CGIAR

INITIATIVE ON
Aquatic Foods

CGIAR Initiative on Aquatic Foods

ANNUAL TECHNICAL REPORT 2022

CGIAR Technical Reporting 2022

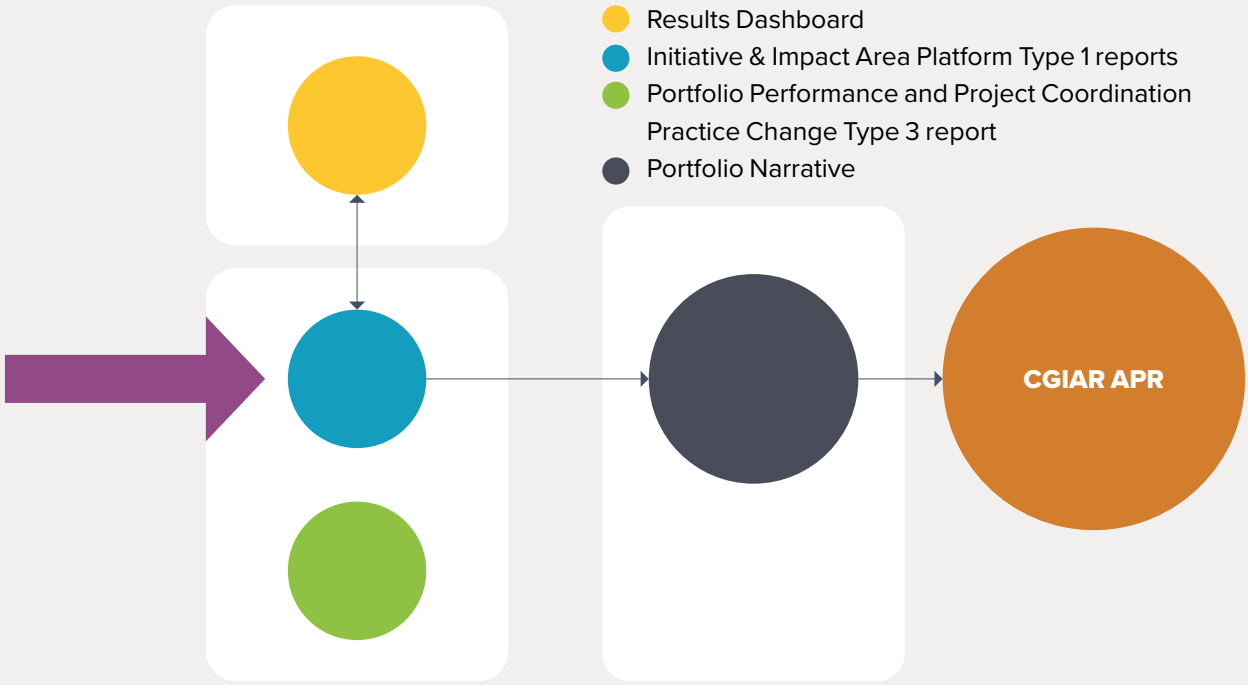
CGIAR Technical Reporting has been developed in alignment with the CGIAR Technical Reporting Arrangement.

This Initiative report is a Type 1 report and constitutes part of the broader CGIAR Technical Report. Each CGIAR Initiative submits an annual Type 1 report, which provides assurance on Initiative-level progress towards End of Initiative outcomes.

The CGIAR Technical Report comprises:

- Type 1 Initiative and Impact Area Platform reports, with quality assured results reported by Initiatives and Platforms available on the CGIAR Results Dashboard.
- The Type 3 Portfolio Performance and Project Coordination Practice Change report, which focuses on internal practice change.
- The Portfolio Narrative, which draws on the Type 1 and Type 3 reports, and the CGIAR Results Dashboard, to provide a broader view on portfolio coherence, including results, partnerships, country and regional engagement, and synergies among the portfolio's constituent parts.

The CGIAR Technical Report constitutes a key component of the CGIAR Annual Performance Report (APR).



US$	2022	2023	2024
Proposal Budget from initial submission	US$7,500,000	US$12,500,000	US$15,000,000
Approved 2022 Budget	US5,654,858		

2022 Disbursement Target based on Approved FinPlan

Section 1 Fact sheet

Initiative name	Resilient Aquatic Food Systems for Healthy People and Planet
Initiative short name	Aquatic Foods
Action Area	Resilient Agrifood Systems
Geographic scope	**Regions targeted in the proposal:** East and Southern Africa; South Asia; Southeast Asia and the Pacific; West and Central Africa **Countries targeted in the proposal:** Bangladesh; Cambodia; Ghana; India; Myanmar; Nigeria; Solomon Islands; Timor-Leste; Zambia
Start date	April 1, 2022
End date	March 31, 2025
Initiative Lead	Cristiano Rossignoli – C.Rossignoli@cgiar.org
Initiative Deputy	Marie-Charlotte Buisson – M.Buisson@cgiar.org
Measurable three-year End of Initiative outcomes (EOI-Os)	**EOI-O 1:** Scaling partners and stakeholders in five countries use improved knowledge systems and data to inform at least five evidence-based investments supporting aquatic food systems transformation.
	EOI-O 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 the Asia-Pacific and bring more nutritious diets to 300,000 people.
	EOI-O 3: Improved food, livelihood, water, and environmental performance in multifunctional land and water systems in Myanmar, Cambodia, Ghana, and Zambia.
	EOI-O 4: At least two strains of tilapia or carp demonstrate increased productivity (+30%) and environmental performance (–25% reduction in GHG emissions) in one African and two Asian countries.
	EOI-O 5: Aquatic food system labs in Solomon Islands and Zambia increase national innovation systems' ability to identify, evaluate, and scale socio-technical innovations.

OECD DAC Climate marker adaptation score*	**Score 1: Significant**: 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*	**Score 1: Significant**: 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*	**Score 1A: Gender** accommodative/aware: 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/

*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.
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.

Drying fish.
Photo credit: Kyaw Moe Oo, Field Coordinator, F4L, WorldFish, Myanmar.

Section 2 Initiative progress on science and towards End of Initiative outcomes

Mst. Shilpi Begum, a woman entrepreneur and fish farmer, is holding a fish after harvesting for sell from her fish pond at Polashbari, Gaibandha, Bangladesh on 15 October 2022

Overall summary of progress against the theory of change

The Aquatic Foods Initiative (AqFI) builds on previous CGIAR research programs and numerous large-scale CGIAR-managed bilateral projects in Africa, Asia, and the Pacific. Strategic partnerships and lessons from these programs, as well as from recent high-level research syntheses (e.g., the Blue Food Assessment, Illuminating Hidden Harvests), informed and enhanced the effectiveness of the AqFI's research and scaling approaches.

AqFI made significant progress in delivering research outputs and outcomes in 2022, laying a strong foundation for expanding its research portfolio and partnerships. It focused on producing benefits in developing countries in Africa, Asia, and the Pacific by improving scientific and practical knowledge about sustainable aquatic food systems. Three Work Packages delivered priority outputs

Tilapia, Nigeria.
Photo credit: D.Oguntade

and outcomes in line with the theory of change, while Work Package 2 and Work Package 5 only partially met their targets.

AqFI needed to adapt its implementation plan to the lower-than-expected Budget and availability of staff. The theory of change was also revised. The funding shortfall was partially overcome by making use of synergies within and between Work Packages and through bilateral fundraising. However, some key activities were reduced, including many under Work Package 5. These will be reconsidered in 2023 if funds are available.

Across AqFI, 149 knowledge products on aquatic food systems were produced in 2022. These included 44 peer-reviewed publications, such as journal articles, conference papers, and book chapters. Seven of these papers, produced by Work Packages 1, 2, and 4, received significant attention from the research and stakeholder community, based on the number of citations, downloads, and Altmetric scores. The highest Altmetric score (142) was achieved by a paper in Nature Food, titled Rights and representation support justice across aquatic food systems. Papers also covered advances in fisheries management to maximize nutritional outcomes; ocean sustainability; social sustainability and social equity in the blue economy; ocean governance; the role of seafood in sustainable diets; and genome sequencing of Genetically Improved Farmed Tilapia.

The WorldFish genetically improved Generation 3 (G3) rohu strain, which was released to several hatcheries in the last two years, was successfully measured at harvest. Research showed it to be growing more than 30% faster than existing rohu breeds. This has huge potential to contribute to aquaculture production in Bangladesh, where 319,000 tons of rohu fish are produced annually, representing a wholesale market worth over US$950 million.

In addition, more than 30 policy briefs, technical briefs, and guidelines were disseminated in multiple languages, and 23 data products were made available in open-access formats. Presentations, videos, and blogs were used to share key information on aquatic foods with researchers and academic institutions, local and international private sector organizations, farmers and related associations, governments and local departments of fisheries, and other policymakers and investors.

Capacity development is integrated in many AqFI activities, supporting researchers, developing country partners, and scaling within the Initiative's theory of change. During 2022, 1,244 people received formal training, of which one-third were women. Highlights of the 26 capacity development activities organized during 2022 included: the definition of research and scaling approaches for the genetic program on tilapia, carp, and catfish in Bangladesh, Nigeria, and India; short-term training for farmers, fishers, and extension personnel on climate-smart aquaculture practices, gender, and integrated fish livestock farming practices in Zambia; data-gathering systems in Nigeria; and community engagement in Timor-Leste.

A key capacity-building event was delivered in Myanmar, where staff from the Departments of Agriculture, Planning, and Fisheries — under the Ministry of Agriculture, Livestock and Irrigation (MOALI) — were trained on the Rice-Fish Suitability Decision Support System Modeling. Following a training-of-trainers approach, they are now sharing their knowledge with local staff from the same departments of the country's Ayeyarwady Region,

who will use and adapt the tool to support small-scale farmers' decision-making and adoption.

Technical training and curricula were developed with partners in the Solomon Islands, Nigeria, and Zambia on improved management practices in fish handling and management, and gender and social inclusion. The re-activation of the innovation hub at Nusatupe station in Solomon Islands was a key step for capacity development activities and the scaling of innovations in the Pacific.

Capacity development activities were also implemented through knowledge exchange at international and national conferences, workshops, and field events. For example, the 2022 FishBase and SeaLifeBase Symposium explored the contribution of these two global information systems to our understanding of biodiversity and the sustainable aquatic ecosystem. It brought together researchers, partners, stakeholders, and investors, providing opportunities to illustrate the different uses of digital platforms and data on aquatic food systems.

Gender researchers from WorldFish and the International Water Management Institute (IWMI) focused on ways to integrate gender approaches into projects, capacity-building activities for Work Packages, and developing a more structured gender strategy for AqFI.

The Aquatic Foods Initiative reported **30 innovations** during 2022, either new innovations (23) or building on previous work (7) that is already in use globally and applied at scale in Bangladesh, Myanmar, and Timor-Leste. These innovations contribute to aquatic food systems transformation, from sustainable supplies of fish from aquaculture and small-scale fisheries to governance and digital solutions and development.

Work Package 1 — AquaData reported on the performance of two CGIAR data innovation platforms: (1) FishBase, which has reached an astonishing 700,000 unique monthly users; and (2) PeskAAS, the publicly available national fisheries monitoring system used in Timor-Leste, which received 5,000 visits from 700 unique visitors in 65 countries in 2022. Other digital solutions, such as the Right Haat, Macher Gari, the KIU Bookkeeping App in Bangladesh, and the Shwe Ngar in Myanmar, were used by over 60,000 people (approximately 50% of whom were women), including farmers and extension agents.

Researchers and partners also made major progress in developing a set of open-access digital tools and standard methods for analyzing data gaps and data needs for aquatic food systems development in different geographies, including Bangladesh, Cambodia, Ghana, India, Kenya, Myanmar, Nigeria, Solomon Island, Timor-Leste, and Zambia. Finally, WorldFish and its partner AgUnity worked on developing a unified data and research portal where stakeholders, including donors, investors, and policymakers, can access data, evidence, and stories of impact related to aquatic foods.

Genetics research (Work Package 4 — AquaGenetics) developed the next generations of the faster-growing Genetically Improved Farmed Tilapia (GIFT) strains in Malaysia and in India, and the production of the second selected generation of silver carp in Bangladesh. Best management practices (BMPs) for farming of GIFT in Nigeria were defined.

Work Package 3 (AquaPlans) worked on innovative geospatial tools to identify suitability for aquaculture in small reservoirs in Ghana and on the new generation of fish-friendly irrigation innovations in Asia and Africa. Work Package 5 worked on innovative tools and strategies to scale up inclusive business models for SMEs and fish powder for the nutrition of infants and young children in Africa.

AqFI research teams and partners worked to lay the groundwork for changing the policy environment to support the adoption of transformative innovations in aquatic foods, accelerating emphasis on research use and delivering substantive outcomes at scale. In 2022, AqFI contributed to the development of 10 policy changes at various scales in Bangladesh, Ghana,

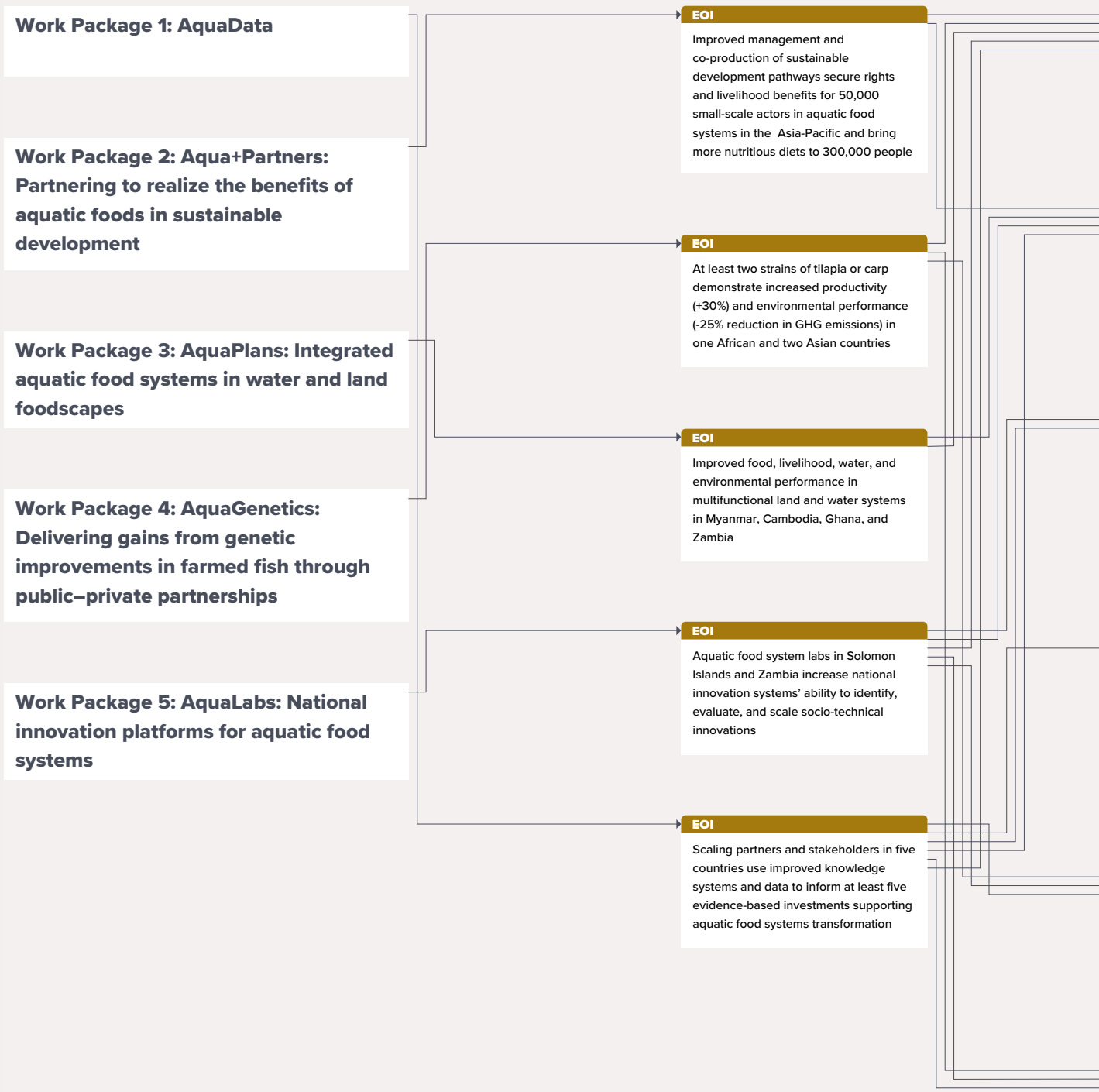
India, Nigeria, and Solomon Islands. Highlighted policy contributions include the support provided to the Ministry of Fisheries and Marine Resources in Solomon Islands to design (1) the Coastal Fisheries Information Strategy and (2) the Solomon Islands Community Based Coastal and Marine Resource Management Strategy 2021–2025. In Solomon Islands, the Initiative research contributed to a new investment of US$150,000 for planning the integration of social protection with fisheries management. In 2022, a legal agreement with the largest tilapia hatchery (Premium Aquaculture Ltd) in Nigeria allowed a batch of over 50,000 enhanced GIFTs to be transferred to the country as the first step in establishing a GIFT-based aquaculture industry there.

In India, Work Package 2 research supported the Government of India to develop a strategy to achieve its target of producing over 2 million metric tons of tilapia by 2032. The inclusion of small fish powder in the Integrated Child Development Scheme (ICDS) Supplementary Nutrition Program was achieved in the state of Assam, through awareness and demonstration programs implemented by WorldFish and its partners. An estimated 7,000 children between 3 and 6 years old across 293 Anganwadi centers are expected to benefit.

Gender and social inclusion work in 2022 focused on capturing promising learning areas from previous CGIAR programs, co-producing key knowledge products, and research to integrate gender-disaggregated data in aquatic food systems. Teams studied gender, youth, and intersectionality dynamics in aquatic food systems in Myanmar, Bangladesh, Zambia, and Malawi; led gender integration and research activities within the AqFI Work Packages; and conducted gender capacity development among research teams. The Women's Empowerment in Fisheries and Aquaculture Index (WEFI) was scaled up, through the production of guidance, videos, and the implementation of strategic training activities. Finally, a gender strategy for the Aquatic Foods Initiative was co-developed by researchers and partners.

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.



EOI — End of Initiative outcome

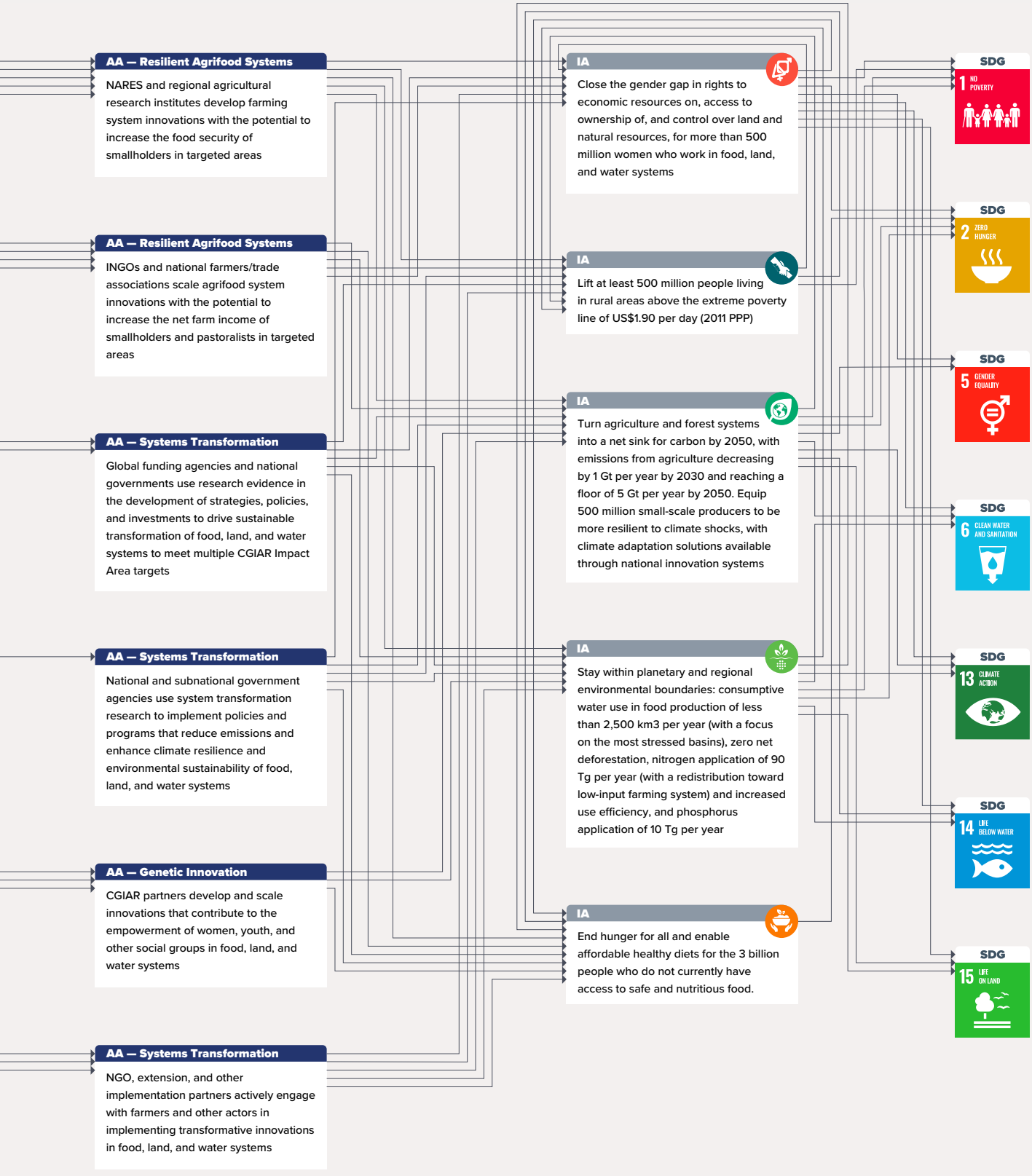
AA — Action Area

IA — Impact Area

SDG — Sustainable Development Goal

- Nutrition, Health, and Food Security
- Poverty Reduction, Livelihoods, and Jobs
- Gender Equality, Youth, and Social Inclusion
- Climate Adaptation and Mitigation
- Environmental Health and Biodiversity

Teams from CGIAR's three Action Areas — System Transformation, Resilient Agrifood Systems and Genetic Innovation — worked to develop an improved set of Action Area outcomes in October 2022. Since this was near the end of the reporting cycle for 2022, it was decided not to update the theories of change based on these new Action Area outcomes.
The exception to this is Genetic Innovation — for this Action Area, as the new outcomes had already been widely discussed among the relevant Initiatives, and with its advisory group of funders and other stakeholders, the decision was made to update their outcomes in time for the 2022 reporting cycle.



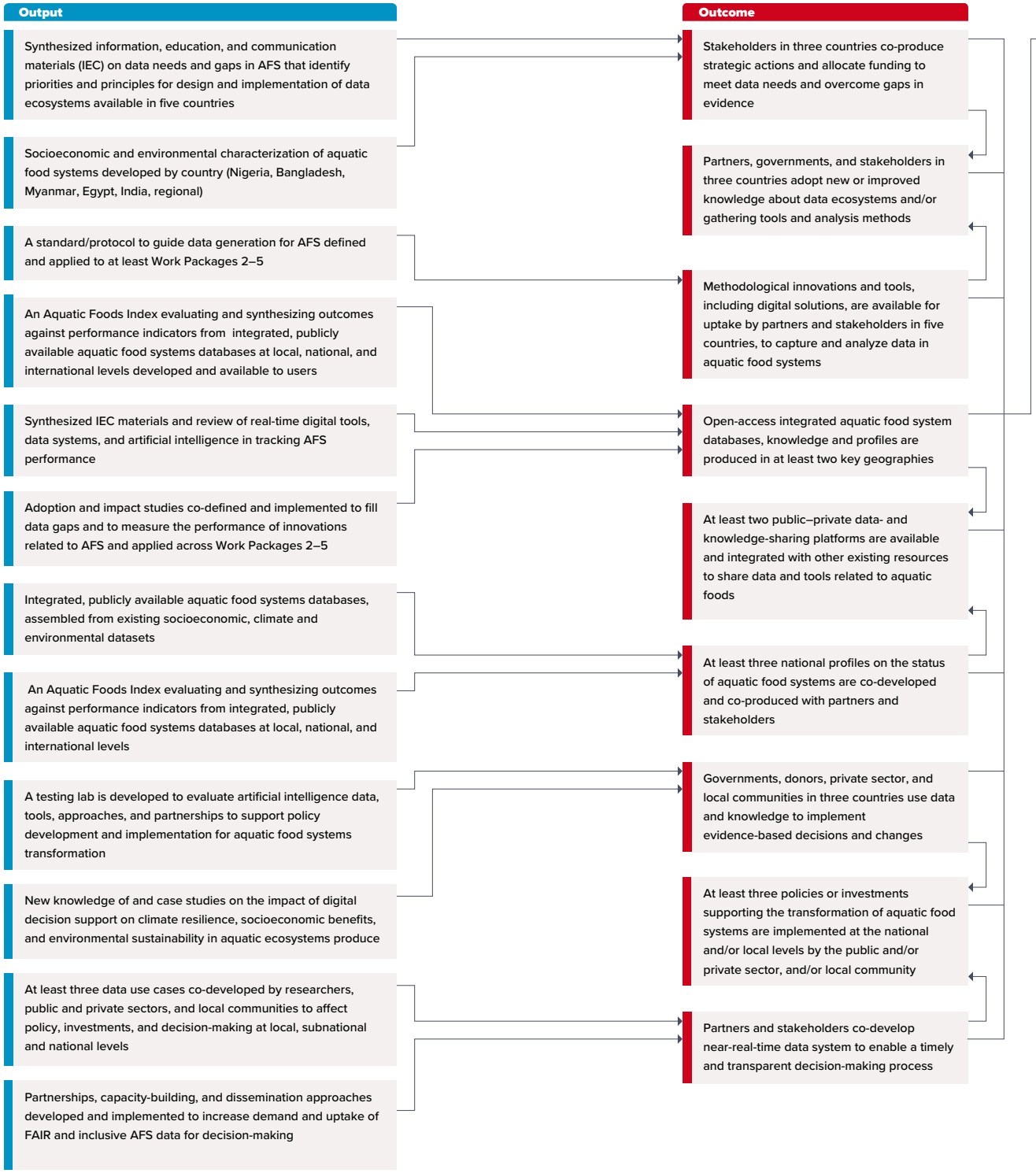
Progress by End of Initiative outcome

EOI-O 1: Scaling partners and stakeholders in five countries use improved knowledge systems and data to inform at least five evidence-based investments supporting aquatic food systems transformation.	Significant progress has been made in delivering research outputs and outcomes in 2022 along the theory of change. Data and knowledge produced are used by multiple users in the case of (1) FishBase — 700,000 unique monthly users; (2) PeskAAS — 5,000 visits from 700 unique visitors in 65 countries in 2022; (3) other digital solutions, such as the Right Haat, Macher Gari, the KIU Bookkeeping App in Bangladesh, and the Shwe Ngar in Myanmar — used by over 60,000 people (approximately 50% of whom were women), including farmers and extension agents. Researchers and partners also made major progress in developing a set of open-access digital tools and standard methods for analyzing data gaps and data needs for aquatic food systems development in different geographies, including Bangladesh, Cambodia, Ghana, India, Kenya, Myanmar, Nigeria, Solomon Islands, Timor-Leste, and Zambia. The investment of the Government of Timor-Leste in PeskAAS continued in 2022. Over 15,000km2 of the country's coast is under improved management as a result of the system, which can help tackle malnutrition in the country.
EOI-O 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 the Asia-Pacific and bring more nutritious diets to 300,000 people.	Partnerships were strengthened in different geographic regions to enable the scaling up of research via policy improvement, institutional strengthening with civil society, and the research responsiveness of development agencies. Support was provided to the Ministry of Fisheries and Marine Resources in Solomon Islands to design (1) the Coastal Fisheries Information Strategy and (2) the Solomon Islands Community Based Coastal and Marine Resource Management Strategy 2021–2025. In Solomon Islands, research contributed to a new investment of US$150,000 for integrating social protection with fisheries management. There was a key achievement in Assam (India) with the inclusion of small fish powder in children's meals, which is expected to benefit around 7,000 children.
EOI-O 3: Improved food, livelihood, water, and environmental performance in multifunctional land and water systems in Myanmar, Cambodia, Ghana, and Zambia.	Important steps were taken in 2022. Outputs have been delivered along the impact pathway for the achievement of the outcome. New knowledge and tools were developed for the rice and fish suitability decision support tool in Myanmar. In Ghana, a remote sensing script and a manual for identifying small reservoirs suitable for fish cultivation were developed and are now publicly available. A new generation of fish-friendly irrigation innovations in Africa and Asia (cross-country collaboration) is under development. Multi-stakeholder platform meetings were organized in Ghana and Zambia to discuss and rework the governance of the water and land foodscape.

EOI-O 4: At least two strains of tilapia or carp demonstrate increased productivity (+30%) and environmental performance (–25% reduction in GHG emissions) in one African and two Asian countries.	Major steps were taken toward achieving the outcome. These included on-farm trials showing 30% greater growth of improved rohu in Bangladesh, and the delivery of 50,000 GIFT tilapia to a private sector hatchery in Nigeria from the core breeding program in Malaysia. Key progress was made in the production of new generations of improved tilapia in India (generation 10) and Malaysia (generation 18), and of silver carp (generation 2) and rohu carp (generation 3) in Bangladesh.
EOI-O 5: Aquatic food system labs in Solomon Islands and Zambia increase national innovation systems' ability to identify, evaluate, and scale socio-technical innovations.	In Solomon Islands, the country's Nusatupe station was refurbished for use as a center to promote innovations in the Pacific. In Zambia, there were delays with the creation of the innovation lab, which is currently being reconsidered due to the Budget revision.

Section 3 Work Package-specific progress

Work Package 1: AquaData



EOI

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

Work Package 1 progress against the theory of change

Work Package 1 (AquaData) made significant progress in delivering research outputs and outcomes in 2022. It produced 49 knowledge products, including 10 peer-reviewed articles. It also produced benchmarking data and knowledge on aquaculture systems in Bangladesh, Egypt, India, Myanmar, Nigeria, and Pakistan. This data provides a holistic view of the performance of aquatic food systems and enables comparisons across geographic, agroecological, socioeconomic, and cultural contexts.

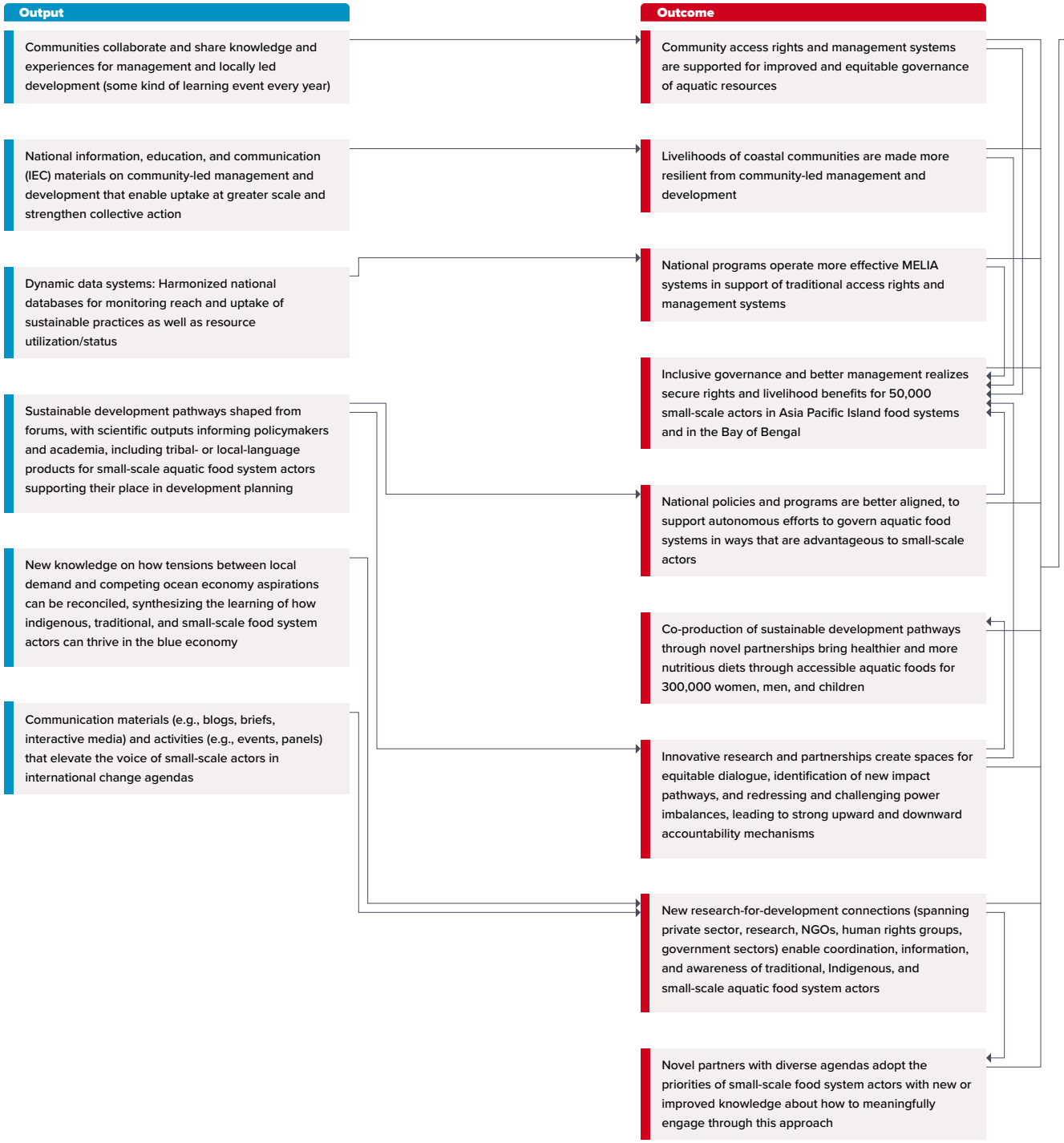
Eight capacity development events were held, with a total of 472 participants (158 women), including the annual FishBase and SeaLifeBase Symposium in Malaysia. The symposium discussed how technologies such as blockchain, cryptocurrency, and non-fungible tokens (NFTs) might support the economic sustainability of digital platforms involved in the transformation of aquatic food systems.

Ten new innovations were under development, while six were already in use in Bangladesh, Myanmar, and Timor-Leste. These 16 innovations help address data gaps and data needs in aquatic food systems and support the development of key digital ecosystems and solutions.

The AquaData team and its partners worked on the first-ever Data for Action Portal on aquatic food systems. This aims to be a unified source of data and research on aquatic foods, telling stories of impact and change, and allowing stakeholders to share new data and stories.

Finally, four policy changes were reported in 2022. These related to the promotion and adoption of a new ontology (digital vocabulary) to enhance the discoverability and use of data related to aquatic foods, and key agreements in Ghana and Nigeria to support aquaculture development.

Work Package 2:
Aqua+Partners



EOI

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 the Asia-Pacific and bring more nutritious diets to 300,000 people

Work Package 2 progress against the theory of change

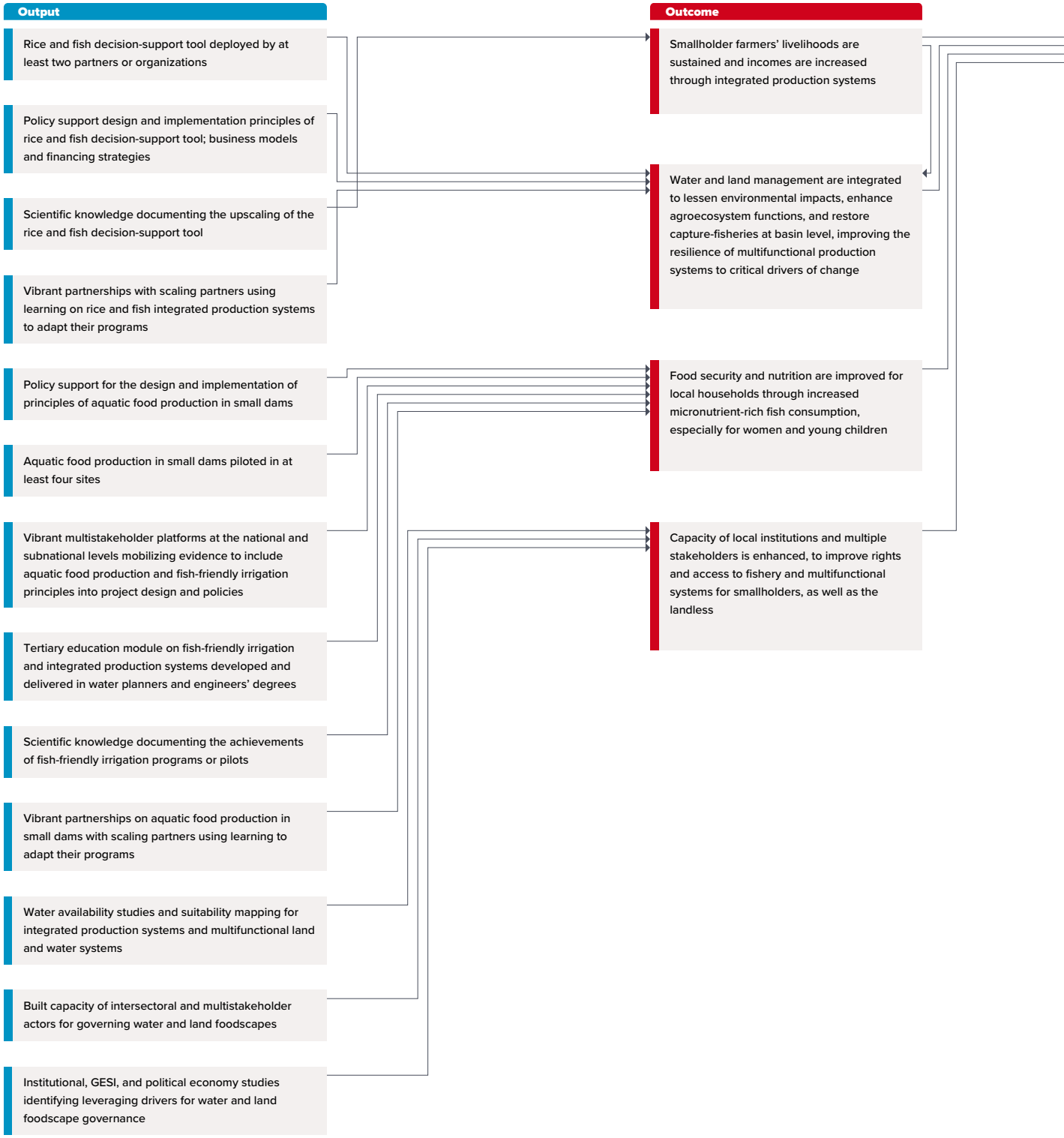
Work Package 2 (Aqua+Partners) made progress in delivering several research outputs and outcomes in 2022. Partnerships were strengthened in different geographic regions to enable the scaling up of research via policy improvement, institutional strengthening with civil society, and the research responsiveness of development agencies. The team produced 32 knowledge products, including 13 peer-reviewed articles. Three capacity development events were organized with more than 200 participants (22 women). Four policy cases were reported, such as the inclusion of small fish powder in children's meals in Assam (India), which is expected to benefit around 7,000 children.

Budget revisions resulted in different challenges in each country of implementation. In all countries, localization of planning was undertaken through stakeholder mapping and engagement workshops to co-define agendas. In India, several activities and partnerships were undertaken with the governments of Odisha and Assam and local communities to support nutrition-sensitive, gender-equitable, and climate-resilient aquatic food systems. In Timor-Leste, Aqua+Partners synergized well with the investment from the Australian Centre for International Agricultural Research (ACIAR) but made limited progress in partnering with a grassroots training provider.

In Solomon Islands, Aqua+Partners developed training modules for inclusive governance and nutrition-sensitive planning to support community-based resource management. A novel partnership began with Kastom Gaden Association, a national agricultural training provider, to integrate aquatic food and fish handling into national programming during 2023. In synergy with ACIAR investments and Work Package 5, the country's Nusatupe station was refurbished to support its role as an innovation hub for sustainable island food systems.

In Bangladesh, despite the progress made on partnership mapping, activities were reconsidered and scaled down due to Budget revisions.

Work Package 3:
AquaPlans



EOI

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

Work Package 3 progress against the theory of change

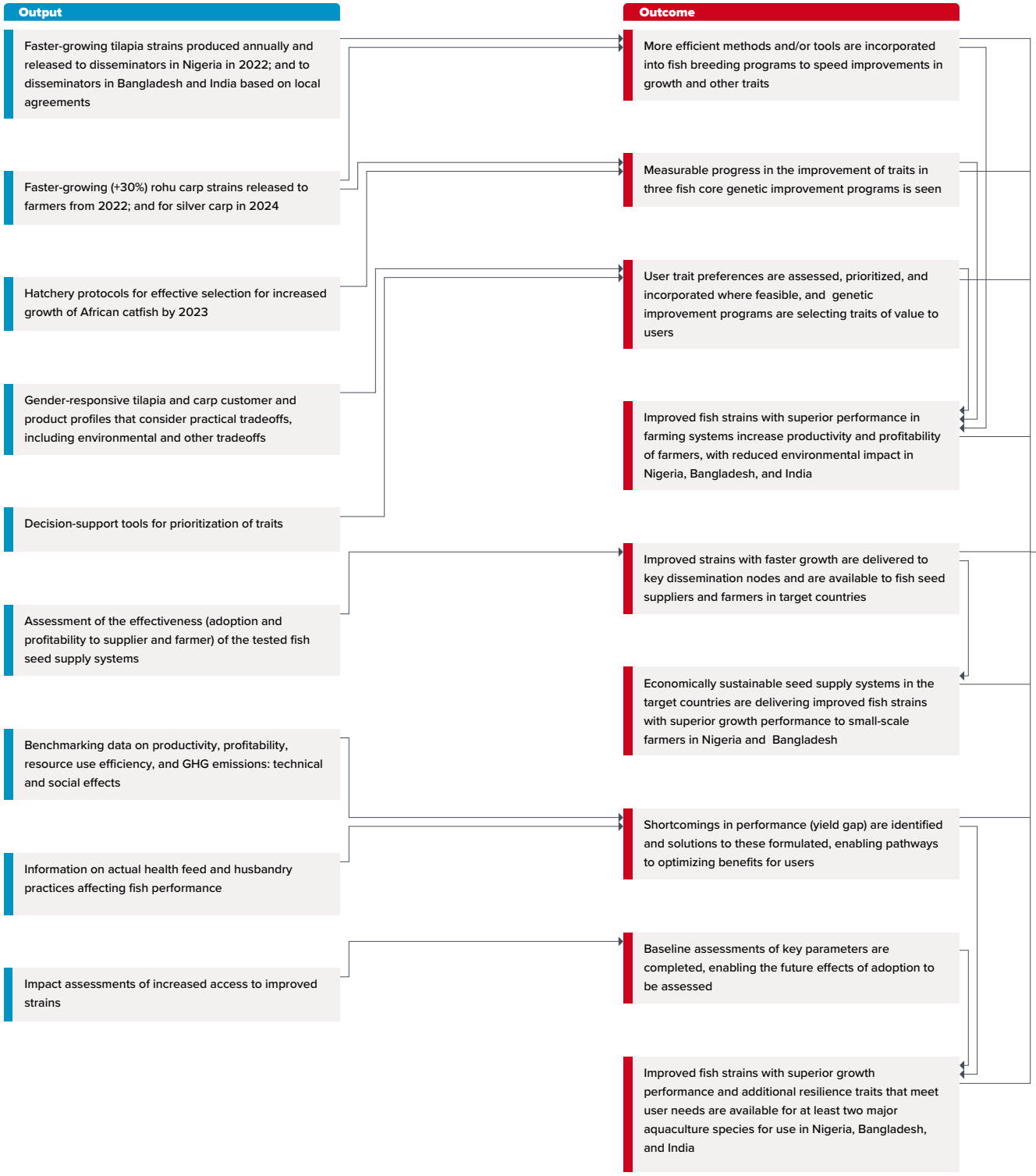
Work Package 3 (AquaPlans) delivered 19 knowledge products, including open-access journal articles, reports, manuals, and briefs. Some of these built on previous research from the FISH CRP, such as the manuals and tools developed for the rice and fish suitability decision support tool in Myanmar. For Ghana, a remote sensing script and a manual for identifying small reservoirs suitable for fish cultivation were developed and are now publicly available.

Knowledge products also explored the links between indigenous knowledge for the management of water and land foodscapes and policy-level decision-making. A framework to guide engagement in the small-scale fisheries policy processes was produced. Institutional, gender equality and social inclusion (GESI), and political economy studies identifying the drivers of improved governance in water and food landscapes progressed well, notably through the publication of a research article, briefs, and presentations on youth engagement in sustainable food systems and fisheries.

Three innovations were under development: fish cage production in small reservoirs (Ghana); a suitability tool for scaling aquaculture in small reservoirs (Ghana); and a new generation of fish-friendly irrigation innovations in Africa and Asia (cross-country collaboration).

AquaPlans supported different capacity-building activities in 2022. In Ghana, the first multi-stakeholder platform meeting for inland fisheries development was held under the patronage of the Minister of Fisheries and Aquaculture Development. In Zambia, a multi-stakeholder platform was also formed to rethink the governance of the water and land foodscape. In Myanmar, through a training-of-the-trainers approach, staff from the Ministry of Agriculture, Livestock and Irrigation (MOALI) were trained on Rice-Fish Suitability Decision Support System Modeling.

Work Package 4:
AquaGenetics



EOI

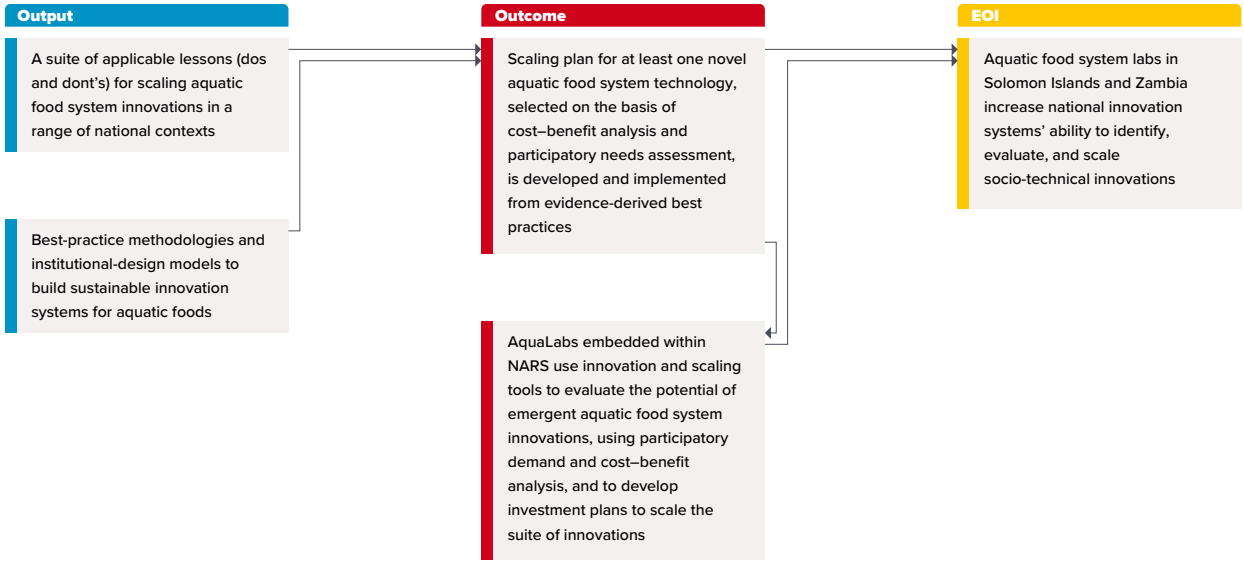
At least two strains of tilapia or carp demonstrate increased productivity (+30%) and environmental performance (-25% reduction in GHG emissions) in one African and two Asian countries

Work Package 4 progress against the theory of change

Work Package 4 (AquaGenetics) made major steps toward achieving its outcomes. These included on-farm trials showing 30% greater growth of improved rohu in Bangladesh, and the delivery of 50,000 GIFT tilapia to a private sector hatchery in Nigeria from the core breeding program in Malaysia. Together with its partners, AquaGenetics generated 45 knowledge products, including 12 peer-reviewed articles. Key products included papers reporting the GIFT tilapia genome and trait preferences for carp. These papers document significant resources developed for the implementation of the latest technologies in fish breeding, key targets for genetic improvement that meet user needs, and evidence of their successful application — key steps in the theory of change.

Principal innovations were the next generations of each of the improved fish strains planned for this year. As such, the AquaGenetics achievements in 2022 include four new innovations related to the production of new generations of improved tilapia in India (generation 10) and Malaysia (generation 18), and of silver carp (generation 2) and rohu carp (generation 3) in Bangladesh. All the next-selected generations were achieved as planned, except the production of the Tilapia Lake Virus resistant strain, which was delayed due to upgrades to rearing facilities in Malaysia. Two policy changes were recorded in India (support provided to the Government of India to increase tilapia production) and Nigeria (legal agreement with the private sector for the development of the tilapia industry). Surveys of farmers' needs adopted a gender lens to estimate adoption and impact.

Work Package 5: AquaLabs



Work Package 5 progress against the theory of change

Work Package 5 (AquaLabs) worked to accelerate the scaling of aquatic food innovations through its activities in Solomon Islands and Zambia. Four knowledge products were produced, including a report to identify key technologies and innovations to scale through the engagement of local stakeholders. These innovations included climate-smart technologies (such as climate information systems), fish powder for nutrition, and value addition (efficient smoking kilns and solar driers). Two innovations were under development in 2022. One focused on linking smallholder fish farmers with small and medium-sized enterprises (SMEs) in Zambia and Malawi to support aquaculture development. The other focused on developing strategies to increase the use of fish powder for children's nutrition.

Four capacity-building activities trained stakeholders and partners on integrating gender into training materials developed for aquatic food systems.

In Solomon Islands, AquaLabs worked with Work Package 2 to refurbish the country's Nusatupe station, a center to promote innovations in the Pacific. In Zambia, there were delays to the creation of the innovation lab due to issues with a local service provider.

AquaLabs was affected by Budget reductions and difficulties in the recruitment process. The implementation of its 2022 workplan was delayed. The research questions were re-evaluated, and the "Fish for Africa Innovation Hub" concept seemed to require a different execution time and a larger geographical scope to be effective. Going forward, the funds for AquaLabs will be reallocated to the other four Work Packages. The scaling work will be streamlined to ensure the Initiative delivers its outcomes.

In person training at FAIH.
Photo credit: WorldFish

Work Package progress rating

WORK PACKAGE	TRAFFIC LIGHT / RATIONALE	
1		• Despite the late start and very slow recruitment process, which greatly impacted AquaData's work in 2022, most of the expected deliverables have been achieved in line with the Plan of Results and Budget, and theory of change. • Implementation of the third research pathway, "Informing decisions and policies on aquatic foods systems through data," was delayed. Policy work and dialogue in 2023 should be more structured and focused on the use of data and scaling the innovations produced by the Work Package. • The Budget reductions received in 2022 will probably affect the research plans going forward. A revision of these plans will be needed in 2023.
2		• Annual progress delayed in Bangladesh and Timor-Leste. • Revision of the theory of change and prioritization of activities in different geographies will be continued in 2023 to cope with the Budget reduction. This includes the scaling down of the work in Bangladesh. • Scaling activities previously assigned to Work Package 5 were integrated into Work Package 2 (but at a reduced pace and scale) following Budget revisions. • Work Package targets by 2025 on livelihoods and nutrition will be reviewed in 2023.
3		• Annual progress made in 2022 in Work Package 3 largely aligns with the Plan of Results and theory of change defined at the design stage of the Initiative. • Outputs have been delivered under the three research pathways, as per the results framework, and are being translated into intermediary outcomes. • Actual spending in 2022 fell behind the initial plan but will be on track once commitments with partnerships are operationalized.
4		• The majority of deliverables planned for 2022 were met and all but one of the key deliverables (delay of four months) that are critical for achieving the outcomes planned in the theory of change were completed. • The Budget reduction in 2022 will require significant changes to the plans going forward. Prioritization of research and scaling activities will be necessary to ensure the successful delivery of core genetic innovations.
5		• Annual progress clearly falls behind the Work Package annual workplan and theory of change. • The accumulated delay affects the possibility of the success of the Work Package to deliver on its outcomes.

KEY

On track		• Annual 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 jeopardise success of Work Package
Delayed		• Annual progress slightly falls behind Plan of Results and Budget and Work Package theory of change in key areas • Deviations/issues/delays/risks could jeopardise success of Work Package if not managed appropriately
Off track		• Annual progress clearly falls behind Plan of Results and Budget and Work Package theory of change in most/all areas • Deviations/issues/delays/risks do jeopardise success of Work Package

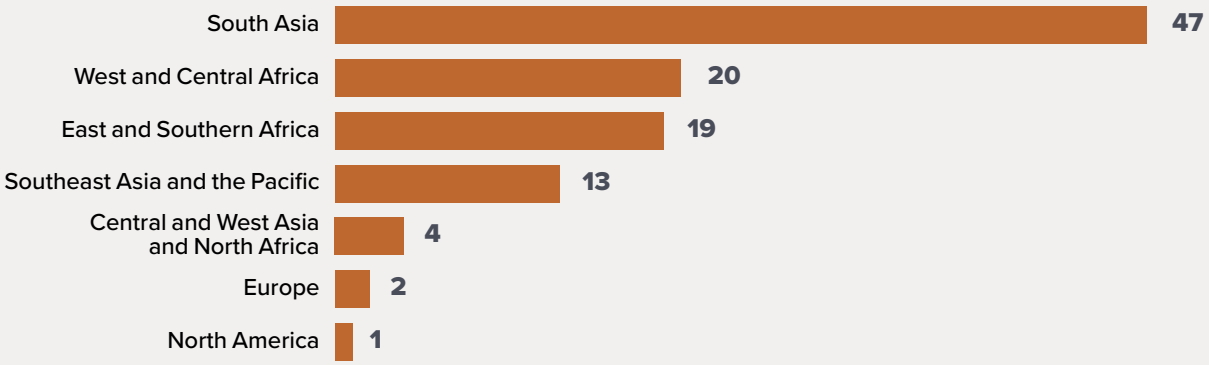
Section 4 Initiative key results

This section provides an overview of 2022 results reported by Aquatic Foods. 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.

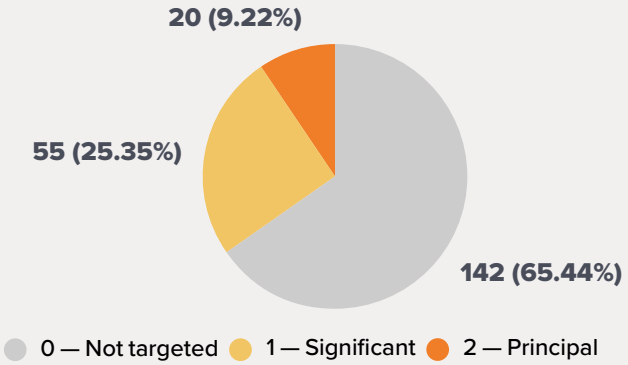
Overview

Results	Outputs				Outcomes	
217	7 SDGs	27 Capacity sharing for development	23 Innovation development	149 Knowledge products	8 Innovation use	10 Policy change

Results by region



Results by gender tag

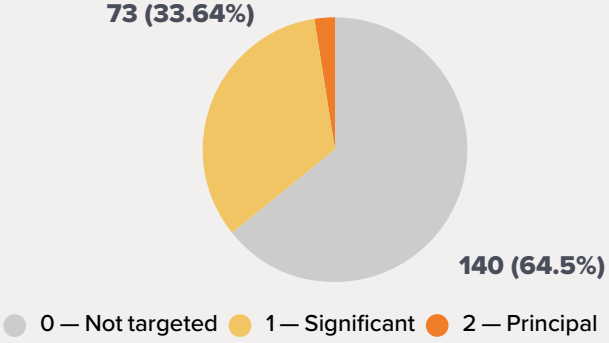


0 = Not targeted: The activity/result does not target gender equality.

1 = Significant: The activity/result contributes in significant ways to gender equality, even though it is not the principal focus of the activity.

2 = Principal: Gender equality is the main objective of the activity/result and is fundamental in its design and expected results.

Results by climate change tag

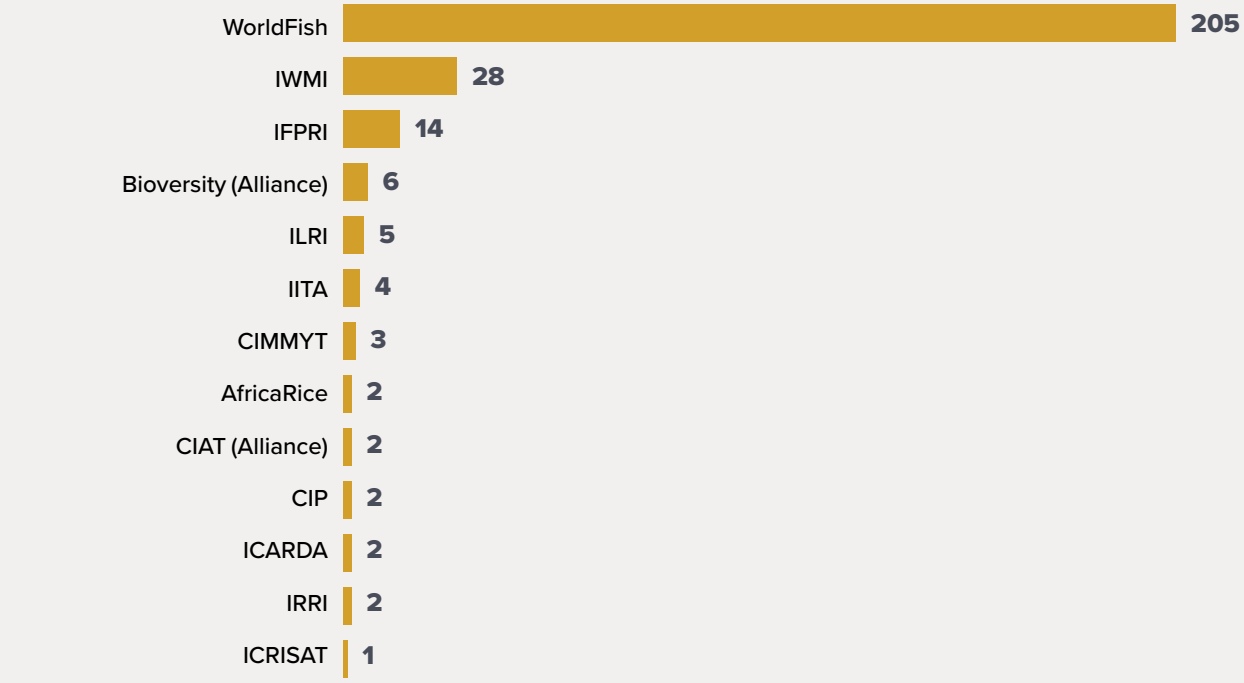


0 = Not targeted: The activity does not target climate mitigation, adaptation, and climate policy goals of the CGIAR as put forward in its strategy.

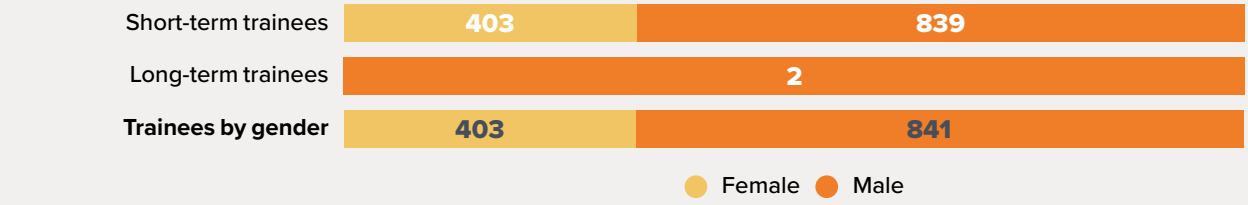
1 = Significant: The activity contributes in significant ways to either one of the three CGIAR climate-related strategy objectives -- namely, climate mitigation, climate adaptation, and climate policy, even though it is not the principal focus of the activity.

2 = Principal: The activity is principally about meeting either one of the three CGIAR climate-related strategy objectives -- namely, climate mitigation, climate adaptation, and climate policy, and would not have been undertaken without these objectives.

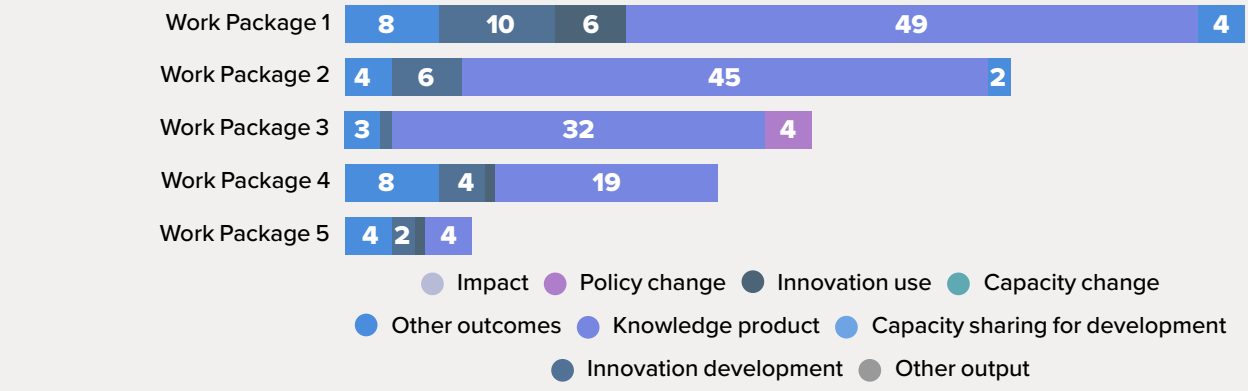
Contributing CGIAR Centers



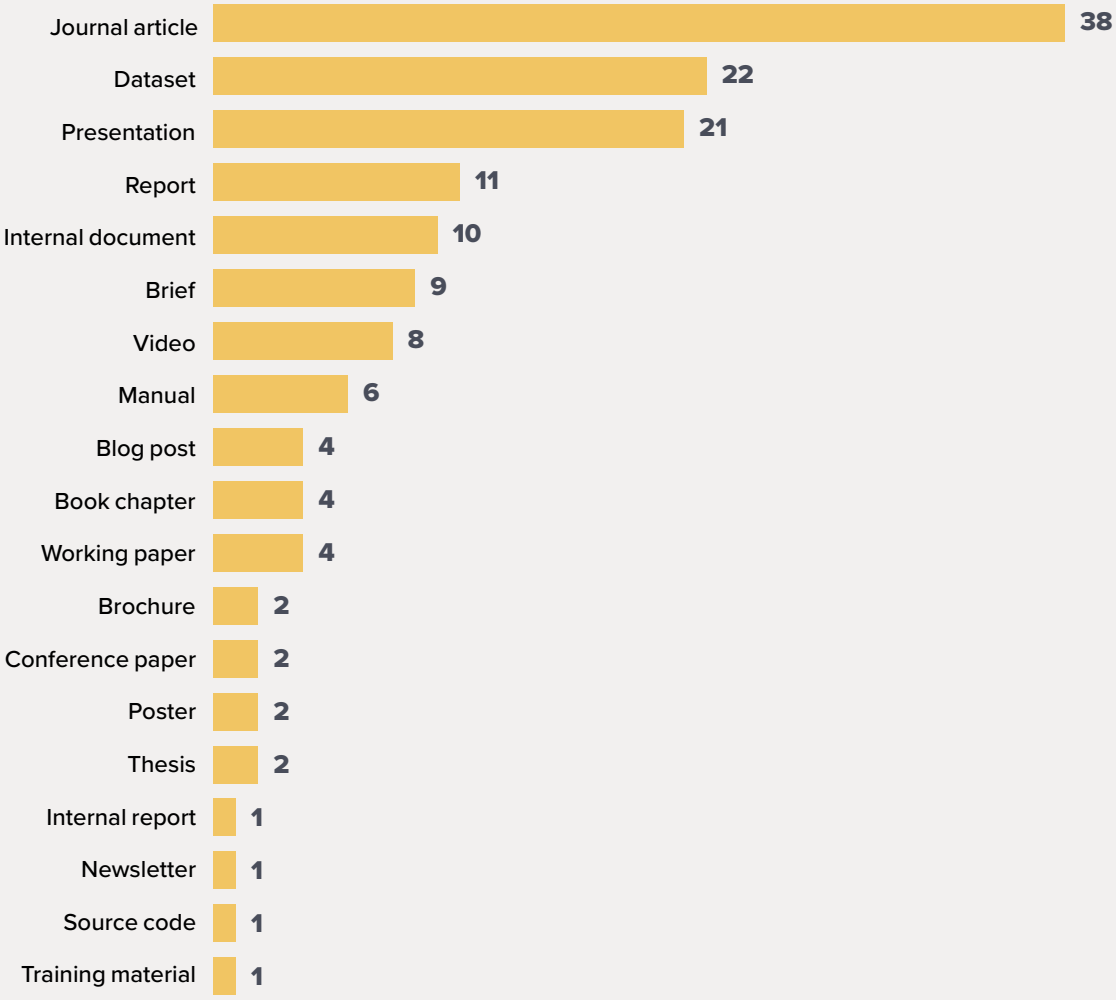
Capacity development trainees by term



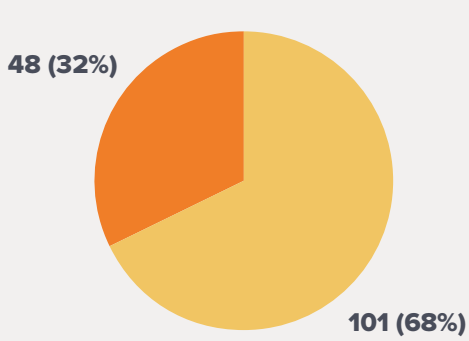
Results by Work Package



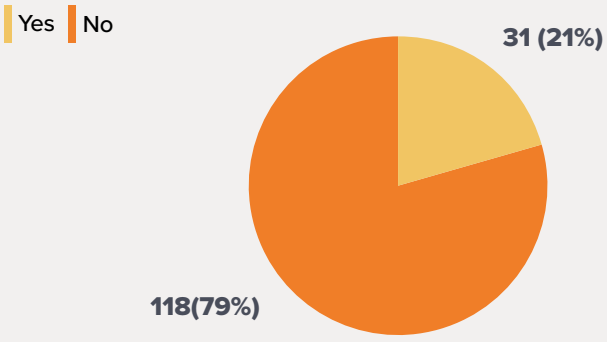
Knowledge products by category



Open access



Web of science core collection



Innovations by readiness level

Pipeline overview
Number of innovations

9	PROVEN INNOVATION – The innovation is validated for its ability to achieve a specific impact under uncontrolled conditions	0
8	UNCONTROLLED TESTING – The innovation is being tested for its ability to achieve a specific impact under uncontrolled conditions	1
7	PROTOTYPE – The innovation is validated for its ability to achieve a specific impact under semi-controlled conditions	1
6	SEMI-CONTROLLED TESTING – The innovation is being tested for its ability to achieve a specific impact under semi-controlled conditions	2
5	MODEL/EARLY PROTOTYPE – The innovation is validated for its ability to achieve a specific impact under fully-controlled conditions	0
4	CONTROLLED TESTING – The innovation is being tested for its ability to achieve a specific impact under fully-controlled conditions	7
3	PROOF OF CONCEPT – The innovation's key concepts have been validated for their ability to achieve a specific impact	3
2	FORMULATION – The innovation's key concepts are being formulated or designed	2
1	BASIC RESEARCH – The innovation's basic principles are being researched for their ability to achieve a specific impact	5
0	IDEA – The innovation is at idea stage	2

Results by country

Section 5 Impact pathway integration – External partners

Aquatic Foods Initiatives partnerships distribution by geography

The Aquatic Foods Initiative gave significant attention to the development of partnerships throughout 2022, creating a strong foundation for future implementation. A portfolio of 159 formal partners engaged with the Initiative in 2022.

Partnership-building started during the Initiative's proposal development phase, thanks to extensive national and regional multi-stakeholder consultations in Bangladesh, Cambodia, Myanmar, Ghana, India, and Zambia. Partnerships were structured through initial planning for research discovery, piloting, and scaling up, with separate workshops in key areas of research. These workshops were facilitated during the Aquatic Foods Initiative inception workshop in Penang in April 2022.

Inception workshops in target countries were also key. In Ghana, for example, the inception workshop brought together 50 participants from organizations under the patronage of the Ministry of Fisheries and Aquaculture Development, and was the first multi-stakeholder platform meeting for inland fisheries development. In the Kafue Plains of Zambia, local leaders, community representatives, and other stakeholders also came together to form a multi-stakeholder platform. In India, representatives of the government, the private sector, and civil society discussed ways to work together with the Initiative.

Key partnerships were also developed during workshops and consultations focusing on future research and scaling strategies, such as during the WorldFish Genetics Workshop in September 2022 (38 participants).

The Initiative also supported WorldFish to build partnerships with private sector organizations in Nigeria, Bangladesh, and India to speed up the adoption of faster-growing strains of tilapia and/or carp.

Building partnerships with national agricultural research and extension systems, particularly the department of fisheries or their equivalent in target countries, was key in 2022. In several cases, such as in India, Ghana, Timor-Leste, Solomon Islands, and Zambia, this involved supporting the department and/or other key traditional partners to work together on common investments and development plans for the fisheries and aquaculture sectors.

Section 6 Impact pathway integration – CGIAR portfolio linkages

Portfolio linkages and Aquatic Foods' impact pathways

Cross-CGIAR collaborations and portfolio linkages are key to the success of the Aquatic Foods Initiative and were pursued in various ways during 2022, including establishing a foundation for expanded cooperation in 2023 and beyond.

AqFI cooperated closely with the Gender Impact Platform, co-producing seven knowledge products including three journal articles. It also made the WEFI Tool Package available and published a brief about the need for action to ensure that research on aquatic food systems and climate change takes gender and intersectional dimensions into account.

AqFI contributed to the CGIAR GENDER Science Exchange Workshop, which focused on gender and social inclusion in food systems. In addition, two capacity development activities were implemented in collaboration with the Gender Impact Platform: (i) a training workshop on the project-level Women's Empowerment in Fisheries and Aquaculture Index (Pro-WEFI) tool in Bangladesh, with 13 participants (six women); and (ii) a workshop with 15 participants (5 women) to discuss a gender and social inclusion strategy for aquatic foods.

AqFI worked with a number of CGIAR Initiatives, including the Asian Mega-Deltas Initiative in Cambodia, the Diversification in East and Southern Africa Initiative in Zambia, and the West and Central African Food Systems Transformation Initiative in Ghana and Nigeria. A journal article to support the use of research in policy development for small-scale fisheries was co-produced by AqFI and the CGIAR Initiative on National Policies and Strategies. AqFI also worked with the CGIAR Foresight Initiative to better understand the prospects for the supply and demand of fish in Egypt, Malawi, and Tanzania, and the implications for food and nutrition security.

Protecting and enforcing inshore exclusive zones for small-scale fisheries: Leveraging communication strategies and tools to organise advocacy and mobilisation
Photo credit: Afeez Olumide Garuba

Section 7 Adaptive management

In line with an adaptive management best practice, the Aquatic Foods Initiative conducted a reflection process. This was an opportunity to share observations on the first year of implementation, with the aim of accelerating the learning process for a more effective implementation strategy. This process took place at both the Work Package and Initiative levels.

Some of the key challenges that emerged across Work Packages included: time limitations and misalignment; Budget reductions; and uncertainty regarding the future. Time and Budget limitations were seen as major constraints for good-quality research and innovation. In addition, overloaded administrative processes interfered with timely decision-making, implementation of activities, and achievements of certain results. The short lifetime of the Initiative and a lack of clarity post-Initiative leave the teams feeling uncertain and limit opportunities to strategize long term. Furthermore, time limitations and short investment horizons were identified as major challenges to delivering high-quality science products and for building long-term partnerships.

On the positive side, the range of partner engagements, the multi-disciplinarity of teams and subject matters, effectiveness of internal communication, and alignment with other investments and frameworks were identified as key factors in the successful planning, implementation, and delivery of results.

In this regard, major recognition goes to ad hoc relationship-building with partners and stakeholders. Additionally, the integration of Initiative work with ongoing bilateral investments and with some of the CGIAR Initiatives provides opportunities for achieving shared objectives.

Despite various challenges, the first year of implementation was successful and offered exceptional opportunities for learning. Importance was given to planning, collaboration, and integration of gender issues into Initiative activities, and this will be further strengthened. The need for more effective planning that is time-efficient and makes better use of existing frameworks (such as the theory of change and management tools) was seen as crucial to the planning and implementation of the Initiative strategy going forward. Another important takeaway was the continuity of efforts to develop new partnerships and strengthen existing ones. Lastly, leveraging new opportunities and investments was identified as important to further expanding the research and scaling activities of the Initiative, not least because of the impact of Budget revisions on some of the planned activities.

Key lessons and recommendations from the reflection process are captured below and will be incorporated into planning for the upcoming implementation period. In 2023, if the allocated Budget remains as expected, there will not be major changes to the theory of change.

RECOMMENDATION	SUPPORTING RATIONALE
Need for prioritization: focus on delivery of fewer but higher-quality research deliverables and results that can continue in the future and continue to build on existing work and other investments.	• The Budget reduction in 2022 and the expected one in 2023 will require significant changes to the plans going forward. Prioritization of research and scaling activities will be necessary to ensure the successful delivery of core research and innovations within the Initiative time and beyond. • Strengthen the ability to construct and work around long-term research, partnerships, and innovation pathways.
Gender and climate change: greater allocation of resources to gender integration and climate change for building capacity.	• Improve gender and climate integration across the different stages of the Initiative lifecycle, from research design to implementation, to build up capacity and make Work Packages more gender-sensitive.
Strengthen communication strategy — internal and external — for better mainstreaming of research legacy (building greater legitimacy toward quality science).	• Expand the current work with new opportunities, collaborations, and investments. • Ensure the recognition of the contribution of aquatic food systems to food, land, and water systems transformation and sustainable development. • Enhance the relevance of the Aquatic Foods Initiative research and achievements.
Engagement and collaborations: further strengthen the way and the level at which we engage with partners and stakeholders from the Global South (improve, increase, diversify, build capacity).	• Improve readiness to work with partners and stakeholders, considering their specificities for greater co-creation, co-ownership, and learning. • Enhance sustainability of research and results produced by the Initiative.

Section 8 Key result story

Protecting and enforcing inshore exclusive zones for small-scale fisheries: Leveraging communication strategies and tools to organise advocacy and mobilisation. Photo credit: Hong Chern Wern

Fisheries monitoring system puts catch information, nutrition data, and more in the hands of decision-makers

A monitoring system developed by WorldFish and partners is helping researchers and decision-makers better understand Timor-Leste's fisheries. PeskAAS is low-cost, open-source, and works in near-real time to track fishing activities. Via an online dashboard, it puts important data in the hands of fisheries officers, researchers, and local stakeholders, and enables them to better understand the current contribution of fish and fisheries to local livelihoods and food security.

A monitoring system developed by WorldFish and partners is helping researchers and decision-makers better understand Timor-Leste's fisheries.

The country ranks 110th on the Global Hunger Index and has the second highest prevalence of childhood stunting in the world. Aquatic foods high in crucial micronutrients and polyunsaturated fatty acids like omega-3 can play an important role in addressing malnutrition there, something reflected in the National Strategic Development Plan

(2012–2030). But fish consumption in the country is low, with an estimated average of just 6.1 kg per capita, compared with the global average of 20.2 kg. This is likely due to the country's underdeveloped fisheries and aquaculture sectors, high prices, and lack of fish in the market in non-coastal areas.

In addition, despite almost 90% of Timorese engaging in agricultural activities, the national budget for the Ministry of Agriculture and Fisheries is relatively low. Lack of documentation and capacity make it difficult to scale up fish production and distribution nationwide, and Timor-Leste's patchy understanding of how many fishing boats were active in the country, where they were fishing, and what they were catching added to the problem.

Since 2019, WorldFish scientists in partnership with Pelagic Data Systems have worked alongside government fisheries officers to develop PeskAAS, a digital catch reporting system that gathers fisheries landings information from remote sites around the country. PeskAAS is low-cost, open-source, and works in near-real time to track fishing activities. Via an online dashboard, it puts important data in the hands of fisheries officers, researchers, and local stakeholders, and enables them to better understand the current contribution of fish and fisheries to local livelihoods and food security.

Since 2020, responsibility for managing the data collection has been with the Ministry of Agriculture and Fisheries, with WorldFish providing ongoing technical support. The Government of Timor-Leste adopted the system as its national fisheries monitoring system and has funded its maintenance and continued development since June 2021. The project has scaled up as 15,690 km^2 of coast was monitored via PeskAAS in Timor-Leste in 2020, 2021, and 2022.

In 2022, a database and predictive model of nutrient composition of fish catches in Timor-Leste was integrated into PeskAAS. This greatly enhanced the potential to develop small-scale fisheries to improve national nutrition. The PeskAAS dashboard is currently publicly available and has received 5,000 visits from 700 unique visitors from 65 countries.

"The PeskAAS dashboard highlights the food and income contributed by fisheries, and opportunities to develop the sector to sustainably enhance food security. We are committed to investing in this system and working with WorldFish to build the capacity of MAF staff to use and manage it."

Acacio Guterres, Director General of Fisheries, at Timor-Leste's Ministry of Agriculture and Fisheries (MAF)

References

1. https://timor.peskas.org/
2. *Tilley A, et al. 2020. PeskAAS: A near-real-time, open-source monitoring and analytics system for small-scale fisheries. PloS ONE.*

LINKS TO IMPACT AREAS

Primary Impact Area: Environmental Health and Biodiversity

Other relevant Impact Area(s): Nutrition, Health, and Food Security; Poverty Reduction, Livelihoods, and Jobs


GEOGRAPHIC SCOPE

Region(s): Asia-Pacific
Country/ies: Timor-Leste

KEY CONTRIBUTORS TO KEY RESULTS STORY

Contributing Initiative(s): Aquatic Foods Initiative
Contributing Center(s): WorldFish
Contributing external partner(s) (full names): Pelagic Data Systems

LINK TO CGIAR RESEARCH PROGRAMS

COVER PHOTO: Fishermen netting a stretch of a weed-choked irrigation channel in the Ayeyarwady Delta, Myanmar. Photo credit: M. Akester/WorldFish

We would like to thank all funders who supported this research through their contributions to the CGIAR Trust Fund.