


March 2018

	منظمة الأغذية والزراعة للأمم المتحدة	联合国 粮食及 农业组织	Food and Agriculture Organization of the United Nations	Organisation des Nations Unies pour l'alimentation et l'agriculture	Продовольственная и сельскохозяйственная организация Объединенных Наций	Organización de las Naciones Unidas para la Alimentación y la Agricultura
---	--	--------------------	---	---	---	--

ASIA-PACIFIC FISHERY COMMISSION**Thirty-fifth Session****Cebu, the Philippines, 11-13 May 2018****GEF 7 Ideas note for fisheries and aquaculture**

Ideas Note

Implementing the ecosystem approach to fisheries and aquaculture to transition the sector toward its Blue Growth potential Contributions of Fisheries and Aquaculture to GEF 7 Strategy

Relevant GEF 7 Impact Programmes (IP) and Focal Areas (FA)

Primary IP linkage:

- Food Systems
- International Waters FA
- Biodiversity FA

Secondary IP linkage:

- Climate Change FA
- Land Degradation FA

Relevance to FAO Strategic Programmes & Regional Initiatives: SO2, and; Regional Blue Growth Initiative.

A Developing Programmatic Overview:

Goal:

Ecosystem services that sustain fisheries in inland water, coastal and marine ecosystems--such as biodiversity, carbon sequestration, coastal protection, and cultural services--will be significantly enhanced while achieving sustainable livelihoods of fisheries and aquaculture communities and overall food security and nutrition in the context of climate change.

Objectives: Through improved governance, practices and informed investments:

- Demonstrated and scaled up Climate smart and climate resilient fisheries and aquaculture systems and practices;
- Improved ecosystem services through protection and restoration of aquatic biodiversity and natural habitats through best practices and management in fisheries and aquaculture
- Promoted and scaled up environmental friendly aquaculture and fisheries technologies, systems and practices;
- Enhanced sustainable fisheries and aquaculture livelihoods and social well-being;
- Improved efficiencies of fisheries and aquaculture (resource use, energy use, economics)

Outcomes, including

- Productive, resilient and sustainable capture (inland and marine) fisheries and aquaculture (marine and freshwater), with critical habitat (e.g. nursery, breeding grounds) and coastal areas protected, pollution reduced, carbon sequestered, etc.
- Increased understanding of the importance of aquatic ecosystem services and the drivers of change
- Reduced IUU fishing
- Reduced over fishing
- Reduced harmful fishing practices
- Eliminated harmful subsidies
- Minimized negative environmental impacts of aquaculture development

- Reduced energy and fuel consumption along the supply chains
- Reduced vulnerability of the socio-ecological systems to climate variability and change
- Multi-stakeholder platforms to engage stakeholders built or strengthened
- Enabling governance frameworks created and strengthened
- Empowered fisheries and aquaculture stakeholders for improved stewardship from within the sector and for improved participation in marine and coastal spatial planning and integrated water management
- Collaboration on transboundary and shared stock management
- Provide alternatives in the face of change
- Reduced carbon emission from intensive and semi-intensive aquaculture
- Reduced loading of nutrients and discharge of chemicals from aquaculture to natural environment;
- Improved efficiency in using natural resources (water, land and marine origin feed ingredients) for aquaculture production;
- Improved energy efficiency in aquaculture;
- Improved livelihood of small aquaculture farmers through improved economic return;
- Reduced vulnerability of small farmer to risks associated with climate change and socioeconomic uncertainties;
- Improved safety of food from fisheries and aquaculture

Baseline scenario or any associated baseline program/projects:

The Asia-Pacific region is recognized for its important fisheries' habitats and abundance of aquatic resources; allowing the capture fisheries and aquaculture sectors to provide vital livelihoods and food security throughout the region. However, the resources and the sustainability of the fisheries are being threatened by inadequate, unsustainable fisheries and aquaculture management, high fishing pressures, illegal, unreported and unregulated fishing (IUU), improper pesticides and feed use, and competition with other users of the coasts and aquatic resources and zones; leading to a state of overfishing and degradation of habitats and water quality and other negative impacts to ecosystem services. Although sharing stocks of important commercial species countries are struggling to manage resources and transboundary stocks through urgently required collaborative fisheries management planning.

In addition, because of their location and type of livelihoods, fishers, fish farmers and coastal communities are directly affected by the lack of uncertainty, changes in species and their distributions, impacts on production and post-harvest practices, sea level rise, coastal erosion and other natural hazards exacerbated by climate change, such as toxic algal blooms, floods, strong wave surges and cyclones that destroy infrastructure and make the act of fishing and fish farming more dangerous.

Through its extensive portfolio of TCP, UTF, GCP (bilateral and GEF) and the Blue Growth initiative, the FAO supports and promotes the responsible and sustainable development of fisheries and aquaculture as guided by the FAO Code of Conduct for Responsible Fisheries.

Our proven and successful work ranges from the development and implementation of International Plans of Actions on IUU, fishing capacity, sharks, and seabirds; the Ecosystem Approach to Fisheries and Aquaculture; efficient and safe post-harvest practices; all the way through to responsible trade and marketing of fish products.

The FAO fosters and supports the work of regional fisheries bodies, such as the FAO Indian Ocean Tuna Commission and Asia Pacific Fisheries Commission. The FAO also plays a key role in the

development of recent global fisheries instruments, such as the binding FAO Port State Measures Agreement and the Voluntary Guidelines in support of Small Scale Fisheries.

New, GEF 7 projects are able to build upon existing development strategies (DoF, etc) and efforts of a range of partners, including but not limited to:

Regional Bodies: FAO Asia-Pacific Fisheries Commission (APFIC), Bay of Bengal-IGO, The Network of Aquaculture Centres in Asia-Pacific (NACA), Southeast Asian Fisheries Development Center (SEAFDEC), Mekong River Commission (MRC), Pacific Community (SPC), Secretariat of the Pacific (SPC), Regional Environment Programme (SPREP), Forum Fisheries Agency (FFA), RPOA-IUU, Regional Seas Programmes (COBSEA/PEMSEA)

Private Sector including CP, Thai Union, Mars, MSC and ASC.

Foundations and INGOs – Packard Foundation, TNC, IUCN, CI, WWF, ICSF, Worldfish/CGIAR, NACA, INFOFISH

IFI – World Bank, ADB, IFAD,

Bilateral donors : USAID, NOAA, State Dept, NORAD, SIDA, JICA, AUSAID, EU,

GEF Program Alternative:

This section goes further into potential outputs broken down by capture fisheries and aquaculture systems.

Outputs

Coastal, marine and Inland capture fisheries

- Increased understanding and provision of ecosystem services provided through inland and marine fisheries and their links to other ecosystem services and drivers of change
- Restoration and protection of key habitats through spatial zoning, gear technology management tools combined with incentive-aligning mechanisms
- Strengthened national capacity for fisheries management including EAFM approaches, fisheries monitoring and stock assessment;
- Improved community-based and co-management of fishery resources for effective and equitable management in support of the Voluntary Guidelines on Small-Scale Fisheries
- Reduced vulnerability from floods and other extreme events through improved DRM and participatory environmental monitoring
- Implemented EAFM policy, legal and management frameworks (including Strategic Action Plans) for key national and transboundary species/systems
- Improved participation in inter-sectoral water and environmental management processes (national and transboundary)
- Identification and reduction of IUU through vessel records, catch documentation schemes, coastal, port and flag state measures, and fisheries management plans
- Reduced fuel use in harvest sector through LIFE fishing
- Reduced waste and spoilage from improved post-harvest practices, such as the FAO-Thiaroye processing technique
- Strategic Action Plan development and implementation
- Strengthened regional and national governance and fisheries management planning frameworks;

- Strengthened regional cooperation in the management of transboundary fish stocks;

Inland, coastal and marine aquaculture

Aquaculture

- Climate Smart Aquaculture practices for key inland aquaculture commodities that contribute to reduced GHS emission;
- Increased climate resilience of small-scale aquaculture for sustainable livelihood
- Increased environmental integrity of inland aquaculture through more efficient use of natural resources and reduced effluents to environment
- Reduced waste and spoilage from improved post-harvest practices
- Circulating aquaculture
- Sustainable intensification of aquaculture
- Reduced vulnerability from floods and other extreme events and improved environmental monitoring
- Climate Smart Aquaculture practices for key coastal and marine aquaculture commodities that contribute to reduced GHS emission and carbon sequestration;
- Increased climate resilience of small-scale aquaculture for sustainable livelihood
- Improved participation in coastal and marine integrated management processes
- Strengthened aquatic biosecurity control related to aquaculture

Theory of Change:

Through the Ecosystem Approach to Fisheries and Aquaculture management process, FAO will provide the structured and participatory processes to enable governments, fishery value chain actors, NGO and fisheries- and aquaculture-dependent communities to identify and prioritize risks to ecosystem well-being, human well-being and enabling governance and to identify the changes required to meet their long-term goals. The EAF/EAA provides stakeholders with the tools to implement agreed-upon actions and to monitor and evaluate the impacts of management actions on their fisheries and aquaculture objectives.

Only by understanding the underlying causes of unsustainable fisheries and aquaculture practices, whether they stem from social, economic or governance drivers, we will be able to tackle unsustainable and unjust practices from within the sector itself and through enabling environments.

I. Geographic foci

To be determined, in consultation with FAORs, government and other partners. Some areas based on environmental and social indicators, country priorities and baseline efforts.

- Large marine ecosystems (LMEs) – BOBLME II, ISLME through FAO, support to COBSEA, Gulf of Thailand) (see short concept note examples in Annex for GoT)
- River Basins – Ganges / Bhramaputra Basin, Ayeyawardy, Yangtze, Lower Mekong River Basin, etc (see short concept note example for MRC fisheries)
- Lake systems - Tonle Sap, etc
- Coastal and marine systems: Myanmar, Cambodia, Bangladesh, REBYC countries (see example concept note in Annex), etc

II. Innovation, sustainability and potential for scaling up

FAO's experience with these TF/IP:

FAO is recognized as *the leading specialized agency* of the United Nations within *the fisheries and aquaculture sectors*. FAO leads international dialogue to promote responsible and sustainable

fisheries and aquaculture based on the ecosystem approach, through normative work to improve policy, legislative and institutional frameworks and through its operational field activities.

FAO, as technical agency and knowledge organization, has an extensive track record of building capacity and promoting regional collaboration in fisheries and aquaculture and has established effective knowledge networks and a suite of approaches and tools to bring together and share knowledge, information, and best practices. The FAO works closely with other UN agencies, national and regional fisheries bodies, and intergovernmental and non-governmental organizations. The FAO works with the 141 members of the FAO Committee on Fisheries (COFI) (the only global intergovernmental forum where major international fisheries and aquaculture issues are examined) to build effective partnerships with national and international institutions, academia, the private sector and civil society.

FAO coordinates the work for developing international norms for the sustainability of fisheries and aquaculture, such as the Code of Conduct for Responsible Fisheries (CCRF, FAO, 1995). The CCRF is now becoming integrated into, or is informing most national fisheries policies. The CCRF advises to: assess and maintain ecosystem integrity, maintain, rebuild and protect biodiversity, rebuild and protect threatened species, minimize adverse ecological change, reduce waste and bycatch. All these goals are fully consistent with the GEF's own priorities as regards sustainability of marine and aquatic ecosystems in relation to fisheries. FAO has also been a leader in establishing norms for the application of the Ecosystem Approach to Fisheries (FAO, Reykjavik, 2001), the implementation of which was set as one of the targets for sustainability of fisheries in the Plan of Implementation of the WSSD (Johannesburg, 2001). These areas are particularly important for the GEF International Waters programme. FAO has developed a number of guidelines for implementation of EAF, including a comprehensive toolbox and a regional training course .

A number of instruments and guidelines that constitute the primary areas of work of FAO's Fisheries Department support the implementation of the CCRF and of the Ecosystem Approach to Fisheries, and for which FAO also has specific competence and comparative advantages. These include the International Plans of Action (IPOAs) on Seabirds, Sharks, Fishing Capacity and Illegal, Unreported and Unregulated fishing (IUU). Furthermore, FAO has developed guidance on the Precautionary Approach (1995), Integration of fisheries in ICAM (1995); Fisheries Ecolabelling (2005); the Ecosystem Approach to Aquaculture (FAO, 2010), Bycatch Management (2012), and the 2009 Port State Measures Agreement (to combat IUU fishing), among others. The FAO has also developed guidelines for the certification and eco-labelling of fisheries and aquaculture, an important market-based instrument towards sustainability.

At the regional level, FAO maintains the Secretariat of the Asia-Pacific Fishery Commission (APFIC), a key regional partner in fisheries, which cooperates with other regional bodies (e.g. SEAFDEC, RPOA). Regional normative guidance has also been produced, including guidelines for Asian trawl management and training courses in Port inspections. FAO has recently completed implementation of the Bay of Bengal LME (BOBLME) project. This project has a wealth of potential synergies and lessons learned that could contribute to proposed projects, ranging from Transboundary Diagnostic Assessment (TDA) and Strategic Action Plan (SAP) development processes, to specific partnering initiatives that have made progress in the areas of transboundary management of critical areas, MPAs, management of migratory stocks of small pelagic fish. In addition, the BOBLME, the NOAA Coral Triangle Support Project and APFIC have recently developed an Ecosystem Approach to Fisheries Management (EAFM) regional training course. This course is targeted at Provincial planning units to build capacity for fishery and related environmental planning using the ecosystem approach. The development of the regional EAFM training course, which is now institutionalized in SEAFDEC, is another key area from which the ISLME will benefit.

FAO's broad spectrum of global and regional competencies related to fisheries, aquaculture and the marine environmental management of high relevance to the objectives of the GEF IW Focal Area and, in particular to the emerging Healthy Oceans/Sustainable Fisheries IP.

Summarize Innovative Aspects – System shifting aspects

The projects will promote Ecosystem Approaches to Fisheries Management (EAFM) and Ecosystem Approaches to Aquaculture (EAA) that balance the activities of fisheries and aquaculture with the ability of the ecosystem to support these activities, whilst seeking options to mitigate negative impacts on non-target species and environments.

The efforts will capitalize on increased awareness globally and within the fisheries and aquaculture sector of the need improve sustainability. Improved governance will be joined by a system of positive incentive mechanisms and reduction of disincentives to ensure social and economic sustainability along-side environmentally sustainability.

Tools, methods, possible approaches.

There are many tools, methods and approaches that support the transition to sustainable fisheries and aquaculture, including:

- Ecosystem Approach to Fisheries
- Climate smart fisheries and aquaculture systems and value chains
- Low Impact Fuel Efficient (LIFE) fishing
- TURFs and Co-management
- FAO IPOA IUU- FAO PSMA, Flag State and Coastal State Measures
- ICT for Fish
- Zero Fish Losses and Waste
- Culture-based Capture Fisheries
- Inland fisheries management
- Fisheries Improvement Plans
- Payment for ecosystem services and other market-based measures
- Integrated multi-trophic aquaculture
- Circulating aquaculture
- Innovative integrated agro-aquaculture systems, technologies and practices
- Semi-closed intensive pond farming system
- Multi-trophic aquaculture;
- Low carbon footprint and energy efficient aquaculture
- Climate resilient aquaculture systems and practices
- Good aquaculture practices
- Eco-aquaculture and organic aquaculture
- Aquaculture planning and management tools
- Ecosystem approach to aquaculture

III. Benefits

Socioeconomic benefits to be delivered by the program at the national and local levels.

Basic statistics on fisheries and aquaculture in Asia-Pacific region:

- Aquaculture production from APFIC region represents 91.3 percent of the world total in 2014. The average annual growth of production in 2013 and 2014 was 6.2 percent. Production wise, seven countries rank within the top 10 global aquaculture producers in 2014, which are

respectively China, Indonesia, India, Vietnam, Philippines, Bangladesh and Republic of Korea.

- The Region continues to be the world's largest producer of fish and represents 61 percent of the global production (61 percent of marine water and 66 percent of inland waters). In 2014, the marine capture fisheries production in Asia and the Pacific reported its highest catch ever at 50 million tonnes.
- In 2014, approximately 3.5 million fishing vessels were reported in Asia and 8.6 thousand vessels in Pacific and Oceania, accounting for 75 and 0.2 percent of the global fleet
- The marine and inland fishery sector continues to make a significant contribution to national economies and the food and nutrition security of many rural and coastal communities in the region,
- Fisheries products remain one of the most traded food commodities worldwide. Trade generates employment along the supply chain and contributes to the economic growth of the countries. Seven states of Asia and the Pacific rank in the top ten importing and exporting country in the world.
- The Asia Pacific region accounted for 84 percent of total global number of persons engaged in fisheries production (total 56.6 million).
- Small-scale fisheries are present in almost all countries, which on average account for three-quarters of the total production, both in terms of quantities and value. About three-quarters of the people in the fisheries sector are involved in small-scale fisheries, of which 65 percent are directly involved in fishing activities, less than 30 percent in post-harvest activities and some in other related activities.

Expected benefits:

- Restoration and protection of key habitats through the ecosystem approach to fisheries
- Protection to marine and inland aquatic biodiversity and ecosystem services
- Increased contribution of fisheries and aquaculture to food security and improved nutrition
- Resilience of livelihood of coastal and inland fisheries communities
- Reduced contribution of fishing activities to GHG emission;
- Increased climate resilience of small-scale aquaculture for sustainable livelihood (inland, coastal and marine)
- Reduced GHG emission of coastal and inland aquaculture through Climate Smart Aquaculture practices for key inland aquaculture commodities;
- Increased environmental integrity of coastal and inland aquaculture through more efficient use of natural resources and reduced effluents to environment

Global Environmental Benefits linked to the CBD, UNCCD, and UNFCCC

This work will contribute to:

- Species with improved status,
- Protected Areas created in aquatic systems
- Proportion of Fisheries Managed Sustainably,
- Basins with Enhanced Water-Food-energy Ecosystem Security (through S2S, R2R)
- Freshwater Resources Managed Sustainably
- Emissions avoided or reduced (Tons of CO₂e)
- Quantity of Pollutants, waste reduced or eliminated (tons)

Annex: Draft example concept notes

Example 1: Promoting sustainable use of the Gulf of Thailand fishery resources through the ecosystem approach to fisheries

Example 2. Sustainable management of the Lower Mekong Basin fisheries through strengthened regional cooperation and implementation of the MRC Lower Mekong Basin Fisheries Management Plan

Example 3: Linking policy to action: Applying the Ecosystem Approach to Fisheries Management for sustainable use of coastal and marine fish stocks and associated biological diversity

Example 4: Carbon Smart Fish

Example 5: Enhancing mitigation of GHG emission in Asian pond aquaculture while benefiting farmers through sustainable intensification of production

Example 1:

Promoting sustainable use of the Gulf of Thailand fishery resources through the ecosystem approach to fisheries

The Gulf of Thailand is well recognized for its important habitats and abundance of aquatic resources providing a wide variety of fisheries products and other aquatic resources in support of livelihoods and food security. In addition, the fishing sector and related activities provide significant livelihood, food security and nutrition to the peoples of the countries around the Gulf of Thailand (Viet Nam, Thailand, Cambodia, and Malaysia). However, the resources and the sustainability of the fisheries are being threatened by insufficient fisheries management, high fishing pressure, illegal, unreported and unregulated fishing (IUU) and competition with other users of the coasts and the sea; leading to a state of overfishing and degradation of habitats. In addition, although sharing stocks of important commercial species (such as anchovy, Indo-Pacific mackerel and blue swimming crab), the bordering countries are struggling to manage resources and transboundary stocks through urgently required collaborative fisheries management planning.

The proposed project aims to promote sustainable use of the Gulf of Thailand fishery resources through implementation of the ecosystem approach to fisheries. Working with partners and stakeholders across the region, the project will support nascent transboundary fish resource governance efforts, improve collaboration and cooperation among the four coastal countries (Cambodia, Malaysia, Thailand and Viet Nam), and implement participatory management planning for improved human- and ecological well-being of those depending on the Gulf of Thailand fishery resources. It will build upon a process set in motion by the Gulf of Thailand Sub-regional group organized under a Sweden-funded initiative of SEAFDEC.

The proposed project will comprise the following four components:

Component 1: Strengthening of sub-regional dialogue, transboundary fisheries governance and management around the Gulf of Thailand

- Support to the development of joint (bilateral/trilateral) fisheries management advisory councils for improved transboundary and shared stock management
- Harmonisation of policy and legal fisheries frameworks across the GoT countries
- Strengthening of fisheries stakeholders' capacities to engage in integrated coastal and marine conservation and resource management efforts throughout the Gulf of Thailand

Component 2: Development and implementation of EAF management plans for transboundary, shared and coastal fisheries (e.g. anchovy, Indo-Pacific mackerel and blue swimming crab), as part of broader ecosystem approaches in the Gulf of Thailand

- EAF management plans supported for priority fisheries and their value chains, which will identify and address priority risks to human well-being, ecosystem well-being and governance
- Development of EAF management plan M&E systems
- Legislative frameworks harmonized to support EAF implementation
- Development of incentive mechanisms to support the transition to sustainable fisheries

- Implementation of the Voluntary Guidelines for Securing Sustainable Small-scale fisheries in the Context of Food Security and Poverty Alleviation

Component 3: Improving the effectiveness of management of fishing capacity and reducing IUU fishing in the Gulf of Thailand

- Promote collaboration in Monitoring, Control and Surveillance (MCS) networks
- Improve MCS mechanisms through, for example, Vessel Monitoring Systems, community-based MCS, data/information exchange
- Catch documentation schemes and other traceability mechanisms
- Support national and regional cooperation between agencies responsible for fishing vessel registration and for the process to issue licenses to fish
- Support to the implementation of the FAO Port State Measures Agreement and other relevant instruments

Component 4: Knowledge management and communication

- Project monitoring program established and under implementation
- Communication and information management systems established
- Policy and outreach communications developed and communicated to national and regional stakeholders
- Participation in the activities of the IW Learn Project

Capacity development will be an integral part of each and every component, and will collaborate with stakeholders from small-scale/artisanal fisheries, large-scale/industrial fisheries, government institutions, and CSO/NGO.

Partners could include:

Government of Cambodia Malaysia, Thailand, and Viet Name
 SEAFDEC: Southeast Asian Fisheries Development Center
 Corin Asia, FFI, WWF, IUCN, MFF as well as national NGO
 Universities and research centers across the region
 Thailand Sustainable Development Foundation and other CSO
 Representatives from input suppliers and processors

Example 2.

Sustainable management of the Lower Mekong Basin fisheries through strengthened regional cooperation and implementation of the MRC Lower Mekong Basin Fisheries Management Plan

Background

More than 60 million people live in the Lower Mekong Basin, with projections of a population of 100 million 10 years from now. The Lower Mekong Basin (LMB) is an ecosystem made up of many subsystems from the Mekong, its tributaries and low lying habitats like floodplains, wetlands, swamps and the Mekong Delta in Viet Nam. The majority of people living there depend on this ecosystem for their livelihoods, for a source of employment and for food. The bulk of economic and socioeconomic benefits are realized by small and medium scale producers. The protection and sustainable utilization of the fisheries resources through effective management and conservation is essential for the larger LMB ecosystem. Capture fisheries are essential for the economic, social and cultural existence and survival of the majority of the rural people and their communities in the LMB. The contribution of capture fisheries, in particular to livelihoods and food security of the rural poor is significant. Wild fisheries resources fulfill critically important eco-system functions.

These fisheries are under threat due to over fishing, habitat destruction, and pollution. The MRC Member Countries have acknowledged this situation by including the development of a comprehensive basinwide framework for fisheries management and development as a priority in the MRC Fisheries Programme (FP). To address these threats, a “Basin-wide Fisheries Management and Development Strategy” (BFMS) has been developed by LMB counties with support from MRC and SEAFDEC. All Mekong River Commission (MRC) Member Countries (MCs) have formulated strategies for fisheries management and development as part of their national development policy frameworks.

Project strategy

The project objective is to ensure sustainable use of resources and to support the LMB countries and partners (MRC-SEAFDEC and MRC Technical Advisory Body (TAB)) in implementing the BFMS.

The project will

- Strengthen regional and national governance and fisheries management planning frameworks;
- Strengthen national capacity for fisheries management including EAFM approaches, fisheries monitoring and stock assessment;
- Strengthen regional cooperation in the management of transboundary fish stocks;
- Enable knowledge management and sharing of information across the region and beyond.

The key elements of the strategy include communication and mutual understanding between actors, and LMB-wide cooperation for fisheries management and development.

The project is fully aligned to the GEF IW Strategy Objectives.

Countries have to act nationally, but if they also take similar collective action, they have a much greater chance of avoiding or resolving water conflicts.

The proposed project will comprise the following four components:

Component 1: Strengthening sub regional and national governance frameworks in fisheries management (including transboundary fisheries governance in the LMB and LMB member countries).

- Support national and regional inter-ministerial dialogues (water, energy, environment, food and fisheries)
- Support countries in implementing EAFM and water management planning frameworks
- Develop capacity in integrated planning for fisheries
- Harmonise policy and legal fisheries frameworks across the LMB countries.

Component 2: Strengthen national capacity for fisheries management including EAFM approaches, fisheries monitoring and stock assessment

- Develop national strategies for the implementation of the basin wide plan
- EAF management plans developed for priority fisheries and their value chains (ensuring y and address priority risks to human well-being, ecosystem well-being and governance
- Support development of national fisheries monitoring systems for MRC.

Component 3 Strengthen regional cooperation in the management of transboundary fish stocks

- Support regional planning for fisheries in the LMB
- Strengthen regional fish migration monitoring
- Support national and regional cooperation between agencies responsible for fisheries management and fisheries licensing.

Component 4: Enable knowledge management and sharing of information across the region and beyond

- Project monitoring and evaluation systems developed
- Communication and information management systems established
- Policy and outreach communications developed and communicated to national and regional stakeholders.

Capacity development will be an integral part of each and every component, and will collaborate with stakeholders from small-scale/artisanal fisheries, large-scale/industrial fisheries, government institutions, and CSO/NGO.

Gender, tenure and implementation of the FAO Voluntary Guidelines for small scale fisheries will be an integral part of the project.

Baseline and coordination

The project will build on the existing baseline in participating countries. In particular the strategies and plans for the MRC and SEAFDEC. Existing water management agencies such as IWMI and the GEF Mekong River Basin Water Utilization Project.

Partners could include:

Government of Thailand, Cambodia, Lao PDR and Vietnam

SEAFDEC: Southeast Asian Fisheries Development Center

Mekong River Commission (MRC)

WWF, IUCN, national NGO

Universities and research centers across the region

Private sector and representatives from input suppliers and processors.

Example 3

Linking policy to action: Applying the Ecosystem Approach to Fisheries Management for sustainable use of coastal and marine fish stocks and associated biological diversity

Countries:

Southeast Asian member countries of the Southeast Asian Fisheries Development Center (SEAFDEC): Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Viet Nam, as well as Papua New Guinea (as a participating country in REBYC and REBYC II CTI), and Timor Leste, a SEAFDEC observer country

The countries of Southeast Asia and the Western Pacific have a considerable dependence on seafood to meet their nutritional needs and therefore a generally very active industrial and artisanal fisheries. Five countries (Indonesia, Papua New Guinea, Philippines, Thailand and Vietnam) have collaborated between 2002 and 2016 in the two phases of the GEF-funded “*Reduction of Environmental Impact from Tropical Shrimp Trawling through the Introduction of Bycatch Reduction Technologies and Change of Management (REBYC)*” and “*Strategies for trawl fisheries bycatch management*” (REBYC II-CTI) Project. By achieving the goals of these projects, they were able to address several technical and managerial issues affecting the demersal (trawl) fisheries. This past collaborative effort has enabled them to now upscale their efforts towards improved management of other important fisheries, applying an Ecosystem Approach, and taking into account the impact of fishing on habitats, biodiversity, and other resources, while likewise considering the impacts of other sector activities on the fisheries. At the same time, the remaining SEAFDEC member (and observer) countries have expressed their willingness to collaborate in the implementation of the Ecosystem Approach to improve their respective fisheries management. By doing so, they will also address the persistent fisheries issues of depleted and degraded resources and habitats, caused by generally high fishing pressure as well as illegal, unreported, and unregulated (IUU) fishing.

The proposed project aims to mainstreamed EAFM planning and implementation, incorporating best practices from the region and elsewhere, and thus promoting sustainable fisheries management. Based on existing stock status information, backed up by risk-based approaches to fish stock assessment, the project will assist countries in matching industrial fishing fleet capacity to available fish resources. For the rational management of the artisanal fisheries, the project will be guided by the Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication (VG-SSF) and promote implementation of the guidelines.

Building on the established collaborative mechanisms and making use of these in particular in view of knowledge management, lessons learning and capacity development, the project will further strengthen institutional capacities and linkages among the participating countries.

This project is in line with the GEF 6 Programming Directions and the International Waters Focal Area Strategy Objective IW 3: Enhance multi-state cooperation and catalyze investments to foster sustainable fisheries, restore and protect coastal habitats, and reduce pollution of coasts and Large Marine Ecosystems.

The proposed project will comprise the following three components:

Component 1: Create, provide or improve an enabling environment for EAFM implementation: policy reform, institutional strengthening and capacity development.

- Ascertain that local fisheries ordinances or national fisheries regulations provide a legal basis for EAFM implementation and sensitize leaders, resource users and other stakeholders to EAFM
- Strengthen and empower fisheries agencies, fisheries/fisher associations, fisheries management advisory councils (as appropriate and required) for EAFM implementation
- Support capacity development for identifying suitable fisheries management units and the drafting of EAFM Plans for prioritized fisheries (at least 2 FMU per country)

Component 2: Development and implementation of Ecosystem Approach to Fisheries (EAFM) Plans for selected fisheries (based on areas, fishing fleet or gear type, or resources)

- Develop EAFM Plans for prioritized areas, gears or fish stocks (resources), linking policy to action, and assure that the resources required for implementation (staff, budget) are available
- Implement EAFM Plans and monitor implementation process.
These EAFM Plans are expected to include elements of Monitoring, Control, and Surveillance (MCS), vessel registration and licensing, implementation of Vessel Monitoring Systems (VMS), Port State Measures Agreement (PSMA), Catch Documentation Schemes (CDS), and the VG-SSF, as well as closed seasons, closed areas, and fishing gear regulations.

Component 3: Monitoring of EAFM Plan effectiveness, knowledge management and lessons learning

- Assure effective project management, monitoring and evaluation.
- Assure documentation and exchange of project knowledge and monitoring information.
- Produce and disseminate outreach communication tools on policy, objectives and outcomes/impact; for local and regional stakeholders, the general public, as well as for non-participating SEAFDEC member countries
- Participate actively in the IW Learn community

Partners could include:

Fisheries agencies of SEAFDEC member countries, Papua New Guinea and Timor Leste
Southeast Asian Fisheries Development Center (SEAFDEC)

Fisheries industry associations and fishing companies/fishing boat operators

Fisherfolk and community associations

Environmental agencies and non-government organisations

Example 4

Carbon Smart Fish

A proposal for climate-proofing (trawl) fisheries value chains in Southeast Asia¹

Issue – Fishing overcapacity, a race to fish, habitat degradation, waste and spoilage - because of mismanagement, misaligned incentives and consumer ignorance - have led to excess fuel and energy use and, hence, greenhouse gas emissions throughout the Southeast Asian fisheries value chains.

The role of fuel and energy (and consequently greenhouse gas emissions²) in the capture fisheries sector is an important yet little noted issue. While specific aspects of fuel use and cost have periodically concerned the fishing industry and its policy and management agents, the strategic issues of these have been relatively unquestioned until recently. The primary energy intensive elements during harvesting are those for fuel for propulsion, and for larger vessels, power supply for a range of ancillaries. The relationship between fishing effort, fishing methods, distance to fishing grounds, vessel speed and fuel efficiency of hulls, engines and propulsion systems are all key factors in excess energy use. Linking with stock conditions and market values, these are all reflected in operating costs, the profitability of fishing and the level and choice of activity. There are important linkages with fisheries management consequences – whether fishers are compelled to overfish in the push for financial returns, whether rationalization will reduce cost and increase returns, whether changes in fishing gear will have impacts on stocks and ecosystems, and whether fuel subsidies are justified as means of retaining local employment or food supply.

Product quality, stability, delivery options, reduction of loss and value addition are key targets in any part of the post-harvest/processing sector, regardless of location and supply chain, and irrespective of whether the focus is on marginal-economy food security issues or on high-value luxury products. Capitalization and the role of energy vary across the sector, but energy issues are critical in areas such as raw material and product handling and movement, temperature control, water supply and ice production, and in the manufacture of packaging and presentation materials. An increasing issue in many parts of the sector is the time between harvest and delivery to the customer, and hence the turnover of capital. Particularly for high-value/low volume products such as shrimp, shellfish, and tuna, post-harvest and transport choices are based on speed and flexibility rather than energy input and costs.

Fuel costs represent a significant 10-25 % of total operating costs and, globally, are directly linked to an average 1.7t of CO₂ emissions per tonne of fish landed (Tyedmers, et al 2005); representing approximately 20 million tCO₂e emissions from the marine fisheries landings of the nine countries in the region. In addition, the recent revisiting of the Sunken Billions estimates that \$54 billion in annual losses due to unsustainable and inefficient fisheries is borne by Asian fisheries.

Reducing fossil fuel dependence within Southeast Asian fisheries will require a combination of efforts, ranging from aligning policies and management, improving fishing vessels and post-harvest

¹ Brunei, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Timor-Leste, Vietnam

² Including carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) among smaller volumes of additional gases

machinery, modifying fishing gears/methods, improving fish handling techniques, ensuring coherent incentive mechanisms, and raising awareness of the value chain actors and consumers. Cost savings from the reduction in fuel and energy use will be combined with other incentive aligning mechanisms to support the sector in its transition to fuel and energy efficiency.

Project objective: Reduce GHG emissions from Southeast Asian fisheries through improvements in fisheries management, vessel design and operation, gear and fishing techniques and practices, post-harvest processing and transport, realignment of incentives and strengthened consumer knowledge

Component 1: Improved enabling environments to reduce the drivers of excess fuel and energy use in Asian fisheries value chains

Subcomponent 1.1: Climate smart regulatory and policy frameworks addressing underlying factors leading to excess fuel and energy use and reducing the sector's GHG footprint

Subcomponent 1.2: Estimations of fuel and energy use, emissions and emissions intensities for fisheries value chains in the region and analyses of emissions and emissions intensities implications of management, technical, processes options within hotspot fisheries value chains.

Subcomponent 1.3: Climate smart capture fisheries management plans developed and implemented to address over-capacity, excess fishing effort, stock status, waste and food loss, to reduce fuel and energy use and, hence, GHG emissions in the harvest sector.

Subcomponent 1.4: Climate smart post-harvest fisheries management plans developed and implemented to improve fuel and energy use, and reduce waste and food loss in the handling, processing, and transport of fisheries products.

Component 2: Implementation of fuel and energy efficiency improvements through fishing capacity optimization, improved vessel design and maintenance, and transition to efficient gear technology and post-harvest techniques and uses

Subcomponent 2.1: Implementation of Low Impact Fuel Efficient (LIFE) capture fisheries technologies, vessels and practices and alternative energy sources

Subcomponent 2.2: Implementation of Low Impact Fuel Efficient (LIFE) post-harvest technologies, practices and alternative energy sources

Subcomponent 2.3: Documentation of fuel efficiency gains and promoting cost-efficient options through fisher-to-fisher, processor-to-processor and sector-to-sector learning events

Component 3: Creation of incentive aligning mechanisms, such as capacity reduction incentives, eco-labelling, green subsidies, and carbon credits, to support regulatory-based management measures

Subcomponent 3.1: Analysis of incentive aligning mechanisms to support the transition to fuel and energy efficient fisheries supply chains in Southeastern Asian fisheries

Subcomponent 3.2: Co-development of social, economic and regulatory incentive-aligning mechanisms, such as buy-back-and-burn, ecolabelling, cost reduction, higher value products, tenure and resource access rights, design and energy savings competitions

Component 4: Blue Carbon for Blue Growth

Subcomponent 4.1: Increased understanding of coastal and marine habitats and their ecosystem services. Status and trends of mangroves and seagrass systems, fisheries resources and links to multiple ecosystem services including carbon sequestration and storage

Subcomponent 4.2: Increased understanding of the human dimensions within the social-ecological coastal systems. Fisheries and aquaculture dependence on coastal and marine resources for food and nutritional security, livelihoods, culture and economic growth. Drivers of change and vulnerabilities within fisheries and aquaculture-dependent communities

Subcomponent 4.3: Improved management of coastal and marine habitats for increased GHG mitigation ecosystem services. National, regional, community level fisheries and aquaculture sustainable use and conservation management plans including objectives, management tools (e.g. economic instruments, spatial and temporal tools, technical tools and methodologies, MCS), and monitoring and evaluation

Component 5: Management, M&E and communication

Subcomponent 5.1: Assure effective project management, monitoring and evaluation.

Subcomponent 5.2: Assure documentation and exchange of project knowledge and monitoring information.

Subcomponent 5.3: Produce and disseminate outreach communication tools on policy, objectives and outcomes/impact; for local and regional stakeholders, the general public, as well as for non-participating countries

Subcomponent 5.4: Development of a carbon footprint tool for Southeast Asian Fisheries

Partners:

Governments of Brunei, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Timor-Leste, Vietnam

SEAFDEC: Southeast Asian Fisheries Development Center

WorldBank, Asian Development Bank, IFAD and other financial institutions

IUCN, TNC, Conservation International

Universities and research centers across the region

Thailand Sustainable Development Foundation and other CSO

Representatives from industry, input suppliers, processors and wholesale buyers (e.g. SeaFish, MARS)

Development partner countries, such as Norway, USA, Japan, Korea, European Union

Regional Fishery Bodies

IMO, UNDP, UNEP

Example 5

Enhancing mitigation of GHG emission in Asian pond aquaculture while benefiting farmers through sustainable intensification of production

According to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), 15 percent of global GHG emissions are caused by agriculture. Another 20 percent of emissions come from land use change leading to land use systems that contain less carbon than the original natural ecosystems. Global warming cannot be avoided without emission reductions in the land-based sectors. Agriculture is the driver for most of the changes in land use. The clearing of forests or grasslands for croplands, pastures or plantations, including biofuel crops, is one major example of agriculture-driven land use change (FAO and Wetlands international 2012).

Aquaculture is globally the fastest growing food sector and more than 80% of the production takes place in Asia being China the main producer.

Aquaculture contribution to GHG

Unlike capture fisheries, where diesel fuel for propulsion greatly dominates energy demand, aquaculture's fuel and energy inputs are more diversified. This is particularly related to the production system and the degree of yield intensification, related directly with external feeds, which are a primary factor in energy content, together with water supply and water quality management.

In general feeds account for almost 80% of energy consumption in intensive systems, and almost the entire use in the semi-intensive, which though not fully dependent on feeds has few other energy inputs. Fuel and power – mainly for vessels and ancillary equipment is much less significant for intensive fish systems. The largest part of feed-related energy use is associated with the supply of raw materials, including in many cases, inputs of fishmeal and oil, where interactions with capture fisheries are most significant. Feed associated inputs can be particularly but not exclusively linked with fishmeal and oil components, where fuel and energy associated with capture and processing can be significant. The levels are linked with the fishery resource, the nature of processing and the transport and distribution costs involved. Other feed inputs – e.g. from conventional agriculture, are becoming increasingly important and also have definable fuel and energy use profiles; in less intensive systems, industrial energy associated with inorganic fertiliser production may also contribute to inputs. The use of feed ingredients such as soy can indirectly be a significant contribution to GHG if soy plantations have replaced green forest. Accurate data on energy inputs associated with feeds from all sources require further development, FAO is working on this particularly in the context of reducing the Feed Conversion Ratios.

Mitigation of GHG contribution in aquaculture

Reducing feed conversion ratios (FCR) in aquaculture

Comparatively salmon aquaculture have some of the lowest FCR and considering the moving to terrestrial feed sources (and provided these do not have large carbon foot prints) their impact on GHG is smaller than for other species including freshwater species (Waite *et al.*, 2014). Salmon farming managed to reduce the FCR from around 2.8 to around 1.2 in less than 30 years thanks to technological development and training, better management. A similar move in freshwater species farmed in Asia such as carps, tilapia and catfish (the bulk of fish farming in the region) could significantly reduce the GHG and other environmental impacts while increasing economic gains especially for small farmers.

Potential of aquaculture ponds in carbon sequestration

“Aquaculture ponds, unlike other inland water bodies, can contribute to carbon emissions but could also contribute to mitigation of emission through management of inputs to produce aquatic animals (Boyd et al., 2007). The carbon sequestration capacity of aquaculture ponds could be used as carbon reduction credits against carbon emissions from aquaculture production. Net carbon sequestration (carbon emissions vs carbon sequestration) by aquaculture operations could be traded as carbon credits. Detailed analyses of carbon emissions and carbon sequestration by aquaculture ponds will be needed to ascertain whether or not the aquaculture sector might benefit from participation in carbon emission “cap and trade” programs” (Boyd et al 2012).

	Tg or Million tonnes C/year
Natural lakes	30-70
Reservoirs/impoundments	150-220
Global oceans	120-140
Terrestrial environments specially wetlands	1000-4000
Aquaculture ponds	15-30 ??? more????

Strategies to reduce C and other greenhouse gas (GHG) emissions from agriculture and enhance C sinks on farms/wetlands have also been identified but until now options for different aquaculture farming systems have not been widely assessed (Adhiraki et al 2012). The exponential growth of aquaculture worldwide requires attention to this matter.

According to Verdegem and Bosma (2009) there are 11.1 million hectares of aquaculture ponds globally and the use of manure, fertilizers, feed and other nutrient inputs in ponds for higher production stimulate OC production by phytoplankton photosynthesis (Boyd and Tucker, 1998). Aquaculture ponds do not have large external sediment loads like reservoirs or watershed ponds in agricultural or other rural areas. Verdegem and Bosma, (2009) using a combined area and average carbon burial rate estimated that aquaculture ponds sequester an estimated 16.6 MT/year of carbon globally. Most carbon sequestration by aquaculture ponds occurs in Asia and particularly in China. China had 62,595 km² or 55.9% of global aquaculture pond area by 2009. According to FAO estimates, currently the total area could be around 70,000 km².

Overall improved management of aquaculture ponds including appropriate improvements in strains, feed management, management of sediments, integrated area management coupling pond culture with agriculture etc. could have a significant impact on GHG reduction while increasing production, minimizing other environmental impacts and increasing resiliency.

National or regional mitigation project in aquaculture could significantly contribute to reduce emissions and to improve carbon sequestration while producing fish as food.

The main objectives of a GHG mitigation project (e.g. in China) would be:

1-Assess the background or baseline situation

2- Develop and implement management options to significantly reduce emissions in aquaculture and increase the potential for carbon sequestration in aquaculture ponds

- 3- Create the appropriate incentives to disseminate better management practices including increased resiliency
- 4- Support large number of aquaculture farmers to take substantial actions to make desired changes in aquaculture systems and farming practices, which will contribute to reduction of emissions from aquaculture and increase the potential for carbon sequestration through aquaculture