

Report on

Regional Technical Consultation

on Development of Aquaculture Planning and Management Toolkit

and Strategy Promoting its Adoption in Asia and the Pacific

Novotel Bangkok Ploenchit Sukhumvit Hotel,
Bangkok, Thailand, 27-29 November 2013

Prepared by

Miao Weimin

Aquaculture Officer

FAO Regional Office for Asia and the Pacific

Table of Contents

Summary Report	3
Background	3
Objective	4
Organization and Participation.....	5
Opening of the Meeting	5
Proceeding of the Sessions.....	6
Session I Introduction to Aquaculture P & M tools and the Regional Technical Consultation.....	7
Session II Presentation of draft Aquaculture P & M tools	7
Session III Working group sessions and the output presentation.....	8
Session IV Recommendation for promoting adoption of aquaculture planning and management tools in Asia and the Pacific	8
Closing of the Meeting.....	9
Outcome	9
Outputs	10
Summary of Aquaculture Planning and Management Tools	11
Environmental Management Plan	11
Carrying Capacity Estimation Tool	12
Environmental Impact Assessment.....	13
Import Risk Analysis (IRA).....	15
Farm level biosecurity plans	16
Emergency disease response plans.....	17
Farm level hygiene.....	17
Chemical residues control	18
Aquaculture Traceability.....	19
Socio Economic Impact Assessment (SEIA).....	20
Feasibility Study.....	21
Monitoring and Evaluation	22
Consultation Recommendations.....	23
Annex 1 Consultation Programme	24
Annex 2 List of Participants.....	28
Annex 3 Opening remarks by FAO ADG/RR for Asia and Pacific.....	35
Annex 4 Opening Remarks by DDG, DOF Thailand	38

Summary Report

Background

Fish and other aquatic animals are gaining more and more importance in people's animal food consumption and nutrition. Fish and other aquatic animals currently comprises some 17% of animal food consumption of the people globally, the contribution is much higher in Asia. Aquaculture industry has grown at the annual rate of 10% in Asia-Pacific in the past 3 decades, driven by the increasing demand of people for fish that cannot be met by the stagnant capture fish production, and increasing global trade of seafood. Asia and the Pacific region is now contributing 89% of global aquaculture production and provide very important source of livelihood for the rural population in the region. Growth of aquaculture industry in the past had been achieved from expansion of industrial scale and intensification of production. The various environmental as well as social problems that came in the wake of a rapid growth could be attributed largely to a poorly planned and managed sectoral development and farm operational practices. The anticipated population growth in the coming decades and changing diet habit of the people will significantly increase the demand for fish in the future, which is believed to be met by increased aquaculture production mainly from Asian region.

Fast growth of aquaculture in Asia region without proper planning and management has raised increasing concern over its sustainability. Aquaculture will have to continue to grow to meet the increasing demand for fish. But the growth won't be sustainable if the planning and management are not improved significantly. In order to support sustainable development of aquaculture in the region, the APFIC regional consultative workshop on "Strengthening Assessments of Fisheries and Aquaculture in the Asia-Pacific Region for Policy Development and Management" was convened from 4-6 October 2011, Yangon, Myanmar, following the APFIC Session and EXCO recommendation. The regional consultation workshop recommended to initiate regional activities to promote the use of different assessment tools in supporting informed planning and management of aquaculture for sustainability in the region. The FAO/NACA regional study/workshop was conducted (3-5 July 2012 at Pattaya) following the recommendation and found that one of the key constraints in informed

aquaculture planning and management is lack of practically applicable planning/management toolkit for the region and thus recommended development of appropriate aquaculture planning/management toolkit as the priority for improving the planning and management of aquaculture for sustainability. The 4th APFIC RCFM (17-19 September 2012, Da Nang, Vietnam) included "Improving the planning and management of aquaculture for food security and social and economic benefit-Appropriate planning and assessment tools developed and shared within the region" in its recommendations to the 32nd APFIC Session, which was endorsed by the 32nd APFIC Session. The subsequently convened FAO/APFIC/NACA Regional Consultation (9-11 October 2012, Bangkok, Thailand) on Sustainable Intensification of Aquaculture also recommended strengthening of national capacities for situation appraisal, carrying capacity assessment, EIA, zoning (regional); and to make the tools for this more readily accessible".

It is now widely recognized that developing appropriate planning/management toolkit and promoting their application in the member countries is a priority action needed for supporting the sustainable aquaculture development in the region. In order to address such regional priority and as well as to contribute to the FAO Regional Priority C "Enhancing equitable, productive and sustainable natural resource management and utilization" Identified by the 31st FAO Asia-Pacific Regional Conference (12-16 March 2012, Hanoi, Viet Nam) and the new FAO Organizational Outcome "Stakeholders make evidence-based decisions in the planning and management of agriculture and natural resources to support the transition to sustainable agriculture through monitoring, statistics, assessment and analysis" (Strategic Objective 2-Outcome 4), a draft aquaculture planning and management toolkit for Asia and the Pacific was now developed by an expert team with FAO regular program support. The regional technical consultation is an important process to finalize the toolkit and develop appropriate regional strategy to promote its adoption in the member countries in the Asia-Pacific region.

Objective

The objective of the regional technical consultation is to significantly increase the general awareness of the importance of improving planning and management for sustainable

aquaculture development through the adoption of the relevant planning and management tools among the different stakeholders in the region.

Its purposes are to finalize an aquaculture planning and management toolkit and recommend a regional strategy to promote the adoption of the toolkit in the region.

The consultation will provide a platform for sharing of experiences in the use of aquaculture planning and management tools in Asia and other regions of the world. The consultation will be an important technical process for finalizing the draft aquaculture planning and management toolkit developed by the FAO expert team. The consultation will provide a good opportunity for relevant stakeholders to review and critique the toolkit, identify key issues and constraints for effective adoption of planning and management tools in aquaculture development and recommend appropriate regional strategy to the forthcoming APFIC RCFM and Session on promoting wide adoption of the toolkit.

Organization and Participation

The consultation is sponsored by FAO and organized and convened by the Asia-Pacific Fishery Commission (APFIC) with support of the Network of Aquaculture Centres in Asia-Pacific (NACA) and other regional organizations.

The regional consultation was convened from 27-29 November 2013 at Novotel Bangkok Ploenchit Sukhumvit Hotel, Bangkok Thailand.

The regional consultation was attended by 48 participants, who represented 17 country governments, 10 international and regional organizations, 8 national research and educational institutions and 3 consultancy companies. Most members of APFIC and NACA had their representation in the consultation.

Opening of the Meeting

The consultation was formally opened by Mr. Vili Fuavao, FAO Deputy Regional Representative for Asia and the Pacific with an opening remark on behalf of Mr. Hiroyuki Konuma FAO Assistant Director General and Regional Representative for Asia and the Pacific. In his remark, Mr. Fuavao reviewed the fast development of aquaculture and its contribution to people's food and nutritional security and rural livelihood in Asia and the Pacific throughout the past three decades. He also informed the audiences the need for sustainable growth of aquaculture in the region in order to meet the increasing global demand for fish resulting from population growth and economic development. He emphasized the

importance of improved planning and management of aquaculture for sustainability. He anticipated the successful conduction of the regional consultation that will guide the finalization of the regional aquaculture planning and management toolkit and develop appropriated regional strategy for promoting the adoption of aquaculture planning and management tools in the region.

Mr. Eknath Ambekar, Director General of Network of Aquaculture Centers in Asia-Pacific delivered a welcome address. He reviewed the collaboration between NACA and FAO throughout the process of developing the regional aquaculture planning and management toolkit starting from the regional study and workshop on adoption of aquaculture assessment tools in Asia-Pacific. He thanked FAO for supporting this important work that is going to benefit the NACA members greatly. He suggested there is still room to further expand the scope of the toolkit to include the tools for natural disaster preparedness and post disaster rehabilitation related to aquaculture.

Mr. Chirdsak Vongkamolchoon, Deputy Director General, Department of Fisheries, Ministry of Agriculture and Cooperatives, Thailand Welcome/opening remarks delivered a welcome remark. Mr. Chirdsak Vongkamolchoon pointed out that the development of Asian aquaculture industry is threatened by different issues, in particular disease problem, environment problem and socioeconomic issues while recognizing the fast growth of aquaculture industry and its contribution to global food fish supply and regional economy and rural livelihood. He appreciated FAO for supporting the development of the regional aquaculture planning and management toolkit, which will be a great support to the country governments in the efforts to strengthen the governance and improve the performance of aquaculture industry in the region. He also request FAO and other regional organization to support the dissemination and application of the toolkit when it is completed.

Proceeding of the Sessions

The regional technical consultation was convened successfully according to the consultation agenda (Annex 1). The consultation had four sessions that included two sessions of presentations and two sessions of working group discussion and output presentation and discussion. The sessions were alternately chaired by the FAO coordinating officer and NACA Manager for Research and Development.

Session I Introduction to Aquaculture P & M tools and the Regional Technical Consultation

This introductory session had a number of presentations by FAO coordinating officer for development of the regional aquaculture planning and management toolkit and R & D Manager of NACA the major collaborating organization for the regional initiative. The participants were well introduced with the background, objective and expected outputs of the regional consultation, including the process of the toolkit development. The process and main findings of the earlier FAO-APFIC-NACA regional study and workshop on adoption of aquaculture assessment tools in Asia-Pacific were introduced. One presentation provided the participants with a snapshot of aquaculture planning and management tools and their adoption in the world. The session was concluded with a presentation on the framework of the aquaculture planning and management toolkit being developed and to presented and discussed during the consultation. Each presentation was followed by brief questioning and commenting.

Session II Presentation of draft Aquaculture P & M tools

Session II is one of the major sessions of the consultation. Five FAO consultants made comprehensive presentations on all 15 draft aquaculture planning and management tools they developed under 5 thematic areas, which covers

Site selection and zoning

- Site selection of floating cages
- Visual impact analysis
- Flood risk analysis

Environment impact assessment and monitoring

- Environmental Carrying Capacity
- Environment Impact Assessment
- Environment management and monitoring

Social & economic impact assessment

- Socioeconomic impact assessment
- Feasibility study
- Aquaculture project monitoring and evaluation

Food safety and traceability

- Farm level hygiene
- Chemical residue control
- Traceability

Biosecurity and animal health management

- Farm level biosecurity plan
- Import Risk Analysis
- Emergency disease preparedness and response plan

Each presentation was followed by a brief plenary clarification and comments.

Session III Working group sessions and the output presentation

This is the session focused on the discussion about the structure and contents of each individual draft tools. The participants were divided into 3 working groups and each working group worked on 5 individual draft tools. Each responsible consultant presented their draft tools more elaborated and working group members provided their comments and suggestions on modification of each tool. Two consultants facilitated the discussion of each working group.

Each consultant presented the major outputs of the working group discussion on the tools he developed in the plenary. The presentations were followed by the comments and questions from other working group members.

Session IV Recommendation for promoting adoption of aquaculture planning and management tools in Asia and the Pacific

Session IV was the last working group session focusing on recommendations for regional strategy to promote adopting of aquaculture planning and management tools in Asia and the Pacific. After introduction to the working group session, participants were divided into three working groups. Each group focused on assigned area, which included:

- Awareness raising and dissemination of aquaculture planning and management tools
- Enabling environment and capacity building for adoption of the tools
- Regional collaboration and exchange for promoting the adoption of the tools

A final plenary session was convened for presentation of major outputs from each working group discussion and comments and questions by other working group members.

Closing of the Meeting

A brief closing session was convened after the plenary presentation of the last working group discussion. FAO RAP Senior Fishery Officer/APFIC Secretary delivered closing remarks. In his remarks, the FAO RAP Senior Fishery Officer reviewed the entire process of the development of the regional aquaculture planning and management toolkit. He thanked NACA and other partners for their support to the process. He also expressed deep appreciation to the consultants engaged in the development of the toolkit for the dedicated work. He thanked all the consultation participants for the active participation and contribution to the consultation process, which will help the finalization of the toolkit and the dissemination and adoption in the region later. Recognizing the draft toolkit has not been finalized for practical application, he ensured that FAO will continue the work with the expert team in finalizing the toolkit and developing appropriate training and other dissemination materials for promoting its adoption in the region. FAO will also present the toolkit and consultation recommendations on strategy promoting the adoption of the toolkit in the region to the 5th RCFM and 33rd Session of APFIC for endorsement.

Outcome

The regional technical consultation will significantly promote the improved aquaculture planning and management through wider adoption of appropriate planning and management tools, which will contribute to sustainable development of the aquaculture industry in Asia and the Pacific region. The consultation greatly enhanced the overall awareness of the importance of aquaculture planning and management tools in good planning and management. The recommendation from the consultation will help the finalization of the toolkit and to make the practically applicable aquaculture planning and management toolkit available to the different users and the consultation recommended strategy will guide country governments in the region on how to promote wider and effective adoption of appropriate tools for planning and management contributing to sustainable aquaculture development in the region.

Outputs

The regional technical consultation was conducted with the wide participation of country government and various international, regional and national organizations and institutions.

The consultation produced the following outputs:

- Built consensus among the different stakeholders on the importance of effective adoption of aquaculture planning and management tools in achieving sustainable development through enhanced awareness and better understanding of current status;
- Well informed draft aquaculture planning and management toolkit to the wide range of potential users and received comprehensive technical comments and suggestions that will advise the expert team to finalize the toolkit immediately after the consultation;
- A set of regional strategies that will guide the country government, regional organizations and private sector in promoting effective adoption of aquaculture planning and management tools based on the effective identification of the issues and constraints;
- A working paper will prepared for the 33rd Session of APFIC to take action to promotion of adoption of aquaculture planning tools for strengthened planning and management for sustainable development base on the consultation recommendations .

Summary of Aquaculture Planning and Management Tools

Environmental Management Plan

Any Aquaculture activity can produce impacts on the environment and social systems. EIA is the tool that is most commonly used for evaluating environmental concerns and sustainability issues and developing mitigation measures for new development projects in the form of an Environmental Management Plan (EMP). A criticism of the EIA process is that once approval or consent for a project is obtained, the implementation of identified environmental mitigation measures identified in the EMP is not subject to the same scrutiny once the project has been constructed and is in operation. Therefore there is a need for improving the effectiveness of the EIA process by strengthening the project's EMP and monitoring survey requirements.

Environmental Impact management of operational aquaculture enterprises is required to ensure that any significant negative impacts are addressed and that monitoring is undertaken to ensure that impacts accumulate and reach unacceptable level.

Environmental monitoring programmes should also be implemented and should be compulsory for sustainable aquaculture site management of large aquaculture projects, clusters of small aquaculture projects with cumulative impact or projects that have a risk of significant impact.

The environmental management and monitoring tools comprise the following;

- **The Environmental Management Plan (EMP)** which is a site or project specific plan developed to ensure that appropriate environmental management practices specifically for aquaculture are followed during the construction and/or operation of a project.
- **Environmental impact Audit** in the form of a checklist which evaluates compliance to environmental management and related mitigation measures. It also identifies management gaps.
- **Environmental monitoring survey scope and format** order to assess the improvement or deterioration of the farm operation and/or external factors on the local environment.
- **Strategic Environmental Monitoring (SEM)** which evaluates longer-term changes in environmental quality for a whole sector of the industry such as shrimp pond farms,

marine cage farms) and are designed to determine whether unexpected adverse impacts are occurring.

The scope of the Environmental Management Plan tool includes;

- Structure and Responsibility of the implementation person or team
- Data collection and analysis.
- Reporting requirements in terms of frequency and distribution of the results and report
- Environmental Training Plan and
- Emergency Contacts and Response
- Complaints Handling protocols for the local community and other stakeholders
- Environmental Management sub-plans as guidelines for the operation of the farm.

Environmental monitoring is required to check the severity and extent of the impact on the environment and ensure that it does not breach any water quality or environmental standards.

Carrying Capacity Estimation Tool

Carrying capacity is an important concept for ecosystem-based management, which helps set the upper limits of aquaculture production given the environmental limits and social acceptability of aquaculture, thus avoiding “unacceptable change” to both the natural ecosystem and the social functions and structures. There are four types of carrying capacity that are evaluated as follows;

- *Physical carrying capacity* is based on the physical factors of the environment and the farming system. This is covered by the Site selection tool.
- *Production carrying capacity* estimates the maximum aquaculture production and is typically considered at the farm scale.
- *Ecological carrying capacity* estimates the level of aquaculture production that can be supported without leading to significant changes to ecological processes, services, species, populations or communities in the environment. This is covered in this tool.
- *Social carrying capacity* evaluates the amount of aquaculture that can be developed without adverse social impacts. This is covered by this tool and the Socio-economic impact assessment tool.

Carrying capacity estimation is undertaken at the planning stage before aquaculture is established in a certain area or location. It is normally undertaken to set the maximum sustainable production without unacceptable impacts on the environment and without

significant conflict with other stakeholders. The tool can be used by the regulator to set maximum production limits as part of the licensing procedure or by the developer to be able to plan the maximum production at that farm.

The carrying capacity for a zone or site can be estimated using such models together with field data and the water quality and environmental quality standards in force. The assessment of ecological carrying capacity uses the assimilative capacity approach which estimates the ability of the ecosystem to deal with inputs of waste wherever they arise in order to maintain a healthy environment. The important fish farming waste components are nutrients, particulates and associated potential biochemical oxygen demand (BOD) resulting from the metabolism of fish food. It is also important to take into account waste such as sewage discharges and diffuse inputs from agriculture, livestock production and domestic waste.

Carrying capacity is estimated by assessing 2 main factors to ensure sustainable and environment friendly aquaculture;

- Environmental capacity of a particular area depends on tidal flushing, current and assimilative capacity of the ecosystem (upland, estuary, near-shore) to the additional nutrient inputs.
- Nutrient outputs from different Aquaculture systems (pond, cage, raft, pen) at different levels of intensification.

The tool comprises of lists of models for different culture systems that have been used in Asia.

The models analyze the hydrodynamic and biogeochemical and ecological processes in the environment as well as with oxygen consumption and sources and sinks of organic matter and nutrients due to farm activity.

Environmental Impact Assessment

There are a number of key areas where the potential aquaculture impacts on the environment may exist:

Environment

- Benthic and water column impacts due to nutrient release
- Sensitive habitats and species such as corals and turtles
- Interaction with predators such as birds and sharks
- Interaction with fisheries such as disease and escapes interbreeding with wild fish

- Landscape and visual impact assessment
- Waste management (fish) such as disposal of dead fish, processing waste, etc.
- Waste Management (non-fish) such as disposal of feed bags, old nets, etc.

Socio-economic and local community impacts

- Socioeconomic both positive and negative
- Local community interactions
- Restriction of access to the coast
- Landscape and visual impact
- Tourism and recreation conflict
- Traffic and transport.

Environmental impact assessment (EIA) is an essential tool that is undertaken at the planning stage before regulators approve a site to be used and a license given for aquaculture. It ensures that proper decision making processes are in place, supported by accurate data on the impacts of the activity, and it takes into account the socio-environmental acceptability of the project. It should be consistent with both sustainability criteria and best practice.

In many countries the EIA procedures are mandatory and implemented for large project or projects with potential for significant impact. The EIA undertakes an analysis of the potential aquaculture impacts, identifies possible mitigation measures to deal with the impacts with the development of an Environmental Management Plan. The EIA should collect baseline site data using field surveys and makes an assessment of potential environmental impact and mitigation based on expert opinion or scientific or producer knowledge.

The tools are guidelines for assessment of Environmental impact specifically addressing aquaculture impacts for single and multiple projects. The tools describe the scope and steps that require to be undertaken to conduct the following;

- Initial Environmental Examination (IEE) for small projects and screening for large projects
- Environmental Impact Assessment (EIA) for large projects or ones with potential for significant impact
- Programmatic EIA (PEIA) for assessment of multiple small-scale farms
- Strategic Environmental Assessment (SEA) for multiple larger farms in an area or water body

Each of these tools take similar steps to complete including;

- Undertaking a base line survey
- Consultation with the local community and stakeholders
- Identification of potential impacts and conflicts
- Assessing the importance of the risks using risk analysis
- Developing mitigation measures to address the identified risks
- Preparation of an Impact Assessment statement

Import Risk Analysis (IRA)

Import of aquaculture commodities, both live and dead, carry an inherent risk of introducing unwanted pests and pathogens into a country. Unwanted pests and pathogens introduced to a country through irresponsible importation could spell disaster and can have serious economic, social and environmental impacts.

As a member of the World Trade Organization and a signatory to its Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement), the measures applied by a country to manage disease risks from the importation of aquatic animal commodities must not exceed the international standard set by the World Organization for Animal Health (OIE) *unless* the measures are based on Import Risk Analysis (IRA).

IRA as the name implies is a systematic structured scientific process to identify hazards, assess the risks, evaluate risk management options and finally make informed decisions concerning the import of a commodity (e.g. live aquatic animals, animal products) into the country.

IRA helps the Competent Authority (CA) of a country to make an informed decision concerning the proposed import/introduction. In addition it also helps the CA to justify sanitary measures higher than those prescribed by the OIE Aquatic Standards. The intended users of the tool are normally the IRA team constituted by the CA on a case by case basis (e.g. import of live shrimp larvae, import of exotic ornamental fish).

The tool described here provides stepwise guidance on to how to go about in performing an IRA and use the IRA outcomes for making informed decisions considering the appropriate level of protection a country wishes to pursue or the level of risk a country can accept.

Key elements covered include process and steps in hazard identification, risk assessment using likelihood and consequence scenarios, risk estimation using a simple risk matrix

approach, risk prioritization and risk management option evaluations, steps in risk communication to all concerned stakeholders and finally decision making.

Use of the tool by the IRA team will provide scientific decision options to the CA. For example, the CA can reject the import proposal because the risk is too high and not acceptable or approve the import proposal on the condition that prescribed risk mitigation measures are applied at pre-border, border and post border.

Proper use of IRA will help to significantly reduce the introduction and spread of unwanted pests and pathogens through international trade in live aquatic animals and their products.

Farm level biosecurity plans

Farm level biosecurity plans document the systems that a farm or group of farms have in place to manage the risk of unwanted pathogens entering farms, the risk of diseases spreading within farms, and the risk of diseases spreading from infected farms to other farms. Farm level biosecurity systems can be a cost-effective means of enhancing the productivity, and thereby the profitability, of aquaculture enterprises by reducing the risk of production losses caused by aquatic animal disease incursions.

A good starting point for developing a farm biosecurity plan is to audit the biosecurity practices already in place and then to compare these against recommended standards. This biosecurity tool is a checklist of standard systems and practices that each farm, farmer group or sector should consider including in a biosecurity plan, as appropriate to its unique circumstances. The checklist also forms the basis of table of contents of a farm biosecurity plan document. The key biosecurity systems elements covered include biosecurity protocols to address the main routes of disease transmission into a farm; namely, animals, water, equipment and vehicles, water and feed.

The tool can be applied to developing farm biosecurity plans for the range of aquaculture sectors; hatcheries, nurseries and grow-out facilities; and recirculation, flow-through and open water aquaculture systems, adapting the guidelines as required.

The checklist can also be used by government agencies in either assisting industry in setting up farm level biosecurity plans, or as an audit table to audit farm biosecurity plans where such plans are a regulatory requirement.

Emergency disease response plans

Incursion of new aquatic animal diseases into previously free countries or regions within countries can cause significant impacts if allowed to establish and spread in farmed or wild aquatic animal populations. These impacts can take the form of aquaculture or fisheries production losses, ecological impacts or loss of access to markets. These diseases may be well known or be emerging diseases, often where the cause is uncertain.

Early response to an outbreak of clinical disease (or the detection of a communicable disease agent) in a previously free country greatly increases the likelihood of the disease being contained and eradicated – the sooner the response, the greater the chance of successful control.

Emergency response planning (or contingency planning) is a tool that can assist government agencies with responsibility for managing emergency disease outbreaks to react quickly to an emergency aquatic animal disease situation.

Emergency response plans:

- help to make rapid decisions about whether there should be a jurisdictional response to a disease incident and if so, what control options could be applied, and
- provide information to help in the design and implementation of a response, for example, by providing guidance on how to dispose of potentially infected animals, how best to disinfect affected farms or whether to prevent disease spread by imposing movement controls on aquatic animals and/or their products.

The biosecurity tool presented is in the form of a checklist of the key systems elements needed to establish an emergency aquatic animal disease response framework. The checklist can be used to design a new response framework, or be used as an audit table to identify gaps in existing preparedness and response arrangements with a view to capacity building.

The checklist has been developed based on the FAO's *Preparedness and response to aquatic animal health emergencies in Asia: guidelines*.

Farm level hygiene

Farming operations can cause biological risks to the fishery products. Food hygiene and safety standards have become more stringent in global markets. Farmers have to adjust to

more regulations and requirements on farm site selection to avoid contaminants, use of clean equipment and tools, and restricted use of chemicals.

The tool is a systematic structured food safety approach to prevent or reduce the biological risk at the farm level, providing assistance in the selection of the fields to review and the way to improve practices in case of poor compliance.

The Farm Hygiene tool provides the farmer with a step to step implementation with templates to record information along the supply chain and allows efficient product recall in case of emergency.

The tool helps the Competent Authority (CA) of a country in their conformity assessment role. It supports training and dissemination of good practices together with improved management of information of the aquaculture sector. It also can be used as prototype to develop sectoral or national food safety schemes.

The tools provide some help on “how-to” mitigate the biologic risk along the production chain and to demonstrate the production of safe and high quality fishery products through the control of contaminants, farm operators’ hygiene, cleaning plan, temperature control/ use of additives on the harvested fishery products and the products analysis.

The tool complements the application of Good Practices with a practical approach to facilitate the compliance with any regulatory and non-regulatory requirements for certification schemes worldwide and avoid any food safety, biosecurity, environment issues and eventually economical loss.

Chemical residues control

Chemical risks mitigation is needed to protect the consumers of food-borne crisis caused by the consumption of unsafe fishery products. Farmers have to adjust to more regulations and requirements on farm site selection to avoid contaminants, use of clean equipment and tools, and restricted use of chemicals.

The tool is a systematic structured food safety approach to prevent or reduce the chemical risk in the supply chain, providing assistance in the selection of the fields to review and the way to improve practices in case of poor compliance.

The chemical residue control tool provides the farmer with a step to step implementation with templates to record information along the supply chain and allows efficient product recall in case of emergency.

The tool helps the Competent Authority (CA) of a country in their conformity assessment role. It supports training and dissemination of good practices to work towards increased traceability together with improved management of information of the aquaculture sector. It also can be used as prototype to develop sectoral or national food safety schemes.

The tools provide some help on “how-to” mitigate the chemical risks along the production chain through the application of preventive measures to reduce the chemical risks from contaminants, feed, Veterinary drugs, Additives (including probiotics, growth promoters) and other chemicals such as fuel and lubricant.

The tool complements the application of Good Practices with a practical approach to facilitate the compliance with any regulatory and non-regulatory requirements for certification schemes worldwide and avoid any food safety, biosecurity, environment issues and eventually economical loss.

Aquaculture Traceability

Traceability is both among regulatory and non-regulatory requirements. Traceability is needed to protect the consumers against food safety hazards. The lack of traceability and efficient product recall can cause severe food safety, biosecurity, environment issues and eventually economical loss.

Traceability is also required to demonstrate the production of fish products according to particular requirements, most often in the frame of certification schemes (e.g. eco-labeling, organic, fair trade). These schemes are indispensable to access some markets and can thus represent a competitive advantage.

The tool described the three basic components required to establish a traceability system at the operator level and within a supply chain. The traceability tool will assist the demonstration of the safety and quality of the fishery products through the application of materials and processes in compliance with prevailing regulations and the ability to recall the product to avoid any harm to the consumers and ensure the compliance with particular requirements.

The traceability tool provides the operators with a step to step implementation with templates to record information along the supply chain and allows efficient product recall.

The tool helps the Competent Authority (CA) of a country in their conformity assessment role. It will support training and dissemination of good practices to work towards increased

traceability and improved management of information of the aquaculture sector. It also can be used as prototype to develop sectoral or national traceability schemes.

The tool covers the requirements on unique identification of the actors in a supply chain and the products by lot/batch of fishery products to be traceable, some rules for the data capture and management (Record keeping and links management between different actors within the supply chain and data communication between various actors in the supply chain in a standardized format.

The establishment of a traceability system complying with local and international requirements will be easier by using the proposed templates.

From a simple paper records at the farm level, the system can be upgraded with more advanced technology to enable faster recall and commercial advantage.

Socio Economic Impact Assessment (SEIA)

Any intervention has positive and adverse impacts, intended and unintended. SEIA identifies, measures, and indicates the direction of the social and economic impacts of a project, programme or policy on the target beneficiaries. An impact assessment of a project proposal would provide decision aid on whether to accept, reject or modify the proposal based on whether the impact on the welfare of target beneficiaries is positive or negative; an assessment of an ongoing intervention would provide decisions on adjustments on the project to enhance its positive impacts; a post-intervention assessment provides lessons on programme development and management, policy, and for project up-scaling or replication.

In this toolkit, the tool applies to a prospective assessment of a simple, single component intervention. It focuses on the economic impacts but includes parameters or variables that are both indicators of social and economic impacts such as employment and food supply or consumption.

A multi-disciplinary team with the following expertise should be constituted for the Socio Economic Impact Assessment Team: Aquaculture resource management, Resource economics, Rural sociology, Agri-business management, Environment, Aquaculture engineering, Project management, and Policy and regulations. None of the members should have any vested interest in the project to avoid bias in the assessment process the interpretation of the significance of the results. Its results would show whether an aquaculture development intervention provides net economic benefit to the target area.

The steps in the assessment of socio-economic impacts are described and includes scoping, baseline profiling and identifying who will be impacted, assessing direct impacts, and assessing indirect impacts. The parameters used for understanding and evaluating the socio-economic impacts include inputs and outputs and the changes on these indicators: production outputs; domestic food supply; jobs – quantity and quality; personal or household incomes including wages; business output or sales volume generated; and changes in property value in and around the project area. The analytical tools (i.e. input-output model) are described but not explained in detail on how to use them.

The tool is for (a) the target beneficiaries, to know impacts on their livelihoods and how they can take part in mitigating adverse impacts; (b) policy makers, to reformulate a policy as needed; (b) programme and project managers, to adopt, reject or modify the intervention; (c) funding agency, to commit funding or not; (d) environmental impact assessors; to quantify environmental impacts; and (e) public information services, to generate public understanding and support.

Feasibility Study

It is not difficult to find examples of private business or public development projects that have failed because the decision to proceed with the project was based on the proposition that it was feasible because there was money and technical resources to implement it. Another possibility is that the decision to proceed was driven by reasons other than viability, such as political, to implement the project regardless of technical resource costs. A feasibility study would avoid these pitfalls.

Feasibility study is a scientific approach to assessing the feasibility of a public or private investment. It is a stepwise and systematic process of assessing the different feasibility criteria – biological, technical/market, economic/financial, and social – to arrive at a set of information that would inform a decision on whether to proceed or abort. It would also provide information to increase the probability of success as well as help secure funding for the project.

An interdisciplinary team should consist of the following expertise: aquaculture (breeding and grow-out), business management, economics (resource and marketing), rural sociology, aquaculture engineering, policy and regulation, and environment. The tool can be used for an area development project (watershed scale, a water body or part of it) and an aquaculture business enterprise or development project. It is applicable to, generically, any proposed

solution to a problem that needs investing in private or public resources. An innovation being promoted for adoption.

The tool uses five sets of feasibility screens : biological, technical including market, economic/financial, and social. Based on these feasibility screens the tool describes six areas of analysis: (1) Biological, (2) Technical, (3) Market, (4) Economic/Financial and (5) Social and (6) Sensitivity and Risk analysis. The analytical approaches and tools to assess financial feasibility (Net Present Value, Internal Rate of Return, Benefit–Cost Ratio and Pay-back Period) are described and their uses in making a decision are explained.

The study can enhance the probability of project success - should the result signal a decision to proceed. It does so by addressing and mitigating early the internal and external risk factors that could affect the project.

Monitoring and Evaluation

The need for M&E is distilled in this statement: “Monitoring tells you if you are doing things the right way; evaluation shows if you are doing or had done the right things.

The tool is tailored to a single component intervention – the promotion of a technology – commercial pellet feed -- for adoption by fish farmers in a specific area. However it also provides an overview of the use of M&E in project design and planning.

Primary users are the M&E staff. The scope of responsibility of the M& E unit begins with project appraisal, when a proposal is assessed of its feasibility and acceptability prior to making a decision on whether to undertake it or to commit funding for it. The M& E staff participates in project design and planning to provide expertise in the development of a *logical framework* and an *evaluation matrix*.

The tool describes the guiding principles in setting up and operating an M& E system, the four parts of the system, steps in setting up the system, and reporting of the results.

M & E informs decisions relevant for the management and operation of a project or any development intervention, and provides lessons that would guide other or future interventions and guidelines for up-scaling a project. It provides the baseline data and information on the achievement of results to enable the measurement of impacts.

Consultation Recommendations

1. A final working group session was conducted for recommending a strategy and priority actions for promoting wide application of aquaculture planning and management tools in the region. The principle strategies promoting the adoption of aquaculture planning and management tools in the region recommended by the consultation are summarized below:

- FAO to support the expert team to further refine and finalize all the tools included in the toolkit and make it available to potential users for comments and suggested modifications
- FAO and partners to support the develop appropriate dissemination materials of the toolkit (training manual, web-based materials etc) for different purpose and target groups
- International and regional organizations (FAO, APFIC, NACA, SEAFDEC etc) are encourage to develop a regional program to support member countries to adopt the toolkit to improve planning and management of aquaculture. In addition , encourage the development of an effective mechanism (such as network of practice) for exchange of relevant experiences, knowledge and information
- Country government to conduct an in-depth analysis at country level on the gaps/constraints in effective application of the planning and management tools and develop appropriate strategy to tackle the issues/constraints
- FAO and other regional organization to support individual country with strong interest, but limited capacity to implement selected tools – to demonstrate how the tools can contribute to improved planning and management of aquaculture sector
- Identify and document success stories in using the tools and share experiences and lessons learnt across the countries
- Strengthen the country level capacity building and institutional support for application of aquaculture planning and management tools

Annex 1 Consultation Programme

FAO-APFIC-NACA Regional Technical Consultation on Aquaculture Planning and Management Toolkit and Strategies Promoting Its Adoption in Asia and Pacific

27-29 November 2013, Novotel Bangkok Ploenchit Sukhumvit, Bangkok Thailand

26 November/Tuesday	
Arrival of Participants	
27 November/Wednesday	
0830 - 0900	Registration and Assembly
Opening Session (Chaired by Weimin Miao, FAO)	
0900 - 0930	<ul style="list-style-type: none"> • Welcome/opening remarks, Mr. Vili Fuavao, FAO Deputy Regional Representative for Asia and the Pacific on behalf of Mr. Hiroyuki Konuma FAO Assistant Director General and Regional Representative for Asia and the Pacific • Welcome/opening remarks Mr. Eknath Ambekar, Director General, NACA • Welcome/opening remarks Mr. Chirdsak Vongkamolchoon, Deputy Director General, Department of Fisheries, Ministry of Agriculture and Cooperatives, Thailand
Session I Introduction to Aquaculture P & M tools and the Regional Technical Consultation (Chaired by Weimin Miao, FAO/C. V. Mohan, NACA)	
0930 - 0940	Introduction to the regional consultation
0940 – 0955	Global overview on Aquaculture Planning & Management Tools and Their Adoption
0955 -1010	Regional status of adoption of aquaculture P & M tools in Asia and the Pacific
1010-1025	Framework of the P & M toolkit for Aquaculture in Asia and the Pacific
1020 - 1045	Group Photo & Coffee break
Session II Presentation of draft Aquaculture P & M tools (Chaired by Weimin Miao, FAO/C. V. Mohan, NACA)	
1045 - 1145	Presentation and plenary discussion on draft tools related to Site selection and zoning <ol style="list-style-type: none"> 1. Site selection of floating cages 2. Visual impact analysis

	3. Flood risk analysis
1145 -1245	<p>Presentation and plenary discussion on draft tools related to Environment impact assessment and monitoring</p> <p>4. Environmental Carrying Capacity</p> <p>5. Environment Impact Assessment</p> <p>6. Environment management and monitoring</p>
12:45 -1400	Lunch break
1400 – 1500	<p>Presentation and plenary discussion on draft tools related to Social & economic impact assessment</p> <p>7. Socioeconomic impact assessment</p> <p>8. Feasibility study</p> <p>9. Aquaculture project monitoring and evaluation</p>
1500 – 1600	<p>Presentation and plenary discussion on draft tools related to Food safety and traceability</p> <p>10. Farm level hygiene</p> <p>11. Chemical residue control</p> <p>12. Traceability</p>
1600 - 1615	Coffee break
1615 - 1715	<p>Presentation and plenary discussion on draft tools related to Biosecurity and animal health management</p> <p>13. Farm level biosecurity plan</p> <p>14. Import Risk Analysis</p> <p>15. Emergency disease preparedness and response plan</p>
1715 - 1745	Overall discussion (Chaired by Weimin Miao, FAO/C. V. Mohan, NACA)
1830	Reception dinner
28 November/Thursday	
	Session III Working group sessions and the output presentation (facilitated by expert team)
0830 – 1115	<p>Working group discussion III- 1 (facilitated by expert team)</p> <p>Working group 1: Environment carrying capacity + Environment impact assessment (Dr. White)</p> <p>Working group 2 Checklist approach for site selection (Dr. Ross) + Import risk analysis (Dr. Perera)</p>

	<p>Working group 3 Economic impact assessment (Mr. Bueno) + Traceability (Mr. Andre)</p> <p><i>Coffee/ served during the working group session</i></p>
1115-1230	Presentation of outputs from Working group discussion III-1 and plenary discussion (Chaired by Weimin Miao, FAO/C. V. Mohan, NACA)
1230 -1330	Lunch break
1330- 1615	<p>Working group discussion III-2 (facilitated by expert team)</p> <p>Working group 1 Farm level hygiene + Chemical residue control (Mr. Andre)</p> <p>Working group 2 Environment management and monitoring (Dr. White) + Site selection for pond aquaculture (Dr. Ross)</p> <p>Working group 3 Emergency disease preparedness and response plan (Dr. Perera) + aquaculture project Monitoring and Evaluation (Mr. Bueno)</p> <p><i>Coffee served during the working group session</i></p>
1615 - 1730	Presentation of outputs from Working group discussion III-2 and plenary discussion (Chaired by Weimin Miao, FAO/C. V. Mohan, NACA)
29 November/Friday	
0900 - 1030	<p>Working group discussion III-3 (facilitated by expert team)</p> <p>Working group 1 Farm level biosecurity plan (Dr. Perera)</p> <p>Working group 2 Site selection/zoning of floating cages (Dr. Ross)</p> <p>Working group 3 Feasibility study (Mr. Bueno)</p>
1030-1045	Coffee break (during working group session)
1045 - 1130	Presentation of outputs from Working group discussion III-3 and plenary discussion (Chaired by Weimin Miao, FAO/C. V. Mohan, NACA)
	Session IV Recommendation for promoting adoption of aquaculture planning and management tools in Asia and the Pacific
1130 - 1200	Introduction to the Working Group Session IV – Recommendations for promoting adoption of aquaculture planning and management tools in Asia and the Pacific
1200 - 1300	Lunch break
1300 - 1430	<p>Working group session VI Recommendations for strategy and actions promoting adoption of aquaculture planning and management tools in Asia and the Pacific (focused on issues/constraints)</p> <p>Working group 1 - Awareness raising and dissemination of Aquaculture P & M tools</p> <p>Working group 2 - Enabling environment and capacity building for adoption of the tools</p> <p>Working group 3 - Regional collaboration and exchange for promoting the adoption of the tools</p> <p>Emphasize: who does what? (international/Regional organization, national government,</p>

	sector) Facilitated by expert team
1430 - 1445	<i>Coffee break</i>
1445 – 1545	Presentation of Working group session VI outputs and plenary discussion (Chaired by Weimin Miao, FAO/C. V. Mohan, NACA)
1545 – 1615	Closing session

Annex 2 List of Participants

Bangladesh	Cambodia
<p>Mr A K M Aminul Haque Deputy Director Department of Fisheries, Barisal Division Barisal Tel: +880 0431 64627 Fax: +880 0431 217 5277 Email: aminngn@yahoo.com</p>	<p>Mr Haing Leap Deputy Director Department of Aquaculture Development Fisheries Administration, Phnom Penh Cambodia Tel: +855 12 922 224 Email: leap_dad@yahoo.com</p>
China	Indonesia
<p>Ms Wang Dan Programme Officer Bureau of Fisheries, Ministry of Agriculture No 11 Nongzhanguannanli, Caoyang District Beijing, China Tel: +86 10 5919 2993 Fax: +86 10 5919 2918 Email: danwang@agri.gov.cn</p>	<p>Ms Wiwik Fitriyaningsih Assistant Deputy Director for America and Europe Cooperation Center of Analysis for International Cooperation and Institution Ministry of Marine Affairs and Fisheries RI Jalan Medan Merdeka Timur No.16, Jakarta 10110, Mina Bahari 1st Building, 1st floor. Tel/Fax.+62 21 386 4293 Mobile +62 812 800 8115 Email : whiedkp@gmail.com, whiedkp@yahoo.com</p>
	<p>Mr Iman I Barizi Directorate General of Aquaculture Ministry of Marine Affairs & Fisheries Jl Hegarmanah IV/no 19 RT 001/008 Pagentongan Gunungbatu, Bogor Jawa Barat Indonesia Tel: +62 813 1023 6367 Fax: + 62 782 2779 Email: ibtea2013@gmail.com</p>
Lao PDR	Malaysia
<p>Mr Vannaphar Tammajedy Department of Livestock and Fisheries, Ministry of Agriculture and Forestry</p>	<p>Mr Johari Bin Tim Department of Fisheries Malaysia Ministry of Agriculture Agro-Based Industry</p>

<p>P.O.Box: 6644, B. Sivilay, Nasaythong District, Vientiane Lao PDR. Tel: +856 20 5560 6866 Tel/Fax: +856 30 525 6799 Email: vannaphar@gmail.com</p>	<p>Malaysia Presint 4 Pusat Pentadbiran Kerajaan Persekutuan 62628 Putrajaya, Malaysia Email: joharitim@gmail.com</p>
Myanmar	Nepal
<p>Mr Tun Tun Oo Fishery Officer Ministry of Livestock, Fisheries and Rural Development, Department of Fisheries Tha-nat-pin Fishery Station Tel: +95 9 645 0251 Email: tuntunoo.dof@gmail.com</p>	<p>Mr Rajendra Kumar K C Directorate of Fisheries Development Balaju, Kathmandu Nepal Tel: +977 01 435 0833/9851 132430 Fax: +977 01 435 0833 Email: rajendrakc07@yahoo.com</p>
Pakistan	Philippines
<p>Mr. Muhammad Ayub Director General Fisheries DG House, Fisheries Complex, Manawan Near Jallo, Lahore, Pakistan Tel: +92 33 3428 3966 +92 42 3652 3077 Email: fishres@hotmail.com</p>	<p>Ms Lilian M Rueca Senior Aquaculturist Bureau of Fisheries & Aquatic Resources Region 3, City of San Fernando, Pampanga Philippines 2000 Tel: +63 91 7596 7307, 45 455 0824 Fax: +63 45 455 0824 Email: lilianrueca@yahoo.com.ph</p>
Singapore	Sri Lanka
<p>Ms Wee Joo Yong Deputy Director Aquaculture Technology Department Agri-Food & Veterinary Authority Aquaculture Services Centre, Sembawang Research Station, Lorong Chencharu Singapore Tel: +67 519 853</p>	<p>Mr Asanka Abeywardena J S D Mudiyanselage Ministry of Fisheries and Aquatic Resources Development, Maligawatta Colombo, Srilanka Tel: +94 71 406 7903 Tel/Fax: +94 11 244 5088 Email: asanka14@yahoo.com</p>

<p>Fax: +67 523 242 Email: wee_joo_yong@ava.gov.sg</p>	
Thailand	Viet Nam
<p>Ms. Waraporn Prompoj Senior Expert on International Fisheries Affairs Department of Fisheries, Chatuchak Bangkok, Thailand Tel: +66 2562 0540 Email: wprompoj@yahoo.com</p>	<p>Mrs. Suttinee Limthammahisorn Fishery Biologist, Senior Professional Level Coastal Fishery Research and Development Bureau, Chatuchak, Bangkok Thailand Tel./Fax: +66 2579 4496 Email: suttinel@gmail.com</p>
<p>Miss Saowanee Taplieng Fishery Biologist, Practitioner Level Department of Fisheries Prodprasob Building, Chatuchak Bangkok, Thailand Tel: +66 2 5797939 Email: yuyswn@gmail.com</p>	
Viet Nam	
<p>Mr Nhu Van Can Vice Director Aquaculture Department - Directorate of Fisheries, Ministry of Agriculture & Rural Development 10 Nguyen Cong Hoan Street, Ba Dinh, Hanoi, Vietnam Tel: +84 (0)4 37 24 67 82 Mob: +84 (0)913 025 788 Email: canny.tcts@mard.gov.vn</p>	
Consultants	
<p>Mr C V Mohan Research & Development Manager Network of Aquaculture Centres in Asia-Pacific (NACA) Suraswadi Building, Kasetsart University</p>	<p>Mr Devamullage Ramesh Perera Director Aquatic Animal Biosecurity Department of Agriculture, Fisheries and</p>

<p>Campus Jatujak, Bangkok 10900, Thailand Tel: +66 86 066 8351 Email: mohan@enaca.org</p>	<p>Forestry, Canberra, Australia Tel: +61 (0) 262 4675 Email: ramesh.perera@daff.gov.au</p>
<p>Mr Lindsay G Ross Professor of Aquatic Physiology Institute of Aquaculture, University of Stirling, Stirling, United Kingdom Tel: +44 7711 533 344 Email: lgr1@stir.ac.uk</p>	<p>Mr Patrick White Senior Aquaculture Consultant AKVAPLAN – NIVA, BP 411 Cedex 26402, Drome, France Tel: +33 678 619 186 Email: pwhitemobile@yahoo.com</p>
<p>Mr Vincent André Food Safety and Quality Advisor AETS Company 171/925 Pradiphath Road, Samsennai, Phaya Thai, Bangkok 10400, Thailand Tel: +66 86 6171 609 Email: vincent.andre@acts-consultants.com</p>	<p>Mr Pedro B Bueno Consultant 2/387 Prasert Manukitch Road, Senanikom, Jatujak, Bangkok 10900, Thailand Tel: +66 81 7316 594, +66 02 158 6519 Email: pete.bueno@gmail.com</p>
Experts	
<p>Mr Yuan Xinhua Deputy Director Freshwater Fisheries Research Centre, CAFS No 9 East Shanshui Road Wuxi, Jiangsu Province 214081, China Tel: +86 510 8555 5796 Email: yuanxh@ffrc.cn</p>	<p>Mr A G Ponniah Director Central Institute of Brackish Water Aquaculture Ministry of Agriculture No 75 Santhome High Road, R.A. Puram Chennai 600 028, Tamil Nadu, India Tel: +91 44 2461 7523 Fax: +91 44 2461 0311 Email: agponniah@gmail.com</p>
<p>Mr Maskur Maskur Director of Fish Health and Environment Directorate General of Aquaculture Ministry of Marine Affairs and Fisheries Jl Harsono RM No 3, Ragunan Jakarta Selatan Indonesia</p>	<p>Mr Nik Ab Wahab Bin Mat Diah Director Aquaculture Development Division Department of Fisheries Malaysia Ministry of Agriculture Agro-Based Industry Malaysia Presint 4 Pusat Pentadbiran Kerajaan Persekutuan</p>

<p>Tel: +62 81 2977 3474 Fax: +62 21 780 6131 Email: maskurfish@yahoo.com</p>	<p>62628 Putrajaya, Malaysia Tel: +60 19 5545115 Fax: +60 3 8889 1052 Email: nikwah01@dof.gov.my</p>
<p>Mr Qtae Jo National Fisheries Research and Development Institute 152-1, Haeanro, Gijang-up, Gijang-gun Busan, 619-705, Republic of Korea Tel: +82 55 640 4731 Email: qtjo@nfrdi.re.kr</p>	<p>Mr Nelson A Lopez Chief Inland Fisheries and Aquaculture Division Bureau of Fisheries and Aquatic Resources 2/F PHILCOA Building, Elliptical Road Diliman, Quezon City 1106, Philippines Tel/Fax: +63-2 929 3439 Email: nlopez_8550@yahoo.com</p>
<p>Mr Putth Songsangjinda Marine Shrimp Culture Research and Development Institute Coastal Fisheries Research and Development Bureau, Department of Fisheries Kaset-Klang, Chatuchak, Bangkok 10900 Thailand Tel: +66 2 579 3682 Fax: +66 2 561 0786 Email: putthsj@yahoo.com</p>	<p>Ms Cao Le Quyen Deputy Director Vietnam Institute of Fisheries Economics and Planning (VIFEP) No 10 Nguyen Cong Hoan, Ba Dinh, Ha Noi Viet Nam Tel: +84 9 8862 3740 Fax: +84 4 3834 5674 Email: quyenvifep@yahoo.com.vn quyenvifep@gmail.com</p>
Regional and international organizations	
<p>Mr Ambekar E Eknath Director General Network of Aquaculture Centres in Asia-Pacific (NACA), PO Box 1040, Kasetsart Post Office Bangkok 10903, Thailand Tel: +66 2 561 1728 (Ext. 117) Fax: + 66 2 561 1727 Mobile: +66 86 770 7288 Email: ambekar.eknath@enaca.org</p>	<p>Mr Relicardo Coloso SEAFDEC Aquaculture Department Tigbauan, Iloilo, Philippines Tel: +63 33 511 9170 to 71 Fax: +63 33 511 9070 Email: colosor@seafdec.org.ph</p>
<p>Ms Hnin Thidar Myint Regional Veterinary Officer OIE, World Organisation for Animal Health OIE Regional Representation for Asia and the Pacific, Food Science Building 5F The University of Tokyo 1-1-1 Yayoi, Bunkyo-ku, Tokyo 113-8657, Japan E-mail: hnin.thidar@oie.int, rr.asiapacific@oie.int oietokyo@tky.3web.ne.jp Tel: +81-3-5805-1931</p>	<p>Mr Abdul Basir Kunhimohamed Director General INFOFISH 1st Floor, Wisma Lkim, Jalan Desari Pulau Meranti, 47120 Puchong, Selangor Darul Ehsan, Malaysia Tel: +60 3 8064 9307, 019 322 4093</p>

<p>Fax: +81-3-5805-1934</p>	<p>Email: director@infofish.org</p>
<p>Mr Amaratne Yakupitiyage Associate Professor School of Environment, Resources and Development Aquaculture & Aquatic Resources Management FoS, Asian Institute of Technology GPO Box 4, Pathumthani 12120 Thailand Tel: +66-2 524 5456 Fax: +66-2 524 6200 Email: amara@ait.ac.th</p>	<p>Mr Nakahori Hiroaki JICA Thailand Office 31st floor, Exchange Tower 388 Sukhumvit Road, Klongtoey Bangkok 10110, Thailand Tel: +66 2 261 5250 (ex.128) Fax: +66 2 261 5262 Email: Nakahori.Hiroaki@jica.go.jp</p>
<p>Mr Anton Immink Global Aquaculture Director Sustainable Fisheries Partnership Tel: +44 7964 888 628 (UK) Email: anton.immink@sustainablefish.org</p>	<p>Mr Ernesto Jack Morales Aquaculture Technical Director Sustainable Fisheries Partnership Philippine based email: jack.morales@sustainablefish.org</p>
<p>Mr Theerawat Samphawamana Programme Officer Mekong River Commission Secretariat(MRCS) 576 National Road #2, Chak Angre Krom Phnom Penh, Cambodia Tel: +855 425 353 Fax: +855-23 425 363 Email: theerawat@mrcmekong.org</p>	<p>Mr. Jesper Hedegaard Clausen University of Copenhagen Department of Veterinary Disease Biology Stigbojlen 4, 1870 Frederiksberg, Denmark Email: jehc@sund.ku.dk</p>
<p>Mr Temdoug Somsiri Director Inland Aquatic Animal Health Research Institute (AAHRI) Department of Fisheries, Phayolyothin Road Jatujak, Bangkok 10900, Thailand</p>	<p>Mr Puttharat Baoprasertkul Inland Aquatic Animal Health Research Institute (AAHRI) Department of Fisheries, Phayolyothin Road Jatujak, Bangkok 10900, Thailand Tel: +66 2 579 4122, 579 6803 Email: puttharat@hotmail.com</p>

<p>Tel: +66) 579 4122, 579 6803 Email: tsi_f@yahoo.com</p>	
<p>Mr Rattanawan Mungkung Director Centre of Excellence on environmental strategy for GREEN business (VGREEN) Assistant Professor/Senior lecturer Department of Environmental Technology and Management Faculty of Environment, Kasetsart University Supracha Vachanon Building (25-Year Science Building), 5th floor Postal address: P.O. Box 1057 Ladyao, Chatuchak, Bangkok 10903, Thailand Tel: +66 2 562-5555 ext. 1508 Fax: +66 2 942 8715 E-mail: fscirwm@ku.ac.th</p>	<p>Mr Setasart Chaiseng Research Assistant Centre of Excellence on environmental strategy for GREEN business (VGREEN) Department of Environmental Technology and Management Faculty of Environment, Kasetsart University Supracha Vachanon Building (25-Year Science Building), 5th floor, Chatuchak Bangkok 10903, Thailand</p>
<p>Mr Jes Sammut A/Professor School of Biological, Earth & Environmental Sciences The University of New South Wales Sydney NSW 2052 Australia Tel:+61 403 154 863 Fax: +61 2 9385 1558 Email: j.sammut@unsw.edu.au</p>	
FAO	
<p>Mr Simon Funge-Smith Senior Fishery Officer FAO Regional Office for Asia and the Pacific 39 Phra Atit Road Phra Nakorn, Bangkok 10200 Thailand Tel: +66 2 697 4149 Fax: +66 2 697 4445 Email: simon.fungesmith@fao.org</p>	<p>Mr Miao Weimin Aquaculture Officer FAO Regional Office for Asia and the Pacific 39 Phra Atit Road Phra Nakorn, Bangkok 10200 Thailand Tel: +66 2 697 4119 Fax: +66 2 697 4445 Email: weimin.miao@fao.org</p>

Annex 3 Opening remarks by FAO ADG/RR for Asia and Pacific

Hiroyuki Konuma

Assistant Director-General and
FAO Regional Representative for Asia and the Pacific

delivered at the

Opening Session

FAO/APFIC/NACA Regional Technical Consultation on Aquaculture Planning and
Management Toolkit and Strategies Promoting Its Adoption in Asia and the Pacific

Novotel Bangkok Ploenchit Sukhumvit, Bangkok, Thailand

27-29 November 2013

Your Excellency, Dr. Chirdsak Vongkamolchoon, Director/Deputy Director General/
Royal Department of Fisheries, Ministry of Agriculture and Cooperatives

Dr Ambekar Eknath, Director General, Network of Aquaculture Centers in Asia-Pacific

Distinguished country delegates, representatives from regional and international
organizations , invited resource persons and FAO colleagues,

Ladies and Gentlemen,

Good morning,

It is my great pleasure to welcome you all to take part in this regional technical consultation on Aquaculture Planning and Management Toolkit and Strategies Promoting Its Adoption in Asia and the Pacific, which is jointly convened by Food and Agriculture Organization of the United Nations, Asian and Pacific Commission of Fisheries and the Network of Aquaculture Centers in Asia-Pacific.

Fish and other aquatic animals are gaining more and more importance in people's animal food consumption and nutrition. Fish and other aquatic animals currently comprises some 17% of animal food consumption of the people globally. Aquaculture industry has grown at the annual rate of 10% in Asia-Pacific in the past 3 decades, driven by the increasing demand of people for fish that cannot be met by the stagnant

capture fish production, and increasing global trade of seafood. Asia and the Pacific region is now contributing some 90% of global aquaculture production and providing a very important source of livelihood for the rural population in the region.

Being a newly developed food production sector, the past growth of aquaculture industry has been achieved from expansion of scale and intensification of production that have been poorly planned and managed in general. The anticipated population growth in the coming decades and changing diet habit of the people will significantly increase the demand for fish in the future, which is believed to be met by increased aquaculture production mainly from Asian region.

Fast growth of aquaculture in Asia region without proper planning and management has attracted increasing concern over its sustainability. Aquaculture in the region will continue to grow if the increasing demand for fish is to be met. But, such growth won't be sustainable if aquaculture planning and management are not improved significantly in the region. Thus, FAO has been making continuous efforts to support sustainable aquaculture development through improving its planning and management in the region. A FAO/APFIC regional consultative workshop on “Strengthening Assessments of Fisheries and Aquaculture in the Asia-Pacific Region for Policy Development and Management” was convened from 4-6 October 2011, Yangon, Myanmar, following the APFIC Session and EXCO recommendation. The workshop recommended to initiate regional activities to promote the use of different assessment tools in supporting informed planning and management of aquaculture for sustainability in the region.

Following the recommendation, a FAO/NACA regional study/workshop was conducted in 2012, which identified that one of the key constraints in informed aquaculture planning and management is the lack of practically applicable planning/management toolkit for the region and thus recommended development of appropriate aquaculture planning/management toolkit(s) as the priority for improving the planning and management of aquaculture for sustainability in the region. The recommendation was endorsed subsequently by the 4th APFIC RCFM and 32nd APFIC Session. The FAO/APFIC/NACA Regional Consultation on Sustainable Intensification of Aquaculture convened in October 2012 also recommended to strengthen the national capacities for situation appraisal, carrying capacity assessment, EIA, zoning (regional) and to make the relevant tools more readily available and accessible.

It has now been widely recognized that developing appropriate planning/management toolkit(s) and promoting their application in FAO member countries is a priority action needed for supporting the sustainable aquaculture development in the region. In order to address such regional priority, supported by FAO regular program, a team of renown international experts have been working very hard in the past several months and completed a draft aquaculture planning and management toolkit for Asia and the Pacific, which covers the key areas related to aquaculture planning and management at different levels, namely Aquaculture site selection and zoning, Aquaculture traceability and food safety, Aquaculture biosecurity and animal health, Aquaculture environment impact assessment and monitoring and Aquaculture socioeconomic impact assessment. This regional technical consultation is an important process to draw expertise, knowledge and experiences of wide range of stakeholders in helping the FAO expert team to finalize the toolkit and develop appropriate regional strategy to promote its adoption in the member countries in the Asia-Pacific region.

Ladies and gentlemen,

To achieve sustainable growth of aquaculture in the Asian and Pacific region is vital to meeting the increasing demand for fish globally, which will further contribute to the global food and nutritional security and as well as support the poverty alleviation through providing more attractive livelihood for rural population. Improvement in planning and development of aquaculture is the key to the sustainable development.

I am looking forward to your active participation in the consultation and valuable contribution of your knowledge and experiences towards modifying and finalization of the aquaculture planning and management toolkit and developing the appropriate strategies for promoting its wide adoption in the Asian and Pacific region. I also expect you to play active roles in promoting the adoption of the toolkit in your own country or through the work of your organization. Your practical experiences will help the further improvement of the toolkit in the future, which is going to be a continuous process.

Finally, I wish a great success of the regional technical consultation and a pleasant stay of all the participants in Bangkok.

Thank you for your attention!

Annex 4 Opening Remarks by DDG, DOF Thailand

Mr. Chirdsak Vongkamolchoon

Deputy Director General, Department of Fisheries, Royal Thai Government

FAO/APFIC/NACA Regional Consultation on Aquaculture Planning and Management
Toolkit and Strategies Promoting Its Adoption in Asia and Pacific

27 November 2013

at Novotel Bangkok Ploenchit Sukhumvit, Bangkok

Mr. Vili Fuavao, FAO Deputy Regional Representative for Asia and the Pacific

Dr. Ambekar Eknath, Director-General, NACA

Distinguished Delegates

Ladies and Gentlemen,

Good Morning!

On behalf of the Department of Fisheries of Thailand, I would like to express my sincere appreciation to the FAO, APFIC and NACA on their cooperation and making the Regional Consultation on Aquaculture Planning and Management Toolkit and Strategies Promoting Its Adoption in Asia and Pacific happened. I also would like to extend my warmest welcome to all of you to this regional consultation in Bangkok.

Fish and aquatic animals are a staple food of our people and its production and trade bring good income to the people and the families. Fish is well known as one of the most important available sources of animal protein for human nutrition as well. As the obviously declining growth of the capture production and aquaculture now produces more fish for food than capture fisheries in the region, we all are aware aquaculture sector is very important in countries' economic development, food security and well-being of people in the world including our Asia and the Pacific region which continues to be the dominant aquaculture producing region of the world. The growth rate of aquaculture production in our region has continued to be very strong with yearly growth rate in term of quantity of 6-7% between 2000-2010. However, aquaculture production is vulnerable to adverse impacts of natural, socio-economic, environmental and technological conditions. For example, marine shrimp farming in several countries in Asia have

experienced high mortality cause by disease outbreak in recent years which resulting in partial or sometimes total loss of production. These constraints could be reduced by proper planning and management which would support the aquaculture development to be more sustainable. As mentioned earlier by Mr. Konuma, FAO and APFIC has made efforts continuously on aquaculture management development in various region and found the need of toolkit for aquaculture planning and management for countries in the region. This toolkit would be anticipated benefit to countries on improving sustainable aquaculture development.

Actually most countries in region including Thailand have developed plan and strategies for their sustainable aquaculture development but not many in the farm level. However, promotion and adoption of developed tools or toolkits are needed by countries with different users. I would like again to express my appreciation to FAO, APFIC and NACA for their organization of this regional consultation that would culminate the priority actions for national government and regional organizations in promoting sustainable aquaculture through adoption of appropriate planning and management toolkits in the Asia-Pacific region.

Ladies and gentlemen,

If you agree with me, all of us commonly recognize the performance of APFIC and NACA, the regional significant consultative forum, in action on addressing of emerging issues of common interest in aquaculture to their member countries, as well as emerging concerns regarding resources, management, trade, where there is high uncertainty about the impact to aquaculture. We are hopeful that APFIC and NACA would, always, play a major role in supporting the development of a dynamic and sustainable aquaculture in our region.

In conclusion, we are confident that this regional consultation would bring about the support to aquaculture development in the region through the development of planning and management toolkits which would assist the governments and agencies in facilitating the sustainable aquaculture in the region. Therefore, I wish you all share valuable experiences and information on finalizing the aquaculture planning and management toolkits and the regional strategy to promote the adoption of the toolkit in the region during next three days.

Finally, I wish you an enjoyable, successful consultation and a pleasant stay in Bangkok . It is my pleasure to now declare the Regional consultation on Aquaculture Planning and Management Toolkit and Strategies Promoting Its Adoption in Asia and Pacific open.

Thank you.