



**STRATEGIES FOR TRAWL FISHERIES
BYCATCH MANAGEMENT
(REBYC-II CTI; GCP/RAS/269/GFF)**

**NATIONAL GUIDELINES ON
TRAWL FISHERIES
MANAGEMENT IN VIET NAM**

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1. Background

1.1. General information

The Code of Conduct for Responsible Fisheries (Food and Agriculture Organization of the United Nations, FAO, 1995) calls for the sustainable use of aquatic ecosystems and requires that fishing be conducted in the environment friendly manners. The Code also promotes the maintenance, safeguarding and conservation of biodiversity of ecosystems by minimizing fisheries impacts on non-target species and the ecosystem in general. However, despite the Code's endorsement by all FAO Members, there is growing global concern that levels of fishing mortality as a result of bycatch and discards threaten the long-term sustainability of many fisheries and the maintenance of biodiversity in many areas, resulting in increased food insecurity and adversely affecting the livelihoods of fishing communities and fish workers dependent on fish resources.

The call for action to manage bycatch and discard to ensure the sustainable fisheries development is highlighted in the FAO International Guidelines on Bycatch Management and Reduction of Discards, endorsed by the Committee on Fisheries (COFI) at its twenty-ninth session in 2011. Consequently, states, sub-regional and regional fisheries management organizations (RFMOs) and other relevant international organizations were urged to reduce or eliminate bycatch, catch by lost or abandoned gear, fish discards and post-harvest losses, and to support studies and research that will reduce or eliminate bycatch of juvenile fish.

Trawl fisheries are among the most productive fisheries in the world and in Viet Nam, trawling is one of the most important fishing methods, with an estimated of about 20,000 trawlers operating in the country. The recent increase in fish meal production and in other fish products coming from trawl fisheries in Viet Nam can be attributed to increase in fishing effort and expansion of the geographical range of fishing activities, and to the retention of most of the fish caught (including shorter-lived, small-sized, fast-recruiting species). The rapid increase in trawl fishing effort in Viet Nam can therefore lead to significant problems on the fisheries sustainability. Attempts at regulating and controlling this development have so far been weak and ineffective mainly because of non-compliance, limited enforcement and fishers' lack of awareness of regulations.

As catch rates and profits have declined, ecosystems have been altered, and conflicts between trawl fishers and other users of the resources, especially small-scale artisanal fishers, have become a common occurrence.

Fisheries management aims to increase the social, environmental and economic benefits from harvesting natural fisheries resources. It attempts to reduce the negative impacts of the many complex issues that affect the sustainable development of fisheries.

The situation today in Viet Nam in trawl fisheries is that it catches large quantities and a great diversity of fish and shrimp to fulfill market demands, with very little discarding. Data that would allow the accurate categorizing of landings for various uses are unavailable.

The trawl sector provides very significant incomes and economic wellbeing for many local communities in the entire country. It provides large number of jobs directly in the sector and an even larger number in related industries such as fish meal factories, processing plants, transport, refrigeration, and supporting services.

However, the expansion of trawl fisheries has reached a limit as there are no new, unexploited fishing grounds available. Although there are some possibilities for expansion into deeper waters, it is well known that these areas have lower diversity and quantities of fish than shallower fishing grounds. The outcome is almost certain: those trawlers would soon return to depleted near-shore areas.

The contribution of trawl fisheries to fish production, occupations and income generation is counter balanced by concerns about the sustainability of catches and ecosystem impacts. As a consequence, these fisheries require careful management underpinned by sound information and solid enforcement to support a transition to sustainable trawl fisheries management and practices.

These guidelines are targeted primarily at fishery departments and institutions that are tasked with fishery management at national and provincial levels in Viet Nam. The guidelines are expected to provide concrete advice on options that are available to address typical issues facing tropical trawl fisheries in Viet Nam. A second purpose of the guidelines is to increase understanding of the issues of Vietnamese trawl fisheries and the ways that they can be managed. It is intended that other stakeholders in the fishery and market chain will better understand how management processes can be supported and implemented. This improved understanding will enable stakeholders to engage more effectively with fishers and fishery managers in addressing their particular concerns about fishery management, resource use and sustainability.

1.2. Overview of trawl fisheries in Viet Nam

1.2.1. General introduction

Trawl is one of the most important gears in marine capture fisheries of Viet Nam. Trawl fisheries can be operated in many areas of Viet Nam with high diversity species composition. Trawl fishery has played an important role in national economic development and in total catch of marine capture fisheries. However, the contribution of the trawl fishery is no longer considered sustainable due to its impacts to marine ecosystems. This is due to lack of efficient fisheries management system of trawl fisheries. In addition, there is wider recognition and knowledge of fishing communities of

the trawl fisheries which is not sufficient on fisheries resource conservation. Lack of effective enforcement ability due to limited human and financial resources is also one of the main causes for unsustainable development of the trawl fisheries. Finally, selective and environmentally friendly gear modifications are not appropriately utilized in the trawl fisheries. Therefore, trawl fisheries management is challenging and there is a need to implement suitable solutions.

1.2.2. Trawl fisheries fleet structures of Vietnam

Up to September 2015, there were about 20,000 vessel units using trawling gears in Viet Nam accounting for a large percentage (about 20%) of total vessel numbers. Of those, the total number of vessel fishing in the coastal areas were about 7,640 and trawlers operating in the offshore areas about 12,560. In general, there has been a large change on the fishing fleet structure over some years. The number of trawl vessel with high capacity has increased over the past few years. Provinces where trawl fishery has developed include QuangNinh, ThanhHoa, Nghe An, KhanhHoa, BinhThuan, Ba RiaVung Tau, Ben Tre and KiênGiang.

1.2.3. Overview of types of trawl fisheries in Viet Nam

1.2.3.1. Otter trawl

Before the otter trawl vessels were not using other gear types on board (while other multi-gear fisheries were). However, recently the otter trawl vessels can also be integrated with pair trawl vessels or to shift to other fisheries such as squid hand-line, gillnet, fish longline, etc. Normally, the otter trawl vessels of Viet Nam are operating in small groups with 2-7 vessels in each group. The otter trawls in the group usually communicate with each other to exchange information on fishing grounds, market price and support each other in fishing at sea. According to a recent survey results about socio-economics of the otter trawl fishery, workers of the otter trawl are usually young, between 18-40 years old, with low education.

1.2.3.2. Pair trawl fishery

Similar to the otter trawl vessels, high cost for fuel in the pair trawl fishing fleets is largely contributing to high overall costs of a trip and is highest in offshore marine capture fisheries.

The pair trawl fishing vessels are not using multiple gears. The pair trawl fishing vessels of Viet Nam are often organized in fishing groups with 2-10 pairs for each group. Fishing ground is often located in the offshore areas and with high negative impacts on benthic ecosystems and related environment.

1.2.3.3. Shrimp trawl fishery

The shrimp trawl fishery is the most abundant in the Northern, Eastern and Southwestern regions of Viet Nam. There are two shrimp trawl-fishing fleets: shrimp otter trawl and shrimp beam trawl fleet. Normally, the shrimp beam trawl vessels have small engine capacity of around 20-90 HP. The main target species of the shrimp beam trawl fishery are shrimp, crab and some small demersal fishes. Shrimp otter trawl vessels are smaller with the engine capacity of 40-60 HP and the key target species are shrimp and small demersal fishes. In general, the shrimp trawling vessels are operating individually without teaming with each other. Professional ability of these vessels is not very high and thus it is difficult to manage these fleets.

1.3. Status of fisheries management and trawl management in Viet Nam

1.3.1. Inputs control

1.3.1.1. Fishing boats management

Up to September 2015, the total number of fishing boats was about 106,700 units including logistic and fishing vessels, with a total engine capacity of over 6.5 million horse power in which: the fishing boat with engine under 20 HP is about 75,000 and offshore fishing boats is about 31,000 units. Of those, there are about 20,200 trawlers accounting for 19.3% in total (the trawlers operating in the coastal areas are 7,639 units and those operating in the offshore areas are 12,562 units).

Fishing boat management is conducted by the registration and licensing system. The management and issuing of fishing licenses play a very important role in controlling the number of fishing boats participating in capture fisheries reasonably with specifications of provinces and fishing grounds with a view to manage fisheries in a sustainable way.

At present, fisheries licensing is being implemented by Decree 33/2010/NĐ-CP dated 31/3/2010 of the Government on regulating the operational conditions of capture fisheries and Decree No. 53/2012/NĐ-CP dated 20/6/2012 of the Government on the amendment of some articles in the Decrees of fisheries sector, the Circular 25/2013/TT-BNNPTNT dated on 10/5/2013 of the Ministry of Agriculture and Rural Development on the guidance of implementing Decree 33/2010/NĐ-CP dated 31/3/2010 of the Government on management of fishing activities of organization and individuals in Viet Nam and implementation the Article 3 of the Decree 53/2012/NĐ-CP dated 20/6/2012 of the Government on the amendment of some articles of the Decrees on fisheries.

However, licensing is not based on the master plan for the capture fisheries. Licensing is still considered as an administrative procedure and is not synchronized and implemented in a systematic manner from central to local.

1.3.1.2. Fishing gear management

Circular No. 02/2006/TT-BTS guiding the implementation the Government Decree 59/2005/NĐ-CP dated 04/5/2005 on the operation conditions of some fishing gears and Circular 62/2008/TT-BNN revising, amending and supplementing some contents of Circular 02/2006/TT-BTS dated 20/3/2006, which regulates the minimum mesh size for some fishing gears and permitted minimum size for some specific species. However the compliance of fishermen is a big challenge. The enforcement at sea is very weak and is insufficiently equipped in terms of human resources and investment capital.

1.3.2. *Technical measures*

1.3.2.1. Zoning for management

The Decree 33/2010/ND-CP dated on 31/3/2010 of the Government regarding management of fishing activities of Vietnamese organizations and individuals in marine areas; Circular 25/2013/TT-BNNPTNT regulating the implementation of some Articles of the Decree 33/2010/ND-CP and Article 3 of Decree 53/2012/ND-CP dated 20/6/2012 of the Government on revising and supplementing some articles of Decrees on fisheries sector. The Circular 25/2013/TT-BNNPTNN stipulates the decentralization to the district and commune levels to formulate their own fisheries management models with participation of communities at lowest levels in managing the fishing activities in coastal areas. However, the provinces are also facing a lot of difficulties and challenges in applying the practical and suitable model of coastal fisheries management.

For the offshore areas, the Ministry of Agriculture and Rural Development has been mandated to manage entire country from the fisheries resources assessment, development of master plans/strategies to set up management measures. Recently, the Prime Minister issued Decision 1445/QĐ-TTg dated on 16/8/2013 approving the Master Plan for fisheries development to 2020, version to 2030.

1.3.2.2. Closed seasons

Although the Ministry of Agriculture and Rural Development (MARD) issued Circular 89/2011/TT-BNNPTNT regulating a list of areas which are prohibited for fishing activities in particular periods of the year, this Circular only regulates the closed seasons for some provinces without regulating the specific fishing closed gears. In most of provinces where they have regulations on the closed seasons/areas the fishing activities cannot be controlled due to lack of mechanisms and a holistic policy on safeguarding livelihoods for fishermen during closed seasons.

1.3.3. Output control

The control of the total allowable catch is very important, especially for some high economic valuable species which are vulnerable to overfishing such as tuna, shrimps, squid, etc. However, because fisheries statistics system from central to local level is still limited and incomplete, there is not enough scientific evidence to develop resource-based management measures to control the overexploited species in order manage and protect fisheries resources in a sustainable manner.

1.3.4. Monitoring, controlling and surveillance system (MCS)

1.3.4.1. Monitoring system

In order to monitor fisheries, Government has established a Decree No. 33/2010/NĐ-CP, Circular No. 25/2013/TT-BNNPTNT to request local authorities to regularly report to MARD; for fishing vessels higher than 20 HP the logbook must be submitted to local authorities. This task is being implemented in almost coastal provinces.

Viet Nam has established a routine data collection system since 2000 however this system was interrupted in a long period (2005-2013) due to lack of financial and human resources as well as collaboration mechanisms among Government agencies.

For vessel registration database, Viet Nam has established a database called VNFishbase however this is not systematic system from central to local levels and not being updated regularly.

1.3.4.2. Controlling system

For controlling activities, Viet Nam has established many legal documents to manage fishing vessels, registration, licensing, closed areas/seasons for fishing, mesh size limitations, forbidding use of explosives, poison and electricity material on fishing in order to manage fisheries in accordance with strategies and plans by the Government.

1.3.4.3. Surveillance

Viet Nam is implementing two approaches for surveillance on fishing operations: landing surveillance and surveillance using central and local inspection system.

Viet Nam has gradually completed inspection system and landing surveillance. Central inspection system in the offshore areas is now developing and coastal inspection system by local authorities as well. For instance, legal and institutional arrangements are being revived and developing to establish an effective and efficient fisheries inspection system.

Viet Nam has presently installed VMS and supporting the installation of high frequency radio system integrated with GPS (installed in 3000 vessels) to monitor fishing vessel

operations and provide weather and fishing ground forecast as well as to help fishers to avoid natural disasters.

1.3.5. National legislations for trawl fisheries management

The specific regulations on managing shrimp and fish trawlers and/or bycatch issues are not sufficient for an effective management in Viet Nam at present. Therefore, in the framework of this project, the regulations for management of the trawl fishery, will be proposed and legislated aiming to be applied for trawl fishery nationwide in the near future.

The Decree No. 33/2010/ND-CP dated on 31 March 2010 is addressing the management of fishing operations of Vietnamese organizations and individuals in all marine areas. The Decree focuses on zoning which categorized areas in inshore waters, coastal areas and offshore areas. The coastal and inshore areas are managed by provincial fisheries management authorities and the rest of the areas in the offshore are being managed by central agencies. This is a legal baseline for fisheries co-management implementation in all coastal provinces.

The Circular No. 02/2006/TT-BTS of Ministry of Fisheries dated March 20th 2006, provides guidelines on regulation of gear mesh sizes used in fishing operation for all marine capture fisheries, including gillnetters, trawlers, seiners, etc. The minimum mesh sizes (stretched mesh size) of the codend allowed for bottom trawl is ranging from 20 mm (shrimp trawler equipped with engine of less than 45 HP) to 30 mm (for the shrimp trawler with the engine of more than 45 HP). The trawlers with more than 150 HP engine capacities are allowed to use the minimum codend mesh size of 40 mm.

1.3.6. Limitations/shortcomings on trawl fisheries management in Viet Nam

- Circular No. 02/2006/TT-BTS issued on March 20, 2006 for guiding the implementation of Government Decree No. 59/2005/ND-CP on production conditions and trading of fisheries products and Circular 62/2008/TT-BNN May 20, 2008 amending and supplementing a number of provisions of Circular No. 02/2006/TT-BTS have been developed and approved. However, these Circulars are based on old scientific research that has not been updated recently.
- Activities on trawl fisheries data collection have not been fully implemented and is unsystematic and thus it is very difficult to have correct assessment of marine resources and hence management of trawl fisheries. There were some research implemented but funding sources for the data collection activities are limited and this has been seriously affecting the accuracy and reliability of the research results.
- Fisheries surveillance activities at sea and at landing sites have not been appropriately considered in fisheries management of Viet Nam in general and in

trawl fisheries in particular. Therefore, illegal and unregulated fishing activities are frequently happening in the trawl fisheries.

- Increase of the total number of trawl vessels has been occurring on trawl fisheries in Viet Nam over the past few years. However, these increases have revealed many problems such as unsustainable development, insufficient and uncontrollable fisheries management, uncontrolled number of fishing boats and many fragmented and small-scale fishing operations. Illegal fishing has still been occurring and has seriously been threatening marine resources sustainability especially in the coastal areas.
- Shrimp and fish trawlers operating in coastal areas may have some negative impacts to estuarine habitats, MPAs and sea grass beds. However, no study on this matter has been conducted.
- MCS system on Viet Nam's fishery management is weak. Fisheries inspection is not good enough to implement MCS activities. The sector works rather in an open access situation. Government is managing to control fishing effort, however, this task demands on high efforts in terms of finance, manpower, etc.
- Lack of legal and institutional frameworks for effective management of bycatch and trawl fisheries.
- Insufficient data and information on bycatch and impacts of trawl fisheries on the marine environments and habitats.

2. Scope, purposes and objectives of the guidelines

2.1. Scope of the guidelines

These guidelines cover the range of typical management issues, problems and potential solutions in Viet Nam's trawl fisheries. Of particular importance are such issues that relate to small scale fisheries that have their own unique problems as they try to balance economic growth with sustained food production, human nutrition and environmental health. These guidelines are applicable to the various forms of trawling used in Viet Nam including fish and shrimp trawlers, bottom and pair trawlers. However, it is recognized that different management issues and measures may be relevant only for certain gears.

These Guidelines are addressed to local authorities of the entire country where trawl fisheries are occurring, and local small-scale fisheries actors (fishers, fish workers, their communities, and related professional organizations). The Guidelines are also aimed at research and academic institutions, the private sector, non-governmental organizations (NGOs) and all others concerned with the trawl fisheries, and the use of the trawl fisheries products.

2.2. Purposes of the guidelines

Main purpose of these guidelines is to provide practical, simple and easy-to-read advice to trawl fisheries managers of all levels on options for addressing the typical challenges raised by trawling in Viet Nam. The purpose of these guidelines is also to assist provincial central and local management authorities in managing trawl fisheries in the light of the international, regional and national instruments and an ecosystem approach to fisheries through effective management of their trawl fisheries.

This document is a guide to inform the local fisheries managers and authorities (including Provincial Fisheries Offices, Local Government Units) who are empowered to regulate fisheries, about management interventions that are available for dealing with specific issues concerning trawling in Viet Nam. These guidelines are also meant to enable more effective dialogue with fishers to help them make decisions as part of a “bottom-up” approach to fisheries management.

3. Guidelines on development of provincial management plans

3.1. General introduction

Fisheries management to date has often been ineffective partly because it has focused on maximizing the catch of a single target species and often ignores habitat, predators and prey of the target species, and other ecosystem components and interactions. The indirect social and economic costs of the focus on single species can be substantial. To address the critical need for a more effective and holistic management approach, a variety of advisory panels have recommended ecosystem considerations be considered broadly and consistently in managing fisheries. Ecosystem-based fishery management (EBFM) is a new direction for fishery management, essentially reversing the order of management priorities to start with the ecosystem rather than the target species.

The overall objective of EBFM is to sustain healthy marine ecosystems and the fisheries they support. In particular, EBFM should help to (i) avoid degradation of ecosystems, as measured by indicators of environmental quality and system status and (ii) account for the requirements of other ecosystem components (e.g., non-target species, protected species, habitat considerations, and various trophic interactions). Maintaining system characteristics within certain bounds may protect ecosystem resilience and avoid irreversible changes.

3.1.1. Purpose

The purpose of this section is to provide guidance to local departmental staff (provincial fisheries management authorities) in the development of provincial trawl fisheries management plans (TFMP) with considerations of ecosystem approach. This guidance document aims to clarify the required content, as well as to recommend a general process

to develop a TFMP.

It is essential that all staff is aware that TFMP is not a legally binding instrument, and cannot form the basis of a legal challenge. The TFMP can be modified at any time. Its development does not affect the regulations set out in the legislation fisheries.

3.1.2. What is a TFMP?

The TFMP is both a process and a document. Its primary goal is to provide a planning framework for the conservation and sustainable use of trawl fisheries resources which will be managed for a period of time.

As a process, it integrates the expertise and activities of all sectors (i.e. ecosystems and fisheries management, strategic and program policy...). It also allows for enhanced input from resource users and other stakeholders into decision-making processes regarding management and conservation measures affecting trawl fisheries.

As a document, TFMP is an important reporting tool and valuable source of information on trawl fisheries for fisheries managers, legislated co-management partners, fishery participants, other stakeholders and the general public. It provides a clear and concise summary of the fishery, which includes scientific aspects, management objectives for the fishery, management measures used to achieve those objectives and criteria by which attainment of objectives will be measured. The provisions of the plan will determine how the fishery will be managed and, where applicable, what will appear in license conditions.

3.1.3. Approvals process

The TFMP should be approved and issued by local fisheries authorities authorized in provinces (i.e. Department of Agriculture and Rural Development). However, TFMP should be approved by a manager who is above the person leading the development of a TFMP. For instance Sub-Department of Capture Fisheries is leading to develop a TFMP to submit to DARD.

3.1.4. Annual review

An annual performance review (or post-season review) of the effectiveness of the TFMP is a crucial part of the TFMP process. Such a review helps to determine the effectiveness of the year's management measures and identify areas for improvement. It is also part of the auditing requirements to establish performance measures for the effectiveness of programs.

There are four main elements that should be considered in the IFMP review:

- Assessment of the TFMP development process;

- Assessment of the plan itself;
- Assessment of the effectiveness of the measures implemented (outputs and outcomes); and
- Recommendations and suggestions for improvement.

Performance reviews also provide an opportunity to examine harvest decision rules, and test whether they have been working and are compliant with the precautionary approach. However, reviews of harvest decision rules may not be required on an annual basis.

3.1.5. Legal context

TFMP is not a legally binding instrument; this should be clearly stated at the beginning of every TFMP using the following text: “This TFMP is not a legally binding instrument”, which can form the basis of a legal challenge. The TFMP can be modified at any time. The local authorities can, for reasons of conservation or for any other valid reasons, modify any provision of the TFMP in accordance with the powers granted pursuant to the legislations”.

3.2. What are the steps in developing a management plan?

There are several possible steps to develop a management plan. However, there are main four steps should be considered as indicated in the below figure (Figure 1).

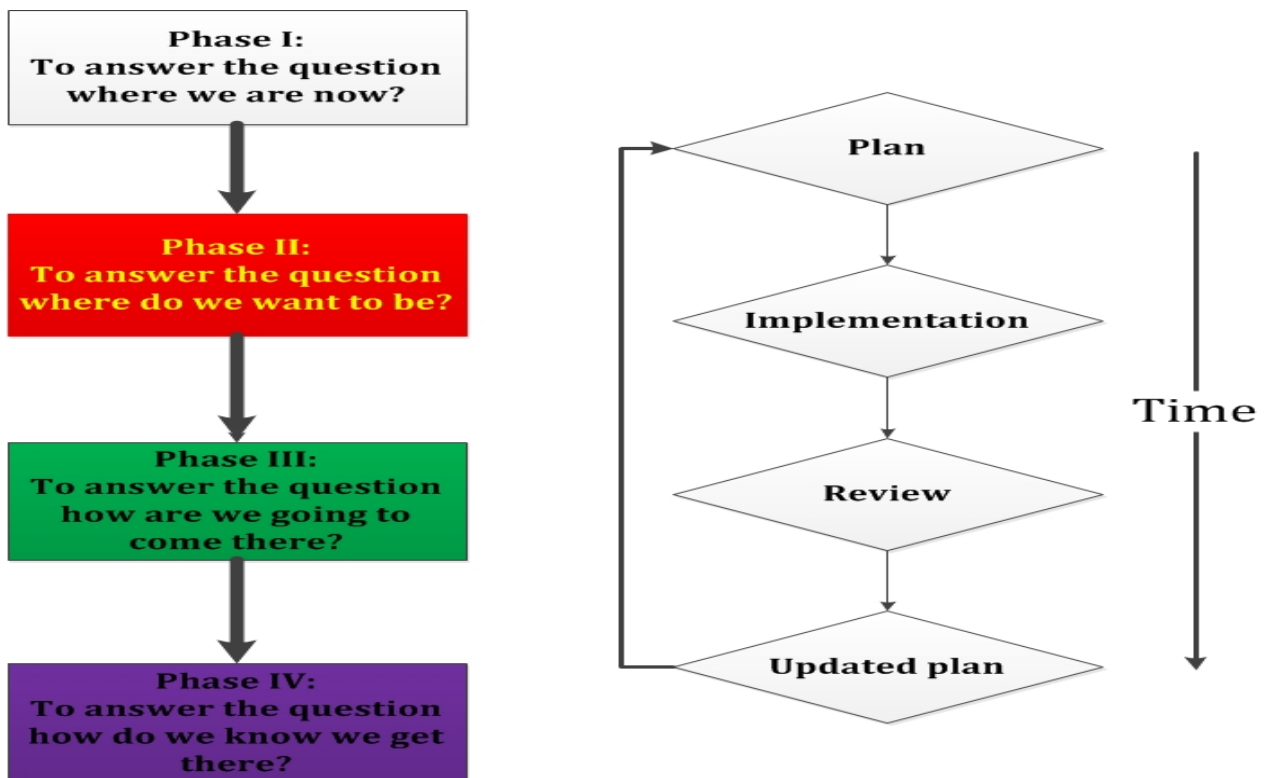


Figure 1. Main phases in writing a trawl fisheries management plan.

These are to answer some questions: (i) where we are now? (ii) Where do we want to be? (iii) How are we going to get there? (iv) How do we know to get there?

In the process of developing a trawl fisheries management plan, there are some phases and stages to be considered as following:

Phase	Stage
<p>I. Preparation for developing the management plan.</p> <p>This phase is to answer the question where are we now?</p>	<ol style="list-style-type: none"> 1. Define: This is dependent on which fisheries you want to manage. In this case we only consider on trawl fisheries and thus trawl fisheries management plan must be defined. 2. Stakeholder analysis: Conduct a stakeholder analysis and decide how we are going to enhance and involve the stakeholders. 3. Situation analysis: Conduct a situation analysis and prepare a list of problems facing on trawl fisheries (or whichever fisheries). 4. Management approach: Decide on your management approach.
<p>II. Developing the management plan</p> <p>This phase is to answer the question where do we want to be?</p>	<ol style="list-style-type: none"> 5. Purpose: An overall purpose should be agreed by all stakeholders on trawl fisheries management. This should be based on ecosystem approach to fisheries management which integrating all social, ecosystem and economic aspects to balance these perspectives. 6. Goals: As indicated above, EAFM should be considered and thus we have to decide on the biological, ecological, social and economic goals to be reached. 7. Objectives: All objectives with respect to goals, which were developed above, should be defined. 8. Management standards: Decide reference points and indicators for each objective. This is to answer the questions on what and how we are going to measure to show that we are achieving our objectives.
<p>III. Developing the management plan</p> <p>This phase is to answer the question how are we going to get</p>	<ol style="list-style-type: none"> 9. Management measures: Decide management options or actions to be taken to achieve the objectives. These can be: mesh size regulations, fishing close seasons/areas, BRDs use compulsory, co-

there?	management approaches, community organization, etc. 10. Resources: Decide what resources we need to put out plan into action.
IV. Planning to implement, evaluate and review the management plan This phase is to answer the question how we will know if we get there?	11. Implementation: Make action plan to implement our management plan. 12. Monitoring: Monitoring is to understand how well our plan is achieving our objectives. 13. Reviewing: Review the plan every few years.

3.3. TFMP document guidance

TFMP serve two key functions:

- Identification of the issues, objectives and management measures designed to ensure an orderly, economically viable, socially/culturally beneficial and sustainable trawl fishery; and
- Communication of basic information on trawl fishery and its management bodies and to outside parties.

Once the TFMP has been finalized, it should constitute an explanation and document of record of how the trawl fishery is managed for readers both within and outside local authorities.

A template to guide the development of TFMP can be following:

3.3.1. Cover Page

Indicate ecosystem-based trawl fisheries management plan and year(s) covered by the plan. Use standard format, and (where available) illustration(s) of the boat.

3.3.2. Overview of the Fishery

The purpose of this section is to provide a general overview of the trawl fishery and provide context for the TFMP details that follow.

1.1. Trawl history: Providing a brief history of the fishery will assist the reader in understanding the fishery, how it developed over time, and the basis of its management regime.

1.2. Type(s) of trawl fisheries: Commercial, artisanal, small scale, etc.

1.3. Participants: Include relevant information such as number of license holders, number of vessels, and number of communities and distribution of participants.

1.4. Location of the trawl fisheries: Describe the management areas/zones where fishing occurs (i.e. regulatory zones and specific areas of trawling vessel operation) and distribution and intensity (where available) of fishing effort. A map for this section is the best.

1.5. Fishery characteristics: Describe the gear types used in the fishery (i.e. bottom, middle, pair shrimp trawls, etc.), including numbers for each if possible, and type of method used to manage the fishery (i.e. seasons, zoning, input vs. output control, etc.), as well as the general timeframe (i.e. season) of when the fishery occurs.

1.6. Governance: Briefly describe key legislation and regulations, as well as types of committees and/or legislative area claims, which are part of the decision making process (based on zones, areas, regions, international considerations).

1.7. Approval process: Describe the general management decision-making process (i.e. decisions made by DARD, MARD...). Information regarding decision-making and approval processes for the TFMP and associated management actions should be general in nature, and indicate who is ultimately responsible for final decisions.

3.3.3. Stock assessment, science and traditional knowledge

The purpose of this section is to provide the reader with an overview of the general biological characteristics of those species targeted by the trawl fishery, their role in the ecosystem and the population status.

Ecosystem interactions: Briefly describe interactions with other species and the physical environment. Where the information is available, briefly describe the effect of climate regime changes on stock status, particularly recruitment and stock productivity.

Stock Assessment: Provide a summary of the stock assessment process, including types of data sources utilized (i.e. research vessel trawl surveys, index fisheries, Catch Per Unit of Effort (CPUE), landing statistics, sentinel fisheries, etc.) and frequency of assessment. For single year plans, provide a summary of the most recent assessment results. For multi-year plans, assessment results are to be provided in the appendices and updated whenever new assessments are completed. Where applicable, scientific studies on bycatch species intercepted by the fishery – such as benchmarks for sustainability of the species, population dynamics, discard mortality rates, effectiveness of bycatch mitigation measures – should be referenced.

Precautionary Approach (PA): Where established, a brief summary of PA reference points (i.e. removal reference, limit reference point and upper stock reference point) and population levels corresponding to stock status zones established under the auspices of the precautionary approach should be provided. Such information is best presented as a table or graph setting out the zones, reference points delineating the zones and the current status of the stock.

Research: Provide a brief overview of research projects being conducted during the period of the plan and their purpose. Also include any research needs not currently being addressed. Consider not just the target species, but also research on associated bycatch and habitat.

3.3.4. Economic, social and ecosystem considerations

The purpose of the economic content in the TFMP is to provide a brief overview of economic conditions and social, ecosystem and economic issues. Use charts and figures where applicable. When extensive analysis is undertaken, summarize and provide reference to a separate analytical document. This section should describe and assess:

- the scale and significance of the trawl fishery in economic terms, and where possible, in a social and ecosystem context (for example, fish meal, incomes, employments, where available);
- the general profitability of the trawl fishery and the economic health of its markets; and
- where applicable, the specific socio-economic impacts of proposed (or incidental) changes in the fishery.

To the extent that these socio-economic aspects of the fishery carry important implications for stock conservation and sustainable use, they are also important for fully informing decision makers, managers, industry and the general public.

For some provinces, there will be a lack of economic information, and the production of a full analytical document may not be practical. The socio-economic framework allows for flexibility in the scope of the analysis that will be carried out, in order to accommodate a wide variety of situations.

3.3.5. Management issues

The purpose of this section is to provide the reader with an overview of key management issues and problems facing the fishery, including those related to the target species, as

well as bycatch and ecosystem concerns. Potential examples of management issues include:

- Fisheries issues, such as conflicts between gear sectors, discard and catch monitoring, concerns regarding trends in the status of the target stock, bycatch problems and other resource user issues.
- Oceans and habitat considerations, including areas of ecological importance that have been identified and documented within the geographic range of the fishery. Maps or geographic coordinates of the area boundaries should be supplied where possible, as well as information about any existing conservation objectives and restrictions/prohibitions in place within the boundaries. Potential interactions between fishing gear and each of these areas should be discussed, with consideration of the intensity and distribution of the fishery.
- Gear impacts, including benthic habitat impact and resulting impacts.
- International, regional and national issues

3.3.6. Objectives of TFMP

The TFMP objectives should be specific, measurable, attainable, relevant and timely and developed to address (and potentially resolve) those management issues outlined in TFMP above section.

Long-term objectives (i.e. those not limited to the duration of the plan) should be developed as a first step. Long-term objectives may address issues related to stock conservation, ecosystems, stewardship, social, ecosystem and economic, compliance and other relevant considerations. Each long-term objective should be supported by one or more short-term objective(s), which are specific for the duration of the plan.

3.3.7. Management measures

Management Measures outline the controls or “rules” adopted for the fishery for the period of the plan, including the stock conservation and ecosystem management measures. These would include such measures as total allowable catch (TAC), seasons, gear restrictions, monitoring tools, vessel monitoring system (VMS), bycatch protocols, discarding protocols, conservation harvesting techniques (including those related to byatch and depleted species), selective fishing requirements (i.e. BRD, TED, fish eye), habitat protection requirements and financial arrangements with industry.

3.3.8. *Compliance plan*

The purpose of this section is to provide the reader with a general overview of the compliance program and a summary of issues and strategies designed to help secure good levels of compliance with legislation, regulations and management measures. For single-year plans, describe priorities as set out in enforcement plans to meet objectives. For multi-year plans, this information is to be provided in an appendix and updated annually. The Compliance Management Plan will be composed of the sections described below.

3.3.9. *Performance review*

Management Objectives Evaluation Criteria: This section should outline measurable indicators to determine whether or not those objectives outlined in TFMP are being achieved and those management issues outlined in TFMP are being addressed. These indicators may include those specifically developed for the TFMP, as well as existing evaluation processes such as the Fisheries Checklist. Potential performance indicators include:

- Was the TFMP developed through a consultative process which included all relevant stakeholders for that fishery?
- Were objectives for ecosystem factors met, partially met or not met?
- Were objectives for the target stock met, partially met or not met?

Consideration must also be given as to whether modifications are required for any individual management measures (e.g. fisheries closures), given the closure-specific objectives identified in TFMP, and any changes to distribution or intensity of other fishing gear sectors in the area since the establishment of the closure.

A summary of the post-season performance review process is also encouraged. The results of the previous year's review (including landings, values, etc. where appropriate) are to be provided in an appendix. In instances where a post-season review results in a detailed report, a summary of that report is suitable for inclusion into the TFMP.

3.4. *Possible contents of a TFMP*

1. Overview of the Fishery

1.1 History:

1.2 Type(s) of Fishery:

1.3 Participants:

1.4 Location of the Fishery:

1.5 Fishery Characteristics:

- 1.6 Governance:
- 1.7 Approval Process:
2. Stock Assessments, Science and Traditional Knowledge
 - 2.1 Ecosystem Interactions:
 - 2.2 Stock Assessment:
 - 2.3 Precautionary Approach (PA):
 - 2.4 Research:
3. Economic, Social and Ecosystem Importance of the Fishery
4. Management Issues
5. Objectives
6. Management Measures for the Duration of the Plan
7. Compliance Plan
8. Performance Review
9. Glossary
10. Appendices

4. Guidelines on monitoring, control and surveillance (MCS) activities

4.1. Before fishing

Control of trawl fisheries vessels and fishers before fishing trips, at the time of the issue of a license is a useful and low-cost MCS operation that can facilitate the following:

- Local authorities can have activities to check gear and effort control mechanisms (e.g. horsepower and vessel capacity) to ensure that regulations or license conditions of trawlers are complied with;
- If illegal gear is detected or shown then it can often be secured so that it is not possible to use it while fishing;
- Pre fishing checking process are also to gather information for fishery statistics;

Safety at sea can also be controlled if a trawl vessel is inspected at port. Fishing at sea is the most dangerous occupation in the world. The drive for economic gain in fisheries has resulted in poor safety for many fishers and this is particularly true for trawl vessels of small sizes as the case of Viet Nam. It is important for local fisheries management authorities to play a large role within this field in cooperation with the maritime authority and port authorities.

4.2. While fishing

Fisheries MCS operations carried out at sea can have an impact as a deterrent or for enforcement of all control measures but generally they are most significant for output and technical controls. It is necessary to consider following issues:

4.2.1. Logbooks

Logbook data (catch, effort, location, environmental parameters, and gear) is completed by fishers during fishing activities. Provision of logbook data is compulsory for vessel higher than 90 HP (Circular No. 25/TT-BNN-KTBVNLT) as an initial stage. Logbooks usually provide valuable information for scientific assessment, catch monitoring, and feedback to the fishers in terms of historical records. The quality of the data in the logbooks may vary and will relate to the management measures applicable (e.g. in an effort controlled fishery, catch and bycatch data are likely to be more accurate than in a catch controlled fishery), control routines (e.g. regular verification by inspectors or observers or the need for daily radio reports) and the fishers perception of the importance of the logbooks. Format of the logbook can be followed as in the legislation or can be slightly adjusted to suite with specific gears.

4.2.2. Patrol vessels

Fisheries patrol vessel is a very broad term for vessels in a variety of sizes with many different configurations and these vessels along with observers (rarely used in Viet Nam) are seen as the traditional tool for MCS. The main principle is that a vessel is able to monitor and enforce fisheries legislation on the fishing grounds. The type of fleet to be controlled may vary from artisanal to large trawlers. The fleet to be monitored, sea and weather conditions, etc. will determine the capacity and configuration required for a patrol vessel.

Local authorities should cooperate with surveillance agencies at local level (Surveillance centers) to conduct inspection activities at sea for all vessels in general and trawlers in particular.

Local authorities should plan short term and regular schedules and sufficient budget to conduct inspection activities for trawlers.

4.2.3. Observer programmes

Observer programmes are often the only way to implement and to ensure compliance with certain controls such as bycatch or discard regulations that require continuous monitoring. Observers are also able to collect the time, date and position information for activities and samples of the catches and through this monitor for area and season restrictions and provide valuable information for the scientific organization. Observer programmes also contribute to deterrence and can create transparency among fishers.

Observers require training, manuals and suitable equipment and supervision to perform their task adequately. Vessels need to be large enough to accommodate observers and possibilities need to exist to place (in port or via the patrol vessel) observers and remove

them from vessels. Observers are generally a low cost option for at-sea monitoring and surveillance that have many advantages such as providing continuous contact with fishers, a high deterrence impact and valuable data collecting. Observers do not have the power of arrest so they are only able to record and report any infringements, not to act.

4.2.4. Vessel monitoring system (VMS)

A Vessel Monitoring System (VMS) used for monitoring trawl vessels will provide real-time position, and speed data through a communication link directly into a base station. This allows captains to follow all licensed activity as it happens. These data are sent from a unit on the vessel to a shore receiving station that then displays the vessels on electronic maps with a high accuracy. Fishing in illegal areas, trans-shipments of fish and transfer of fuel can all be indicated through this system. VMS is a tool to assist in more timely and cost effective monitoring and surveillance of authorized and participating fishers. It also significantly supports the more efficient direction and deployment of patrol vessels.

Additional opportunities provided by a VMS include the manual entering of catch and effort data (from logbooks) that can be forwarded through the same system for assisting in management of quotas (if available) and stock assessment when timely information is required. VMS also creates a solid safety feature for vessels as their position is known at all times and an emergency function is built into the system. Added benefit for the industry is also possible including the option for improved fleet management and catch information that may be available in a timely manner, facilitating improved marketing possibilities.

Local authorities should recommend a list of vessel intending to set up VMS to the Government so that central agencies approve this list and make plan to install VMS system if funding available.

4.3. During landing

The place of landing whether it is a small landing site or a large port provides a bottleneck in fishing operations where vessels can be checked, documents such as logbooks collected and the fish being landed can be identified and weighed. Monitoring of landings is one of the most important elements of MCS operations when output controls are in place. Landing controls are normally less expensive than use of classical MCS platforms as inspectors will be able to travel by road to most ports or landing places, and sampling systems can be developed to suit the local conditions. It is important to remember that monitoring of landings does not detect discarded or trans-shipped fish or fish sold prior to landing. Only physically landed fish can be monitored without knowing where or how the fish has been caught. For sampling protocols, see above.

4.4. Post landing

Control measures of trade units dealing with fish may be another valuable site where catch data can be verified. Inspections of fish markets, transport providers and sales organizations can provide valuable information about the catches. This type of operation generates valuable information for biological and economical cross-checks as well as validation of other MCS information. It is also a viable operation for control of illegal fishing, especially that of undersized and protected species.

Local authorities should consider enhancing verification process for fisheries products to be exported into European Union (Circular 28/2011/TT- BNNPTNT dated on 15 April 2011). All requirements and procedures are described in this Circular.

4.5. Facilitating for MCS

To facilitate for MCS means that apart from the core MCS system further arrangements or actions are taken to make MCS operations easier, more efficient and more cost effective. Often relatively simple arrangements can result in substantial improvements in the MCS solution.

4.5.1. Vessel marking system

A proper trawl vessel identification system must be in place in order patrol vessel crew or inspectors are able to identify fishing vessels and verify legal vessels effectively. Small registration marks or hand painted registration numbers will make the job of the enforcement units almost impossible.

Vessel marking regulations were indicated in the national legal documents such as Decree No 33/2010/ND-CP and Circular No 25/2013/TT-BNNPTNT. Local authorities should fully understand and initially implement such legislations for certain fleets (i.e. trawlers with capacity higher than 90HP).

4.5.2. Briefing and vessel clearing

In a commercial fishery it can be very valuable to have the captain report to the fisheries authority at the start of each fishing season in order to be briefed about the conditions of a license and to offer the opportunity to collect documentation including logbooks, licenses etc. At the same time the vessel will be available for clearing by inspectors.

4.5.3. Checkpoints for vessels leaving a zone

Local authorities cooperating with fishing port authorities, maritime police, and marine coastguard should enhance activities to check fishing vessels before and after a trip.

Checkpoints should be established so that captains or vessel owners can report their fishing activities before and after the trips. This is also to enhance monitoring ability of safety at sea.

4.5.4. Limitation of landing sites

For artisanal or small-scale fisheries of Viet Nam, there have been thousands of landing sites both legal and illegal landing sites making it impossible to control or even realistically to sample landings. One option is to limit the illegal landing sites for a particularly valuable, protected or overexploited fishery or fish species. Landings of trawlers should be restricted to a restricted number of landing sites and this makes it easier to deploy inspectors or data collectors to sample the fishery. It may be necessary to support this with spot-checks at other landing sites and markets to ensure a deterrence against violating this regulation.

5. Awareness, communication and capacity building measures

Local authorities should provide reliable information and raise the level of awareness of trawl fisheries management measures to fishers, governments, policy-makers, other relevant stakeholders and the general public.

Local authorities should develop a framework for long-term cooperative working relationships on trawl management with stakeholders, management authorities at all levels and other agencies and organizations, including providing accurate and timely information on bycatch-related issues, regulations and activities.

Local authorities should collate and share best practice methods for monitoring, estimating and managing trawl fisheries, preparing appropriate legislation and/or regulations and for effective communication and training.

Local authorities should provide opportunities for trawl fisheries management staff to increase their knowledge of bycatch and discard issues and their potential solutions.

Local authorities should also ensure that fishing gear technologists to mitigate bycatch and discards on trawl fisheries should be provided using adequate training to fishers in the use and maintenance of the technology and practices so developed.

Central agencies should support universities and other organizations with similar functions in the development and implementation of training programs related to human resources necessary to manage trawl fisheries;

MARD should cooperate with the relevant ministries and agencies to provide vocational trainings for local fishermen on how to use fishing methods to mitigate bycatch on trawl fisheries.

MARD in collaboration with local authorities should ensure awareness for all stakeholders and the community on policy, legislation, conservation, allowing ability of resources exploitation and issues of socio-economic, environment and other issues of concerns on trawl fisheries.