaken without this objective.
- **1 = Significant:** The result directly contributes to one or more aspects of the Impact Area. However, contributing to the Impact Area is not the principal objective of the result.
- **0 = Not targeted:** The result has been screened against the Impact Area, but it has not been found to directly contribute to any aspect of the Impact Area as it is outlined in the CGIAR 2030 Research and Innovation strategy.
- **Not applicable:** Pertains to 2022 reported results when only information on Gender and Climate impact area tagging was available.

This graph shows how Aquatic Foods results align with CGIAR's five Impact Areas—highlighting strong contributions to gender equality, nutrition, poverty reduction, climate adaptation, and environmental health.

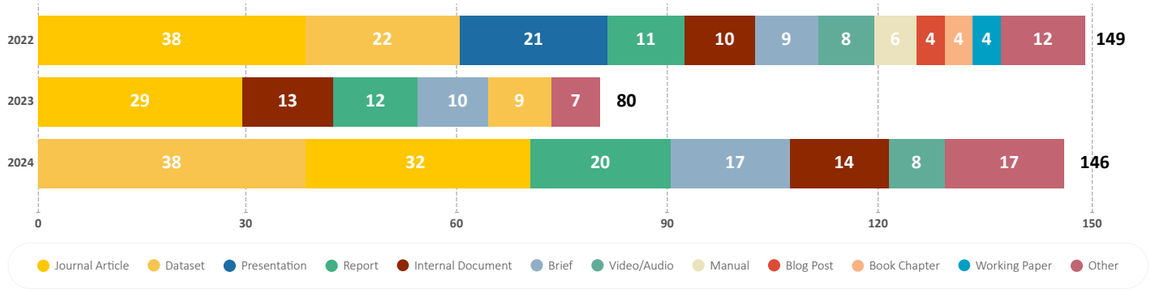
## Geographic focus of Aquatic Foods Initiative's work




This map illustrates the geographic spread of the Aquatic Foods Initiative's results from 2022 to 2024, with high concentrations in Bangladesh, Nigeria, India, and Zambia, and 118 results with a global focus. It highlights the Initiative's strong country engagement and cross-regional impact.

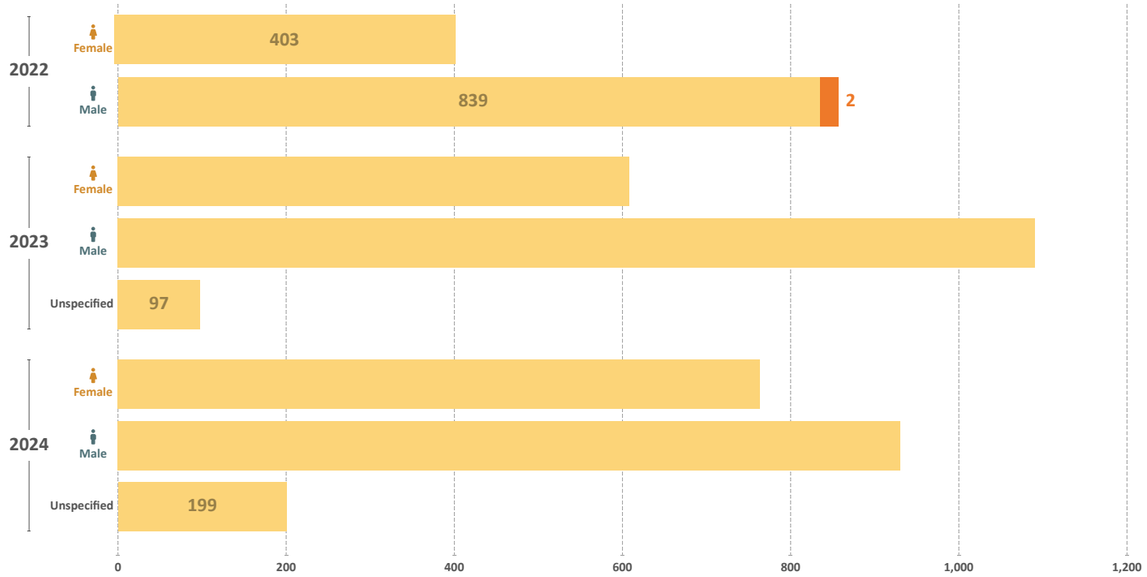
One result can impact multiple countries and can therefore be represented multiple times.

## Knowledge products by typology



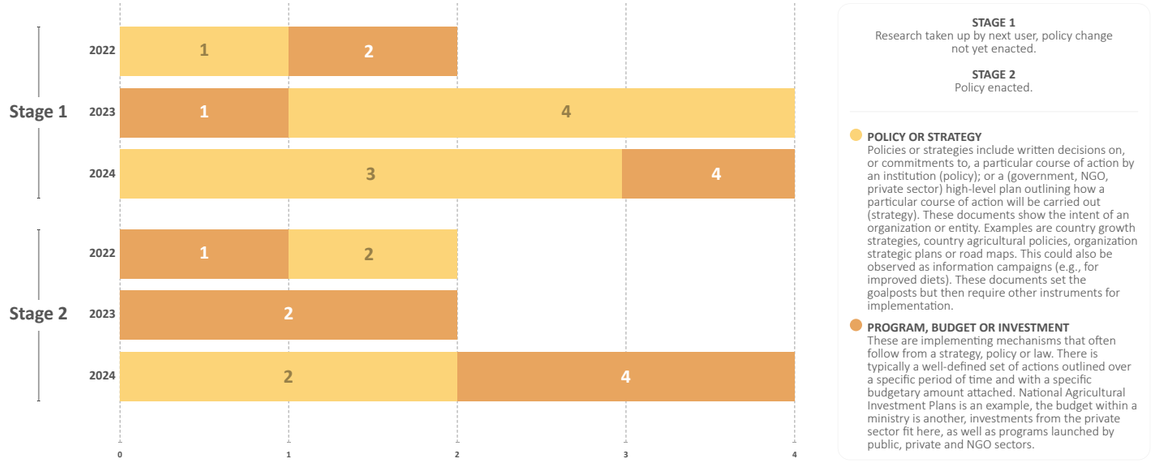

The graph illustrates the number and types of knowledge products generated by the Aquatic Foods Initiative from 2022 to 2024. Across the three years, the Initiative produced a consistently high volume of outputs (149 in 2022, 80 in 2023, and 146 in 2024).

## Number of individuals trained by the initiative



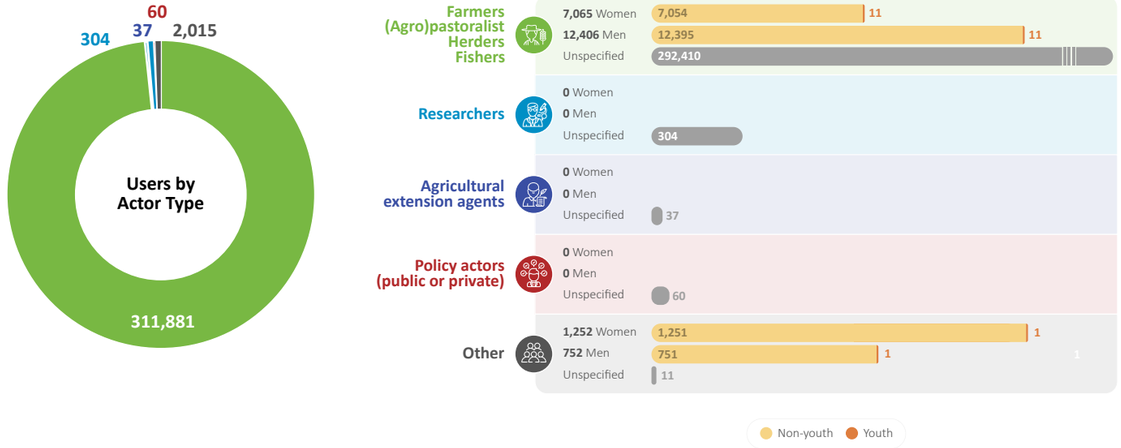

From 2022 to 2024, the Initiative trained more than 4,900 individuals through short-term programs, with increasing participation by women each year. Two long-term trainees were supported from 2022, while the overall training effort emphasized equitable access and practical skills for aquatic food systems transformation.

## Policies by stage and by type




The Initiative contributed to a growing number of policy shifts from 2022 to 2024, with 15 Stage 1 policies taken up by stakeholders and 11 Stage 2 policies formally enacted. Notably, policy or strategy contributions increased steadily, while 2024 marked a peak in enacted programs, budgets, or investments.

## Innovations users by actor type

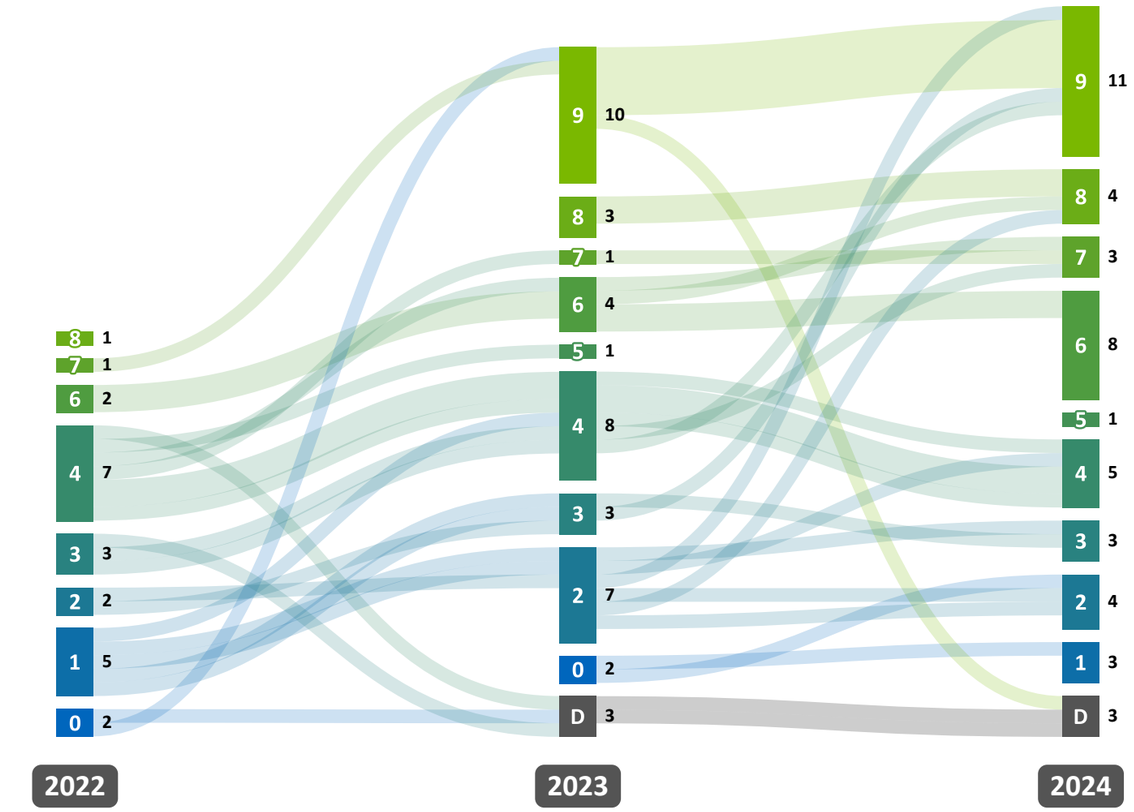



This graphic shows that more than 311,000 farmers and fishers were the largest group of innovation users, while researchers, policy actors, and extension agents also engaged with the tools and technologies. The “Other” category included 2,015 users, with a more balanced gender distribution (62 percent women, 37 percent men), reflecting broader uptake among diverse stakeholders.

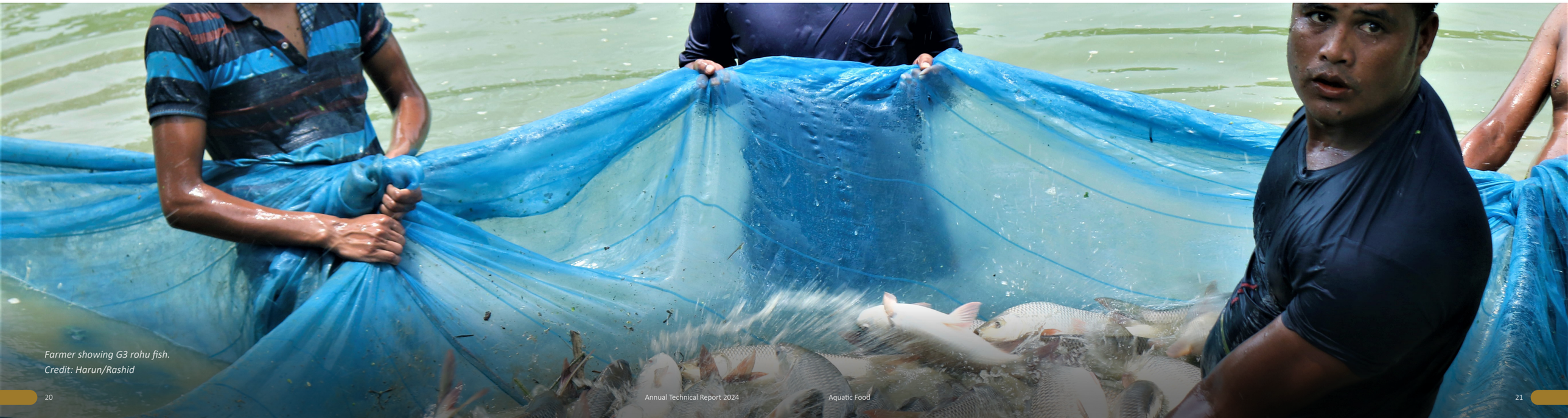
## Number of innovations and their readiness levels

| | | Pipeline overview # of innovations |
|---|---|---|
| 9 | **Proven Innovation** The innovation is validated for its ability to achieve a specific impact under uncontrolled conditions | 12 |
| 8 | **Uncontrolled Testing** The innovation is being tested for its ability to achieve a specific impact under uncontrolled conditions | 5 |
| 7 | **Prototype** The innovation is validated for its ability to achieve a specific impact under semi-controlled conditions | 3 |
| 6 | **Semi-Controlled Testing** The innovation is being tested for its ability to achieve a specific impact under semi-controlled conditions | 8 |
| 5 | **Model/Early Prototype** The innovation is validated for its ability to achieve a specific impact under fully-controlled conditions | 1 |
| 4 | **Controlled Testing** The innovation is being tested for its ability to achieve a specific impact under fully-controlled conditions | 5 |
| 3 | **Proof of Concept** The innovation's key concepts have been validated for their ability to achieve a specific impact | 4 |
| 2 | **Formulation** The innovation's key concepts are being formulated or designed | 4 |
| 1 | **Basic Research** The innovation's basic principles are being researched for their ability to achieve a specific impact | 3 |
| 0 | **Idea** The innovation is at idea stage | 1 |

## Innovations readiness levels progression (2022-2024)

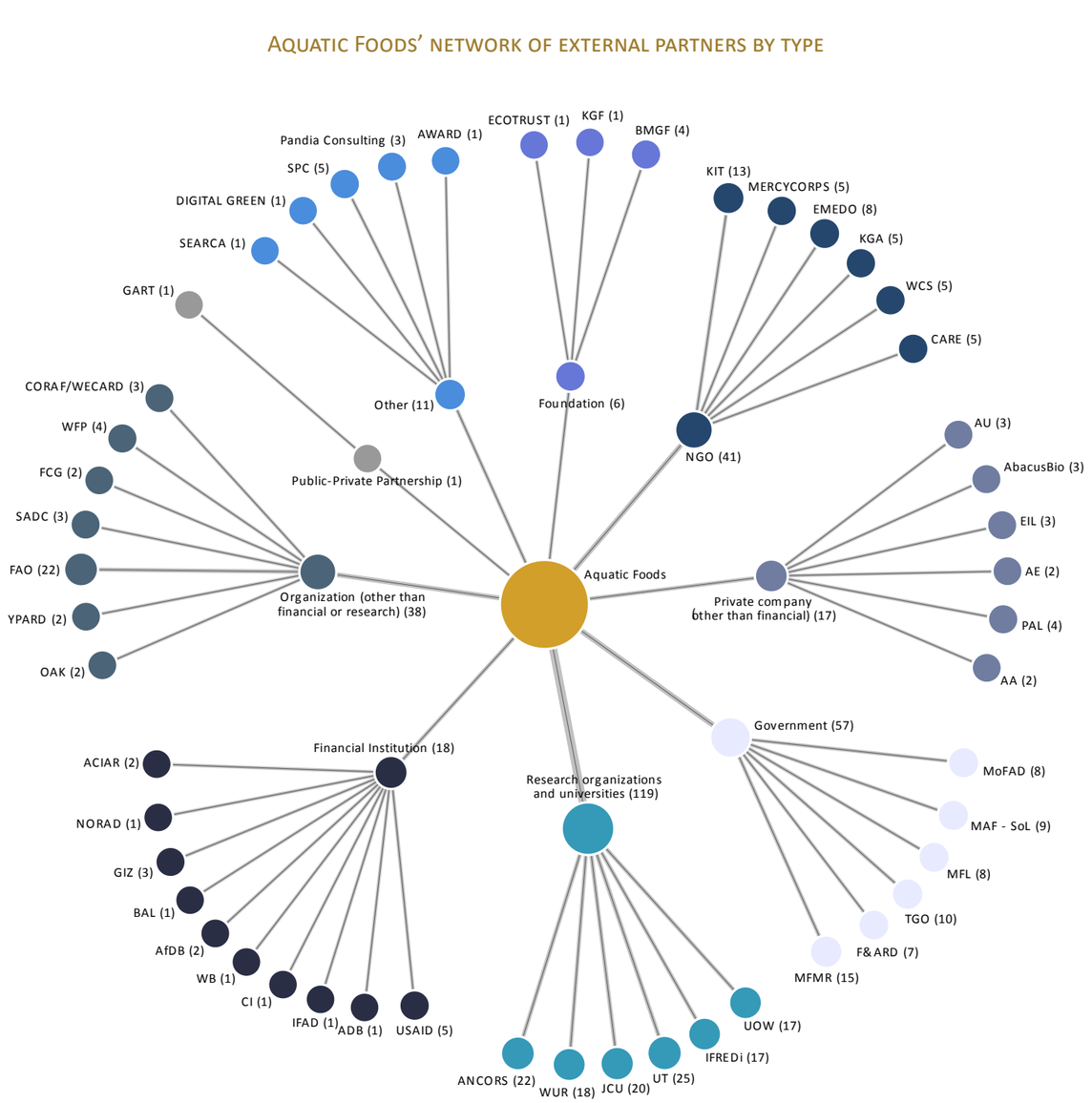



This graphic shows the maturity of 46 innovations developed under the Aquatic Foods Initiative, with 12 reaching the "Proven Innovation" stage (level 9) of demonstrating impact under real-world conditions. The strong distribution across all readiness levels highlights a dynamic pipeline with both scalable solutions and early-stage innovations under development.



*Farmer showing G3 rohu fish.*
*Credit: Harun/Rashid*

# Section 5: **Partnerships**




This network visualization highlights AqFI's broad and diverse partnerships that span more than 300 collaborators. Government institutions, NGOs, and research organizations formed the largest clusters, underscoring strong cross-sector engagement across the Initiative's three-year implementation.

To allow for a clearer view, a maximum threshold of six partners was applied for each typology in the network diagram. The list of partner acronyms is available here.

## Partnerships and Aquatic Food's impact pathways

AqFI developed a network of partnerships to deliver research outputs, support innovation uptake, and scale aquatic food system research and solutions. It engaged more than 350 partners, with an average of over 200 active partnerships per year, spanning academic institutions, government agencies, national agricultural research systems, civil society organizations, and the private sector.

In 2022, the Initiative's 171 partnerships were primarily shaped through multistakeholder consultations in countries such as Bangladesh, Cambodia, Ghana, India, Myanmar, and Zambia. These set the groundwork for collaboration across the research, piloting, and scaling stages of the Initiative.

The global inception workshop in Penang (April 2022) and national workshops in each target country brought together government representatives, researchers, and development partners to co-design research and capacity-building activities.

In 2023, AqFI recorded 214 new collaborations, while in 2024 there were 156. During 2023 and 2024, there was increasing emphasis on delivering innovations at scale, with stronger engagement of government and policy actors, civil society organizations, and the private sector. In 2024, approximately 35 percent of partnerships were geared toward innovation development, while 30 percent focused on scaling and broader system change.

Collaboration with national agricultural research and extension systems, especially Departments of Fisheries or their equivalents, was at the core of the Initiative's approach. In countries such as India, Ghana, Timor-Leste, Solomon Islands, and Zambia, the Initiative played a catalyzing role in aligning government and traditional partners around shared goals for fisheries and aquaculture development. In India, this involved supporting state-level strategies for fish-based products in public nutrition programs. In Zambia, AqFI contributed to the launch of a multistakeholder platform under the Ministry of Fisheries and Livestock, promoting inclusive planning in inland fisheries governance. In the Pacific, the Initiative established a consultative process to help address poor and limited data on island food systems.

The Initiative fostered strong partnerships with Bangladesh, Nigeria, and India, working with public and private actors to support the dissemination of genetically improved strains of tilapia (GIFT) and carp. These partnerships advanced seed dissemination strategies and laid the foundation for national scaling efforts.

In Ghana, collaboration with the Council for Scientific and Industrial Research and the Fisheries Commission under the Ministry of Fisheries and Aquaculture Development supported pilot testing of cage aquaculture in small reservoirs. These institutions were critical in shaping national scale-up strategies and aligning research with sector priorities.

In Cambodia, a formal partnership with the Inland Fisheries Research and Development Institute strengthened national research-policy linkages. In Myanmar, AqFI built strong collaboration with the Departments of Agriculture, Planning, and Fisheries under the Ministry of Agriculture, Livestock and Irrigation, supporting co-designed innovations for integrated rice–fish systems.

In Solomon Islands, AqFI helped integrate aquatic foods into the broader Indigenous foods movement. Its partnership with Kastom Gaden Association, representing a network of 10,000 smallholder farmers and fishers, resulted in the creation of a new social platform to promote safe aquatic food practices and localized training.

In Timor-Leste and India, the Initiative embedded aquatic foods into school meal planning through multisector partnerships involving stakeholders in education, nutrition, and agriculture.

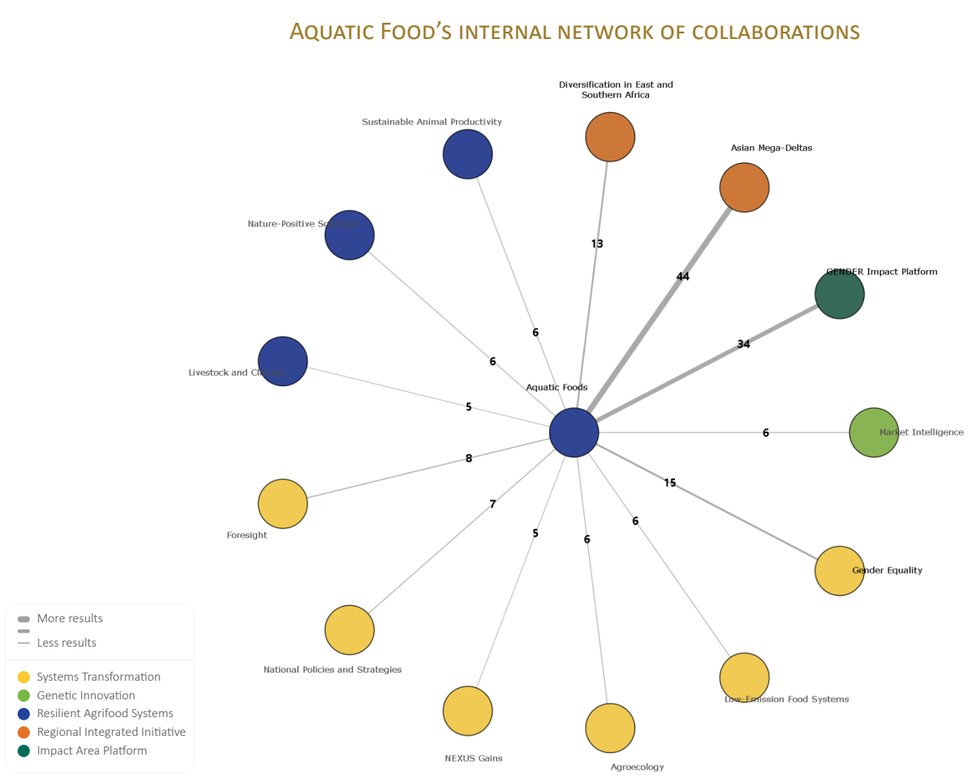
In 2024, partnerships expanded, with an emphasis on digital innovation and national ownership. AqFI formalized collaboration with Planetek Italia to apply satellite and digital technologies for monitoring aquatic food systems, and with ANCORS to co-develop evidence-based scaling strategies for the Pacific. These collaborations—alongside deepened engagement with governments in Ghana, Nigeria, and Solomon Islands, and increased collaboration with the private sector and national institutions to develop sustainability scores for food systems—advanced efforts to localize digital platforms and better align data systems with national decision-making needs.

At the global level, AqFI sustained its strong partnership with FAO and other key actors, contributing evidence to show the crucial role of small-scale fisheries in food systems and supporting global policy processes. AqFI and FAO also co-developed a participatory MEL framework to support the implementation of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries, reinforcing their joint commitment to inclusive and transparent governance.

By 2024, AqFI partnerships had evolved into deeper, more impact-driven collaborations with broad geographic reach and strong co-ownership. The Initiative partnership model successfully fostered an enabling environment for the transformation of aquatic food systems—linking grassroots innovation, national policy alignment, and global advocacy. These accomplishments provide a solid foundation for continued collaboration and scaling under CGIAR's SAAF Program, which will build on and carry forward the momentum created by AqFI

*Fisherman's hands repairing fishing nets, preparing them for the next catch.*
*Credit: Festo Lumwe*

# Section 6: **CGIAR Portfolio linkages**




This collaboration map shows strong internal CGIAR linkages between AqFI and key programs such as Asian Mega-Deltas, Gender Impact Platform, and Diversification in East and Southern Africa, reflecting AqFI's cross-cutting role in climate, nutrition, and inclusion research. Thicker lines highlight the most intensive collaborations, especially around integrated food systems and regional scaling efforts.

Connections are sized according to the number of shared reported results, highlighting the depth of collaboration across the CGIAR Portfolio.

A results threshold filter is applied (set to a minimum of five results) to focus the view on the most significant collaborations. Thicker lines represent stronger collaborative links based on a higher number of shared results.

## Portfolio linkages and Aquatic Food's impact pathways

From 2022 to 2024, AqFI established and expanded linkages with multiple CGIAR Initiatives. These played a vital role in supporting the Initiative's TOC and delivering progress toward its EOIOs. The linkages aimed to enhance research quality, improve geographic reach, integrate cross-cutting themes, and strengthen uptake pathways across target countries and global forums.

A significant engagement emerged between AqFI, the AMD Initiative, and the CGIAR GENDER Impact platform. These partnerships integrated efforts across water governance, climate resilience, and food and nutrition security. They enabled multilevel contributions, from policy development in Cambodia to innovation scaling in Bangladesh and India.

In Cambodia, WP3 of AqFI and WP4 of AMD worked to advance integrated decentralized food system governance. This enabled the co-development of TWGs across districts that bring together the fisheries and aquaculture communities, water user groups, and local authorities to design and manage aquatic food landscapes more sustainably. This model responded directly to the TOC outcome on inclusive institutions and is a strong case of inter-Initiative complementarity: AqFI contributed technical expertise and local facilitation, while AMD brought climate-informed governance frameworks. Strong synergy with AMD was also achieved for the dissemination of improved rohu carp strains in Bangladesh, a key to achieving EOIO4 of AqFI. In Bangladesh and India, the partnership between AqFI and the Nutrition Impact Platform advanced the development and dissemination of nutrient-rich aquatic food products, including small indigenous species and fish powders, linking to school feeding programs and national nutrition policies. AqFI and the Nutrition Impact Platform also collaborated on methods to assess food environments and dietary impacts, leading to harmonized protocols for evaluating the nutrition sensitivity of food system interventions. This was reflected in shared metrics for dietary quality, enabling cross-site comparability and laying the groundwork for further integration into the CGIAR SAAF Program.

The Initiative also worked closely with the CGIAR Gender Impact Platform, co-developing tools such as the Pro-WEFI and contributing to global learning through joint publications, capacity building activities, and events. In Kenya, joint work supported a local women's community facing issues of food waste and loss, highlighting the gendered dynamics of climate change in aquatic food systems and informing community-led adaptation strategies in Lake Victoria's small-scale fisheries.

Portfolio linkages also saw cooperation with Ukama Utsawi, particularly in Zambia. Here, AqFI piloted the scaling readiness approach for aquaculture innovations, drawing from diversification tools and evidence pathways developed under Ukama. This cooperation facilitated the co-establishment of multistakeholder platforms for inland fisheries management and climate-smart aquaculture in the Kafue Flats region.

AqFI also worked with the NPS Initiative to support policy review and institutional analysis in Nigeria and Ghana. A co-developed report on policy coherence in food, land, and water systems provided a framework now being considered for replication in other contexts and informed the update of Nigeria's National Fisheries and Aquaculture Policy. The collaboration helped deliver outcomes related to enabling policy environments and institutional strengthening. Currently, Liberia is working with WorldFish to learn from this example and find ways to establish a similar process to update their own policy framework.

AqFI also provided tools and protocols for the characterization of aquatic food systems, which were applied jointly with AMD and the CGIAR Research Initiative on Foresight. For example, work on eDNA monitoring and the AquaIndex (a digital tool for aquatic food systems sustainability assessment) helped build standardized approaches for data collection, analysis, and visualization. These efforts are now positioned for broader application across the CGIAR portfolio, including future integration under SAAF's Digital and Data Solutions Area of Work.

Collaborative work within CGIAR culminated in the November 2024 Joint Transition Workshop, co-convened by WorldFish, AMD, and the Nutrition Impact Platform. This confirmed the value of synergies and promoted a unified research agenda that leverages AqFI's contributions in new programmatic structures. Shared methods, joint innovations, and complementary delivery models were all identified as assets for the new CGIAR Portfolio.

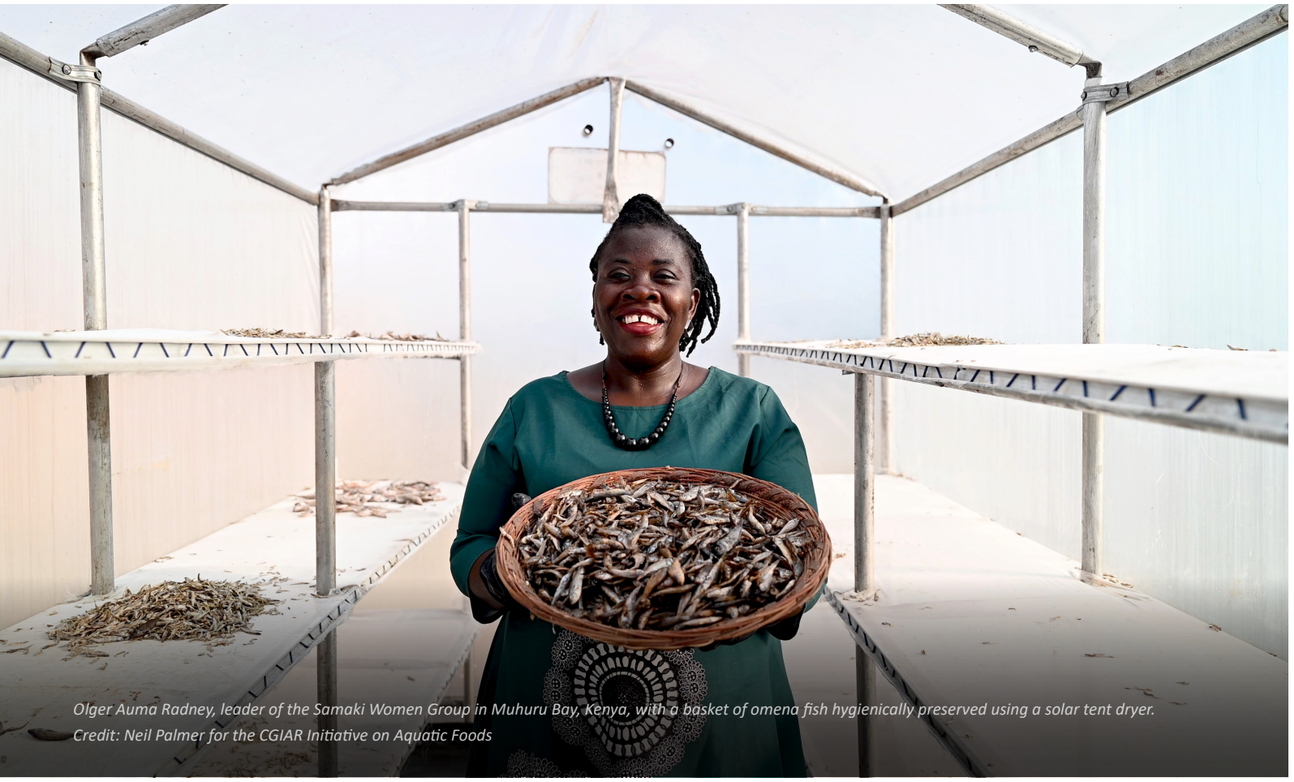
These partnerships enhanced the collective capacity of Initiatives to address complex development challenges, while also helping establish a coherent foundation for future work in aquatic and agrifood systems. Many of the methods, datasets, and innovations generated are already embedded in planning for the 2025–2030 period. Their comparative advantage lies in their adaptability across geographies, grounding in multistakeholder engagement, and cross-Initiative relevance, particularly within those Science Programs addressing climate change, One Health, nutrition, and gender equality.

*A fish vendor.*
*Credit: Harun/Rashid*

# Section 7: **Key result story**

## Women's empowerment and climate justice in Kenya

**Fish preservation, handling, and processing interventions are improving livelihoods in Kenya's Lake Victoria region.**



*Olger Auma Radney, leader of the Samaki Women Group in Muhuru Bay, Kenya, with a basket of omena fish hygienically preserved using a solar tent dryer.*
*Credit: Neil Palmer for the CGIAR Initiative on Aquatic Foods*

**Primary Impact Area**

**Other relevant Impact Areas targeted**

**Contributing Initiative**

CGIAR Initiative on Aquatic Foods · CGIAR Gender Impact Platform · CGIAR Initiative on Diversification in East and Southern Africa

**Contributing Centers**

WorldFish · IWMI

**Contributing external partners**

Ukama Ustawi: Diversification for Resilient Agribusiness Ecosystems in East and Southern Africa (ESA) · Stockholm Environment Institute · Murang'a University of Technology · Homa Bay County Government · Migori County Government

**Geographic scope**



**Regions:** East Africa

**Countries:** Kenya

**Three fish preservation innovations are improving food security, incomes, gender equity and climate resilience in Kenya's Lake Victoria region. Researchers partnered with local government and women's groups in Homa Bay and Migori counties to install solar dryers, freezers, and smoking kilns that reduce post-harvest fish losses and improve food safety. These interventions are empowering women-led groups to earn more, expand their businesses, and support their communities, while also informing gender-sensitive fisheries policy development.On any given morning on the edge of Kenya's Lake Victoria, the ground twinkles as tiny cyprinid fish, locally known as omena, are dried in the sun. For hours, women sweep the fish to ensure even drying. But increasing rainfall linked to climate change means there are now more cloudy days, leading to slower drying and a greater chance that these fish, so vital to food and income, will spoil.**

Along with this finding, a 2023 scoping study also showed that annual average temperatures and rainfall in the Lake Victoria region have been rising for the last four decades, affecting fish stocks and leaving vulnerable communities exposed. The study, conducted as part of AqFI to assess the impacts of climate change on fishing communities in the riparian counties of Homa Bay and Migori, provided new insights into the challenges the communities are facing.

In consultation with local partners and the communities themselves, researchers set out to find ways to improve food safety, fish loss, and fish preservation in an era of unreliable weather. First, they supported construction of solar tent dryers in Migori County to help with drying omena, as well as larger fish such as Nile perch and tilapia.

The dryers look like greenhouses with polythene sides instead of glass, and the interior contains racks raised off the floor. They can dry around 150 kg of omena in a couple hours on sunny days, and they even work on cloudy days. When closed, they allow women to engage in other tasks instead of spending the morning sweeping fish or chasing away birds. The project also introduced a series of health protocols for safe fish handling.

Olger Auma Radney, Chief of Muhuru Sub-County and leader of the Samaki Women Group, said the dryer had changed the lives of the community members: "They can now dry their fish whenever there is a need, and their customers benefit from safer handling."

In Nyandiwa sub-County, in Homa Bay, the Luor Ber Suna Ladies Women Group received a solar-powered freezer, with storage batteries that ensure it can run around the clock. The fish can be safely stored in the freezer for several months. The freezer is used by

*G3 Rohu spawn distributed to nurserer.*
*Credit: Harun/Rashid*

the wider community as well, with the Suna Ladies charging a small fee per kilo of fish preserved. They are considering expanding into aquaculture, since they will always be able to preserve their harvest.

In addition, the project installed a smoking kiln in Mbita sub-County, Homa Bay. Medium and large fish are prepared and placed on a large grilling shelf. With the kiln door closed, the fire box underneath is stuffed with wood and other combustibles and set alight. Smoking takes about two hours and means the smoked fish can last up to six months. It has been a boon for a community that normally needs to rush the fish to market and hope to sell it the same day.

Mary Awour of the Good Start women's group, which operates the kiln, says the money they earn from smoked fish pays for all their children to go to school. The Group wants to become a hub for fish smoking in the area and charge a fee for the service. The project is also supporting them to harvest omega 3 oil—a by-product of the smoking process—and helping them to refine, package, and sell it.

Looking ahead, researchers will also work with the county government of Homa Bay to further support gender-sensitive fisheries and aquaculture policy in Lake Victoria.

> The communities are really excited; they really see the potential of these interventions to improve their lives and livelihoods, and to help them access bigger markets. They all want to see more and bigger solar tent dryers, more solar-powered freezers and smoking kilns in these areas.
>
> Rahma Adam, Senior Scientist and Social-Economic Inclusion Impact Lead, WorldFish

CGIAR

INITIATIVE ON

Aquatic Foods

Credit: WorldFish