Annual Plan of Work and Budget (POWB) for 2020

CGIAR Research Program on Fish Agri-Food Systems (FISH)

Led by

WorldFish

In partnership with

IWMI International Water Management Institute

JAMES COOK UNIVERSITY AUSTRALIA

UNIVERSITY of GREENWICH

WAGENINGEN UNIVERSITY & RESEARCH

Annual Plan of Work and Budget (POWB) for 2020

CGIAR Research Program on Fish Agri-Food Systems (FISH)

This Plan of Work and Budget 2020 was prepared by WorldFish in collaboration with FISH managing partners: International Water Management Institute, James Cook University, Natural Resources Institute of the University of Greenwich and Wageningen University and Research

Contents

Contents	iii
List of Abbreviations	iv
CGIAR Research Program on Fish Agri-Food Systems	1
1. Adjustments/changes to the theories of change	1
2. Plans and expected progress toward outcomes	1
3. Financial plan for 2020, including use of W1/W2	6
Table 2A. Planned milestones mapped to FISH outcomes in 2022.	8
Table 2B. Planned evaluations/reviews, impact assessments and learning exercises for 2020.	12
Table 2C. Planned major new collaborations (CGIAR internal or with non-CGIAR collaborators).	13
Table 3. Planned budget for 2020.*	18
	19

List of Abbreviations

A4NH	CGIAR Research Program on Agriculture for Nutrition and Health
AMR	antimicrobial resistance
BMGF	Bill & Melinda Gates Foundation
BMPs	best management practices
CapDev	capacity development
CBFM	community-based fisheries management
CCAFS	CGIAR Research Program on Climate Change, Agriculture and Food Security
COA	Cluster of Activity
COFI	Committee on Fisheries
FAO	Food and Agriculture Organization of the United Nations
FISH	CGIAR Research Program on Fish Agri-Food Systems
FP1	Flagship 1 (Sustainable Aquaculture)
FP2	Flagship 2 (Sustaining Small-Scale Fisheries)
GIFT	genetically improved farmed tilapia
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
IDOs	Intermediate Development Outcomes
IFPRI	International Food Policy Research Institute
IHH	Illuminating Hidden Harvest
ILRI	International Livestock Research Institute
IMR	Institute of Marine Research, NO
LCA	life-cycle assessment
M&E	monitoring and evaluation
MC	FISH Management Committee
PIM	CGIAR Research Program on Policies, Institutions, and Markets
POWB	Plan of Work and Budget
RICE	CGIAR Research Program on Rice Agri-Food Systems
RTB	CGIAR Research Program on Roots, Tubers and Bananas
SA	sustainable aquaculture
SADC	Southern African Development Community
SDGs	Sustainable Development Goals
SIDS	Small Island Developing States
SLOs	System Level Outcomes
SNP	single nucleotide polymorphism
SRC	Stockholm Resilience Centre
SSFs	small-scale fisheries
TAAT	Technologies for African Agricultural Transformation
TiLV	tilapia lake virus
ToC	theory of change
USAID	United States Agency for International Development
WLE	CGIAR Research Program on Water, Land and Ecosystems

CGIAR Research Program on Fish Agri-Food Systems

This document provides the 2020 Plan of Work and Budget (POWB) for the CGIAR Research Program on Fish Agri-Food Systems (FISH).

1. Adjustments/changes to the theories of change

Country-level theories of change (ToCs) were developed in the following FISH focal countries in 2018: Bangladesh, Cambodia, Myanmar and Solomon Islands in the Asia-Pacific; and Egypt, Nigeria and Zambia in Africa. In 2019, informed by these country-level ToCs, the FISH Management Committee (MC) conducted a final review of the flagships (*Sustainable Aquaculture* (FP1) and *Sustaining Small-Scale Fisheries* (FP2)) and overall program ToC with reference to: (1) plausibility of delivery of planned research outputs and outcomes, (2) efficacy of pathways toward development outcomes and targets, (3) key change mechanisms and scaling strategies, and (4) research prioritization and investments. A key focus was on explicitly defining FISH pathways to achieve in delivering System Level Outcome 2 (Improve Food and Nutrition Security for Health) and on crosscutting outcomes, including those related to gender. The MC reviewed, adjusted and endorsed the ToC and related narratives, which are now revised and available on the FISH website.

The MC and flagship research teams also reviewed and revised the milestones (Table 2A) in October 2019. The review built on FISH successes and learning to date, overall seeking to ensure that the milestones better adhere to the FISH research-development continuum by capturing new partnerships, research priorities and scaling approaches. The review has helped to optimize the delivery of FISH outcomes by 31 December 2021.

In 2020, FISH enters a key phase of consolidating its research advances, optimizing the delivery and quantification of outcomes and impacts, and synthesizing and communicating these achievements. This is also of vital importance to build the foundations for the future, enhancing the contributions of aquatic foods to achieve CGIAR SLOs and SDGs. During 2020, we will refine the ToC for all six research clusters and for specific FISH innovations. This will sharpen our innovations in specific sectors and/or geographic regions. The innovation ToC will assist us to optimize our scaling readiness, methods and strategies, and synthesize the key learnings across the FISH research portfolio and countries. This approach will include analyzing the potential application of FISH research to other geographies. For example, what can be learnt from the explosive growth of aquaculture in Asia, and the contributions that CGIAR has made to this growth, that could be applied in Africa? We will use Outcome and Impact Case Reports, along with impact studies in 2020 to evaluate the effectiveness of the FISH ToC, including all the nested levels: flagships, clusters and countries.

2. Plans and expected progress toward outcomes

Investment plans for 2020 were determined based on three factors: (1) rigorous assessment of progress to date, including individual innovations at various stages, (2) potential for outcomes, and (3) a subsequent prioritization exercise conducted by the FISH MC and ISC. Prioritized areas also reflect investments that will lead to optimal impacts of fish within agri-food systems at all levels: local, national, regional and global.

Sustainable Aquaculture

The **Sustainable Aquaculture** flagship (FP1) will continue to contribute to Intermediate Development Outcomes (IDOs) and System Level Outcomes (SLOs). 2020 priorities include:

- Deploying the genomics data available on three key traits (tilapia lake virus (TiLV) response, feed efficiency and aerobic performance) into tilapia genetic improvement programs in Malaysia.
- Production of a third-generation of rohu (*Labeo rohita*) and cohorts of rohu and silver carp (*Hypophthalmichthys molitrix*) for on-farm trials in Bangladesh, a key milestone in the release of novel improved strains for these important South Asia aquaculture species.

- Partners in six countries (Bangladesh, Egypt, Myanmar, Malawi, Nigeria, and Zambia) will deploy FISH epidemiological and diagnostic tools, to inform hatcheries, nurseries, private and public extension services about enhanced tilapia and carp disease management, and national policy development.
- Field testing of a new genomic-based diagnostics tool for fish diseases in Bangladesh, Malaysia and Thailand with public and private partners.
- A new database, mobile apps and targeted training will be used to improve feed formulation more widely through private sector partnerships in Bangladesh, Egypt and Zambia.
- Knowledge on improved tilapia health, feed and operational best management practices (BMPs packaged and integrated into large-scale training programs for impact throughout Asia and Africa.

Strategies and processes that lead to effective dissemination of improved fish strains and management practices will be evaluated through quantitative analysis of the resulting production yields. This includes applying FISH's on-farm performance tools across a wider range of countries to assess the performance of improved tilapia, which will be of great value in scoping response to the growing interest in tilapia farming in multiple African countries, within and beyond FISH focal and scaling countries.[1]

FP1 has clearly demonstrated the benefits of closely integrating research on genetic improvement, nutrition, health and production environments. This is reflected in FISH tilapia and, more recently, carp genetic improvement programs, which have delivered productivity improvements of 8%–10% per generation—a rate of genetic gain far greater than is possible in terrestrial animal and crop sectors. The flagship is strongly committed to optimizing the introduction, dissemination and scaling of these advances with partners across focal and scaling countries.

Cluster of Activity 1.1: Fish breeds and genetics

Highlighted outputs for 2020 are improved tilapia seed, a new improved rohu generation (Generation 3), rohu and silver carp cohorts for on-farm performance testing and base populations for a genetic improvement program of the indigenous three spotted tilapia (*Oreochromis andersonii)* in Zambia and tilapia shiranus (*Oreochromis shiranus)* in Malawi. A detailed assessment of Abbassa Nile tilapia in Egypt will deliver a new plan for its genetic improvement and dissemination. Key publications include journal articles on the genetics of TiLV response, the new tilapia single nucleotide polymorphism (SNP) array and policy guidance for tilapia dissemination in Africa. A key publication will fill the global gap in gender-disaggregated knowledge on user preferences regarding fish traits, by sharing findings from the WorldFish-led CGIAR post-doctoral fellow program on gender and breeding.

Cluster of Activity 1.2: Feeds, fish nutrition and health

Highlighted outputs for 2020 from fish disease research are publications on TiLV susceptibility of carp polyculture species, rapid genomic methods for fish disease detection and knowledge on patho-microbiomes and antimicrobial resistance (AMR) bacteria in carp-tilapia polyculture systems. Syndromic surveillance systems linked to mobile apps for carp and tilapia farmers, and a suite of extension products and policy advice on fish disease control for private and public sector partners will be produced.

Highlights of fish feed research are a database of the nutritional value of local feed resources for developing locally-specific fish feeding strategies, nutrient and energy evaluations of improved strains of tilapia and carps, and nutritious pond farming scaling strategies for Bangladesh, Myanmar and Zambia. An expanded set of user-friendly knowledge products on tilapia and carp farming practices will be developed, tested and disseminated widely. A review of genetics-feeds-health-performance interactions will help guide the optimal integration of these interactions and data into future fish genetic improvement programs.

---

[1] Key FISH countries remain as per the proposal: *Focal countries*: Bangladesh, Cambodia, Myanmar, Nigeria, Tanzania and Zambia. *Aquaculture research and training hub*: Egypt. *Small-scale fisheries research hub*: Solomon Islands. *Scaling countries:* Ghana, India, Indonesia, Kenya, Malawi, Philippines, Sierra Leone, Timor Leste, Uganda and Vietnam.

Cluster of Activity 1.3: Aquaculture systems

This cluster is a key conduit for on-farm performance assessment of improved tilapia and carp strains and system models and scaling, operating in 2020 in Bangladesh, Egypt, India, Myanmar, Malawi, Nigeria, Timor Leste and Zambia. Highlighted outputs for 2020 include a cross-regional analysis of on-farm performance of improved tilapia, benchmarking data on tilapia farm performance in Egypt and new knowledge on the environmental effects of tilapia and carp aquaculture-systems, to be published in three papers on life-cycle assessment (LCA) and design of low carbon and resource efficient tilapia and carp aquaculture systems.

Research on delivery and use of aquaculture improvements will provide a framework to analyze inclusive aquaculture technology innovation systems and journal articles and policy guidance on dissemination systems for improved tilapia in Bangladesh and Malawi. FISH publications on innovation-systems related to nutritious ponds, farmer networks and GIFT in Bangladesh will be completed. A journal paper on entrepreneurship in aquaculture and new knowledge on gender dynamics in aquaculture value chains and markets in Egypt and Bangladesh will support progress in cross-cutting themes of entrepreneurship and gender. A Gendered Value Chain Analysis Conceptual Framework and Methods Package custom-made for fish value chains will also be produced. New digital tools for integrated farm performance assessment and analytics will be released for testing with partners in Bangladesh, Egypt and Myanmar.

Sustaining Small-Scale Fisheries flagship (FP2)

The **Sustaining Small-Scale Fisheries** flagship (FP2) will continue to contribute to IDOs and SLOs during 2020. Priorities include:

- Putting into use the global "model of nutritional yield"[2] and novel methodologies and data for evaluation of hidden nutrition, livelihood and sustainability values of small-scale fisheries (SSFs) in national, regional and policy recommendations to enhance development outcomes from fish and aquatic foods in food systems. Global and national recommendations will be used to raise the profile and investment in fish and aquatic foods in key intergovernmental processes, particularly FAO COFI and the UN High Level Panel on Food and Nutrition Security.
- Enhancing gender inclusivity in co-management models as part of broader research on improving co-management for fisheries sustainability, food and nutrition security, and a focus within new coastal management investments through keystone FISH partners (regional and national; Solomon Islands, Bangladesh, Timor-Leste). More equitable decision-making and control over and access to productive assets are the expected outcomes, resulting from shifting towards more inclusive processes.
- Scaling of the multi-partner guidelines on improving fisheries performance and production will progress through integration in water management (e.g. irrigation, dams, rice-systems), through partnerships (e.g. national governments) and a communication strategy targeting government, the private sector and development banks. In Myanmar, the full implementation of these guidelines will be tested through integrated agricultural land, using a geographic information system, multi-stakeholder platforms and cross-sector planning processes targeting multifunctional rice-dominated landscapes. Research on this combination of technical and social innovations will draw insights for future investment in innovation and scaling strategies in Asia and Africa
- Collaborating with IWMI and IRRI for evaluation and scaling of rice-fish innovations in Cambodia and Myanmar into national rice-fish-water strategies and initial extension of these innovations to Africa.
- Combining a series of analyses conducted or published before 2020 with emergent research illustrating previously unknown contributions of SSFs to food and nutrition security and livelihoods with the African Great Lakes as focus region.

[2] Hicks et al. 2019. *Nature*.

- Fisheries management gains from using Big Data innovations will begin testing and evaluation, in addition to the scaling of the technology, approach and analyses alongside the Illuminating Hidden Harvest (IHH) methods. The purpose will be to construct recommendations, capacity investments and data standards linked to enhancing the awareness and management of SSFs at national, regional and global levels.

Cluster of Activity 2.1: Resilient coastal fisheries

Highlighted 2020 outputs include publications on gender-inclusivity and a methodology for assessment, as a journal article and as fact-sheets for use by national and regional partners in co-management and climate-smart fisheries management. Progress in using Big Data innovations for SSFs management will be reported in a journal and through policy recommendations to national government partners. Co-management learning from the hilsa fishery in Bangladesh will be published as journal articles and policy briefs, and used to design new co-management investments in the fishery that focus on improving equity and sustainability.

Cluster of Activity 2.2: Fish in multifunctional landscapes

Highlights for 2020 include a series of policy-oriented communication products designed for policy change, focusing on water managers at global scales, such as FAO COFI members, and national decision-makers on water infrastructure and policy. A further highlight is a report on use of the guidelines on inland fisheries in constructed water bodies, developed through modelling and a desk review as well as by incorporating existing innovations, such as fish passes and rice-fish systems, in Myanmar and Cambodia. A journal article will trace the policy trajectory in non-fisheries agencies for outcomes and lessons with respect to effecting policy change for fish in multifunctional landscapes at national levels. Finally, an analysis of rice-fish systems (from capture to culture), mapping and (a rice-fish suitability) modelling will be able to examine trade-offs (nutrition, water security, rice production) in different multi-sectoral management scenarios.

Cluster of Activity 2.3: Fish in regional food systems

A key highlight for 2020 is a series of global and national syntheses products from the IHH initiative co-developed with FAO, including a global synthesis report, with FISH-researcher led chapters on nutrition and gender. Additional highlights include a journal article on the role of SSFs in poverty alleviation and nutrition, four country case studies evaluating SSFs nationally across key countries, and one global analysis of trade flows of nutrients from fish in food systems. The cluster will also elaborate an impact pathway that refines and focuses on the use of the IHH research products for greater policy influence. The aim is to achieve global and national policy change in advancing development outcomes from SSF investments and a series of communication products, policy briefs and a regional summary. This will help promoting policy shifts to enable the nutrition and livelihood functions of fisheries, including through SSFs and sustainable aquaculture (SA). Regional fish in food systems research will contribute a global review, an analysis of fish in Nigerian food systems and new insights into the role of fish in food systems in the African Great Lakes region.

Crosscutting themes: Gender, youth, capacity development and climate change

Gender integration research, included in both flagships, will be enabled through a combination of second stage piloting of the FISH Gender Integration Coaching Program in 2020 (India and Myanmar) and the release and application of custom-made FISH Gender Integration Guidelines. Cutting-edge strategic gender research will focus on refining and scaling gender-transformative approaches within FISH and to external partners, as well as research advances in the area of women's empowerment and gender and social equity in the Blue Economy. Key gender strategic deliverables in 2020 include leadership of the CGIAR Gender Platform high-level paper on gender-transformative approaches. Custom-made methodologies for assessing women's empowerment in fisheries and aquaculture (point 2) and two new data sets on women's empowerment (Myanmar and India) will be published. In addition, a Blue Paper will be co-authorship on Ocean Equity (Blue Paper 13) for the High-Level Panel on Sustainable Ocean Economies.

To support gender integration and strategic research, as well as FISH monitoring and evaluation, the gender theme will be moving to the next stage of progress in three key methodological areas:

1. Validating and scaling FISH's Project Women's Empowerment in Fisheries Index for wider application and scale in order to measure before and after changes in SA and SSFs interventions.
2. Sharing a tested case study methodology identifying pathways for women's empowerment for policy and practice recommendations in SSFs and, later, SA and fish food systems.
3. Sharing a tested custom-made mixed methods methodology for assessing inclusion, and exclusion, in community-based fisheries management and in other fisheries governance systems. In line with CGIAR developments, in 2020 FISH will also strengthen quality systems to assess and support FISH compliance with CGIAR gender-related Performance Management Standards.

FISH's implementation of its **Youth Strategy** will focus on improving our tracking of age-disaggregated data, including FISH M&E systems. It will also include publishing a key synthesis paper on youth, fish and food systems, which will set the stage for future investments. This synthesis paper will draw together key lessons, policies and practices from select FISH focal and scaling countries on the significant opportunities and challenges for youth within the fish food system.

Capacity development (CapDev) activities are to be integrated across all flagships and crosscutting themes of FISH, informed by a FISH CapDev strategy. The Gender Integration Coaching Initiative will be continued and training sessions, workshops, PhDs and mentoring young scientists to enhance research capabilities will also be pursued across the program. Highlights for FP1 include testing digital tools for vocational education in Zambia and disseminating BMPs widely through partners across multiple geographies. An additional highlight is support for an emerging Fish4Africa Innovation Hub in Egypt that seeks to enhance access of private sector entrepreneurs in Africa to FISH research knowledge. CapDev highlights for FP2 include policy oriented CapDev research to support uptake of rice-fish innovations in the Mekong region and a special focus on improving research capabilities with partners in the African Great Lakes region.

Climate change activities will be strengthened through cooperation with the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). The focus will be in the areas of climate-smart aquaculture technologies, evaluation of aquaculture systems using LCA, climate information services for fish farmers, and adaptation to climate change in SSFs communities. Two new post-doctoral scientists will strengthen FISH climate change research in 2020. One will focus on SSFs and climate change in Small Island Developing States (SIDS), with empirical work in Solomon Islands and Timor Leste. The other will focus on climate information services in the inland, freshwater systems of Bangladesh and India. FISH will also contribute to the development of CGIAR's special initiative on climate change.

Evaluations, impact assessments and learning exercises

FISH's monitoring, evaluation and learning system framework is now up and running. It allows evidence of links between research outputs, outcomes and impacts to be gathered throughout the year for key innovations and across FISH focal and scaling countries. Impact and outcome assessments are planned for both FP1 and FP2. Because of the increasing level of maturity of FISH and the approach in achieving final targets, certain studies are particularly relevant. These include evaluating the effectiveness of policy-related interventions in Africa, Asia and the Pacific, and their related implications for SLO targets for food and nutrition security, poverty reduction and the environment. A special collaboration with the CGIAR Research Program on Policies, Institutions, and Markets (PIM) will be established via a jointly supervised position, specifically to enhance knowledge and understanding of processes around policy influence and the contribution of FISH to SLOs and Sustainable Development Goals (SDGs).

Evidence gathered from specific studies will be complemented by the output and outcome monitoring of all W1-W2 and W3-bilateral projects. Additional investment is being made in capturing lessons from W3-bilateral projects, specifically on approaches for scaling FISH innovations, to better inform future fish-related investments. Foresight cooperation with PIM is expanded during 2020, with new publications on Nigeria and new research on fish and aquatic foods in global food systems, building on the recent incorporation of a fish module within the global IMPACT model.

Four MC meetings during the year will monitor program progress and capture learning, within the framework of FISH's overall TOC and results-based-management system. Table 2B provides planned studies for outcome and impacts, and relevant monitoring, evaluation and learning exercises. Each impact/outcome study will explore and reflect on the links to the IDOs, SLOs and SDGs, depending on the focus of the studies. Nutritional outcomes will receive particular attention, reflecting the increasing evidence of nutritional values of fish and the implications for healthy and nutritious diets.

Collaborations

Partnerships are key to the success and impact of FISH and will continue to receive significant attention at all levels during 2020. The partnerships strategy for 2020 builds upon the MC's review of partnerships done in October 2019. That review requested a shift toward policy- and outcome-oriented partnerships during 2020–2021, including developing private sector partnerships for scaling innovations in the FP1, as well as a focus at national levels. Country-level annual TOC workshops in 2019 helped identify new collaborations as well as needs and opportunities to strengthen existing collaborations at the national level and opportunities for cooperation between and across country programs. A new cooperation with FAO has helped identify new pathways for policy outcomes that will be actively pursued. New FISH collaborations, within and external to the CGIAR, are described in more detail in Table 2C.

3. Financial plan for 2020, including use of W1/W2

As in 2019, FISH's planned budget for 2020 (Table 3) estimates approximately 81 percent of funding[3] from W3/bilateral sources and approximately 19 percent from W1/W2. A blend of both W3/bilateral and W1/W2 sources are again planned for research under both FP1 and FP2. W3/bilateral funds are mostly used to address issues of importance to a specific donor or client. They are mapped to the FISH flagships following a review process that determines their contribution to priority FISH outputs and outcomes, aligned to the overall program TOC. An enhanced mapping process was introduced for FISH during 2019, aligned with the new CGIAR Performance Management Standards. The process will continue to be applied rigorously in 2020.

W1/W2 investments are made directly into flagships and also to facilitate the integration across clusters and strategic cross-cutting areas of the program. This covers strategic key areas not addressed by W3/bilateral funds, including new priority research areas, global syntheses, cross-country collaboration and partnerships, as well as FISH management and support costs. An intense prioritization process has guided the priorities for W1/W2 investments. This process was conducted by research teams and the MC for 2020 planning and guiding prioritization criteria that have been widely circulated to research teams. As of December 31, 2019, the amount of secured W3/bilateral funds for 2020 was USD 25.5 million. The planning guidance for W1 and W2 funds provided to FISH in the 2020 financial plan is USD 1.959 million and USD 3.998 million, respectively, providing a total of USD 5.957 million as per the CGIAR 2020–2021 Financial Plan.[4]

No major changes are being made to FP1. Prioritized investments are in line with the approved FISH proposal across each of the three FP1 research clusters, but with focus on key priorities within each cluster. In FP2, the contribution of W1 and W2 funds will cover key research and program management capabilities and activities. This will ensure sufficient research capability is available to deliver the quality research outputs already identified in the POWB 2020. Partial funding contributions are made to partners to enable better engagement in the FP2 research implementation. There is additional investment in research capability and the SSFs research agenda in Africa, particularly cluster 3 research on fish in food systems within the African

[3] Updated W3/bilateral estimates based on signed contracts as of 31 December 2019.

[4] As per the 2020–2021 Revised CGIAR Research Financing Plan (2020–2021 FINPLAN) presented to the 16th CGIAR System Management Board meeting, January 28-29, 2020. storage.googleapis.com/cgiarorg/2020/01/SMB16-05_2020-2021-Financing-Plan.pdf

Great Lakes region. Some increased investment is also being made in impact, outcome and policy research and selected key synthesis papers to capture FISH evidence and learning for the future.

Table 2A. Planned milestones mapped to FISH outcomes in 2022.

(Note: For each milestone, the table indicates the level of change from the original proposal, means of verification, CGIAR crosscutting markers for gender, youths, CapDev, climate change, and likely risk to achievement (low risk = very likely to be achieved).

FP	Mapped to Sub-IDO	2022 FP outcomes	Milestone (2020)	Milestone: identical to proposal reworded/rephrased from proposal, or new/changed*	Means of verification	CGIAR Crosscutting markers for the milestone 0=not targeted 1=significant 2=principal N/A=not applicable				Risk assessment to achieve the milestone (L/M/H)	Main risk for medium/high risk assessment
						for gender	for youths	for CapDev	for climate change		
FP1	1.4.3/2.1.3: Enhanced genetic gain	Outcome 1.1: 1.5 million households have access to and are using our selectively improved, faster growing and more resilient strains of tilapia and carp seed.	Produce faster growing and more robust tilapia strains using genomic information and faster growing rohu and catla carp strains.	New	Publications, pedigree databases, molecular databases, meeting reports	0	0	0	2	Medium	Weather and research-related risks
	1.4.3/2.1.3: Enhanced genetic gain		Develop and assess practical methods to introduce resilience traits (feed efficiency, disease resistance and oxygen resilience).	New	Publications	0	0	0	2	Medium	Mobilization of teams in both countries
	1.3.4: More efficient use of inputs 1.4.2/2.1.2: Closed yield gaps through improved agronomic	Outcome 1.2: 2.5 million households have adopted disease detection and control strategies, cost-effective and	Public and private sectors in four focal countries are using improved health, feed and management practices through	Reworded/rephrased from proposal	Technical reports, public sector records/extension materials, journal articles	1	1	2	1	Medium	1) Funding not fully confirmed or at risk of being cut 2) Risk that partners will not be able to deliver on time

	and animal husbandry practices 2.4.2:Reduced risk of livestock and fish disease associated with intensification and climate change 3.3.2: Enhanced adaptive capacity to climate risks 2.4.2: Reduced risk of livestock and fish disease associated with intensification and climate change	sustainable aqua-feeds and/or improved aquaculture management practices	countrywide programs								
FP2	1.3.2: Increased livelihood opportunities 2.1.2: Increased access to nutrient-rich foods 3.2.1: More productive and equitable management of natural resources XC 3.1.3: Conducive agricultural policy environment	Outcome 2.1: Reduced poverty for 1 million fishery dependent households as a result of adopting improved fisheries management	Adoption of improved co-management models in focal countries on a wider scale, and policy recognition and support for complementary governance models	Reworded/rephrased from proposal	Field monitoring data and reports, partners monitoring reports, external evaluation reports, learning products and related publications, documentation of learning events and dialogs organized	1	1	1	1	Low	
	1.3.2: Increased livelihood opportunities 1.4.5: Increased access		Raised visibility of SSFs functions in cross-sectoral nongovernmental	Identical to proposal	Field monitoring data and reports, partners monitoring	1	1	1	1	Medium	Assumes partners remain committed with funding

	to productive assets, including natural resources 2.1.2: Increased access to nutrient-rich foods XC 3.1.3: Conducive agricultural policy environment		organizations and public sector policies		reports, external evaluation reports						
	1.3.2: Increased livelihood opportunities 2.1.1:Increased availability of diverse nutrient-rich foods 2.1.2: Increased access to nutrient-rich foods 3.2.1: More productive and equitable management of natural resources XC 3.1.3: Conducive agricultural policy environment		Nutrition-sensitive approaches to fisheries articulated, evidenced and prepared for scaling in focal and scaling countries and supporting nutrition-sensitive fisheries management model	New	Journal articles, technical reports, articulated	1	1	1	1	Low	
	1.3.2: Increased livelihood opportunities 3.2.1: More productive and equitable management of natural resources	Outcome 2.2: 1.2 million people, of which half are women, assisted to exit poverty through livelihood improvements Outcome 2.3:	Wider application of improved management models, technologies and livelihood solutions that promote equitable resource access and benefits	Reworded/rephrased from proposal	Field monitoring data and reports, partners monitoring reports, external evaluation reports, learning products and related publications,	1	1	1	1	Medium	Assumes partners remain committed with funding

	XC 2.1.1: Gender-equitable control of productive assets and resources XC 1.1.4: Enhanced capacity to deal with climate extremes	2.1 million ha of inland aquatic and coastal marine habitat restored and under more productive and equitable management	in focal and two scaling countries		documentation of learning events, dialogs organized						
	1.3.2: Increased livelihood opportunities 3.2.1: More productive and equitable management of natural resources XC 2.1.1: Gender-equitable control of productive assets and resources XC 3.1.3: Conducive agricultural policy environment		Investment in effective (evidence-based) scaling strategies to spread innovations in focal and scaling countries and supporting nutrition-sensitive fisheries management model	New	Journal articles, technical reports, articulated	1	1	1	1	Low	

Table 2B. Planned evaluations/reviews, impact assessments and learning exercises **for 2020.**

CRP	FP/CRP	Status	Planned studies/learning exercises	Geographic scope	Who is commissioning this study?
FISH	FP1	ongoing	Baseline study for the assessment of current tilapia production, productivity and environmental effects	Egypt	W1/W2 and Skretting (private sector)
FISH	FP1	new	Assessing the impacts of GIFT on livelihoods, nutrition and food security, and gender empowerment	Bangladesh	Funding Standing Panel on Impact Assessment or W1/W2
FISH	FP1	new	Forecasted impact evaluation of genetically improved carp	Bangladesh	W1/W2
FISH	FP1	new	Impact assessment of the Odisha Convergence program on Fish Farming by women self-help groups in village tanks	Odisha, India	W1/W2
FISH	FP1	new	Baseline study for the assessment of current aquaculture systems	Rajshahi and Rangpur divisions, Bangladesh	W1/W2 and the Bill & Melinda Gates Foundation (BMGF)
FISH	FP1	new	Baseline study for small-scale aquaculture systems	Myanmar	W1/W2 and USAID
FISH	FP1	new	Project evaluation: Improving the Production, Nutrition and Market Values of Small-Scale Aquaculture in Myanmar's Shan State and Sagaing Region (INLAND MYSAP)	Shan State and Sagaing Region, Myanmar	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)
FISH	FP2	ongoing	Project evaluation: Enhancing Livelihoods while Governing Marine Resources in Pacific Island Countries	Solomon Islands, Timor-Leste	SwedBio
FISH	FP2	new	Impact assessment of hilsa co-management system on productivity, nutrition and food security, and environment	Bangladesh	W1/W2
FISH	CRP	ongoing	Fish foresight modeling study	Nigeria	BMGF
FISH	CRP	new	Policy effectiveness study (SA and SSFs): Land use policy reform (2018–2022) in multifunctional landscapes as a driver to increase income and well-being	Myanmar	W1/W2
FISH/PIM	CRP	new	Foresight modeling with the IFPRI/PIM on aquatic foods in global food systems	Global	W1/W2/bilateral
FISH	CRP	ongoing	Other activity related to monitoring, evaluation, learning and impact assessment. Please specify: management information system (ME&L) improved implementation	Global	W1/W2

Table 2C. Planned major new collaborations (CGIAR internal or with non-CGIAR collaborators).

CRP or non-CGIAR collaborator	Brief description of collaboration and value added
CGIAR collaborator	
Agriculture for Nutrition and Health (A4NH)	A4NH and FISH will further strengthen cooperation with three A4NH flagships in 2020 for research on fish and human nutrition and health in food systems, specifically the following: • A4NH Flagship 1 (Food Systems for Healthier Diets): Joint research on fish in Bangladesh and Nigerian food systems will include a co-funded PhD on modeling fish in Bangladesh food systems at Wageningen University, plus collaborative activities to identify future research priorities for fish within food systems. • A4NH Flagship 3 (Food Safety): Potential joint research, carried over from 2019, will be explored on food safety and fish in Bangladesh and Nigeria. • A4NH Flagship 5 (Improving Human Health): A new joint post-doctoral fellow will start work in 2020, on AMR, aquaculture and water systems. This follows the development of a joint research agenda on AMR for fish within the CGIAR special initiative, along with the CGIAR Research Program on Livestock and the emerging CGIAR AMR hub at the International Livestock Research Institute (ILRI) in Nairobi.
Climate Change, Agriculture and Food Security (CCAFS)	During 2020, we will continue to deepen cooperation with the CCAFS on raising the profile of fish within climate change agendas regarding the following: • CCAFS Flagship 3 (Low Emissions Development): A paper will be published on modeling low-emissions development pathways for aquaculture. • CCAFS Flagship 4 (Climate Services and Safety Nets): The Capacitating Farmers and Fishers to manage climate risks in South Asia (CAFFSA) project will be implemented to improve access of climate information services for aquaculture farmers and fishers in Bangladesh and India. • Collaboration in the Two-Degrees Initiative will occur across several challenge areas.
Livestock	Collaborative research on terrestrial animals and aquatic food futures will be implemented with A4NH and PIM and external CGIAR partners.
Policies, Institutions and Markets (PIM)	PIM Flagship 1 (Technological Innovation and Sustainable Intensification) will contribute to fish foresight research to the CGIAR Foresight Report, and fish futures research in Nigeria. Collaboration will occur on policy analysis to identify key policy pathways for scaling fish innovations.
Water, Land and Ecosystems (WLE)	During 2020, we plan to deepen cooperation with the CGIAR Research Program on Water, Land and Ecosystems (WLE) in the integration of fish within water management initiatives. Specifically, with WLE Flagship 4 (Variability, Risks and Competing Uses) the collaboration will link our fisheries-focused analyses under the fish in multifunctional landscapes cluster in FISH FP2. There will include broader research on multiple uses of water and land at landscape and river basin scales. During 2020, we will seek to enhance the circulation of a joint paper, called “Increasing the benefits and sustainability of water control infrastructure through integration of fisheries: A guide for water planners, managers and engineers.” We will do the same for another journal article, called “Enhancing biodiversity in irrigation systems.” This will be done together with a joint, targeted awareness campaign. The campaign will include co-organizing a session together with FAO at the International Commission on Irrigation and Drainage, Third Irrigation Forum. The title of the session will be “Modernizing irrigated agriculture

	to protect and restore aquatic biodiversity and inland fisheries in Asia." Additionally, we plan to develop a proof of concept (together with Cambodian partners) on the potential for incorporating fish production into existing community-managed small-scale irrigation infrastructure. We also plan to publish a joint policy brief with a view to developing scalable lessons and management models that can feed into larger water infrastructure and management investments and policy. In Myanmar, a collaboration with the WLE is also exploring the EAT-Lancet report's dietary guidelines and the application within the country.
CGIAR Research Program on Rice Agri-Food Systems (RICE)	RICE Flagship 3 (Sustainable Farming Systems): We will build on collaborative activities in 2019 (Myanmar research) and further develop collaboration with FAO and extension to consultations to identify research priorities and policy shifts for sustainable rice-fish systems at global scales. Lessons learned from rice-fish systems will be extended to Africa, including with Africa Rice. There will be a special focus also on developing strategies for adaptation in the Asian mega-deltas, as part of the CGIAR Two-Degree Initiative.
Roots, Tubers and Bananas (RTB)	During 2020, we plan to complete and publish a working paper on synergies between FISH and RTB in food systems. We will focus on Nigeria and Bangladesh and identify potential future research for development opportunities to increase our collective impact across the two CRPs. India is one likely geography for collaborative activities.
Big Data Platform	The primary focus in 2020 will be to contribute to the Climate Adaptation Atlas that will look at vulnerabilities, risk and exposures to address issues related to climate change. This will involve the process of looking for interesting and valuable datasets (data mobilization and curation) and bringing them together as one common CGIAR. The development of the WorldFish/FISH digital strategy will also be a priority in 2020. This will build on the recommendation from the Big Data Platform and Accenture development partners enabling WorldFish and FISH to undergo a digital transformation. FISH will leverage digital technologies to enable effective and more efficient research. We will also continue with work started last year in the development and contribution to the fishery ontology to facilitate data annotation, easy aggregation and analysis. FISH will also implement two innovative projects. Lastly, we will continue developing tools and systems with assistance from the Big Data Platform to make sure FISH research outputs are in line with FAIR (Findable, Accessible, Interoperable and Reusable) principles.
Excellence in Breeding	The Excellence in Breeding Platform will aid FISH in developing stage gate processes relating to bringing new fish genetic innovations to market. FISH researchers will also continue to participate in the negotiations to alter the data entry forms for breeding assessment programs to be effective for fish genetic improvement programs.
CGIAR Gender Research Platform	FISH will contribute knowledge and experience to the establishment of the new CGIAR Gender Platform, including in terms of institutional memory, to the 2020 Platform Advisory Committee and the Annual Science Conference Team. A contribution will be made to the Gender Platform synthesis papers/book on gender in CGIAR, which will be published in 2020.
CGIAR AMR Hub	AMR in food systems is emerging as an issue. WorldFish is one of four members of the CGIAR hub and will be working with range of international partners (e.g. Royal Veterinary College London (RVCL), Stockholm Resilience Centre (SRC), and Fleming Fund) and a new post-doctoral fellow to deepen collaboration related to AMR use in aquaculture.
Non-CGIAR collaborator	
Partners engaged in discovery/proof of concept research	

Australian Research Council Centre of Excellence for Coral Reef Studies, James Cook University	Partnership extends to examine climate change impacts and adaptive capacity in fisheries-reliant communities of SIDS through a joint post-doctoral fellow.
Centre for Environment, Fisheries and Aquaculture Science; Exeter University	New PhD will start in 2020 for research on patho-microbiomes, disease and AMR in carp-tilapia polyculture systems in Bangladesh.
Commonwealth Scientific and Industrial Research Organization	Under a new initiative funded by the BMGF, value chain and food system studies in Nigeria will explore aquaculture value chains, as well as potential ones, within the country. A new collaboration on nutrition quality of fish and nutrition-sensitive fisheries management will begin in 2020 under the Timor-Leste project, which is funded by the Australian Centre for International Agricultural Research.
Duke University	There will be a collaboration with Duke University to developing methodologies to Illuminate Hidden Harvests of small-scale capture fisheries, and to understand networks of non-state actor networks representing SSFs and capture fisheries for food security.
De Heus Animal Nutrition	Two new PhD studentships in Bangladesh will research feeding efficiencies in carp-based polyculture systems and energy requirements of genetically improved rohu.
Earlham Institute	FISH research on tilapia genomes will be extended, focusing on East and Southern Africa.
Hohenheim University: Institute of Rural Development, Faculty of Agricultural Sciences	We will collaborate on integrated performance and dissemination assessment of improved tilapia strains in Bangladesh, Myanmar and Malawi, supported by the Federal Ministry of Economic Cooperation and Development, DE, and also the GIZ.
Imperial College, London	Collaborators at Imperial College will examine the scale-up and spread of local conservation and management interventions in both theory and practice. Their quantitative methodological development complements the applied understandings and qualitative skills of our team to bring a solid understanding of scaling strategies and both the potential and limits of spread.
Indian Council of Agricultural Research	A new memorandum of understanding signed deepens the collaboration with FISH FP1 and FP2 in 2020–2021 in India.
Lancaster University	Continued collaboration on nutrition-sensitive fisheries will take global level insights from 2019 to policy recommendations and national level data on nutrition composition and distribution. Together, we will explore the possibility of joint post-doctoral fellows.
Mahidol University	TiLV research will include transmission modalities in carp-polyculture systems and preventative disinfection management strategies.
Mississippi State University; USAID Feed the Future Innovation Lab on Fish	Value chain studies of aquaculture in Nigeria Carp genetics in Bangladesh (possible extending to Myanmar) Gender and youths in Zambia Novel feed ingredients and feed development in Zambia and sub-Saharan Africa.
Faculty of Information Technology, Monash University	We will cooperate on the use of social media to influence policy change related to the use of fish within nutritional programs.
Natural Resources Institute, University of Greenwich	Two post-doctoral research fellows will focus on fish in food systems within the African Great Lakes region. Two new PhD students will start to examine waste and loss from capture fisheries systems in the region.

Norwegian Veterinary Institute	Cooperation on tilapia health with key external partners will be extended to new areas in 2020, particularly in Africa. This will include managing TiLV and extending the use of the epidemiology and health economics online tool widely available.
The Roslin Institute, University of Edinburgh	Joint appointments will strengthen the application of genomics to tilapia genetic improvement.
Royal Veterinary College London	AMR research (with A4NH and the ILRI AMR hub)
Stockholm Resilience Centre (SRC)	Life Cycle Assessment Tools will be applied to designing pathways for low environmental growth for aquaculture FISH will cooperate with the SRC, the Stanford University Center for Ocean Solutions and EAT on a Blue Foods Assessment. The Blue Foods Assessment will be to draw together evidence of the role of aquatic foods in the future of healthy, sustainable and equitable food systems.
University of Tasmania, Centre of Marine Socioecology	Building on collaborative work with University of Lancaster, we will work together on an analysis of fisheries trade data and the understanding of cross-broader nutrient flows associated with trade in fish and other aquatic products.
Wageningen University: Knowledge Technology and Innovation group	There will be new research on innovation systems and the adoption of aquaculture technologies as well as on women's entrepreneurship, via a joint PhD studentship.
Wageningen University; Institute of Marine Research (IMR); Skretting and other industrial feed partners	A Dutch government-funded research scientist (2019–2021) will strengthen cooperation on fish nutrition in FISH FP1. A new cooperation with the IMR will support the development of new in-vitro digestibility tools for ingredient testing. New private sector cooperation with Skretting will build greater capacity for fish feeds research in Egypt and Zambia. It will also strengthen dissemination opportunities for improved fish feeds, particularly around sustainable local ingredients, production of experimental feeds and on-farm validation.
Partners engaged in policy/scaling/capacity development	
African Development Bank; Technologies for African Agricultural Transformation (TAAT) investment	We will collaborate on the framework of TAAT for disseminating aquaculture technologies at scale and applying new feed ingredient analyses and data analysis tools from FISH FP 1 (cluster 2) for sustainable aquafeeds in Nigeria and other select African countries.
FAO	Various collaborations will occur around aquaculture and SSFs, including specific follow-up actions from the International Symposium on Fisheries Research and Policy. Cooperation with FAO also includes collaboration with the FAO's EAF-Nansen Programme, in the form of capacity building and publications.
Global Action Network: Sustainable Foods from the Oceans and Inland Waters for Food Security and Nutrition	A new partnership for FISH in this network will seeks ways to mobilize actions to increase the role of sustainable food from the oceans and inland waters to ensure food security and nutrition in the Decade of Action on Nutrition (2016–2025), in line with the SDGs.
Includovate	A collaboration with this small private sector partner began in 2019 and continues into 2020. It is focused on building a custom-made methodology to examine women's empowerment in SSFs value chains.
Locally Managed Marine Area Network	We will collaborate on civil society influence in policy arenas for coastal SSFs. We will also work together on emergent joint investment on networks, cross-scale governance and scaling of community-based approaches to fisheries management in the Pacific.
Lilongwe University of Agriculture and Natural Resources	Two new PhD students will research fish in the African Great Lakes food systems.

Skretting, and other digital partners	This collaboration builds on our cooperation with the Big Data platform and bilateral funded research in Bangladesh, Egypt and Nigeria in 2019. Together we will focus on strengthening partnerships on the application of digital innovation in on-farm performance assessments and extension.
Southern African Development Community (SADC)	We will strengthen cooperation in policies and practices for fish genetic improvement within the SADC region, including developing appropriate policies for access and benefit sharing.
University of Pisa, Department of Agriculture, Food and Environment	A research fellow will focus on policies related to fish in food systems within FISH focal countries.

Table 3. Planned budget for 2020.*

	Planned budget (USD)			Comments on major changes
	W1/2	W3/bilateral	Total USD	
Flagship 1	$2,157,000	$21,345,811	$23,502,811	
Flagship 2	$927,000	$4,119,034	$5,046,034	
Cross-program investments	$1,520,000	$0**	$1,520,000	The budget line includes an impact assessment, ME&L, Investments in Scaling & Change Mechanisms, Gender, Youth, Capacity Development, Partnerships, and Communication
	$597,000	$0	$597,000	This budget line presently represents funds currently classed as "carryover" from 2019 (subject to final auditing). The budget line is subject to an ongoing allocation process to priority flagship and cross-program investments through a competitive process
CRP Management & Support Cost	$756,000	$0	$756,000	
CRP Total	**$5,957,000**	**$25,464,845**	**$31,421,845**	

* This table reflects the revised CGIAR Research Financing Plan 2020–2021 as submitted to the System Management Board 16th meeting and is subject to approval by that meeting. The 2020 W1 and W2 budget is based on guidance provided in the 2020–2021 FINPLAN for 90 percent of W1target (USD 1.959 million) and W2 (USD 3.998 million).

** Cross-program investments are also funded by W3/bilateral. However, the figure for cross-program investments is embedded under the FP1 and FP2 W3/bilateral budget.

CGIAR

RESEARCH PROGRAM ON Fish

fish.cgiar.org