

2nd DRAFT

PROVINCIAL TRAWL FISHERIES MANAGEMENT PLAN IN KIEN GIANG

1. Necessity of developing the management plan on trawl fishery

1.1. Necessity

Currently, the challenges in the effective fishery management have become increasingly difficult for the Asian region in particular and the world in general, which is the increase in fishing capacity and overfishing beyond the allowable catches of the aquatic resources (quotas), along with unsustainable fishing methods (trawls) are a matter to be considered in the fishery management worldwide as well as in the region. Overfishing of quota, if not well and promptly managed will become a major factor causing overfishing of aquatic resources, depletion of resources and socio-economic benefits, the life of coastal fishing communities will face difficulties and affect the food security of many countries.

In recognition of this issue, since 1995, the Food and Agriculture Organization of the United Nations (FAO) has developed a Code of Conduct for responsible fishery calling for the sustainable use of marine ecosystems and requiring the fishing activities to be developed based on environment-friendly methods. This Code of Conduct also aims to enhance the maintenance and conservation of ecosystem biodiversity by minimizing the impacts on non-target species, including catches from the trawlers. This could threaten the sustainability of fishery and the stability of biodiversity in many regions; affect the food security as well as impact on the livelihood of fishing communities and the people who live on aquatic resources.

The call for action to bycatch and trash fish was raised at the United Nations Security Council in order to ensure the sustainable development of fishery. Simultaneously, countries in the region, the relating international organizations have urgently study and apply measures to reduce, exclude the bycatch, production caught by inappropriate fishing gears.

Trawling is one of the fishing methods having the highest production in the world. In Vietnam, trawls are also an important fishery that provides the highest production. Trawls have thrived in Kien Giang province, where its production accounts for about 80% of the province's total catch. Although the province's TFC continues to increase, the productivity (catch per unit effort (CPUE)) declined. The average catch per unit capacity unit (HP) in 2015 was 0.24 tonnes/HP/year, lower than the one of 2005, which was 0.26 tonnes/HP/year. On the other hand, the increasing demand for production of fish meal and other products from the trawls in Vietnam in general and

Kien Giang province in particular also causes the increased fishing capacity, fishing gear improvement, trawling speed, expanded fishing grounds... to catch all types of species (species with short life cycles, fingerlings, trash fish, the species with fast growth rate), seriously threatening the stability of trawls and sustainability of aquatic resources.

Besides, the regulations on the management on developing the trawls have been incomplete and not brought a high effectiveness: The fishery statistical data system so far has not been fully constructed from central to local. The vessel management is still inadequate, which basically collects only the vessel number whereas the information on fishing capacity is limitative; there is a lack of unity in studying and managing the trawls and there are no exclusive guidance, regulations for managing the trawls.

1.2. Legal basis

- Decision no. 787/QĐ-BNN-TCTS dated April 21th 2014 of the Ministry of Agriculture and Rural Development on approving the national action plan on managing the fishing capacity.
- Decision no. 3151/QĐ-BNN-HTQT dated December 22th 2011 of the Ministry of Agriculture and Rural Development on approving and assigning the Directorate of Fisheries to implement the project “Developing the management strategy of random catch in the bottom trawl fishery” – REBYC II-CTI funded by the Global Environment Fund (GEF).
- Decision no. 1105/QĐ-UBND dated May 23th 2014 of the People’s Committee of Kien Giang province on approving the master planning project on developing the fisheries in Kien Giang towards 2020.
- Plan no. 101/KH-UBND dated November 4th 2014 of the People’s Committee of Kien Giang province (Plan no. 101/KH-UBND) on Implementing the Scheme on reorganizing the production in capture fishery in Kien Giang province towards 2020; Plan no. 107/KH-UBND dated November 13th 2014 on implementing the programme on protecting and developing the aquatic resources towards 2020 in Kien Giang province (Plan no. 107/KH-UBND).
- Decision no. 23/2015/QĐ-UBND dated June 25th 2015 of the People’s Committee of Kien Giang province on promulgating the Regulation on managing the capture fisheries and aquatic resources protection in Kien Giang province.
- Official letter no. 1682/TCTS-KTTS dated July 02nd 2015 of the Directorate of Fisheries on developing the Management plan of trawl fishery in Kien Giang province.

2. Overview of the trawl fishery in the world and the current status of fishing and management in trawl fishery in Viet Nam

2.1. General context of the trawl fishery in the world

According to FAO’s statistic of current status of fisheries in the world 2004:

- Fish is provided to over 2.6 billion people (nearly 40% of the world population), equivalent to approximate 20% of animal protein.
- The world population are increasing faster than the total food supply from fish;
- Capture fisheries is declining while aquaculture is developing;
- To world's fisheries: 50% completely exploited – unable to fish anymore; 25% overexploited, depleted or recovering and 25% are exploited underexploited or moderately exploited.
- 97% of the population from developing countries depends on fishing due to the income and food.
- 50% of the world fishing catch is from small-scale fisheries.

Since 1970s, the fishing capacity of trawl fishery in the world in general and in Asia in particular led to an enormous decline of aquatic resources. The efforts aim to regulate and control the development of trawls are usually not enough and ineffective due to the lack of understanding of regulations, enforcement activities are somewhat limited and the lack of consensus of fishermen.

Trawls management in the tropical region of Asia - Pacific requires that actions which are implemented on considerations for management and social-economic aspects of member countries of the Asia Pacific Fishery Commission (APFIC). Using the ecosystem approach to fishery management can best solve the above complicated perspectives. APFIC emphasized these issues at the 32nd meeting session and agreed to use the trawls as a model through directly managing trawl fisheries and indirectly on building capacity in the fishery management and ecosystem approach at countries in the Asia – Pacific region.

The orientation for a responsible trawl fishery is aim to balance the needs of human in using fish and aquaculture feed, ensure the sustainability of ecosystem functioning and improve the ecosystem quality. A general principle for sustainable developing is understood as the combination of three aspects, which are ecosystem, social, and economics.

In addition to setting out the policies and management measures from managers and stakeholders. It is also noticed that the participation of fishermen is the essential role for the entire process of fishery management. At the same time, it is necessary to improve following issues: the conflicts between the fleets, overcapacity, a unprofitable trawl fishery, bycatch, impacts on ecosystem and ecosystem functioning, IUU fishing, monitoring, surveillance and control (MCS), science and monitoring needs, low valuable fishing, supporting impact of the fishing industry, ghost fishing and other unidentified death, increase in the investment subsidies.

On the global scale, many fisheries are also experiencing these problems. We need to manage the fisheries more carefully in order to reverse the downward trend and maintain the fish production in the future. The fish populations have a lower resilient than we think, and the recovery of fish populations will be much slower if overfished.

Thus, strong actions suitable towards good trawling management manners are essential at the moment.

2.2. Overview of the trawl fishery in Vietnam

2.2.1. Vessel capacity

Trawl is one of the important tools in capture fisheries in Vietnam. In the last time, trawl fishery contributed an important role in the economic development of the country. However, trawls are now considered as an unfriendly fishery to the environment due to many negative impacts on the resources, environment and ecology.

In 2014, there were approximately 17,000 trawlers, which accounted for about 20% of the total vessels of the country. In particular, the number of vessels with a capacity < 20 HP accounted for about 10% of the total trawl vessels, from 20-150 HP accounted for 48% and the remaining (42%) had a capacity of > 150 HP. Overall, the fleet structure change in recent years where the number of trawlers with greater capacity tends to increase.

Some provinces having a developed trawl fishery are: Quang Ninh, Thanh Hoa, Nghe An, Khanh Hoa, Binh Thuan, Ba Rịa - Vung Tau, Ben Tre và Kien Giang.

2.2.2. Trawl fisheries in Vietnam

Unlike many countries in the world, in Vietnam fishermen use only the bottom trawl for fishing in sea areas. There are many types and naming ways of trawl fishery in Vietnam such as: frame trawls, beam trawls, otter trawls, pair trawls, shrimp trawls, fish trawls, anchovy trawls ... but in general, there are two main types of trawls are single trawls and pair trawls.

2.2.1. Single trawl fishery

Single trawls are one of the traditional fisheries, formed and developed long time ago in Vietnam. Single trawling occurs widely in the coastal provinces, cities in our country, plays an important role in the fisheries structure and creates livelihoods for a part of fishermen in the coastal areas. Single trawl has diverse scales and structures, depending on the target objects, practices and experiences of the people. Trawlers are very diverse with an installed capacity of 20 - 1000HP, operate year-round. In addition to the main fishing objects such as shrimp, fish,... trash fish occupies a significant proportion (30-60%) in the catch of trawling.

In coastal waters, some single trawling types are commonly used, such as frame trawls, beam trawl for fishing shrimp and other objects; shrimp trawl for fishing shrimp... In offshore waters, single trawl is used for fishing fish, squid and some other objects..., which tends to decrease and is used currently only in some provinces such as: Ca Mau, Kien Giang, Ben Tre, Ba Ria - Vung Tau... due to the decline in resources and fishing efficiency. The single trawlers have changed to another fisheries such as stick held falling nets, hook and lines, gillnets, ... The management of the single

trawlers (number of vessels, catch, ...) has not been separated , but grouped into the general trawl fishery (including pair trawlers also).

The single trawlers operating in coastal areas are usually individually organized; the fishing trip time is 1-7 days. The longer fishing trip is from 15-30 days. Some trawlers perform concurrently other fishing methods: squid lines, hook and lines, gillnets... seasonally. On the other hand, single trawlers operating in offshore waters are often organized into groups and teams, including 2-7 units. The vessels in the same group, teams regularly contact to each other to exchange information about the fishing ground, market and support in activities at sea. The level of cooperation, exchange of information may differ between vessel in the same group, teams and between groups, teams. The groups, teams organized according to families, clans or friends and operate based on an unclear and inconstant principle.

2.2.2. Pair trawl fishery

Compared with single trawls, the pair trawls was formed and developed later and flourished in the 90s in the southern provinces such as: Kien Giang, Ba Ria - Vung Tau, Quang Ngai.... Due to the huge advantages compared with single trawls, pair trawls was strongly developed and became one of the important fisheries in the structure of offshore capture fisheries in Vietnam. Up to now, the pair trawls is widely developed in the coastal provinces, cities and is applied by vessels with a capacity of 30 - 1000HP. Pair trawls is thriving in the southern provinces such as: Kien Giang, Ben Tre, Ba Ria - Vung Tau, Binh Thuan, Quang Ngai, Nghe An ...

The main target objects of pair trawls are fish and squid; the proportion of trash fish accounts for about 30-40% of the total catch form a fishing trip. The main fishing grounds of pair trawls locate in offshore waters, a small number of pair trawlers operate in inshore waters. Similar to single trawls, pair trawls often operates year-round, the fishing trip usually takes 20-30 days; to some large vessels in Ba Ria - Vung Tau and Kien Giang, the fishing trip lasts up to 50-60 days; some small vessels in Nghe An, Quang Ngai, the fishing trips usually lasts 7-10 days. The pair trawlers have a higher professionalism and rarely use other fishing methods concurrently. The pair trawlers are also organized into groups, teams with 2-10 unit according to the principle of voluntary, which is loose and operate not under any strict rules.

3. Current status of the trawl fishery in Kien Giang province

3.1. Role and position of the trawl fishery in Kien Giang province

Kien Giang is a coastal province in the Mekong Delta with a great potential for fisheries economic development. In the past years, the province's fisheries has witnessed a rapid and fairly uniform development in the fields of capture fisheries, aquaculture, construction of infrastructure and fisheries services, processing and export-import of fisheries products, playing an important role in the stability and social-economic development of the province.

Kien Giang sea has mild climate and weather, few storms and tropical depressions; the depth is not huge, the seabed is low-sloping; the marine resources are diverse and abundant, stable fishing productivity; many big and small islands with some fishing

ports and fisheries logistics service areas which are conducive to capture fisheries, especially trawl fishery.

Kien Giang trawls has formed since before 1980s, on a small scale, with mainly coastal single trawlers having a capacity of under 90 HP. After that, through the acquisition of fishing technology, fishing fleets with higher capacity (above 400 HP) appeared and operated in the farther offshore areas, hundreds of miles from the shore. Especially since recent years, the trawl fishery of Kien Giang province has grown both in quantity and scale, leading to an increasing fishing pressure on marine resources and ecosystems.

By the end of September 2015, the province had 10,275 vessels engaging in fishery activities (including 10,002 fishing vessels, 273 logistics service vessels) with a total capacity of 2,032,175 HP, averagely 197 HP/unit. The capture production of all species reached 493,824 tonnes, increased by 6.64% than the same period of 2014. The number of trawlers is 3,192 units, accounted for 31.1% of the province's fishing vessels, the trawling production accounted for above 75% of the province's fishing production, contributing significantly to the GDP of the agriculture sector in particular and of Kien Giang province in general, ensuring the jobs, income life for more than 70,000 workers in- and outside the province.

3.2. Structure of the trawling fleet

According to statistics by the end of September 2015, the number of trawlers was 3,192 with a total capacity of 1,546,812 HP, accounting for 31,1% in number and 76,1% in engine capacity respectively. In which, the number of vessels with a capacity of over 400 HP was 2,230 units, accounting for 70% of the total trawlers (Table 1), as follows:

Table 1: Statistics of trawler number and capacity in Quarter III 2015

No.	Fishery	<90HP		90 - <150HP		150 - <250HP		250 - <400HP		≥400HP	
		Nu.	Cap.	Nu.	Cap.	Nu.	Cap.	Nu.	Cap.	Nu.	Cap.
1	Single trawls	142	6,476	41	4,858	181	31,246	125	40,280	71	37,690
2	Pair trawls	1	74	10	1,249	56	9,564	406	141,660	2,159	1,273,715
	Total	143	6,550	51	6,107	237	40,810	531	181,940	2,230	1,311,405

- Single trawls: 560 unit, capacity 120,550 HP, averagely 215 HP/vessel.

- Pair trawls: 2,632 unit, capacity 1,426,262 HP, averagely 541 HP/vessel.

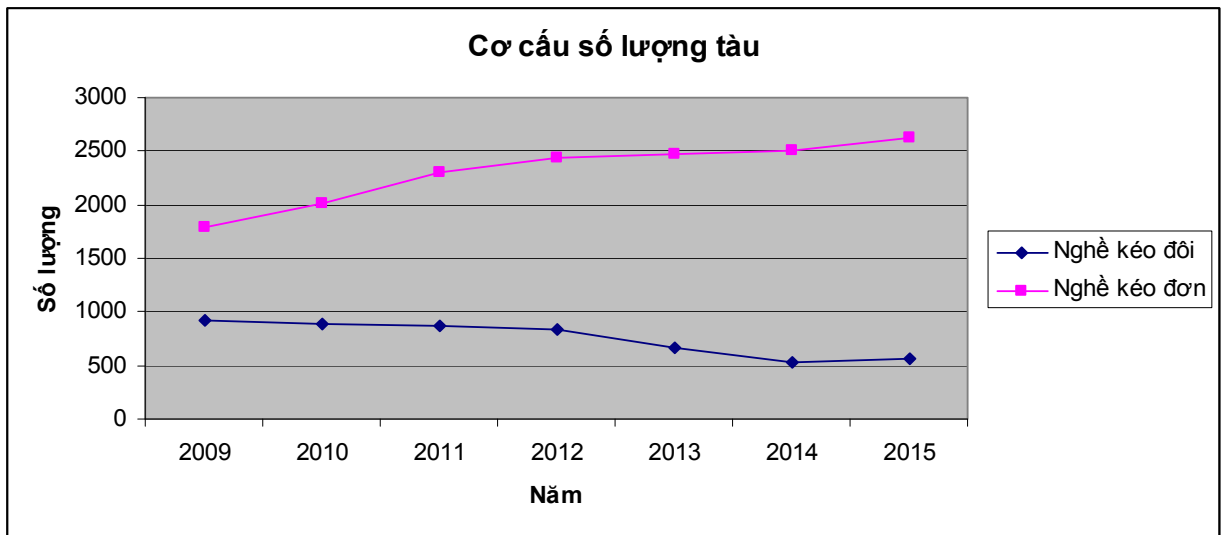


Figure 1: Chart of the structure of single- and pair trawler number in the period 2009 – 2015

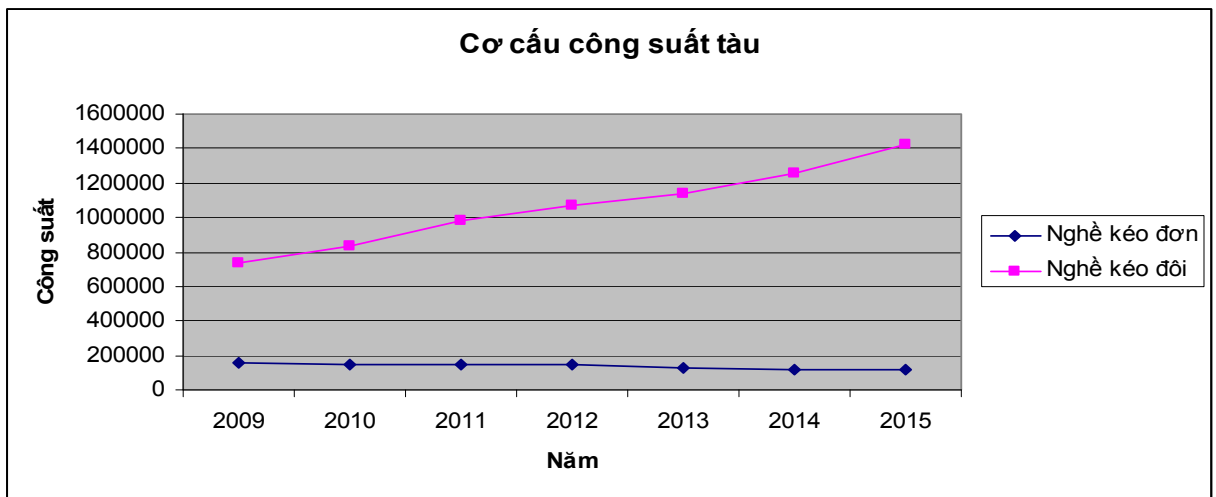


Figure 2: Chart of structure of single- and pair trawler capacity in the period 2009 – 2015

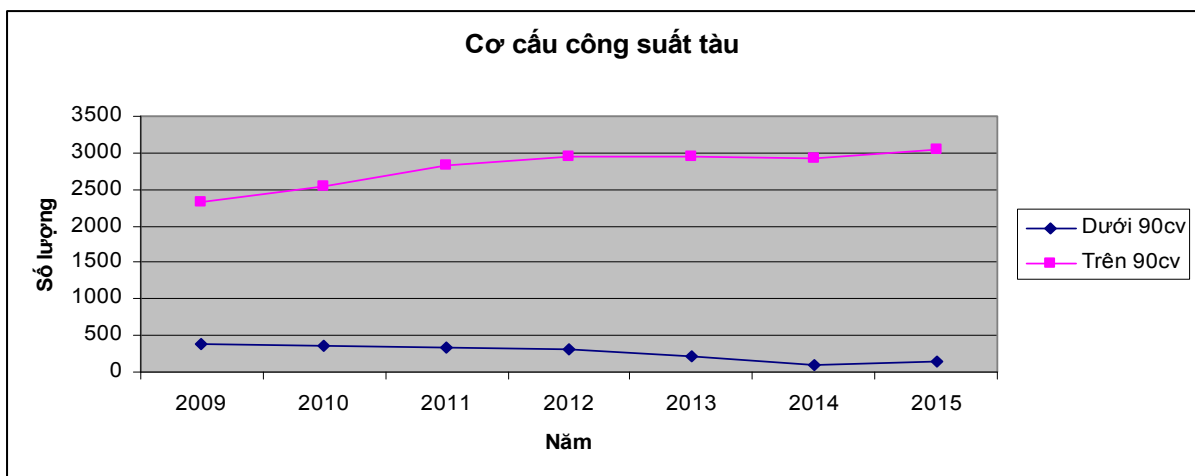


Figure 3: Chart of structure of trawler capacity in the period 2009 – 2015

The charts above show that, single trawls tended to decrease and pair trawls tended to increase both in number and capacity in the period from 2009 to 2015.

The capacity group of over 90 HP (offshore areas) increased continuously while the capacity group of less than 90 HP (inshore and coastal areas) tended to decrease.

3.3. Fishing ground and season

3.3.1. Fishing ground

The trawl fishery diverse in scale and fishing objects, gear size, fishing depth,... This fishery occurs both in coastal and offshore areas. Thus, the Southwestern Sea of the Gulf of Thailand is a year-round fishing ground for trawlers. However at present, the trawl fishery extends farther into the Southeast Sea and contiguous zone with other countries in the region such as Malaysia, Indonesia, Cambodia (Figure 4).

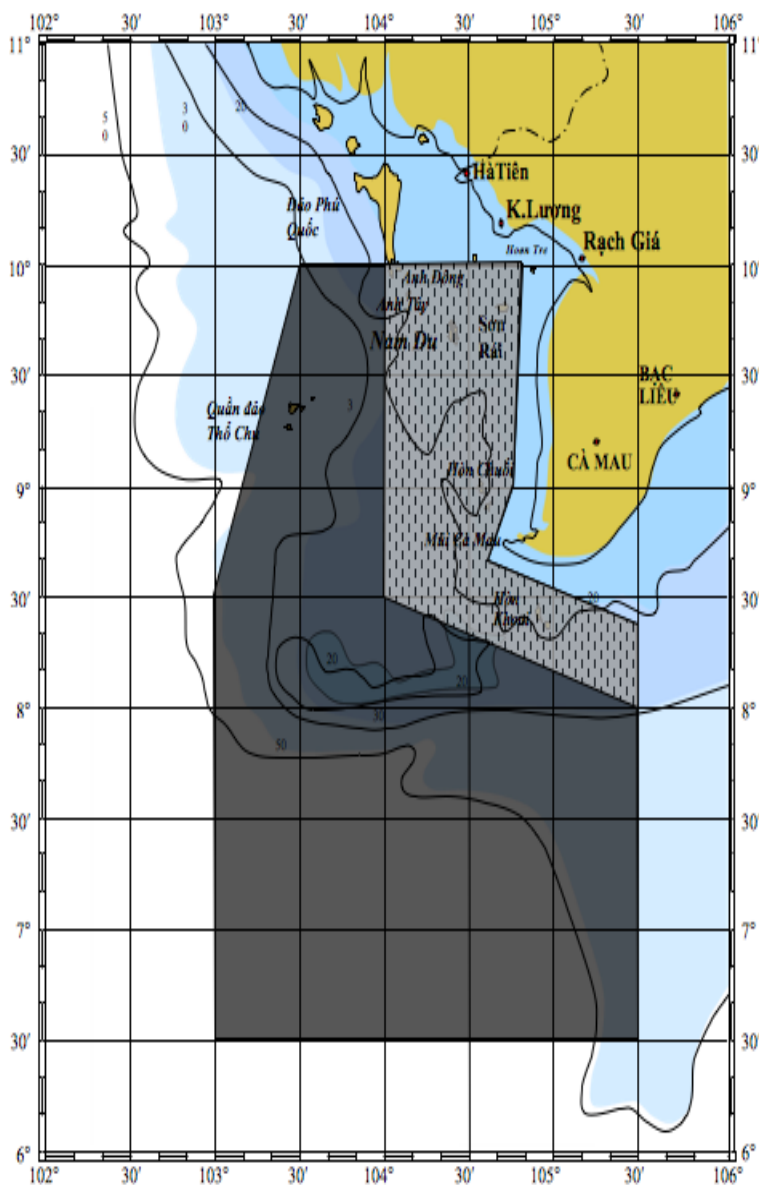


Figure 4: Fishing ground of the trawl fishery in Kien Giang province

According to the Report on data collection results from logbook and biological data of the trawl fishery in Kien Giang province in 2014 through the REBYC-II project, in general, the pair trawlers operated in a wider range and at lower latitudes than the single trawlers (Figure 5). The key fishing ground of pair trawlers concentrated in the offshore waters, including: fishing grounds C14, C15 with coordinates 8°N-10°N, 103°E-104°E and the fishing grounds C16, D16, E16 with coordinates 7°N-8°N, 103°E-105°E 30'E. In the single trawls, the key fishing grounds concentrated in the offshore areas C14, C15 with coordinates 8°N-10°N, 103°E-104°E and the coastal areas D14 with coordinates 9°N-10°N, 104°E-105°E.

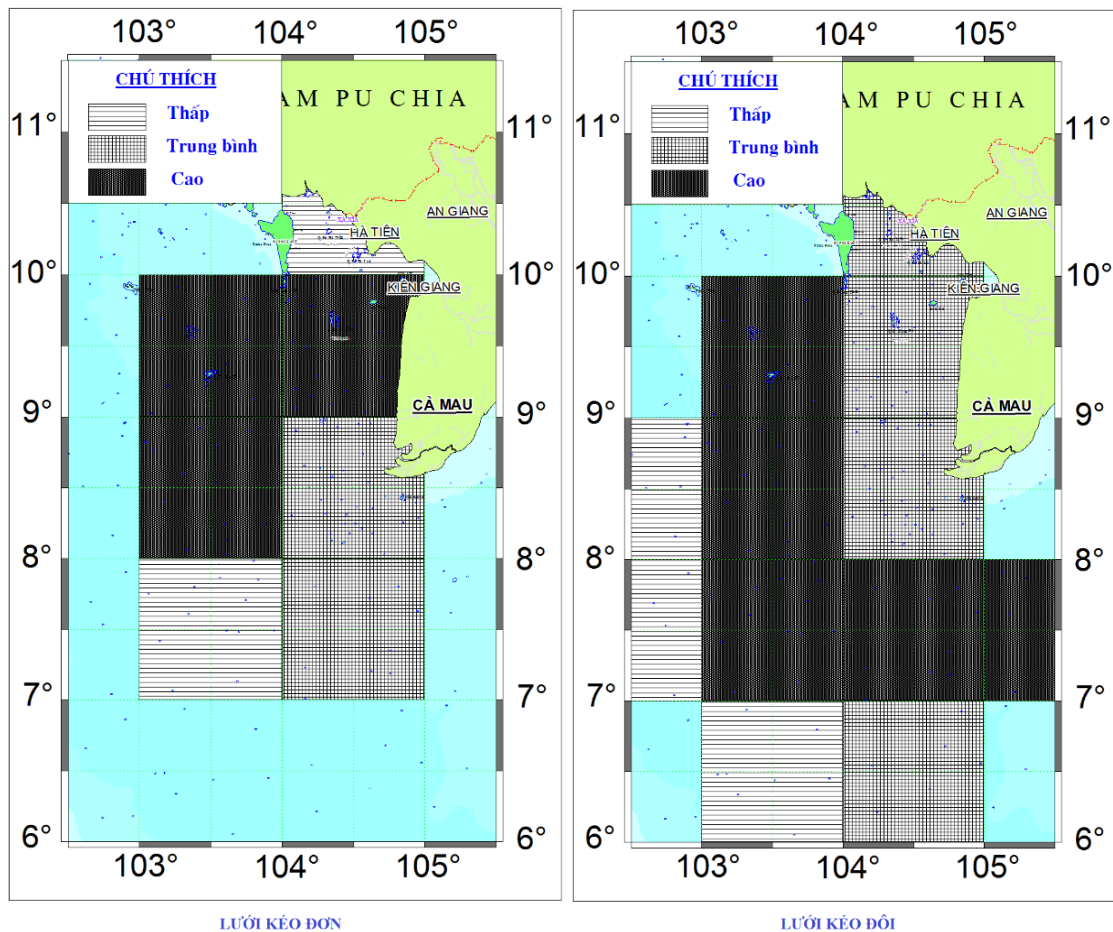


Figure 5. Fishing grounds of the single- and pair trawls in Kien Giang province

This indicates that fishing grounds of trawlers of Kien Giang spread very broadly, including the West and the South East sea and also the waters adjacent to other countries in the region, so it is difficult to manage and control the operation of trawlers at sea.

3.3.2. Fishing season

The trawl fishery in Kien Giang can operate year-round, without any clear season. However in general, the operation of the capture fisheries in Kien Giang is divided into two seasons according to the two monsoon modes, which are the southwest and northeast monsoon.

North season (North fishing season): is the season when fishing vessels push off in the period from October to March of the next year.

South season (South fishing season): is the season when fishing vessels push off in the period from April to September. This is the main fishing season of Kien Giang fishermen due to the favorable weather conditions, less storms, so the fishermen can expand the fishing grounds farther (greater fishing depth), the number of fishermen at sea are also more and the number of fishing trips are higher than in the North season. The fishing season lasts year-round, which leads to an enormous pressure on the marine resources, being one of the reasons for declining in marine resources.

3.4. Marine resources and catch composition

3.4.1. Marine resources in the Southwest sea

The Southwest sea of Vietnam is a part of the Gulf of Thailand. This is a shallow sea, the bottom is muddy, sandy and relatively flat. The natural resources in Southwestern sea clearly reflects the diversity of tropical marine biology, including mangrove ecosystem, coral reef ecosystem, seagrass ecosystem, covering almost the tidal estuary area, providing areas for the residence and reproduction of many marine species. The marine resources in this sea are quite diverse with 341 species belonging to 192 varieties and 97 families of seafood identified in the period 2011-2013. In which, there are 120 bottom fish species, 79 reef fish species, 60 pelagic species, 20 crustaceans species and 23 cephalopods species.

The capture production in the waters of Kien Giang mainly focuses in some groups, including: Carangidae, anchovy, sardine, croaker, cuttlefish and squid. The typically popular fish are normal sardine, striped sardine, flattail croaker, silver croaker, goatfish, yellow goatfish, goldband goatfish, threadfin bream, Indo Pacific mackerel, shorthead anchovies, *Encrasicholina devisi*, buccaneer anchovy, herring and hard tail scad.

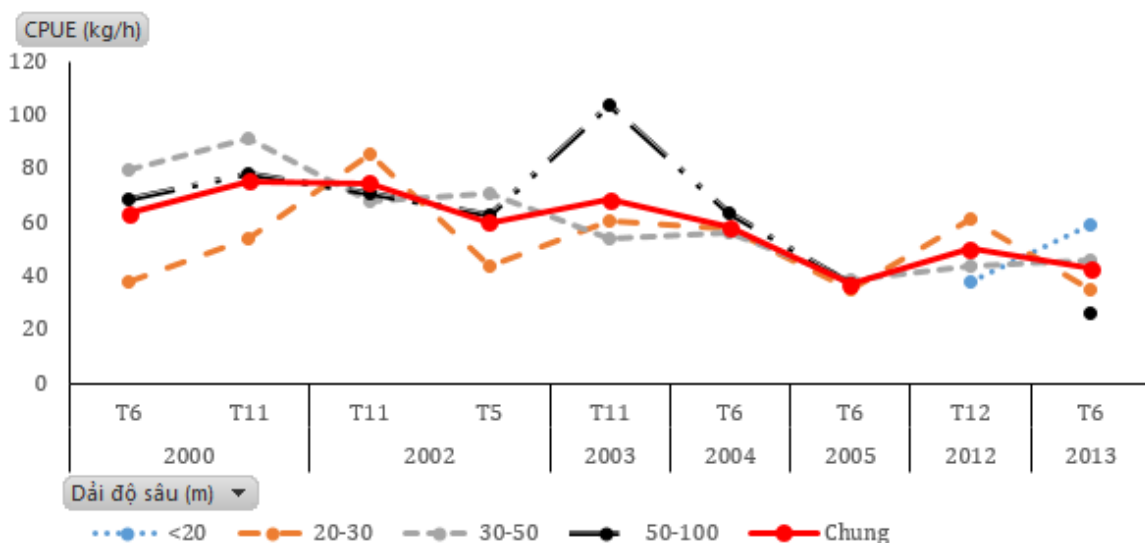


Figure 6: Chart of the fluctuation of fishing productivity (kg/h) of single trawls in the Southwest sea, period 2000-2013

Based on a survey on marine resources in the Vietnam sea, the fishing productivity of commercial fish tend to decline and is replaced by a group of low-value species. The average fishing productivity surveyed by single trawl was around 60 kg/h in 2000-2003, then dropped to approximately 40 kg/ h in 2013.

Reasons leading to the decline of marine resources in recent years as follows:

- Impacts of human on coastal ecosystems;
- Pressure from the subsistence needs of fishermen which leads to the willingness of violating the law in order to fish as much as possible.
- The development of auxiliary industries which use all the products from fishing (processing fish meal, fish cakes ...).
- Increase of fishing capacity.

Although the total seafood production of the next year is higher than one of the last year, the quality does not increase, the fishing productivity decreases, the economic efficiency is not high, the bycatch occupies a high proportion in each haul (trash fish) which affects the recovery of marine resources.

For waters of Kien Giang, the reserves and fishing potential have not been assessed accurately. However, these can be assessed according to the research materials of FAO, Vietnam Institute for Sea and Island Research and the actual fishing situation of fishermen in the past year as follows:

Table 2: Reserve and allowable fishing capability of demersal and artisanal fish in Kien Giang waters

Depth (m)	Area (km ²)	Artisanal fish		Demersal fish		Wide area	
		Reserve (tonnes)	Allowable fishing capability (tonnes)	Reserve (tonnes)	Allowable fishing capability (tonnes)	Reserve (tonnes)	Allowable fishing capability (tonnes)
Under 20m	15,440	77,200	30,880	61,760	39,880	138,960	70,760
20-50m	33,960	127,350	50,940	135,840	67,920	263,190	118,860
Above 50m	13,890	34,730	13,890	27,780	13,890	62,510	27,780
Total	63,290	239,280	95,710	225,380	112,690	464,660	217,400

Whereas, the average annual marine production of Kien Giang is above 400,000 tonnes (in 2015 was 493,824 tonnes), which shows the fishing production has exceeded the sustainable allowable fishing capability of resources.

3.4.2. Catch composition of the trawl fishery

According to the Report on data collection results from log book and biological data of the trawl fishery in Kien Giang province in 2014 through the REBYC-II project, the catch composition of trawl fishery is very diverse, however focused in around 9-10 major commercial fish groups such as: trash fish, commercial fish, squid, seafood... in which the trash fish and bucket fish are the two groups occupy the highest proportion in the catch. The seafood groups with high economic value such as squid usually occupy low proportions (Table 3).

- **Single trawls:**

In single trawlers, the commercial groups include trash fish, bucket fish and shrimp account for a significant share in the total production. Overall for the year, trashfish accounts for 39.3%, shrimp accounts for 28.0% and bucket fish accounts for 17.9% of the total production. The economic commercial groups account for lower rates, including: bucket squid (3.4%), bucket shrimp (3.1%) and cuttlefish (1.1%). The number of species in catches is relatively abundant, about 135 trash fish species and 147 bucket fish species. Overall for the entire single trawls in Vietnam, the proportion of trash fish accounts for 30-60% of the total catches (national guidelines on the management of trawls).

- **Pair trawls:**

The composition of catch from pair trawls fluctuates in the dependence on different times in the year and there is a rotation between commercial groups. Overall for the year, the trash fish and bucket fish groups occupy the main proportions, corresponding to 56.9% and the 19.2% of the total catch. The squid group including squid (7.1%), bucket squid (6.3%) and cuttlefish (1.1%) has a much higher proportion than other groups, and particularly higher in comparison with single trawls.

According to a study on trash fish conducted by Nguyen Van Lung in 2008-2009, the proportion of trash fish in the single trawls was 48.04% and in the pair trawls was 43.17%. Overall for the entire pair trawls in Vietnam, the proportion of trash fish accounts for 30-40% in the total catches (national guidelines on the management of trawls).

Table 3. Catch composition according to commercial groups, captured from the trawl fishery in Kien Giang in 2014

Fishery	Commercial group	Proportion %
Single trawls	Trashfish	39.3
	Mixed fish	17.9
	Stingray	2.5
	Goatfish	2.4
	Mixed squid	3.4
	Cuttlefish	1.1
	Mixed shrimp	3.1
	Shrimp	28.0

	Other	2.2
Pair trawls	Trashfish	56.9
	Mixed fishes	19.2
	Nemipreridea	3.4
	Cá mối	1.7
	Grouper	1.8
	Cá trác	1.4
	Squid	7.1
	Mix squid	6.3
	Sapiola	1.1
	Other	1.1

3.4.3. Catch and landing

It is true that trawler fishery has made a crucial contribution to the total catch in the province. However, according to the statistics, there is only total number of catch, which is not divided by species or gears.

Based on the logbook and port sampling data collected under REBYC-II CTI project, the total catch of trawl fishery in Kien Giang province is about 444.000 tones (table 4) in 2014. The catch of pair trawlers, which is the majority with 422.000 tones, accounts for 95% of total catch. The total catch of bottom trawls, which was not much with about 22.000 tones, makes up for 5% of the total. The fishing vessels whose engine is from 250-400 HP to over 400 HP catch most of the total catch.

Table 4. The total catch of trawl fishery in Kien Giang 2014

Gear	Horse power	Catch (ton)	Proportion (%)
Pair trawl	< 45	-	0,00
	45 - 90	79	0,02
	90 - 150	6.312	1,42
	150 - 250	86.293	19,43
	250 - 400	786	0,18
	> 400	328.660	73,99
	Sub Total	422.130	95,04
Otter trawl	< 45	1.284	0,29
	45 - 90	3.679	0,83
	90 - 150	4.917	1,11
	150 - 250	7.049	1,59
	250 - 400	1.946	0,44
	> 400	3.172	0,71
	Sub Total	22.047	4,96
Total	444.177	100,00	

1.6. Catch preservation and lost harvest

Together with the increase in number of fishing vessels, the catch is from 305.565 tones to 493.842 tones, in years 2005-2015. The annual catch gradually increases including high economic species, especially squid. However, just about 50% of the total catch is processed, of which 20-30% is fishmeal. The rest of the catch is either consumed or sold as trashfish with low price due to low quality.

The reasons for the low quality product are numerous. However the biggest problem is from using preservation technology. The fishers are less concerned about the investment on improving stores on the boats. There are about 10.000 fishing vessels in Kien Giang province in which 4000 units are over 90 HP. Milled ice is used to preserve their catches on board and to transport fish to the shore. Therefore the quality of these products is not high and the benefits are in decrease as well. Although several studies on this case have been conducted, their results are not applied yet.

According to statistic data, the lost harvest is around 20% of the total catch, even 30% of trawl fishery. It is caused by the poor preservation on boats. The harvest loss is still in the risk of being high.

Traditional methods are used to preserve the catch most fishing vessels in Kien Giang. Some of these methods are mill ice, salt and drying. 90% of the material, which is used to make stores, is mixed spongy. With this way of preservation, the temperature is unstable; thus the qualities of fish as well as the profit of the trip are lower. In addition, the duration of trip, which lasts for 20 days, is another reason for poor quality of products.

3.5. Status of trawl fishery management in Kien Giang

Currently, there are 3 methods applied in the world including input control, output control and technical method. In Kien Giang in particular and Viet Nam in general, fishermen are applying input control, but other methods are still under consideration.

3.5.1. Input control

Currently, all fishing activities are managed by Law of Fisheries and regulations of Viet Nam government. On a local scale, People's committee of Kien Giang issued the Decision No 23/2015/QĐ-UBND dated 25/6/2015 regarding to the management of capture fisheries and conservation fisheries resources in Kien Giang province.

In general, fishing license can control input of capacity but licensing now is being considered as administrative procedures with any quota limit for trawl fisheries.

3.5.2. Technical measures

Circular No. 02/2006/TT-BTS and Circular No. 62/2008/TT-BNN regulated mesh sizes and fish sizes, zoning, closed areas/seasons.

Kien Giang stipulated decision No 23/2015/QĐ-UBND dated on 25/6/2015 to regulate fisheries management in Kien Giang waters in order to integrate all national measures into provincial measures. However, enforcement still is a problem due to lack of coordination and cooperation mechanisms.

3.6. Monitoring, controlling and surveillance (MCS)

2.4.1. Monitoring system

At the moment, entire the country, there have been 3000 vessels installed the VMS system and of those 407 vessels belong to Kien Giang province. However, this system is not working very well and need to be revised in the future.

2.4.2. Controlling system

To control fishing activities, the Government issued Decree No. 33/2010/ND-CP dated 31/3/2010 of the Government on management of fishing activities for Vietnamese individual and organizations at sea; Circular No. 25/2013/TT-BNN dated 05/10/2013 of the Ministry of Agriculture and Rural Development guiding some articles of Decree No. 33/2010/ND-CP; Article 3 of Decree No. 53/2012/ND-CP dated 20/06/2012 of the Government on amending and supplementing some articles of the Fisheries Decrees which requires local authorities to make monthly reports to the Ministry of Agriculture and Rural Development; all fishing vessel captains with higher than 20 HP must submit logsheets to the competent authority. However the implementation of fishing logbook program also encountered many difficulties.

Before 2000, the data collection system has been established, however, this system was interrupted in the period from 2005 to 2013 due to lack of financial and human resources as well as a mechanism for coordination between management agencies.

3.7. Strength, weakness, opportunities and threats analysis (SWOT) on trawl fisheries in Kien Giang

SWOT analysis considering economic, social, fisheries, resources and ecosystem is implemented for Kien Giang trawl fisheries. Summaries are indicated in following table:

Table 7: Analysis of SWOT for trawl fisheries of Kien Giang

Strength	Weakness
S ₁ : Trawl fisheries are the most important gear in the province.	W ₁ : Lack of labor and educated persons.
S ₂ : Trawl fisheries are traditional fishing gear and fishers have many experiences.	W ₂ : high fishing cost.
S ₃ : High investment.	W ₃ : Low level of infrastructures and fisheries logistic in the province.
S ₄ : Many fishing vessel.	W ₄ : Many trawl fishing vessels.
S ₅ : High biodiversity and large fishing grounds.	W ₅ : Lack of fishing and preservation technologies.
S ₆ : Many existing legal framework on trawl fisheries.	W ₆ : High bycatch level.
	W ₇ : Lack of cooperation and coordination among stakeholders.
	W ₈ : Low level of enforcement (MCS).

	W ₉ : Lack of consideration of fisheries extension. W ₁₀ : lack of fisheries management measures specified for trawl fisheries.
Opportunities	Threats
O ₁ : Investing a large landing site. O ₂ : Considered by provincial management leaders. O ₃ : Kien Giang has potential for offshore fisheries. O ₄ : Ability to approach advanced fishing technologies. O ₅ : Very high abundance of anchovy, crab, coral reefs... O ₆ : Many policies of Government for offshore fisheries development.	T ₁ : Fish price and fuel price unstable. T ₂ : Fishing ground conflicting. T ₃ : High demand on resources. T ₅ : High demand on fishmeal. T ₆ : More strict rules on sanitation and quality control. T ₇ : High negative impacts on seabed. T ₈ : Many countries and regions want to reduce fishing capacity of trawl fisheries. T ₉ : Reduced resources. T ₁₀ : Large fishing grounds, difficulties for controlling. T ₁₁ : Common fishing grounds and thus difficult for managing.

3.8. Shortcoming and challenges of trawl fisheries in Kien Giang

As indicated in the above SWOT analysis, the trawl fisheries in Kien Giang are encountering following problems/shortcomings:

- There is no any management legal framework specified for trawl fisheries and if available then these have not been updated for suitable with current status
- Insufficient scientific data
- MCS activities are not implemented effectively and sufficiently
- Low understanding of fishing communities.
- Port harvesting losing very high.
- High bycatch proportion.

4. Provincial trawl fisheries management plan in Kien Giang (PTFMP)

1.1. Principles of the PTFMP

The provincial trawl fisheries management plan is to enhance effective fisheries management in general and trawl fisheries management in particular for more suitable with strategies, goals, objectives and policies to develop socio-economic from central to local levels; suitable with international and regional intentions.

1.2. Development orientation

- The trawl fisheries in Kien Giang is managed sustainably, environment friendly and in the light of strategies, goals, objectives and policies to develop socio-economic of the province and compliance with the National Master Plan.

- The trawl fisheries are developed with modernization manners focusing on advanced and selective fishing technologies and improved post harvest product quality to ensure the accession of international markets.
- The trawl fisheries management must be ensured to integrate other sectors and combination with provincial economic development potentials to harmonize and balance with other sectors in term of inter-sectoral management as indicated in the ecosystem approach to fisheries management.
- The trawl fisheries is to manage effectively and efficiently to ensure all sectors in the supply chain should be managed systematically.

1.3. Goals of the PTFMP

Trawl fisheries are to manage sustainably to balance economic, social and ecosystem. in Kien Giang up to 2020. Management effectiveness of trawl fisheries in particular and fisheries in Kien Giang in general should be improved.

1.4. Objectives of the PTFMP

- Legal framework on trawl fisheries management is updated, amended and completed from local to central levels;
- Trawl fisheries database is developed and regularly updated;
- Monitoring, controlling and surveillance system on trawl fisheries is improved and completed;
- Awareness of trawl fishing communities enhanced and their incomes and livelihood maintained and enhanced;
- Negative impacts of trawl fisheries reduced;
- Trawl fishing vessels frozen in province;
- Bycatch of trawl fisheries reduced to less than 30% (currently of 40-50%);
- Post-harvest losing reduced to 10% (currently of 20-30%)

1.5. Phạm vi điều chỉnh và đối tượng áp dụng

The PTFMP is to apply for inshore and coastal areas where they were authorized to be managed by Kien Giang management authorities. In the offshore areas, there is necessary to obtain cooperation by management agencies under Ministry of Agriculture and Rural Development (MARD).

The PTFMP is to apply for all individuals and organizations involving on trawl fisheries from fishing, purchasing, transshipping, processing and consuming trawl fisheries products.

1.6. Detail activities of the PTFMP (appendix attached)

Activity 1: Complete legal and policy frameworks on trawl fisheries management.

Activity 2: Establish and maintain data collection system for stock assessment and management.

Activity 3: Complete MCS system on trawls fisheries management.

Activity 4: Educate and enhance awareness of fishing communities to provide alternative livelihoods for trawl fishing communities.

Activity 5: Conduct actions to mitigate negative impacts of trawl fisheries to marine resources, seabed and their ecosystems.

Activity 6: Implement management measures to manage trawl fisheries in Kien Giang province.

1.7. Solutions to implement the PTFMP

7.1. Legal and policy solutions

Review and propose to Government, MARD to amend and add Circulars or Decrees regarding to trawl fisheries management.

Review and propose legal and policies in relation to financial mechanisms to establish and implement trawl fisheries data collection systems.

7.2. Raising awareness

Enhance raising awareness activities on legal documents and policies on trawl fisheries management. Enhancement of fully participation of all stakeholders including fisheries associations.

Using flexible forms of propaganda in line with traditional, qualifications and conditions of each object, each area; development and maintain regular channels on radio, television, newspapers; compilation and distribution of publications and legal inquiry documents.

Research, compiled to give the main contents on aquatic resource protection in extracurricular programs for students of all levels.

7.3. State management solutions

Strengthen the capacity of State management agencies in charge of the marine resource conservation and management at provincial, district and commune levels.

Establish a mechanism for data collection for example, on the species composition of catches and landings of trawlers at the fishing ports and landing sites in the province.

Develop a mechanism for coordination between the relevant units: Marine Coast Guard, marine police, fisheries surveillance... to inspect, monitor and control trawl fisheries operations to ensure full compliance.

Develop mechanisms to coordinate and promote the participation and strengthen practical responsibilities of the stakeholders in fishing, processing and sale of trawl fisheries products.

Development and trial implementation of co-management model on the exploitation and protection of fisheries resources as basic models to expand to other areas.

Establishment of MPAs, in addition to expanding and strengthening the role of current MPAs to better protect marine resources and marine ecosystems.

7.4. Financial mechanisms

Integrating trawl fisheries management fund into the existing program or plans of the province such as Plan 101/KH-Committee on Project Provincial People Committee about reorganizing fishing operations and Plan 107/KH-provincial People's Committee on marine resources conservation and management program by 2020 in Kien Giang province.

Coordinate with the departments concerned, the Ministry of Agriculture and Rural Development to review and propose supports on the implementation of management activities as authorized.

8. Implementation organization

8.1. Department of Agriculture and Rural Development

Coordinate with the departments and agencies, People's Committees of districts, towns and cities to implement PTFMP in Kien Giang province.

Disseminate and introduce all contents of the plan to management authorities, related organizations and individuals involved in the management of trawl's fishing activities within Kien Giang Province.

Develop and implement the proposed programs and projects to implement the plan; and best reconcile with international organizations to receiving and using funding (if any) in order to cater for the implementation of this plan effectively.

Regularly monitor and review the plan to report periodically with PPC to adjust and supplement accordingly.

8.2. Fisheries Associations

Coordinate with the State management agencies to implement activities such as collecting information and data of trawl fisheries; providing raising awareness to fishing communities to implement the contents of this plan.

Strengthen Association's operations to ensure that it is organizations actually bring practical benefits to the fishermen in the following activities: advocacy, promotion, technical advice, technology transfer, insurance, loans...

Participate in activities management, consulting and policy decisions of the provincial fisheries management.

8.3. The Department of Planning - Investment, Finance

Collaboration with the Department of Agriculture and Rural Development to propose sufficient budget to implement the plan on schedule and efficiency.

8.4. The departments and agencies; People's Committees of districts, towns, cities

As authorized on the function and their duties in coordination with the Department of Agriculture and Rural Development to implement provincial trawl management plans as assigned.

Appendix: Proposed actions of the Provincial Trawl Fisheries Management Plan

No	Activities	Current status	Output	Implementation/ cooperation agencies	Period
I	Enhanced legal and policy frameworks				
1	Review, amend and add legal and policy frameworks on trawl fisheries management	Existing legal and policies frameworks are very general not specified for trawl fisheries management	Legal and policies established or integrated on other legal documents (e.g. management system, technical measures and monitoring and surveillance regimes...)	Provincial Department of Agriculture and Rural Development (DARD) and Directorate of Fisheries (D-FISH)	2015-2017
2	Developing fisheries policies and legal frameworks on data collection	Not existing	Specified legal document established for trawl fisheries data collection (i.e. at provincial, district and commune level)	DARD, D-FISH and Provincial Department of Financing	2016 - 2017
3	Developing fisheries policies and legal frameworks to enhance monitoring, controlling and surveillance (MCS)	Existing but not strong enough and ineffectively	A systematical legal framework established from central to local level (Using a National Project namely MOVIMAR)	DARD, D-FISH and Provincial Department of Financing	2016 - 2020
4	Developing	Some existing	New policies or	DARD, D-FISH,	2016 -

	fisheries policies to change alternative livelihood for coastal communities	but not systematic	integrated with policies from other sectors	Provincial Department of Financing and other Department	2017
5	Establish policies to develop co-management	Some co-management sites established without implemented effectively and efficiently	A Decree or Circular on fisheries co-management established	DARD, D-FISH	2016 - 2017
6	Developing policies to modernize trawl fleets to enhance product quality	Existing but not strong enough and ineffectively	New policies on modernizing fishing vessel to reduce fishing cost, enhancing preservation technologies to suite with current conditions	DARD, D-FISH	2017 - 2020
7	Developing policies to enhance education quality and training course for management staffs from district to commune level	Few such policies existing	New policies or integrated with policies from other sectors	DARD, D-FISH and Provincial Department of Labor and Society	2016 - 2020
II Trawl fisheries data collection and analysis					
1	Review and development of trawl fisheries data collection system such as fishing vessel, landing data, fishing effort...	There is no a comprehensive data collection system established	Port samplers and enumerators trained and recruited regularly	DARD, D-FISH	2017 - 2020
2	Complete a fisheries database from central to local level	Not implemented effectively	A fisheries database from central to local level established and updated regularly	DARD, D-FISH	2016 - 2017
3	Collect landing data, species composition, fishing effort of	Only sampling landing data with very general	A landing, effort and other biological database		2017 - 2020

	trawl fisheries	information	established and updated regularly		
4	Enhance logbook program for trawl fisheries	Existing but not implemented effectively	More strict legal framework for national logbook program developed and established to amend current Circular No 25	DARD, D-FISH	2016 - 2017
5	Improve delivery and recovery of logsheets to trawl fisheries	Implementing but not effectively	Logbook database produced	DARD, Marine Coastguard, District communities	2017 - 2020
6	Regularly collect port sampling and collect vessel statistic at landing sites/ports or at processing companies	Not yet implemented	Port sampling database on species composition, fish size and other biological data of trawl fisheries collected	Fishing port authorities, Research Institutes	2017 - 2020
7	Regularly collect socio-economic data of trawl fisheries	Few socio-economic data collected	Database on socio-economic developed and established	DARD, D-FISH, Fisheries associations (FAs)	2016 - 2017
III	Enhanced monitoring, controlling and surveillance				
1	Review and supplement of policies on financial and human mechanisms for fisheries surveillance activities	Not suitable at the moment since all penalty fees are transferred to provincial budget holder without kept by surveillance section.	New policies on financial and human mechanisms for fisheries surveillance activities established.	DARD, D-FISH, Financial Department	2016 - 2017
2	Review and supplement of cooperation mechanisms among management agencies relating on MCS activities	Lack of coordination and cooperation	A general mechanism established and actively implemented	DARD, D-FISH, Marine Coast Guard, Marine Police	2016 - 2017
3	Enhance monitoring trawl vessels (using VMS from	No controlling station; VMS installed but operating	Vessel information monitored and local observation	DARD, D-FISH	2016 - 2020

	MOVIMAR project)	ineffectively	stations established		
4	Enhance enforcement activities to implement existing management measures/regimes	Not effectively	Fishing zones, closed areas/seasons and mesh size and fish size regulations managed and implemented effectively	DARD, D-FISH, Marine Coast Guard, Marine Police	2016 - 2020
IV	Reduced negative impacts of trawl fisheries and quality reduction of post-harvest products				
1	Investigate selective fishing gears (BRDs and new fishing technologies)	The unselected fishing gears being used	The BRD is installed operated in some trawl vessels.	DARD, D-FISH, vessel owners	2016 - 2017
2	Improve preservation technologies on board and apply advanced technologies on board	Using traditional technologies (e.g. ice)	Advanced preservation technologies investigated and applied to reduce post-harvesting losing	DARD, D-FISH, vessel owners	2017 - 2020
3	Investigate fishing gear to reduce the negative impacts on seabed	Not existing	The mid-water fishing technologies using mid-water trawling investigated and some vessel applied	DARD, D-FISH, vessel owners	2019 - 2020
4	Implement recent national regulations on freezing number of trawlers	Lack of detail guidelines	The recent national regulations on freezing number of trawlers (Decision No 9443/QD-BNN-TCTS) implemented effectively	DARD, D-FISH and other stakeholders	2016 - 2017
5	Review and establish new MPAs and improve these MPAs management	MPAs are not managed effectively	New MPAs established and their management mechanisms improved and implemented effectively	DARD, D-FISH and other stakeholders	2018 - 2020
6	Development of co-management models on trawl	Not existing	Management models on trawl fisheries	DARD, D-FISH and other	2017 - 2020

	fisheries		established and implemented effectively	stakeholders	
7	Enhance raising awareness	Raising awareness existing but not specified for trawl fisheries	A detail awareness plan established	DARD, D-FISH and other stakeholders	2016 - 2020
V	Marketing and market-based measures				
1	Enhance and implement effectively fisheries logistic services	Existing but not implemented effectively	- The integrated models on fishing including logistic vessel support developed - Cooperation model on fishing operation among fishing communities established and implemented	DARD, FAs;	2016 - 2020
2	Develop auctions at landing sites	Not existing	Auctions developed and established to reduce downgrading products by buyers.	DARD and other Departments in the province	2019 - 2020
3	Establish mechanisms and policies to enhance roles and responsibilities of relevant stakeholders in supply chain of trawl fisheries.	Not existing	Mechanisms and policies established to enhance roles and responsibilities of relevant stakeholders in supply chain of trawl fisheries	DARD and other Departments in the province	2018 - 2020