2.2 Flagship 2: Sustaining small-scale fisheries

2.2.1 Flagship project narrative

2.2.1.1 Rationale, scope

Background analysis. Fish is by far the fastest-growing animal-source food, and is a critical contributor to global food and nutrition security (Beveridge et al. 2013; Troell et al. 2014; Béné et al. 2015). Demand for fish is projected to continue to rise, particularly in Asia (World Bank 2013; OECD-FAO 2015). Despite the growth of aquaculture, capture fisheries will continue to supply most of the fish consumed in much of the developing world in the coming decades. The great majority of these fisheries are small-scale, operating in rivers, lakes and wetlands and in coral reefs and estuaries in coastal seas (World Bank/FAO/WorldFish 2012).

Small-scale fisheries (SSF) generate food and income, often where formal markets and supply chains function poorly. However, the role SSF play in nutrition and livelihood security is poorly represented in global debates about food security and development. Pressures from within and external to SSF threaten sustainability and the equitable distribution of the benefits they provide. The complexity of fisheries, both in their ecology and the social and institutional environments they operate in, has thwarted the search for universal solutions. Securing and rebuilding SSF for the millions of people who depend on them is a significant and urgent problem, and is the central rationale for flagship 2 (FP2).

Problem statement. Sustaining and increasing the contribution of SSF to poverty reduction and food security requires addressing three interrelated problems. First, overharvesting caused by increased fishing to meet local and distant demand, combined with insecure resource tenure and competition with other users, has degraded the resource base of many SSF. Social and economic drivers outside the sector influence the availability of alternative livelihoods, while ecological drivers undermine ecosystem functions, notably for coral reefs. Second, the sustainability of inland SSF is threatened by changes in the broader landscape. These include infrastructure development (dams, irrigation systems, roads) that disrupt ecological flows and connectivity, and agricultural intensification and land-use conversion that reduce wild fisheries productivity in multiple-use systems such as rice field fisheries. Third, even where local innovations address some combination of these threats in coastal or inland systems, there is inadequate policy recognition of the importance of SSF and poor alignment of efforts among diverse stakeholders to drive solutions at higher scales.

Scope and approach. The objective of FP2 is to secure and enhance the contribution SSF make to poverty reduction and food security by addressing these three barriers in select geographies. FP2 is motivated by the vision that strategic investments in fisheries research, embedded in partnerships and networks, and building on the strengths of fishing communities, will sustain and improve the contributions fisheries make to the wellbeing and social-ecological resilience of fishery systems. We view SSF from a systems perspective (Sayer and Campbell 2004; Andrew et al. 2007; Pomeroy and Andrew 2011) and pursue research through a combination of global and regional analysis and place-based research in strategic coastal and inland geographies.

We will build on progress in decentralized fisheries governance, which has proven potential to address sustainability, food security and poverty alleviation objectives (Evans et al. 2011; Cinner et al. 2012). Central issues include gender and other social differentiation in the control of assets and in decision-making, increasing the profile of fish in policy agendas, and fish trade in domestic and intra-regional food systems. We will develop and refine tools, engagement processes, management models and supporting policies suited to the contrasting contexts (clusters 1 and 2). These streams of research will be integrated with analyses of drivers of change affecting the future of SSF and their role in regional food systems (cluster 3).

FP2 will focus on Africa and Asia-Pacific, where the largest numbers of poor people depend on fish for food and nutrition security and where our research can have impact at scale. In Asia-Pacific, we will focus on inland and estuarine fisheries in Bangladesh, Myanmar and Cambodia and coral reef fisheries in Solomon Islands. In Africa, we will continue work on inland fisheries and the small fish that constitute the majority of catches. We will work in Zambia as a case study on the complexities of land use and governance of fisheries. We will initially focus our scaling research on coastal co-management in the Philippines and subsequently in Tanzania. Scenario and foresight development to engage with policy stakeholders will focus on trade along complex value chains in the (1) African Great Lakes, (2) Mekong region, and (3) Pacific food system.

Grand challenges and Sustainable Development Goals. FP2 focuses on the grand challenge of *unsustainable harvest of fish from the oceans and from aquatic systems* (the only flagship in the CGIAR portfolio to do so). FP2 also contributes to addressing the grand challenges of *overdrawn and polluted water supplies, nutritious and diverse agri-food systems and diets*, and on *climate change* through analyses of vulnerability and adaptation and climate change implications of alternative uses of land and other aquatic resources.

FP2 contributes to a number of SDGs, particularly SDG 14: Conserve and sustainably use the ocean, seas and marine resources. FP2 also contributes to SDG 6.6 on protecting and restoring water-related ecosystems. Alongside investments in ecological sustainability goals, the flagship examines how these translate to reducing poverty (SDG 1) and increasing food security (SDG 2), gender equality (SDG 5), and sustainable livelihoods and economic growth (SDG 8). SDG 8 recognizes the importance of Small Island Developing States and the particular development challenges they face.

2.2.1.2 Objectives and targets

The objective of FP2 is to secure and enhance the contribution of SSF to poverty reduction and food security in priority geographies. To achieve this, fisheries need to be ecologically sustainable and governed for objectives of food security and resilience of fishery-dependent households.

FP2 will primarily deliver research outputs and outcomes in support of system-level outcome (SLO) 1 (*reduced poverty)* and the enabling conditions provided by SLO 3 (*improved natural resource systems and ecosystem services*). Improved fisheries governance will increase the productivity of fisheries and the yield from them; FP2 will therefore make secondary contributions to SLO 2 (*improved food and nutrition security for health)*.

The primary target beneficiaries of FP2 are the fishery-dependent households and communities in the places we work and the traders and consumers of fish they produce. Many value chains are long and complex, creating wealth and opportunity at multiple points. Contributions to SLO 1 targets therefore refer to people and households dependent on fishing and associated processing and trade as significant contributors to their income and livelihood. Contributions to SLO 2 targets similarly consider benefits for food security and nutrition realized by consumers at multiple scales, often distant from the source fisheries. In the case of SLO 3, we measure the area of an inland water body, terrestrial agro-ecosystem (such as rice field fisheries) or coastal fishery under improved management as a proxy for calculating hectares of "degraded land area restored."

Flagship-specific outcome targets and their contributions to SLO targets and sub-IDOs are summarized in Table 9.

FP2 seeks to reduce poverty of fishery-dependent households in focal countries and beyond. Initial investments in 2017–2018 will be in inland/estuarine fisheries in four countries (Bangladesh, Cambodia, Myanmar and Zambia) and two coastal systems (Solomon Islands and Philippines). We will increase resources and investments in other African and Asian countries (initially focusing on coastal fisheries in Tanzania and Vietnam) in 2018 and beyond, following targeted and strategic fundraising after a period of consultations with national and regional partners. Improved fisheries governance aims to deliver more food, more income, and greater social inclusion and distribution of benefits. Within households we will disaggregate and track progress for young people and women.

In making contributions to SLO 2 (*reduced poverty)*, we recognize the multidimensional nature of poverty and therefore the interrelated nature of the IDOs and sub-IDOs as they measure outcomes. Our approach considers three primary dimensions of poverty: (1) income and asset poverty, the condition in which individuals and households do not have access to sufficient means to sustain a decent standard of living (addressed through sub-IDO 1.3.2); (2) vulnerability, the result of people's exposure to risks, the sensitivity of their livelihood systems to these risks, and their capacity to use assets and capabilities to cope and adapt (1.1.1, 3.3.1 and XC 1.1.4); and (3) marginalization or social exclusion (XC 2.1.3, XC 3.1.3). All three dimensions of poverty are strongly gendered, age-dependent and interactive. For example, people who are socially excluded or marginalized may become income and asset poor, and asset poverty reduces the capacity to adapt, making people more vulnerable to external shocks and adverse trends. Action research interventions aimed at building wellbeing and resilience in communities dependent upon SSF aim to capture these multiple dimensions.

Flagship-specific outcome targets by 2022 PRIMARY (annual milestones included in PIM Table D)	Target geographies
1 million fishery-dependent households have reduced poverty as a result of adopting improved fisheries management Addresses SLO target 1.1 and sub-IDOs: *Increased capacity to cope with shocks* *Increased livelihood opportunities* *Enhanced capacity to deal with climatic risks and extremes* *Improved capacity of women and young people to participate in decision-making* *Gender-equitable control of productive assets and resources*	**Cluster 1** Solomon Islands and Tanzania (scaling investments in Philippines and Vietnam) **Cluster 2** Bangladesh, Cambodia, Myanmar, Zambia **Cluster 3** National and regional foresight and intra-regional trade analyses across all countries in the Pacific region and regional trade analyses in the African Great Lakes region and Mekong Delta
1.2 million people, of which 50% are women, assisted to exit poverty through livelihood improvements Addresses SLO target 1.2 and sub-IDOs: *Increased capacity to deal with climatic risks and extremes* *Increased capacity to cope with shocks* *Increased livelihood opportunities*	
2.1 million ha of aquatic and coastal marine habitat restored and under more productive and equitable management Addresses SLO target 3.3 and sub-IDOs: *Enhanced conservation of habitats and resources* *Increased resilience of agro-ecosystems and communities, especially those including smallholders* *Conducive agricultural policy environment*	
Flagship-specific outcome targets by 2022 SECONDARY (progress measured through CRP-level M&E)	
0.3 million people, of which 50% are women, without micronutrient deficiencies as a result of increased consumption of fish sourced from small-scale fisheries Addresses SLO target 2.3	
0.6 million more women of reproductive age consuming an adequate number of food groups as a result of improvements in small-scale fisheries Addresses SLO target 2.4	

Table 9. FP2 outcome targets by 2022.

FP2 investments for each sub-IDO are summarized in Table 10.

Sub-IDO name	Total amount	W1+W2 (%)	W3/Bilateral (%)
SLO-related			
1.3.2 Increased livelihood opportunities	$12.83M	$3.85M (30%)	$8.98M (70%)
3.3.1 Increased resilience of agro-ecosystems and communities, especially those including smallholders (see also XC 1.1.5)	$12.83M	$3.85M (30%)	$8.98M (70%)
3.2.1 More productive and equitable management of natural resources	$12.83M	$3.85M (30%)	$8.98M (70%)
Cross cutting			
XC 1.1.4 Enhanced capacity to deal with climatic risks and extremes (see also 1.1.1 and 3.3.2)	$5.35M	$1.61M (30%)	$3.75M (70%)
XC 2.1.1 Gender-equitable control of productive assets and resources	$5.35M	$1.61M (30%)	$3.75M (70%)
XC 2.1.3 Improved capacity of women and young people to participate in decision-making	$5.35M	$1.61M (30%)	$3.75M (70%)
XC 3.1.3 Conducive agricultural policy environment	$5.35M	$1.61M (30%)	$3.75M (70%)
Total (USD)	**$59.89M**	**$17.97M (30%)**	**$41.92M (70%)**

Table 10. Investments by sub-IDO for FP2 for 2017–2022. Note that only the most relevant sub-IDOs are listed—a wider set of sub-IDOs is addressed in collaboration with other flagships.

The flagship will contribute to all four cross-cutting IDOs, in collaboration with other flagships within FISH and other CRPs, particularly CCAFS, PIM and WLE. Specifically, we address *enhanced capacity to deal with climatic risks and extremes* (XC 1.1.4; see also 1.1.1 and 3.3.2), *gender-equitable control of productive assets and resources* (XC 2.1.1), *improved capacity of women and young people to participate in decision-making* (XC 2.1.3) and *conducive agricultural policy environment* (XC 3.1.3). Integral to achieving each of the named sub-IDOs is also *increased capacity for innovations in partner development organizations and in poor and vulnerable communities* (XC 4.1.4).

Within SLO 3 we focus on the sub-IDOs that track attributes and outcomes of improved fisheries governance: *increased resilience of agro-ecosystems and communities* (3.3.1; see also XC 1.1.5), and *more productive and equitable management of natural resources* (3.2.1). FP2 also contributes to other sub-IDOs, such as *enhanced conservation of habitats and resources* (3.1.2) and *increased capacity for innovation in partner development organizations and in poor and vulnerable communities* (XC 4.1.4), but these are secondary to the named sub-IDOs.

Outcome milestones are provided in the Performance Indicator Matrix, and the program approach to outcome monitoring, evaluation, and impact assessment is addressed in Annex 3.6.

2.2.1.3 Impact pathway and theory of change

Securing and increasing the contribution of fisheries to poverty reduction and food security depends on the ecological sustainability of harvests. However, sustainability alone is not sufficient. To reduce poverty, access rights and benefits need to be equitably distributed and fisheries need to be integrated with diverse livelihoods. While isolated knowledge advances can lead to local outcomes, impactful research must be embedded in wider governance and political processes, engaging diverse community, civil society and public sector partners at multiple scales. Lessons learned from AAS have re-emphasized the importance of multiscale approaches to influencing change in these complex governance landscapes. Building on AAS, FISH will invest in proven partnerships and networks that span communities to national agencies and regional intergovernmental bodies.

The flagship theory of change (ToC) reflects this multi-scale approach (Figure 5) and incorporates fishery-specific propositions (Table 11) relating to the CRP-level change mechanisms. These propositions will be tested in three interlinked clusters. Clusters 1 and 2 address coastal and inland/estuarine fisheries, and the barriers to improved

productivity, including overfishing and landscape-scale resource competition and governance (e.g. infrastructure development and other uses of land and water). Cluster 3 integrates the place-based clusters to address the role of fisheries in poverty reduction at national and regional scales. By combining local innovations with those at higher scales, the three clusters aim to contribute jointly to gender-equitable resource access, control of assets and distribution of benefits for fisheries-dependent households, improved management, and sustained yields from marine and aquatic environments, leading to increased incomes and livelihood resilience.

We make a very deliberate choice to develop, support and refine management approaches that have been shown to serve the welfare of the many, rather than to manage to economic or ecological optima that have been shown to be susceptible to the capture of a few (Béné 2003; Béné et al. 2010; Cunningham et al. 2009). These approaches focus on processes sensitive to social differentiation to bring multiple stakeholders together to govern and to build capacity of governors to adapt management as conditions change (Bene et al. 2011). Evidence suggests this approach can lead to broader participation, greater compliance and improved social and ecological outcomes (Cinner et al. 2012; Evans et al. 2011), enhanced adaptive capacity, and resilience (see also Table 13 for selected references to this evidence-base and the track record we build upon).

Cluster 1 will work on decentralized management and livelihoods in coastal fisheries in Solomon Islands and the Philippines. These countries are highly dependent on coastal fisheries for rural livelihoods and food security, have a supportive policy environment, and offer opportunities to influence regional policies and practices within the Asia-Pacific region. Both countries have capacity deficiencies in delivering long-term co-management and livelihood solutions that result in equitable impacts, challenges that are emblematic of many coastal nations. We will build on methods piloted by WorldFish to refine community engagements that lead to increased ecological sustainability, enhanced production for food security, and improved opportunities for men and women to generate income. These engagements include (1) co-management to sustain fish stocks and ensure women's and men's access to and control over the resource, and (2) measures to increase benefits by improving equitable market access and building alternative livelihoods. To achieve impact at scale, we promote the spread of innovations through learning and governance networks, ultimately embedding these in policies of governments and regional bodies, as well as within the priorities of development agencies and civil society actors.

Cluster 2 focuses on SSF in multifunctional, estuarine and freshwater landscapes in Myanmar, Cambodia, Bangladesh and Zambia, with an emphasis on managing competition and adapting to external drivers of change. In addition to their high reliance on freshwater fisheries and relatively strong government commitment to the sector, these countries exemplify the challenges of sustaining the livelihood and nutritional benefits of SSF amid intensifying competition over water resources, related infrastructure development, conversion of key aquatic habitats and climate change. SSF-dependent communities have struggled to achieve the visibility necessary to influence policy and regulatory environments amid competition for water and landscapes. Activities will focus on drivers of change, tradeoffs and governance mechanisms to sustain and increase the contributions of fisheries in the face of these challenges.

Cluster 3 is based on the proposition that policy will better sustain and transform the role of fisheries for poverty reduction and food security if forward-looking scenario and foresight analysis is used in multi-stakeholder dialogue to raise the profile of fish in regional food systems. In the African Great Lakes fish trade corridor and the Mekong Delta, we will examine how domestic and intra-regional trade affects capture fisheries production, and how trade policy and other measures can influence the livelihood and nutritional benefits of fish from these sources for the poor and marginalized. In the Pacific islands food system, we will examine how the contribution of SSF evolves under a range of ecological and social drivers, focusing on climate change. These three case studies provide a strong basis for generalizable lessons about how fish in food systems at larger scales interface with the place-based value chain work of FP3.

The impact pathway diagram and ToC narrative outlined here simplify complex, interactive mechanisms linking research to development outcomes. As detailed in Table 12, strategies to address risks include (1) capacity development in gender-sensitive and transformative approaches, community livelihood and management interventions, and responsive and accountable institutions; (2) outcome evaluation assessing progress in fostering governance networks; and (3) building on established partnerships to maximize opportunities to apply research within policy design and implementation.

Flagship-specific propositions	Addressed in Cluster
Co-management: Localized improvements to resource governance implemented with partners and fishing communities will improve sustainability and lead to equitable improvements in food security (change mechanism a).	1, 2
Livelihoods and markets: Localized improvements to livelihood alternatives and market access will lead to reduction in poverty. Improved food security will result from governance and livelihood interventions implemented in collaboration with partners and fishing communities (change mechanism a).	1
Scaling through networks: Substantive, sustainable and equitable improvements in food security, poverty reduction and sustainability will result from mobilization of innovations through networks and strategic investments in networks (change mechanisms a, c and d).	1, 2
Governance landscapes: Local and cumulative impacts of localized interventions, and the ability of SSF to sustain and improve the benefits they deliver, will be accelerated and enhanced by creating a stronger enabling environment (change mechanisms c and d).	1, 2, 3
External drivers of change: Accounting for external drivers (e.g. trade, resource access/trade agreements, global environmental change) in local interventions and broad-scale policy will improve SSF resilience (change mechanisms c and d).	2, 3
Imagining alternative futures: Policy will better sustain and transform the role of fisheries for poverty reduction and food security if forward-looking scenario and foresight analysis is used in multi-stakeholder dialogue (change mechanisms c and d).	3
Capacity development: Investing in the capacity of CRP partners through gender-sensitive and transformative approaches, learning and governance networking, community livelihood and management interventions, and responsive and accountable institutions will accelerate and enhance impact (change mechanisms c and d).	1, 2, 3
Gender, equity and youth: Improving equitable access to, and control of, assets and participation in decision-making will accelerate poverty reduction and improvements in food security (change mechanisms a, c and d).	1, 2, 3

Table 11. Flagship propositions. These propositions relate to and ground the CRP-level mechanisms described in Section 1: (a) local adoption and dissemination of technologies and management practices; (c) public sector policy improvement and institutional strengthening; and (d) influence on policies and priorities of civil society and development agencies. FP2 does not emphasize research on change mechanism (b) private sector investment and replication of innovative business models.

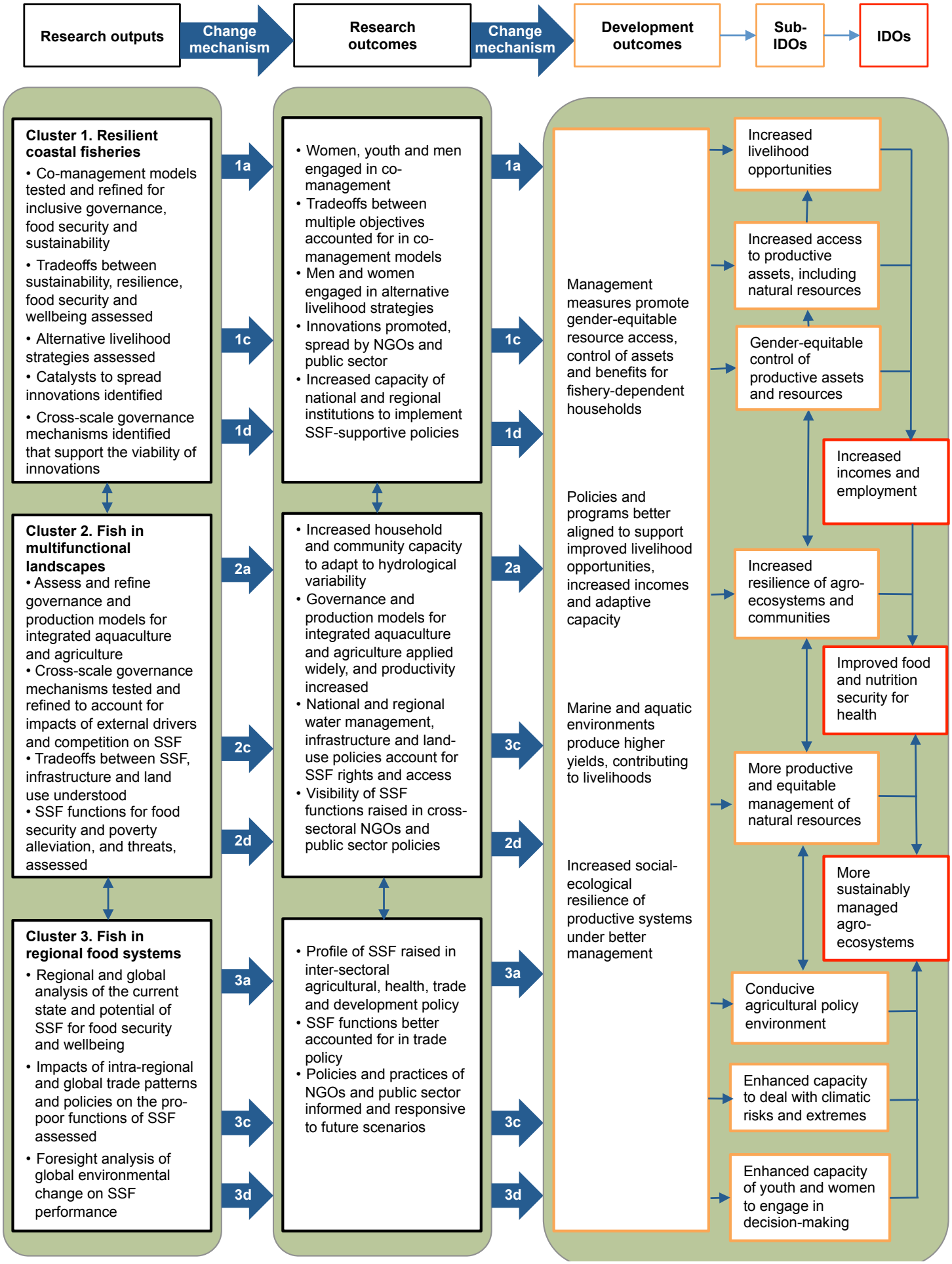

Figure 5. FP2 impact pathways.

Change mechanism	Key assumptions and risks associated with change mechanisms	Corresponding strategies and risk management actions
a Local adoption and dissemination of technologies and management practices	**Research outputs to research outcomes** **1a – 2a** Communities willing to engage in co-management, alternative livelihoods and integrated agriculture/aquaculture, and sustain these efforts post-engagement. (Risk: poor engagement) **1a – 2a** NGOs, public sector and development agencies receptive to new innovations and policy amendments, and able to play a dissemination role effectively. (Risk: limited sharing) **Research outcomes to development outcomes** **1a – 2a** Co-management, livelihood strategies and practices realize equitable outcomes, avoiding elite capture. (Risk: increased inequities) **1a – 2a** Outcomes from new innovations persist amidst external drivers of change. (Risk: low sustainability) **1a – 2a** Replicated forms of co-management, livelihood and integrated farming innovations still deliver equitable and sustained improvements to food security, production and incomes. (Risk: limited adoption)	**Research outputs to research outcomes** **1a – 2a** Identify communities on need and expressions of interest; tailor activities to local demand; employ participatory processes to establish co-management and livelihoods, with resilience an explicit objective. **1a – 2a** Co-develop innovations with partners; focus strategic research and engagements explicitly on dissemination via networks. **Research outcomes to development outcomes** **1a** Implement participatory action research with explicit attention to gender and social differentiation in co-management and alternative livelihoods. **2a** Explicitly engage with cross-sectoral and cross-scale drivers and partners in research; build co-management and livelihood innovations into broader community-resilience-building approaches. **1a – 2a** Co-develop co-management and livelihood innovations with NGOs and public sector; incorporate lessons on challenges and tradeoffs in capacity building and communication resources.
c Public sector policy improvement and institutional strengthening	**Research outputs to research outcomes** **1c** Public sector and development agencies receptive to recognizing and disseminating new innovations. (Risk: limited sharing) **1c – 2c** Governments able to implement policy and practice changes with adequate budget and technical capacity. (Risk: inadequate capacity) **2c – 3c** Government actors across sectors receptive to longer-term concerns of food security and wellbeing, including tradeoffs with short-term economic growth. (Risk: policy obstacles) **Research outcomes to development outcomes** **1c – 3c** Government policy supports longer-term perspectives on decentralization, welfare and ecological sustainability objectives, vs. short-term economic growth. (Risk: policy obstacles) **1c – 3c** Government policy promotes poverty alleviation and food security objectives, alongside ecological conservation. (Risk: policy obstacles)	**Research outputs to research outcomes** **1c – 2c** Select countries where early policy change indicates progress and support towards decentralization, yielding evidence on benefits of decentralized approaches. **1c – 2c** Co-develop innovations and cross-scale governance research with public sector; use profile-raising activities to support increased public and development investment, and governance networks to moderate capacity gaps. **3c** Communicate foresight analyses to raise the profile of current and future roles of SSF in food systems. **Research outcomes to development outcomes** **1c – 2c** Raise the profile among government and regional agencies of the outcomes and potential of decentralized SSF governance and alignment to SDGs and other policy commitments; engage with civil society to ensure government accountability to SDGs, human rights and SSF commitments, as well as conservation commitments. **3c** Integrate foresight analysis in existing and ongoing strategic planning and commitment-reporting processes.
d Influence on policies and priorities of civil society and development agencies	**Research outputs to research outcomes** **1d** NGOs and development agencies receptive and able to promote improved forms of co-management. (Risk: inadequate capacity) **1d – 2d** Health, development and environment-focused agencies recognize SSF livelihoods alongside other conservation and development objectives in multifunctional landscapes. (Risk: inadequate investment) **3d** Civil society and development agency policy and program decision-making responsive to foresight analysis. (Risk: poor integration) **Research outcomes to development outcomes** **1d – 3d** Civil society activities promote human wellbeing and food security in SSF, not only environmental conservation. (Risk: poor integration)	**Research outputs to research outcomes** **1d – 2d** Co-develop innovations with NGOs and public sector **1d – 2d** Partner with cross-sectoral civil society and development agencies in analysis of the food security and poverty reduction functions of SSF, and work with them to communicate results. **3d** Integrate foresight analysis into existing fora for strategic planning and policy formation. **Research outcomes to development outcomes** **1d – 3d** Partner to recognize SSF explicitly in cross-sectoral and cross-scale governance arenas in which civil society and development agencies are active; build accountability to SDGs, human rights and SSF commitments into civil society capacity development work.

Table 12. FP2 change mechanisms.

2.2.1.4 Science quality

We strategically align our research priorities to those articulated by community and national stakeholders (e.g. SSF guidelines, FAO 2015). These are summarized as flagship-specific propositions (Table 11) representing interrelated dimensions of the SSF challenge and are set within different literatures and theoretical framings. The partners in the flagship have made significant contributions to that literature (see Table 13 for examples).

Across all clusters, we consider SSF through an overarching lens of social-ecological resilience because they encapsulate sustainability, poverty and food security; account for relationships between social and ecological systems and cross-scale interactions; and explicitly account for feedback and shocks. While this focus is closely aligned with the objectives and commitments laid out in the SSF guidelines (for example), efforts to apply resilience thinking in practice have struggled to account for the human dimensions and objectives of social-ecological systems (Cote and Nightingale 2012; Brown 2014). We will address this gap through our comparative advantage in social and interdisciplinary science in the SSF domain, and through established and emerging policy networks in Asia, Africa and the Pacific. For example, within our efforts to improve livelihoods and strengthen co-management, we will examine and test how resilience is defined locally, how it is built and the inevitable tradeoffs that determine where improved resilience does, and does not, translate to improved wellbeing (Hicks et al. 2009; Mills et al. 2011; Coulthard 2012; Cohen et al. 2013). We employ quantitative fisheries and demography research to examine changes in productivity, ecological status, and incomes and nutritional status of men, women and children reliant on SSF.

We recognize the multidimensional nature of development and the inadequacy of framing poverty solely in economic terms (Stiglitz et al. 2009). We will build on conceptual framing and measurement of human wellbeing to reconcile resilience insights with poverty alleviation and ecological sustainability (Smith and Subandoro 2007; Ballard et al. 2011; OECD 2013; McGregor et al. 2015). This will require methodological advances at the interface of research and development and policy practice at local and national scales. At this interface, CGIAR and FP2 research partners enjoy comparative advantage and a track record.

Research within clusters 1 and 2 will examine governance and social and ecological outcomes among diverse fishery systems. While we examine localized cases in depth, we will also use analytical frameworks to facilitate comparative, cross-case analyses (e.g. Ratner et al. 2013). Employing such frameworks strengthens our analytical power to draw generalizable lessons for different governance arrangements in different contexts. While there is a great deal of advocacy around co-management approaches, there is also a paucity of systematic comparison of outcomes, particularly for the social and equity dimensions (Selig et al. in press). By addressing this gap, we can provide robust guidance for policies and practice to achieve impact at scale. This research extends beyond the application of existing frameworks and uses applied insights to further refine and operationalize them. Both the use and refinement of frameworks will be subject to peer review.

In clusters 1 and 2, our work on local impacts and engagement with fishing communities and policy forums aligns with established and peer-reviewed frameworks that guide implementation and subsequent analyses of implementation and governance processes (e.g. Andrew et al. 2007; Ratner et al. 2013; Stockholm Resilience Center 2015). Our research will be co-generated with fishing communities and government, non-government and research agencies, using participatory action research principles that have been shown to promote both local innovation and multi-stakeholder dialogue that can influence policy and institutional change (Reason and Bradbury 2008; Ratner et al. 2014). Our emphasis on knowledge co-production from on-the-ground engagements sets us apart from traditional research organizations and gives our research greater responsiveness to stakeholder needs and increased credibility to influence practice and policy.

A critical element of our science quality is to understand how locally generated insights and lessons are considered within a systems perspective, and the potential and limitations of scaling. For example, investments in co-management and livelihoods can bring about improvements to sustainability and human wellbeing, but structural dynamics (e.g. international trade, global environmental change) can affect sustainability and human wellbeing to even greater degrees. Much existing research focuses on one scale or the other; we have a strong comparative advantage for linking actors in meaningful, evidence-based dialogue about options to address SSF challenges through networks bridging local, national and regional scales.

To ensure the quality of our science remains high, FP2 will maintain and strengthen the engagement of its implementing partners in international communities of practice to ensure we are at the leading edge of research for development (R4D) in fisheries governance. This includes networks that facilitate exchange of methods and approaches across resource systems, such as the CGIAR Systemwide Program on Collective Action and Property Rights (CAPRi), sustained through PIM FP5 and the CGIAR Gender Platform (PIM FP6). It also includes sector-specific research networks such as Too Big To Ignore, a global network established to elevate the profile of SSF.

Flagship proposition	Conceptual frameworks and theories	Selected evidence of track record on which we build
Co-management	Fisheries and ecological sustainability examined from the perspective of sustainable fisheries resources (Dugan et al. 2010). Linkages between sustainability resilience and adaptive capacity (Gallopin et al. 2006). Governance understood locally (e.g. Ostrom 1990; Ratner et al. 2013) and from multiscale governance perspective (Bavinck et al. 2013).	Cohen and Alexander 2013; Cohen and Foale 2013; Cohen et al. 2014; Dewan et al. 2014; Evans et al. 2011; Mapedza et al. 2012; McClanahan et al. 2011; Schwarz et al. 2011
Livelihoods and markets	Research structured around the resilience of social-ecological systems (Folke 2006), linkages between resilience and adaptive capacity (Gallopin et al. 2006), improved nutritional security and the role of aquaculture for the poor (Troell et al. 2014; Powell et al. 2015). Research guided by seminal approaches to livelihoods by Allison and Ellis (2001).	Albert et al. 2014; Cinner and Bodin 2010; Cinner et al. 2013; Schwarz et al. 2011; Sulu et al. 2015
Scaling through partnerships and networks	Social network theory (Bodin and Crona 2009; Borgatti 2009), diffusion of innovation theory (Rogers 2003) and institutional analysis.	Abernethy et al. 2014; Cohen et al. 2012
Governance landscapes	Interactive Governance Framework (Bavinck et al. 2013) and Ratner et al. (2013) framework for analyzing governance. Analyzing policy and practice against SDG policy and human rights approaches (e.g. Allison et al. 2012).	Abernethy et al. 2014; Andrew et al. 2007; Foale et al. 2013; Ratner and Allison 2012
External drivers of change	Research builds on ideas of globalization of social-ecological systems (Young et al. 2006). Explicit focus on global trade and climate change.	Albert et al. 2014; Allison et al. 2009; Baran et al. 2015; Eriksson and Clarke 2015; Eriksson et al. 2015; Hecht and Lacombe 2014; Hoanh et al. 2010; Kam et al. 2016; Kura et al. 2014; Lacombe et al. 2014; Phong et al. 2016; Winemiller et al. 2016
Imagining alternative futures	Participatory scenario development and related techniques (Vervoot et al. 2014); foresight modeling using IMPACT fish supply modeling (World Bank 2013; Kobayashi et al. 2015) and WorldFish Fish Supply Model (previously AsiaFish model, Dey et al. 2005).	Dey et al. 2005; Evans et al. 2013; Secretariat of the Pacific Community 2015
Capacity development	Systems approaches to capacity development at individual, institutional and organizational levels (Morgan 2006; Ortiz and Taylor 2008) and understanding of capacity development as a process (OECD 2008).	Apgar et al. 2015; Leuwis et al. 2014; Sarapura et al. 2014
Gender, equity and youth	Ratner et al. (2013) framework to examine gendered and socially differentiated representation and power in SSF governance. Application of wellbeing (Weeratunge et al. 2014) and rights-based (Allison et al. 2012) framings.	Allison et al. 2012; Cohen and Steenbergen 2015; Cole et al. 2015; Kantor et al. 2015; Morgan et al. 2016; Ratner et al. 2013; Weeratunge et al. 2014

Table 13. Propositions addressed in FP2 ToC, their relationship to science literatures and theories, and our track record in contributing to those fields of enquiry. These relationships and contributions are critical to situating our research in the literature and as evidence of our capacity to produce IPGs. See Table 11 for summaries of the propositions and their relationship to change mechanisms.

In addition, we will develop two communities of practice for FP2 that leverage existing investments in science quality, including research design. For coastal fisheries (clusters 1 and 3) we will use the Centre of Excellence for Coral Reef Studies Scientific Management Committee as a review panel for the design of research. To review our research on the interactions of inland fisheries with broader trends in landscape-level change (clusters 2 and 3), we will draw on relevant expertise through

our engagement with the Ramsar Convention's Scientific and Technical Review Panel (STRP) where the International Water Management Institute (IWMI) is an International Organization Partner, and the Ecosystem Services Partnership, coordinated by the Environmental Systems Analysis Group at WUR.

Research will also be published in regionally appropriate, peer-reviewed venues to ensure that it is not only academically robust, but withstands review from practitioners and policymakers. In addition, all the partner research organizations have internal peer-review processes that require sign-off from experts with domain knowledge.

2.2.1.5 Lessons learnt and unintended consequences

FP2 has been shaped by lessons drawn from AAS as well as linkages with WLE (particularly in the Mekong and Ganges regions). In Zambia, for example, the proposed work under cluster 2 builds on the experiences and research in the Barotse Floodplain under AAS where geographic information system (GIS) and remote sensing were key methods to better understand the natural resource status and trajectory of change over time, important particularly in the context of a trade-off analysis for potential wetland use options. The remote sensing and GIS was complemented with the local knowledge system to help inform realistic decision-making process as part of research in development in wetland areas (Xueliang et al. in review). In regard to the work proposed for Cambodia, adapting local institutional models (developed under the earlier phase of the USAID investment within AAS) through participatory community dialogues, will expand the scope of fish refuge management committees to adopt a more multi-user orientation critical for balancing often competing uses.

Learning from AAS on local political economies linked to resource capture has presented critical understanding for designing approaches to building institutions that support decision-making processes that result in both sustainable and equitable resource use (Agpar et al. In review). Learning from Kulna in Bangladesh, through AAS and the WLE Ganges focal region work on improved community water and land management practices at the microscale within the polders, has contributed to the creation of innovative water resource governance mechanisms to reduce conflict associated with water management among community members (Dewan et al. 2014; Kenia and Buisson 2015) and has informed what is proposed in Bangladesh under cluster 2.

Through our linkages with WLE, particularly flagship 4 (FP4) on managing resource variability, risk and competing uses for increased resilience (VCR), we will together be exploring and testing innovative solutions for sustaining fisheries and livelihood adaptations in man-made water bodies such as reservoirs constructed for hydropower and irrigation. We will also be together ensuring the optimization of water management in integrated fish and crop production systems. Further, we expect to develop complementary research in integrated sites – such as in Bangladesh, Cambodia and Myanmar. Ultimately as indicated in Annex 3.7, our partnership with WLE seeks to make certain that deliberations over basin and watershed-scale resource competition and development scenarios take into consideration fisheries outcomes. Reviews by the World Bank and African Development Bank on fisheries sector investments consistently point to governance as the key enabling factor in securing the sustainability of capture fisheries and their economic and social benefits. The design and approach of FP2 responds to global experience on the pathways and pitfalls to achieving progress towards this goal.

Our science outputs will also undergo rigorous review. The majority of our research has and will continue to be published in peer-reviewed literature (see named CVs for recent articles in leading journals). The peer review mechanism provided by leading journals will remain the benchmark for ensuring science quality in the flagship. Our

We have learned that co-management carries risks, particularly when issues surrounding accountability and representation are not addressed. This creates opportunities for elite capture (Béné et al. 2009; Evans et al. 2011; Cinner et al. 2012; Cohen and Steenbergen 2015). Our research will pay particular attention to power imbalances and other social differentiation that interventions may cause or exacerbate.

Fisheries reforms at local, national and regional scales commonly fail because of problems of implementation and external drivers such as natural, political or economic shocks; internal social relations and leadership issues; and competition for resources with other sectors (Andrew et al. 2007). More successful reforms anticipate a wide range of economic, social, political, institutional or environmental risks and opportunities, and build in mechanisms to adapt (Armitage et al. 2009; Gelcich et al. 2010). Recognizing that social and ecological shocks are inevitable, we focus on building resilience and adaptive capacity through the design of our engagements. Further, our use of foresight analysis

and multi-stakeholder dialogue on future scenarios, as well as related capacity development efforts, aim to embed such resilience principles in policy and institutional reform decisions.

Without adequate attention to linkages across sectors and scales, institution-strengthening investments in the sector also frequently fail to yield the intended results. An African Development Bank review (2008) of fisheries projects found that "the lack of adequate analysis of the institutional framework is undermining the establishment of mechanisms to support public, private or civil society organizations." Similarly, a key lesson of AAS is that strengthening community-level institutions needs to be complemented by a greater focus on governance across scales and on the external drivers of change. FP2 uses this learning, notably in cluster 2 where tradeoffs among land and water usage and the ecosystem services they provide are a focus of research. This can help mitigate risks associated with the potential negative impacts on fisheries from intensification of agriculture production, for example.

We also recognize risks inherent in action research that aims to influence change in governance, particularly in areas under collective or contested tenure. We have learned that the process of clarifying tenure, deemed necessary for resource management and development efforts, can precipitate contestation or dispute (McDougall 2005). Mechanisms to manage competing perspectives and integrate an awareness of gender and social equity are critical to avoid aggravating conflicts or unintentionally enabling elite capture. FP2 incorporates lessons from WorldFish's long history in community engagement and community-based fisheries management, including from phase 1 CRPs (Douthwaite et al. 2015; Apgar et al. in press). Collaborating for Resilience, co-developed under AAS and PIM in phase 1, will also be used, along with locally contextualized tools to provide tested approaches to address this challenge through multi-stakeholder dialogue (e.g. Schwarz et al. 2014) and mediation and conflict resolution between resource users in multifunctional landscapes (e.g. scenario development and decision support tools developed with WLE).

2.2.1.6 Clusters of activity

FP2 will pursue a combination of place-based field research in strategic geographies, comparative analysis and cross-cutting learning, and analyses of fish in regional food systems. Research in cluster 1 focuses on the challenge of sustaining production from and equitable access to small-scale coastal fisheries. Cluster 2 focuses on sustaining fisheries production in multifunctional landscapes in which land-use changes, hydropower development and climate change present major challenges. Estuarine fisheries at the mouths of rivers are included in cluster 2. Cluster 3 focuses on the role of SSF in regional food systems, analyzing the drivers of change and routes to improve contributions to food security, equitable asset building and wealth creation. This integrated set of clusters is designed to address the eight propositions outlined in the flagship ToC (Table 11).

Cluster 1: Resilient coastal fisheries
Coastal SSF produce approximately half the fish consumed in the developing world and employ 47 million people, about a third of whom are women (Mills et al. 2011). With appropriate governance, coastal SSF contribute to the wellbeing and food security of millions of people who have few economic and nutritional alternatives (Béné et al. 2010). Research in this cluster focuses on sustaining the food security and poverty alleviation functions of coastal SSF through four streams of action research:

1. Strengthening co-management (change mechanism a)
2. Building alternative and improved livelihood strategies to reduce poverty and alleviate pressure on coastal fisheries (change mechanism a)
3. Spreading co-management and livelihood innovations via novel, strategic networking (change mechanisms a and d)
4. Investing in the enabling environment via regional policy forums (change mechanisms c and d).

We will focus on Solomon Islands and later on Tanzania and Vietnam because of their high reliance on coastal fisheries (Cinner et al. 2012a; Foale et al. 2013) and opportunities for regional influence. WorldFish and JCU have established networks, partnerships and a track record in these countries and surrounding regions. In the first year of FISH, we will build on JCU's networks in Tanzania to leverage bilateral funding and expand our African engagement. We will develop in Vietnam in response to national demand as funding is secured.

Country-specific and comparative analyses will address the following questions: (1) How can multi-scale governance be improved to both increase ecological sustainability and promote gender-equitable flows of benefits from fisheries, particularly to the poorest and most marginalized? (2) What are the tradeoffs between longer-term system

sustainability, resilience and food security, and more immediate improvements to wellbeing? (3) In what ways can resilience be built into SSF at national, sub-national and local levels to account for external and local drivers of change? While meta-analyses suggest co-management can contribute to each SLO, impacts are highly variable and socially differentiated (Evans et al. 2011; Cinner et al. 2012a). This cluster aims to determine the local contexts, tradeoffs and enabling structures that increase SSF sustainability and equity. We will engage locally and with partners to assess options for and foster improvements to co-management in communities in Solomon Islands (in Malaita, Western Province and Langalanga Lagoon).

We will employ data from gender-disaggregated catch surveys, interviews, focus groups and household surveys to test gender-inclusive and women-targeted livelihood options and market opportunities in Solomon Islands (e.g. fish-aggregating devices, communication technology for market connectivity). We will use gender-inclusive participatory approaches to identify livelihood options prioritized by women, men and youth; how they can be introduced in an equitable manner; and how costs and benefits differ by gender and social group. We will examine outcomes in terms of poverty alleviation and interactions with SSF sustainability and resilience.

To realize impact at scale, we will strategically invest in partnerships and networks, such as governance and learning networks in the Asia-Pacific region (e.g. the Locally Managed Marine Area network [LMMA]) and Solomon Islands (e.g. National Coordinating Committee for the Coral Triangle Initiative). In the Philippines we will focus on scaling co-management in governance networks (e.g. the Iligan Bay Alliance of Misamis Occidental, and the Regional Development Council). We will measure impact on practice and policy of network members in terms of co-management practice, livelihood strategies and gender equity. Using social network analysis, we will measure the institutional and social accelerants and barriers to innovation spread and network functioning to amplify learning and governance outcomes.

We will synthesize policy lessons and support partners to engage effectively in regional networks, leveraging the commitments made by countries towards global norms in SSF (e.g. FAO 2015) that reinforce human rights and gender and social equity in governance. Cross-scale governance interactions are a particular focus. By engaging with policy instruments and forums, we will influence environmental and development policies and support their implementation to better protect SSF functions.

Cluster 2: Fish in multifunctional landscapes

Research in this cluster will address how fisheries in estuaries, rivers, wetlands, man-made water bodies and rice fields can be sustained in landscapes where natural variability, land-use changes, hydropower development and climate change are major challenges. Additional localized challenges include access rights, power dynamics and decision-making, and distribution of benefits in terms of gender and social equity among poor and marginalized people. We will take an interdisciplinary approach to interventions, combining ecological, hydrological and governance research and providing an understanding of how poor women, men and youth manage risks and realize opportunities. Tools to negotiate tradeoffs and synergies between fish production and alternative landscape uses will be considered. Research will cut across scales, linking with and informing national as well as regional development and policy processes. Cluster 2 principally focuses on change mechanisms a and c.

Country-specific and comparative analyses will address the following three questions: (1) How do drivers of change affect the hydrology, ecological character and fisheries livelihood opportunities in multifunctional landscapes? (2) How can governance mechanisms be improved in these landscapes to support gender-equitable distribution of benefits from fisheries, particularly to the poorest and most marginalized (including youth)? (3) What tradeoffs between fish production and other uses within these landscapes need to be considered to optimize contributions to livelihoods, food security and wellbeing while maintaining long-term ecological sustainability?

We will work in the Bangweulu wetland system in Zambia as a learning site on enhancing the contributions of inland SSF to diversified livelihoods in southern and eastern Africa. Using remote sensing and GIS tools to do land-use classification and change detection analyses, we will assess how temporal and spatial variability in the hydrological regime affects and influences patterns of wetland utilization and fisheries livelihoods. We will link this with tradeoff analysis, including the feasibility of integrating fish-rice production systems, in line with the Zambia Government's strong support for fish production.

Research in Myanmar's Ayeyarwady Delta addresses opportunities for improved governance of integrated rice-fish production systems (including water management) to ensure benefits such as better incomes, nutrition and health are acquired in a gender-equitable manner by fishers and producers who depend on these systems. Similarly, in Cambodia

we will consider ways of optimizing integrated rice field fisheries production systems in Tonle Sap Lake by testing best practices and models of water governance that adopt a multiple-use orientation in community fish refuges. In support of the government's policy objective to enhance natural productivity of rice field environments, including establishing 1200 fish refuges by 2019, research will help improve governance mechanisms to manage competing resource claims. This research leverages a substantial USAID investment in rice field fisheries enhancement.

In Bangladesh, we will contribute to improving the governance of the Padma-Meghana river-estuarine system to ensure socially equitable benefits for women, young people and the landless. In this multifunctional landscape, fisheries, agriculture, aquaculture and ecosystem conservation can be complementary but also compete. We will analyze the tradeoffs between SSF, increased productivity and equitable resource management with communities. This research leverages a substantial USAID investment, which aims to improve community fisheries management and livelihood resilience, in support of government policy goals for the sector. While these fisheries are multispecies, a focus in freshwater is on hilsa (*Tenualosa ilisha*), the national fish of Bangladesh and an important food fish throughout South Asia.

Lastly, we will research sustaining fisheries and livelihood adaptations in man-made water bodies, focused on sites in the Mekong and Ayeyarwady basins, where the number of reservoirs is rapidly increasing as a result of irrigation and hydropower development. There is significant scope to improve management practices to minimize inter-annual variation in fisheries production. Our research will focus on testing techniques and management frameworks aimed at increasing natural fish production in these reservoirs without compromising other uses (e.g. ensuring connectivity with upstream spawning grounds, conservation zones and artificial wetlands). Further, we will test and promote access strategies that promote equitable benefits from these fisheries, in particular nutrition, for women and children.

Cluster 2 will link with WLE FP4 on managing resource variability and competing uses for resilience, including site integration in Cambodia and Bangladesh, linking our fisheries-focused analysis with broader research on multiple uses of water and land at landscape and river basin scales.

Cluster 3: Fish in regional food systems

Local research and development outcomes must be understood in the context of larger-scale dynamics and external drivers such as trade, the rise of aquaculture, regional governance and global environmental change (e.g. Allison et al. 2009; Winemiller et al. 2016). These drivers will have profound impacts on fish supply and demand, and on the ways in which the benefits of growing, catching and consuming fish are enhanced and multiplied by trade. This cluster augments on-the-ground activities in clusters 1 and 2 to build the evidence base needed to influence policy that enables productive and equitable SSF (principally through change mechanisms c and d). Activities focus on governance of fish food systems and alternative future trajectories for selected systems and intraregional trade.

Country-specific and comparative analyses will address the following three questions: (1) How will supply and demand for fish from SSF evolve in the face of market dynamics, competing claims on landscapes and coastal zones, and demographic and environmental change? (2) How can policy and practices governing SSF be influenced to maximize their contribution to poverty reduction and food security? (3) What policies and institutions affecting national and regional trade of fish are needed to increase gender-equitable impact on food and nutrition security and livelihoods of the poor?

Recent reviews have contrasted projections of supply and demand and the role of fish in regional food systems (e.g. Bell et al. 2015; Amos et al. 2016). Understanding the future of fish production, trade and consumption will be critical in the evolution of regulations governing fish production, land use, coastal development, hydropower and food policy. We will use foresight modeling and participatory scenario development to understand the dynamics of fish in two contrasting food systems: The Pacific and the lower Mekong, as they evolve under a range of ecological and social drivers of change, particularly climate change. By year four we will launch scenario analysis in East Africa as well.

In collaboration with PIM flagship 1, we will use the IMPACT model (Rosegrant et al. 2001) to explore global and large-scale regional trends in fish supply and demand. We will focus on Africa and Asia as two regions where the emergence of aquaculture offers contrasting projections for future supply. In addition, FP2 will collaborate with Australian National University scholars to further develop the WorldFish Fish Sector Model (previously the AsiaFish model; Dey et al. 2005) to downscale IMPACT projections to smaller regional and national scales. In these analyses we will focus on the Mekong Delta, East Africa and the Pacific region to augment scenario development and research in FP1 and FP3.

In collaboration with CCAFS FP 1 we will continue scenario development (Vervoot et al. 2014; Amos et al. 2016) in the Pacific region, where nutrition security is challenged by rapid population growth and urbanization; shortages of arable

land; and cheap, low-quality food imports from global trade. Many Pacific island countries are affected by the double burden of malnutrition (undernutrition and obesity). We will extend these analyses to the Mekong Delta, where infrastructure development such as reservoirs for hydropower and irrigation, dikes and sluices for flood protection, and irrigation is considered key to sustaining economic growth. National agencies in Cambodia and Vietnam have sought more in-depth studies to identify impacts of changing patterns of fish production as they evolve under broader landscape development and climate change.

Our analyses of trade will focus on domestic and intraregional fish trade that, in contrast to North-South trade, remains poorly understood and in which the contributions to poverty reduction remain contested (Béné et al. 2010; 2015; 2016; HLPE 2014).

Two case studies of fish trade systems will highlight contrasting challenges to fish, delivering benefits to poor women, men and youth in their roles as producers, processors, traders and consumers. The first, in collaboration with FP3, addresses intraregional trade in the African Great Lakes fish trade corridor with a focus on small dried fish. The second will focus on trade in fish in the Mekong Delta, particularly from Cambodia to Vietnam, to support the latter's burgeoning aquaculture industry and understand its emerging importance as a regional hub for seafood trade, including as an entry point to Chinese markets.

In conducting value chain analysis, a particular focus will be on regulatory and institutional barriers that incentivize unsustainable fisheries exploitation and reduce equitable access to livelihood opportunities, along with measures to address these barriers through policy, capacity strengthening and development investment. Household survey data, reviews of regulation and institutional performance, and participatory, qualitative case studies will be used to gather evidence on the implications for different social groups, distinguishing by occupational group, gender and age. These analyses will inform scenario research and will be used in structured multi-stakeholder dialogue, complemented by institutional capacity development, to increase the profile of fish in a development priority setting, along with coordinated actions and investments in governance solutions at national and regional levels.

2.2.1.7 Partnerships

The multi-stakeholder partnership brought together through FP2 provides a globally unique capability to directly impact the lives of fishery-dependent people and to scale that impact beyond direct engagements. No other collaborative partnership brings together place-based capability to directly improve coastal and inland SSF through an action research agenda and produce IPGs to influence research and policy practice and scale outcomes nationally and regionally. While other research groups make significant contributions to fisheries R4D, none has the breadth of thematic expertise in SSF, geographic engagement or in-country presence to sustain relationships and drive the impact pathways we have outlined. While several other groups do work on broader governance issues associated with oceanic fisheries, this is an area where CGIAR has no comparative advantage, and it is not addressed by FISH.

An additional differentiator for FP2 is the relationships WorldFish and IWMI have formalized with national and regional agencies that ensure commitment to national demands and priorities. Central to our ToC are the fishing communities with whom we work—principally as discovery and proof of concept partners. Partners not only help shape the research agenda and are active participants in research, testing new approaches to resource management, but they are essential for impact at scale through appropriate changes in national policy and capacity development.

FP2 will work with a broad range of networks, individual academics and smaller NGOs on specific issues within the impact pathway. We recognize that these partners have limited capacity to realize shared objectives alone. Below we headline selected strategic partners and summarize the roles of non-CGIAR partners as discovery, proof of concept or scaling partners in Table 14.

Discovery	Proof of Concept	Scaling
FP2 Cluster 1: Resilient Coastal Fisheries		
James Cook University (design of research agenda for coral reef fisheries) Promundo (guidance on gender and livelihoods)	**Solomon Islands**: Provincial Governments, Ministry of Fisheries and Marine Resources, and Ministry Environment, Climate and Disaster Management (co-design of research agenda and enabling environment for interventions; policy development)	**Solomon Islands**: Malaita Provincial Partnership for Development and Western Province Coalition of Development partners (scaling of learning through provincial development initiatives)
	Philippines National Fisheries Research and Development Institute; Bureau of Fisheries and Aquatic Resources (BFAR) (co-design of research agenda and enabling environment for interventions; policy development); Palawan State University and UP Marine Science Institute (lead research on fisheries governance)	**Philippines**: Iligan Bay Alliance of Misamis Occidental and Protected Area Management Bureau (scaling of learning through provincial and national policy initiatives)
FP2 Cluster 2: Fish in multi-functional landscapes		
Cornell University; USAID Innovation Lab (design of research on fisheries ecology and tool development) University of Rhode Island (guidance on research methods for adaptive co-management)	**Cambodia:** IFReDI (lead rice-field fisheries research); Tonle Sap Authority (lead development and implementation of policy for Tonle Sap)	**Cambodia:** Fisheries Administration and Department of Agriculture Extension (policy and capacity development initiatives in support of SSF); NGOs – Conservation International and Forum Syd (inter-sectoral coordination and scaling through networks)
	Bangladesh: Dhaka University (lead research on Governance); Sylhet Agricultural University (lead research on socio-economics of fishing households); International Institute for Environment and Development (lead policy & incentives research)	**Bangladesh**: Department of Fisheries (policy and capacity development initiatives in support of SSF)
	Myanmar: Department of Fisheries Research Division, Universities of Yangon, Mandalay, and Yezin (field research on fisheries)	**Myanmar:** Department of Fisheries (policy and capacity development initiatives in support of SSF); National Water Resources Committee (inter-sectoral coordination and scaling through networks)
	Zambia: University of Zambia (field research on fisheries ecology and community fisheries)	**Zambia**: Ministries of Fisheries and Livestock, and of Agriculture (policy and capacity development initiatives in support of SSF)

FP2 Cluster 3: Fish in regional and global food systems		
James Cook University (design of research agenda for coral reef fisheries) Australian National University (adaptation of foresight	**Mekong Delta**: Vietnam RIA2, SIWRP (foresight and trade analyses); Sustainable Mekong Research Network; Can Tho University; IFReDI (field research on fish trade)	**Mekong delta**: Ministry of Agriculture and Rural Development (Vietnam) and Ministry of Agriculture Forestry and Fisheries (Cambodia) (policy and capacity development investments)
	African Great lakes: Regional Economic Communities (SADC, EAC, COMESA) and Regional Fisheries Bodies (LVFO, LTA) – integration of policy into regional agendas	**African Great lakes**: AU-IBAR; Lake Victoria Fisheries Organization and Lake Tanganyika Authority (scaling through policy forums and norms building on AU's policy framework and reform strategy for fisheries)
	Pacific Food System: SPC member countries (provision of household data and analysis)	**Pacific Food System**: SPC (scaling through New Song policy initiative and intergovernmental forums)

Table 14. Illustrative examples of non-CGIAR FP2 partners at discovery, proof of concept and scaling stages of the impact pathway.

Strategic research partners. Cluster 1 on resilient coastal fisheries will be led by the Australian Research Council Centre of Excellence in Coral Reef Studies at JCU. The center is an international collaboration of leading research institutions providing scientific knowledge to help sustain the ecosystem goods and services of the world's coral reefs. We will draw upon this extended network, principally through the center's program on People and Ecosystems.

Advanced research institutions. In addition to JCU, FP2 will continue to collaborate with researchers from a range of advanced research institutions, often jointly with other CRPs and flagships. For example, we will partner with Stockholm Resilience Center on social-ecological resilience and learning and governance networks, Michigan State University on land and water governance and impacts on SSF in Myanmar, and the Australian National University on foresight modeling.

NARES. In all focal countries, FP2 will work through national research and development partners. For example, in Cambodia the Inland Fisheries Research and Development Institute (IFReDI) will lead research on rice field fisheries ecology, value chains and trade, and in Bangladesh, Dhaka University will lead research on governance of the hilsa fishery.

Development organizations. At national scales, government agencies mandated to manage fish, water, rice and environment are critical partners. FP2 will build on longstanding partnerships in all focal countries to identify priorities and contribute research outputs and outcomes that can help guide national policy and practice. For example, in Solomon Islands, FP2 will continue an existing partnership with the Ministry of Fisheries and Marine Resources (MFMR), and Ministry of Environment, Climate and Disaster Management (MECDM) to target research on national policies and inform national approaches for coastal management.

2.2.1.8 Climate change

FP2 addresses the grand challenge of climate change and the need to build resilience to risks associated with climate variability. While fishers in floodplains and coastal areas are well adapted to seasonal variability in resource flow, climate change will affect river flow regimes and associated flow velocity, river and sea water levels, sediment transport, water temperature and associated dissolved oxygen content. This will impact fish population dynamics and breeding areas and habitats.

Cluster 2 will develop approaches for sustainable fisheries production that are resilient to natural variability and external threats, including climate change. Cluster 3 will continue its collaboration with CCAFS to analyze alternative future trajectories of fisheries and food security in the Asia-Pacific region. Both will include examination of possible climate change impacts on fish-related livelihoods influencing seasonal and inter-annual dynamics of water availability, quality and productivity over the long term. This will focus on water availability for capture fisheries and aquaculture, and the impact on fish habitat, fish populations and access to fish by small-scale fishers.

Understanding trajectories of resource variability will inform decision-making from household to regional scales and build capacities to cope and adapt. Foresight analyses enable development of models and scenarios of plausible futures to inform intervention decisions and policy pathways that will ensure equitable development outcomes for the most vulnerable, including

women and youth. This flagship will build on tools generated by IWMI for assessing combined impacts of drivers of hydrological changes on river flows (e.g. Lacombe et al. 2014) and multiple-use approaches for building resilience (Hills et al. 2015).

2.2.1.9 Gender

Women are consistently underrepresented in SSF policy and insufficiently engaged in decision-making in SSF governance and management (e.g. Mills et al. 2011). This reduces the effectiveness of management actions and sustains inequities in the distribution of benefits from SSF. FP2 will address these challenges through action research examining gender equity in resource access under alternate tenure regimes, participation in decision-making, and benefit sharing. We will continue to develop and implement socially and sex-disaggregated data collection and analysis methods to provide an evidence base testing pathways to accelerate progress in these domains.

In collaboration with Promundo, FP2 will test strategies to enhance socially and gender-equitable participation in SSF governance and associated livelihoods. Building on prior WorldFish research in focal countries (e.g. Cohen and Steenbergen 2015; Cole et al. 2015), we will use participatory action research to analyze gender and social differentiation through a wellbeing lens (Weeratunge et al. 2014), human rights perspectives (Allison et al. 2012), and analyses of power, representation and accountability (Ratner et al. 2013), as well as gender-transformative strategies and tools (McDougall et al. 2016; Promundo 2016). FP2 will apply participatory action research to identify and promote women-targeted livelihood options. Investments in capacity development for both public agencies and civil society aim to improve consideration of gender in SSF governance practice and in national and regional policy forums.

FP2 will collaborate with PIM FP5 and the CGIAR Gender Network to refine tools for assessing women's empowerment in fisheries contexts. Specifically, we will further adapt the Women's Empowerment in Agriculture Index to develop a fisheries-specific index suitable for cross-regional comparisons.

We will scale gender impact through four main channels. The first will be through a strategic focus on gender as part of capacity building (first examined and refined through a needs analysis) via "learning and governance networks" comprised of NGO and government informal and formal partners. This work builds on research under AAS conducted in collaboration with Promundo. Second, deliberate efforts will be made to draw together cases from across FP2, and indeed the whole CRP, to ensure that generalizable lessons are crystalized. Third, with an explicit emphasis on gender, Cluster 3 examines how regional and national policies impact the benefits men, women and other sectors of society receive from SSF (e.g. research question 1). Fourth, to ensure impact among the research community our research will be disseminated to natural resources, fisheries and environmental governance fields of scholarship (where gender and other forms of social differentiation are commonly overlooked).

2.2.1.10 Capacity development

Capacity development enables all change mechanisms in the CRP-level ToC. FP2 contributes to two cross-cutting outcomes: enhanced capacity to deal with climatic risks and extremes, and improved capacity of women and young people to participate in decision-making.

Capacity development will be implemented through an iterative process starting with *needs assessments and intervention strategies* (element 1 of the CGIAR Capacity Development Framework) to specify needs of natural resource management NGOs and government agencies, multi-stakeholder networks, regional and intergovernmental agencies, and individual researchers within national research institutes in focal countries. We will assess the following four capacity areas: (1) gender-sensitive and transformative approaches, (2) learning and governance networking, (3) community livelihood and co-management interventions, and (4) responsive and accountable institutions. We will build on experience of quality *learning materials and approaches* (element 2) such as community-based resource management manuals and systems approaches to capacity development. All materials and approaches will be *gender and youth sensitive* (element 5) in line with our gender and youth strategies (see Annexes 3.4 and 3.5). *Monitoring and evaluation of capacity development* (element 7) will be integrated into program-level monitoring, evaluation and learning (see Annex 3.3).

Our work on *institutional strengthening* (element 6) has two modes: (1) developing the capacity of learning and governance networks and platforms to realize collective impact, and (2) increasing the capacity of institution, including through policy reform, to help secure the ecological sustainability, food security and poverty alleviation functions of SSF. Aligning with the program's partnerships strategy, our needs assessment and outcome evaluation work will also identify gaps and interventions to increase the *capacity of scientists to partner* to achieve target outcomes (element 3).

One of the main modes of capacity development is via "learning and governance networks." In many of the places we work, networks of organizations form around particular themes. For example, the Malaita Provincial Partnership for Development is a multi-stakeholder and sectoral network focused on sharing knowledge and collectively building capacity to govern the region of Malaita. A further example is the Solomon Islands Locally Managed Marine Areas Network, which was specifically established to build capacity of government, NGOs and community partners to govern via community-based co-management approaches. These networks are natural, existing channels through which to provide further resources and technical expertise to realize improvement in capacity.

2.2.1.11 Intellectual asset and open access management

FP2 will manage intellectual assets consistent with CGIAR, center and partner policies and procedures, as well as those of our bilateral donors. FP2 will contribute to and take advantage of program-level mechanisms to ensure widespread use and analysis.

All outputs from the project will be published in the public domain with the exception of the individual resource management plans of communities. Consistent with WorldFish's policy of engagement with communities, management plans are owned by them and will only be made publically available with their permission. Research in clusters 1 and 2 on livelihoods, household dynamics and gender will pay particular attention to compliance with research ethics standards and the protection of participants' privacy and dignity.

FP2 will contribute to FishBase, the world's leading open access database on fish biology. This database was developed by ICLARM in the 1980s. WorldFish maintains ReefBase and the Coral Triangle Atlas and will continue contributing to them, drawing on FP2 research in Tanzania, the Philippines and Solomon Islands.

2.2.1.12 FP management

FP2 will be led by WorldFish. The flagship leader, Dr. Neil Andrew, will (1) provide overall strategic leadership for flagship research; (2) work with cluster leaders, scientists and other flagship leaders to develop and oversee execution of the research agenda for the flagship; (3) lead identification and negotiation of significant strategic science partnerships that will strengthen links between the flagship science team and leaders in the appropriate body of science; and (4) provide a focal point for collaborations with other CRPs.

Cluster 1: Resilient coastal fisheries will be led by the Australian Research Council Centre of Excellence in Coral Reef Studies at JCU, drawing on its networks and those of WorldFish in focal countries, in collaboration with national fisheries agencies and regional bodies such as the SPC.

Cluster 2: Fish in multifunctional landscapes will be led by IWMI, bringing expertise and networks in water management, governance, rural livelihoods and resilience, in collaboration with national fisheries, water and land management agencies and national research centers such as Bangladesh Dhaka University.

Cluster 3: Fish in regional food systems will be led by WorldFish, in collaboration with the Stockholm Resilience Centre and Australian National University, including research linkages to international bodies such as the FAO.

Cluster leaders will (1) provide overall strategic leadership for cluster research; (2) work with contributing scientists to develop and oversee execution of the research agenda for the cluster; and (3) lead identification and negotiation of significant strategic science partnerships for the cluster.

CVs of flagship leads, cluster leads and other key scientists leading implementation of the flagship research are provided in Annex 3.8.

2.2.2 Flagship budget narrative

2.2.2.1 General information

CRP Name	FISH
CRP Lead Center	WORLDFISH
Flagship Name	FLAGSHIP 2 – SUSTAINING SMALL-SCALE FISHERIES
Center location of Flagship Leader	MALAYSIA

2.2.2.2 Summary

Total Flagship budget summary by sources of funding (USD)

Funding Needed	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Total
W1+W2	2,624,418	2,759,061	2,878,586	3,028,789	3,170,111	3,329,595	17,790,560
W3	0	0	0	0	0	0	0
Bilateral	6,200,000	6,572,001	6,834,879	7,176,623	7,463,689	7,836,873	42,084,065
Other Sources	0	0	0	0	0	0	0
	8,824,418	9,331,062	9,713,465	10,205,412	10,633,800	11,166,468	59,874,625

Funding Secured	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Total
W1+W2 (Assumed Secured)	2,624,418	2,759,061	2,878,586	3,028,789	3,170,111	3,329,595	17,790,560
W3	0	0	0	0	0	0	0
Bilateral	4,093,156	2,502,740	1,803,892	0	0	0	8,399,788
Other Sources	0	0	0	0	0	0	0
	6,717,574	5,261,801	4,682,478	3,028,789	3,170,111	3,329,595	26,190,348

Funding Gap	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Total
W1+W2 (Required from SO)	0	0	0	0	0	0	0
W3 (Required from FC Members)	0	0	0	0	0	0	0
Bilateral (Fundraising)	-2,106,844	-4,069,261	-5,030,987	-7,176,623	-7,463,689	-7,836,873	-33,684,277
Other Sources (Fundraising)	0	0	0	0	0	0	0
	-2,106,844	-4,069,261	-5,030,987	-7,176,623	-7,463,689	-7,836,873	-33,684,277

Total Flagship budget by Natural Classifications (USD)

	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Total
Personnel	2,680,395	2,864,603	2,986,473	3,174,509	3,542,741	3,881,073	19,129,798
Travel	485,055	611,589	705,362	874,203	998,217	1,010,737	4,685,164
Capital Equipment	10,500	0	0	0	0	0	10,500
Other Supplies and Services	3,273,746	3,371,865	3,531,349	3,829,038	3,449,227	3,567,318	21,022,545
CGIAR collaborations	0	0	0	0	0	0	0
Non CGIAR Collaborations	1,403,624	1,456,104	1,421,315	1,204,571	1,473,423	1,478,532	8,437,571
Indirect Cost	971,096	1,026,899	1,068,963	1,123,089	1,170,190	1,228,805	6,589,044
	8,824,416	9,331,060	9,713,462	10,205,410	10,633,798	11,166,465	59,874,611

Total Flagship budget by participating partners (signed PPAs) (USD)

	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Total
WorldFish	7,884,417	8,334,662	8,677,208	9,117,342	9,502,208	9,978,296	53,494,137
IWMI	620,000	657,199	683,488	717,662	746,369	783,687	4,208,407
James Cook University	319,999	339,199	352,767	370,406	385,223	404,482	2,172,079
	8,824,416	9,331,060	9,713,463	10,205,410	10,633,799	11,166,465	59,874,613

Explanations of these costs in relation to the planned 2022 outcomes:

Major cost drivers and how these relate to planned activities and target outcomes
Major cost drivers are scientific personnel, travel and operating expenses. Scientific personnel costs include those of principal investigators and cluster research teams, the vast majority of whom are located in the countries in which fieldwork will be implemented. Many of these countries are
high-inflation economies and this is expected to be a major driver over the life of the CRP. Investments are also made in personnel for leading/coordinating key crosscutting dimensions of flagship activities, including gender, youth and capacity development. Travel includes investments in field visits and assessments, planning and review meetings/workshops, partner consultations and scientific supervision. Given the nature of the research, no capital equipment (>USD$25,000 per item) is expected to be purchased.

Risks and plans to mitigate risks
FP2 is heavily dependant on bilateral funding – the continuity of that funding is the major risk to achieving our ambitious targets. Bilateral funding is secured for the majority of 2017 and there is a significant pipeline of projects already in the pipeline to be confident for the first 18 months of the CRP.

Funding risks increase beyond 2018 when the funding pipeline becomes more uncertain. The greatest risk mitigation strategy is to deliver strong outcomes in the first 18 months of the CRP and promote that progress through a diverse array of channels to provide bilateral donors with the compelling case they need to invest. On an operational level, implementation and fiduciary risks will be managed through CGIAR partner policies and processes.

2.2.2.3 Additional explanations for certain accounting categories

Benefits: Personnel costs are based upon best estimates of the level of effort required by specific staff positions to deliver upon the objectives of the Flagship.

This level of effort has been expressed as a number of days per period. The personnel costs have been determined via the application of daily standard rates per position/staff member. In addition to the daily standard rates, the cost of benefits have been calculated on an individual basis and expressed as a function of salary. The benefits included are those that are applicable per the employing Center's established policies and procedures.

The estimated cost of the allowances and benefits vary depending on the classification of the individual staff member as well as the location in which they are working. WorldFish has three staff designations: Global (GRS), Home Country International (HCI), and National (NRS). The following
benefits are have been included in the budgeted salary costs:

Retirement contributions: WorldFish contributes the equivalent of 15% of base salary to a retirement fund for staff. This is applicable to all designations of staff (GRS, HCI, NRS).

Insurance premiums: this includes medical (GRS, HCI & NRS), accidental death and dismemberment (AD&D) (GRS & HCI), long-term disability (LTD) (GRS & HCI), and life insurance (GRS, HCI, & NRS).

Annual medical examination costs: applicable to all staff designations (GRS, HCI, NRS), WorldFish encourages annual medical examination for all staff and agrees to subsidize the costs thereof for all staff over the age of 40, up to $250USD per annum.

Housing allowance: generally applicable for GRS staff only, WorldFish provides an allowance of up to 75% of the cost of housing, subject to monthly maximums established by location.

Dependant Education Allowance: applicable for GRS staff only, WorldFish provides the cost of education (up to end of secondary education) for dependant co-located children.

Home Leave: applicable for GRS staff only, WorldFish funds the cost of an annual trip to the staff members' home country for the staff member and dependants.

Relocation and Repatriation costs: applicable for GRS staff only, WorldFish covers the cost of relocating GRS staff from their home location to their duty post. Once the staff member has completed at least 3 years of continuous service, WorldFish will also cover the cost of repatriating the staff member to their home location upon termination of employment.

Location specific benefits (i.e. hardship allowances), where applicable, have also been included in the cost as have the cost of statutory employment related taxes applicable in certain operating locations.

As there is great range in the cost of benefits by location and by staff designation, we assigned a specific percentage (of salaries) to each location/staff designation combination. The following provides the range of percentages that were used by staff designation:

Range of Benefit %		
	High	**Low**
HCI	Zambia (63.56%)	Philippines (21.6%)
GRS	Zambia (129.03%)	Egypt (36.59%)
NRS	Solomon (62.15%)	Zambia (21.64%)

Other supplies and services: Other supplies and services include (i) specialist contracts for international development partners (e.g. Promundo), national and regional NGOs and network (e.g. LMMA) and field enumerators, and other field costs, (ii) costs associated with participation in planning and design meetings, at global/national levels; and (iii) workshops for annual flagship and cluster planning, stakeholder consultations and training, scaling activities and national research platforms, (iv) National workshops/multistakeholder platforms: costs associated with the organization of national / local level workshops and multi-stakeholder platforms; (v) Training events/student fellowships: this includes costs for capacity development of local stakeholders, own staff, and fellowships for PhD and MSc students integrated into the FP2 program. Given the participatory nature of FP2 and the need to engage with governance networks and national processes as a central element of the impact pathway, this budget is estimated to be a significant proportion of the flagship budget.

2.2.2.4 Other Sources of Funding for this Project

Should full funding not materialize FP2 will reduce its ambitions and implement this cut by reducing the number of geographies we engage with in 2017 and the scope of the activities within those remaining. The outcomes we seek in 2017 through to 2022 will consequently be reduced. Hiring of key new appointments, including economists and fisheries scientists will also be postponed until sufficient funds are available. We will continue to seek bilateral donor funds to implement the research priorities identified in the proposal.

2.2.2.5 Budgeted costs for certain key activities

	Estimate annual average cost (USD)	Please describe main key activities for the applicable categories below, as described in the guidance for full proposal
Gender	1,343,563	Gender: investment of US$8.1M over the six years or 13.5% of the budget will support integration of gender into all flagship activities as well as focused research on gender to increase the impact of the research on development outcomes for women. This includes global and national scientists, specialist consultancy, partners, workshops and training of research teams and development partners and operating expenses for field research in focal countries and cross-country synthesis. Research will focus on gender-equitable control of assets and participation in decision making as a contribution to building more resilient fishing communities and households (clusters 1 and 2) and on increasing the value women derive from value chains through improved governance and policy. WorldFish and IWMI will continue to recruit and train people in our own organizations so we are fit-for-purpose in engaging with the ambitious FISH gender research agenda.
Youth (only for those who have relevant set of activities in this area)	308,843	Youth: investment of $1.9M over the six years or 3.1% of the budget will lay the foundation for a growing research agenda to increase participation and benefit sharing among young people. Existing tools and approaches to better engage young people will be further developed. Cluster 3 research on alternative future for fish in food systems and on trade will ensure young people have a 'voice' in imagining that future and policy concerning young people as labour in value chains will be better informed. In the latter years of the CRP, and as the evidence base grows, the research agenda will increasingly shift to more direct engagement in youth as agents of change in fisheries governance.
Capacity development	916,347	Capacity development: investment of US$5.5M over the 6 years represents 9.2% of the budget allocated to FP2 and supports integration of gender into all activities as well as focused research on gender to increase the impact of the research on development outcomes for women. Investment in national partners through collaboration in research activities, training (spanning short courses to post-graduate scholarships) is a significant enabling activity in the ToC. Thematically our investments in building capacity range from community leadership to national policy. We will continue to invest in our own staff to build the capacity needed to remain at the leading edge of fisheries R4D.

	Estimate annual average cost (USD)	Please describe main key activities for the applicable categories below, as described in the guidance for full proposal
Impact assessment	409,455	Impact assessment investment of US$2.5M over the 6 years represents 4.1% of the flagship budget and supports household surveys, consolidation and analysis of data, annual after-action meetings to consolidate outcomes, GIS mapping of land use, and development of tablet-based systems for data collection and consolidation and development and updates of an outcome tracking database.
Intellectual asset management	29,414	Intellectual asset management: investment of US$176K over the 6 years is focused on maintenance of OA databases, including hosting infrastructure costs and staff time. The budget is largely comprised of external expert resources (legal, training, contracting) and allocation of personnel time towards ensuring capacity development of intellectual asset management best practices throughout the Flagship operations.
Open access and data management	159,449	Investment of US$957K over the 6 years supports publication of research data and papers (including OA publication costs) and management. This includes investments in ensuring materials are disseminated through the CRP website, investments in data management and appropriate documentation to make datasets publicly available through open access depositories, and purchasing of open access privileges for publication in non-open access journals where needed. The budget also consists of external expert resources (legal, training, contracting) and allocation of personnel time towards ensuring capacity development of open access data management best practices throughout the Flagship operations.
Communication	528,774	Communication: Investment of US$3.2M over the 6 years supports publication of research papers, and communication activities (policy briefs, manuals, technical reports, outcome stories) that will support the communication of research to end users with and through partners, including fishing communities in focal countries (costs of pamphlets, manuals), policy makers (policy briefs) and NGO or government partners (extension manuals). We will build on existing investments in innovative channels to better engage youth through theatre, social media and cartoons. Communications will also be resourced through our partners and their institutional investments in communications, particularly, for example, JCU which has developed a highly effective communications and media program. Similarly, we will seek synergies with collaborating CRPs.

2.2.2.6 Other

The level of ambition of Flagship 2 - Sustaining Small-Scale Fisheries requires mobilization of approximately $42 million in bilateral and Window 3 funds over the life of the program. This calls for flexibility to address the priorities of funders in terms of country focus and thematic interest. **Window 1 and 2 funds are used primarily to support core elements of the program** that can be widely applied when matched with bilateral funds. Given the breadth of the flagship and the funding model, with dependence on all sources of funding, funds from different sources are often integrated in support of tasks that have been determined to fit within the scope and priorities of the Program.

Annual funding certainty of W1 and W2 funds will be critical to ensure the flagship achieves its objectives on time and on target. As a means of risk mitigation, WorldFish will dedicate organizational resources to securing the bilateral

funding targets identified in the proposal, however W1 and W2 funds will need to be secured and received in order to leverage the bilateral opportunities. Delays in receiving W1 and W2 funds will have a follow-on effect on implementation and execution of the flagship as WorldFish will not be in a position to pre-finance Program activities that are designated to be funded from W1 and W2 sources.

Due to the limitations of the online submission form, the funding figures presented herein have combined all bilateral and Window 3 funds into the bilateral fields. It is our full expectation that there will be a mix of both bilateral and Window 3 funds contributing to the flagship.

Indirect costs included in the budget have been set at 12%, which is consistent with existing audited indirect costs for WorldFish, adjusting for information technology and facility costs which have been specifically included as direct costs in the flagship budget.

2.2.3 Flagship Uplift Budget

This Uplift budget has been prepared based on the scenario whereby the aggregate portfolio of funding increases by 50% from the $900M indicative budget. The following additional activities would be prioritized within this Flagship. Please refer to descriptions of these activities in the CRP Uplift Budget narrative, section (1.1.7):

- **Rice-fish production systems in Asia**
- **Global agenda setting to better profile fish in development**
- **Accelerating fisheries management fisheries management work in key geographies**
- **Climate change in fisheries and aquaculture**
- **Integrated assessment of sustainable/resilient pathways for fisheries and aquaculture development in Tanzania**

Outcome Description	Amount Needed	W1 + W2 (%)	W3 (%)	Bilateral (%)	Other (%)
1.1 - 4.9 million producer households adopted improved breeds, aquafeeds, fish health and aquaculture and fisheries management practices	13,847,000	32%	0	68%	0
1.2 - 3.5 million people, of which at least 50% are women, assisted to exit poverty through livelihood improvements related to fisheries and aquaculture value chains	12,444,000	32%	0	68%	0
2.3 - 2.4 million people, of which 50% are women, without deficiencies of one or more of the following essential micronutrients: iron, zinc, iodine, vitamin A, folate & B12	2,379,000	32%	0	68%	0
2.4 - 4.7 million more women of reproductive age consuming adequate number of food groups	2,379,000	32%	0	68%	0
3.3 - 3.3 million ha of ecosystems restored through more productive and equitable management of small-scale fishery resources and degraded aquaculture ponds restored	1,464,000	32%	0	68%	0