

## ASSESSING ON COASTAL FISHING ACTIVITIES AND MARINE RESOURCES IN TUY AN DISTRICT, PHU YEN PROVINCE

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Received: 5.Oct.2018; Revised: 21.Dec.2018; Accepted: 27.Dec.2018

### ABSTRACTS

Studying on fishing activities and marine resources protection in general, fishing in coastal area in particular play an important role in order to support fisheries authorities to proposing the reasonable solutions that based on scientific results. This study have implemented the case study of fishing activities on coastal of Tuy An district, Phu Yen province. The result showed that number of fishing boat was fluctuate from 1,172 in 2014 to 1,032 in 2018, mainly boats of range of less than 20 HP that account for around 51.4%, the range of 45 – 90 HP occupies about 7.6%. The mostly fishing gear is gill-net (56.8%). The fishing boats violated minimum mesh-size regulations are very popular, for example, mesh-size of lobster seed driftnet is smallest at 2 mm. Many fishing boats were IUU fishing such as trawl, driftnet etc. Also, fishermen's awareness are low and limited in terms of fishing activities and resource protection that is cause of crucial decrease of marine resources. The solutions should be noted that alternatives, studing the marine resources stock, enhancing the fishermen awareness to sustainable fisheries.

*Key words:* fishing activities, marine resources, Tuy An district, Phu Yen province

### I. INTRODUCTION

Phu Yen is one of the 28 sea provinces with a long coast of 189 kilometers and sea zone of 6,900 square kilometers. The marine resources are abundant with over 500 species of fish, 39 species of shrimps, 15 species of squids and

many other rare species (Huynh, 2018). Tuy An district is one of the four sea areas in Phu Yen province which have been developing for a long time and is the main source of income for many coastal households.



Figure 1: The Map of Tuy An district, Phu Yen province

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The fisheries play a very important role to socio-economic development in this district, creating diversity of jobs for contributing to hunger eradication and poverty reduction. However, the fishing activities have not been modernized, most of fishing boats are small capacity, near-shore fishing to lead to the situation of coastal marine resources exhausted while the off-shore resources are still potential. On the other hand, there are not much studies about the status of fishing activities and marine resource protection and it is lack of information for fisheries management. Therefore, the assessment of the current fishing activities and marine resources status helps the authorities to find appropriate solutions to minimize the negative impacts caused by human activities that are needed to restores coastal resources.

## II. METHODOLOGIES

### 1. Object of study

- Assessing on various aspects of fishing activities, such as: the number of fishing boats, type of fishing boats, coastal fishing gears;
- Evaluate about impact of fishing activities on coastal resources, the status of resources protection;
- Suggest some solutions towards the sustainable fishing activities in the study area.

### 2. Method of study

2.1. *Research site: Tuy An district, Phu Yen province*

2.2. *Scope of the study:*

- Coastal fishing activities of local community
- Fisheries authorities: Fisheries Department of Phu Yen province, Agriculture and Rural Development Branch - Department of Tuy An district, Statistics Department of Tuy An district...

2.3. *Method of collecting data*

- a. Secondary data

- Collecting data on the number of fishing boats, catches in coastal Tuy An district, Phu Yen province.

- Collecting data on natural conditions, socio-economic conditions, policies and solutions in Tuy An district, Phu Yen province.

#### b. Primary data

- Interviewing coastal fisheries households in Tuy An by questionnaire

- Interviewing fisheries authorities about the solutions to protect marine resources, legal, and policies documents related to fishing and marine resources protection.

### 2.4. Sample size

The sample size has been figured out on the basic of recommendation given by Yamane (1967). The size of sample has been estimated using the following formula:

$$n = N/(1+N*e^2)$$

Where:

n: is the required sample size

N: is the total number of fishing boats in Tuy An district

E: is an acceptable percentage error (10%)

Replacing the values  $N = 627$ ,  $e = 0.1$  into the above formula, the sample size will be 86 samples. Sample distribution is a simple random sampling that was distributed to the different localities.

### 2.5. Data processing methods

Using MS. Excel to calculate and make to graphs, tables show the values of fishing boats, landings, fish components etc.

## III. RESULTS AND DISCUSSION

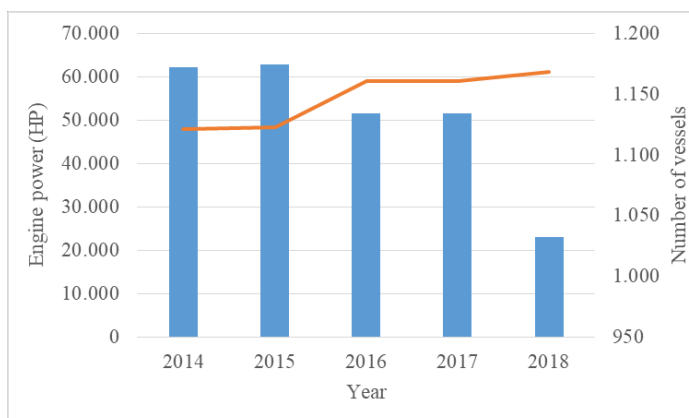
### 1. The trend of fishing boats in Tuy An district between 2014 and 2018

The table 1 and figure 2 show that the number of fishing boats moderately fluctuated overtime from 1.172 in 2014 to 1.174 in 2015 and down to 1.032 in 2018. While, the total engine power rapidly increased during 5 years

**Table 1. The number of fishing boats and HP overtime**

Year	2014	2015	2016	2017	2018
Total boats (no.)	1,172	1,174	1,134	1,134	1,032
Total engine power (HP)	47,940	48,240	58,898	58,898	61,179

(Source: Statistics Department of Tuy An district, 2018)



**Figure 2: The trend on the number of fishing boats and engine power overtime**

between 2014 and 2018, specifically from 47.940 HP in 2014 to 61.179 HP.

The table 2 illustrates the number of fishing boats in 6 type of fishing gears between 2014

and 2018. Overall, the number of fishing boats are quite stable year by year. The number for gillnet were significantly higher than in other fishing gears, while the driftnet was lowest

**Table 2. Fishing boats classified by fishing gears and overtime (Unit: vessel)**

No.	Fishing gear	2014	2015	2016	2017	2018
1	Trawl	80	55	52	52	40
2	Purse sein	58	97	129	129	203
3	Gillnet	281	732	722	722	586
4	Driftnet	601	129	2	2	3
5	Longline	140	119	164	164	144
6	Others	23	3	65	65	56
Total		1,183	1,135	1,134	1,134	1,032

(Source: Statistics Department of Tuy An district, 2018)

in 2018. Particularly, the driftnet was rapidly decreasing from 601 fishing boats in 2014 down to 3 fishing boats in 2018. In contract, the purse sein were strongly increasing from 58 boats in 2014 to 203 boats in 2018. According

to the survey, the number of purse sein increase due to effective fishing. The gillnet proportion accounted by the most about 56,8%; followed by the purse sein (around 19,7%), longline (just 14%), others (9,6%).

**Table 3: Fishing boats classified by engine power over time (Unit: vessel)**

No.	Year	<20HP	20-<45HP	45-<90HP	>=90HP
1	2014	706	241	87	149
2	2015	652	259	67	157
3	2016	627	257	90	160
4	2017	627	257	90	160
5	2018	530	252	78	172

(Source: Statistics Department of Tuy An district, 2018)

The table 4 above gives information about fishing boats classified by engine power during 2014 and 2018.

It is clear that the quantity of engine boats of less than 20 HP is the largest number from

year to year, specifically, in 2018, this number is 530 fishing boats, followed by the boats of range of engine power from 20 to 45 HP (252). On the other hand, the quantity of vessel with engine power range between 45 and 90 is the

smallest by 78 boats.

Regarding to each type of boats in 2018, the engine power vessel with under 20 HP were decreasing trends year by year, from 706 boats (2014) to 530 boats (2018). While the boats with capacity of 90 HP and above gradually increased between 2014 and 2018, from 149 to 172 boats, of which 41 boats with over 400 HP capacity to be built under Decree

67/2014/ND-CP on the various policies of fisheries development. This is a good signal for coastal fisheries in Tuy An district. There is a downward trend for boats with engine power under 20 HP, but it is still high proportion. Therefore, the fisheries authorities should take measures and solutions to reduce the number of boats with engine power less than 20 HP to avoid highly pressure on coastal areas.

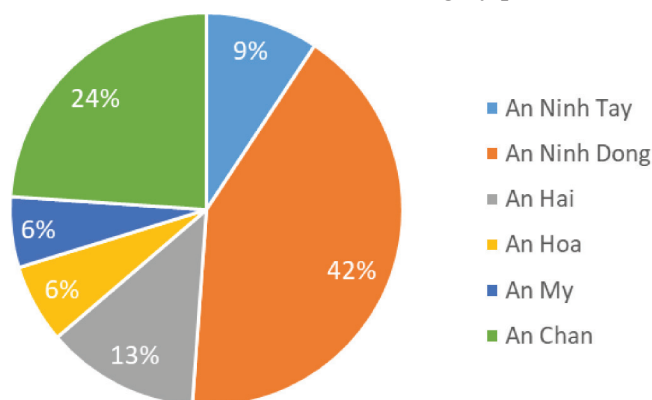


Figure 3: Distribution of coastal fishing boats by areas in 2018

The figure 3 above show the distribution boats in different areas in Tuy An district in 2018. Overall, the number of fishing boats in An Ninh Dong commune is the most significant proportion, which accounted for 42 percent of total fishing boats, while An Hoa and An My communes had the least number of boats (6

percent).

2. Vessel specifications

According to the surveys, there are four main fishing gears operated in coastal Tuy An district: gillnet, driftnet, trawl and longline. The basic parameters of these boats are showed in Table 4.

Table 4. The basic parameters of fishing boats in Tuy An district, Phu Yen province

TT	Parameter	Value
1	Average length (m)	4 – 11
2	Average width (m)	0,8 – 2,7
3	Material	Wood
4	Average life expectancy (year)	5 – 10
5	Initial status of engine power (%)	60 – 70

The table 4 above shows that boats operated on the coastal waters of Tuy An district, Phu Yen province are small and old version. Most boats are bought from old as second-hand sources then life expectancy as well as initial status of engine power are relatively low. This type of vessel is appropriate for small wave conditions in coastal areas, which are not capable to operating in the bad weather conditions. Main

type of machines are from China, Japan and Korea that mainly used with under limited quality to often causing damaged.

3. Mesh size of fishing gears

In a fish population with diverse sizes, the fishing gears can only catch a certain size of fish that is called selectivity. The selection aspect depends on fishing principles and parameters of fishing gear such as: mesh size,

material, raw roughness, fishing speed etc. In particular, mesh size of fishing gears have the greatest impact on selectivity.

Therefore, in order to assess the negative

impact level of fishing gear, this study concerned with the violation of minimum mesh size that regulated in Circular 02/2006/TT-BTS. The impact activities are showed in table 5.

**Table 5. The mesh size of fishing gears**

Fishing gear		Actual mesh size	Regulations on Circular 02/2006/TT-BTS (Minimum mesh size)
Driftnet	Shrimp	2 mm	
	Fish	12 – 20 mm	18 mm
Gillnet		17 – 40 mm	28 mm
Trawl		10 – 15 mm	28 mm

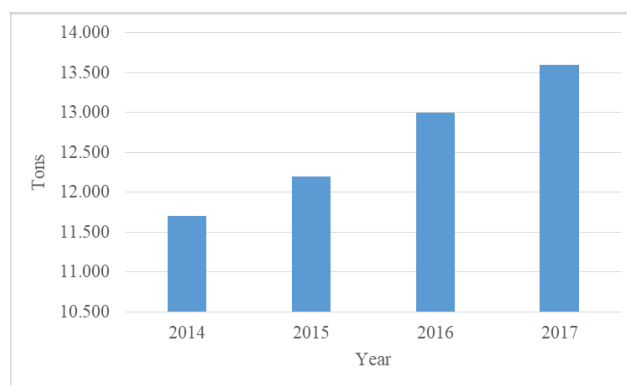
The table 5 shows that fishing activities with illegal mesh size of fishing gears are definitely popular. Particularly, lobster seed driftnet have the smallest mesh size of just 2mm. In addition, the mesh size of fishing gear in the real are greatly smaller than regulations of Circular 02/2006. This negatively impact on ecosystem environment and marine resource status in Tuy An district, Phu Yen province. However, if the fishing banned will affect to various aspects such as: aquaculture activities, employments of coastal communities and livelihoods as well.

It should be noted that these illegal mesh size of fishing gears are even much smaller than the illegal mesh size of fishing gears in Nui Thanh district’s coastal fisheries, Quang Nam province and Van Phong Gulf, Khanh

Hoang Province, for example: i) the Nui Thanh district fisheries’s actual mesh size of trawl is from 18 to 20 mm compared with the mesh size of trawl fished in Tuy An district by 10 - 15mm; ii) the actual mesh size of shrimp driftnet in Nui Thanh district and Van Phong Gulf are about 4mm compared with these in Tuy An district by 2mm (To, 2017; Vu, 2018). Therefore, the actual mesh size in Tuy An fisheries have a similar violated trend to others in Vietnam’s fisheries.

**4. The trend of landings in Tuy An district overtime**

The column graph gives overview of landing during 2014 and 2017 in the coastal Tuy An district, Phu Yen province as shown in the figure 4 below.



**Figure 4: The landing in Tuy An district, Phu Yen province from 2014 to 2017**

The Figure 4 shows the increase in landing year by year. In 2014, the landing in coastal Tuy An district had the lowest value, at around 11,700 tons. After that, the landing gradually went up between 2014 and 2017, from 11,700

tons to over 13,500 tons. According Statistics Department of Tuy An district and Agriculture Department of Tuy An district, the reason for growing landing is bigger fishing boats increased. However, the landing of lobster seed



tends to decrease from 320 seed of lobsters in 2014 to 265 seed of lobsters in 2017. The mainly fished species are scads, anchovy, mackerel, crayfish, shrimp etc.

It should be noted that landing of coastal fisheries in Tuy An district have different trends compared these in Cua Lo and Dien Chau District, Nghe An Province over the same times (Nguyen, 2018).

### **5. Fishing season**

In fact, the coastal fishing activities take place throughout the year and focusing more pressure from January to September because of the favorable weather. From October onwards, the weather often occurs the phenomenon of rain, tropical depression and storm then the fishermen do not fish frequently.

In Tuy An district, the coastal fishing boats usually operate different types of fishing gear. The driftnet and gillnet fishing by seasons, while the lobster seed will be caught from November to March next year in lunar calendar.

There are around 20 coastal fishing trip per month that last to just a day or night per trip, normally at night from 3 pm to 8 am in the next morning.

### **6. Impacts of fishing activities on coastal resources**

In fact, most of fishing boats operating in the coastal water in Tuy An district have engine power of less than 45 HP. Specifically, the gillnet is a type of fishing gear that is actually popular in this coastal water areas and mainly with engine power of under 20 HP. Although it is highly selective, the gill-net use much smaller than regulation of Circular 02, then impact negatively on the coastal marine resource.

Particularly, trawl is one of fishing gear that mostly adverse impact on the coastal marine as well as the fish's habitat environment. According to the surveys, most of trawl operated in the coastal waters, even the boats with more 90 HP engine power and very much small mesh size (10 – 15 mm) while the Circular 02 regulate over 28 mm. This fishing gear catching all types of fish, including

juveniles and immature and reproduction. With the trawl density active all year, it has strongly harmed on the coastal sea bottom, coral reefs, seagrass beds... which have deprived breeding grounds, shelter and growing of many aquatic species.

In addition, the lobster seed driftnet is strongly negative impact on the current lobster resource. Small lobster fished will result in poor quality of seed, combined with inadequate storage and transport techniques that have weakened these and might much dies in rearing.

### **7. The status of coastal marine resource protection**

In fact, the violations of fishing activities have been complicating and sophisticating in the coastal water. Some violations should be noted that i) the fishing boats operating in the unregulated fishing ground such as trawl, driftnet; ii) Explosives, chemicals (cyanide) hydropower are much used to destroy coral reefs, sea beds; iii) the fishing gear with very much smaller mesh size than regulated; iv) Illegal, unregulated, unreported fishing (IUU fishing).

However, handling of violations in the coastal areas has been difficult and not much effective. Some causes should be identified such as: i) the patrol in Tuy An district is limited with one canoe (115 HP); ii) The local fisheries authorities are not enough for covering all fishing activities in the big coastal areas.

In the past years, as the other local authorities such as Nui Thanh District, Van Phong Gulf (To, 2017; Vu, 2018), the Tuy An District's fisheries management authorities have been concerned and implemented via various solutions, such as i) frequently training to popularize legal regulations and enhancing fisheries communities' awareness; ii) making alternatives from prohibited fishing gears to off-shore fishing in various forms; iii) strictly managing registration of fishing activities in near-shore waters; iv) priority to develop offshore fishing boats like purse seines, gill nets and logistic services.

#### IV. CONCLUSION AND SUGGESTION

- The number of fishing boats are quite stable during last 5 years that is around 1,030 in 2018. The number of gillnet is the highest while the driftnet is lowest for fishing in coastal water in Tuy An district, Phu Yen province.

- Fishing boats operating on the coastal waters of Tuy An district, Phu Yen province are small and old version. The fishing activities mainly come from the engine equipped boats of less than 20 HP to highly pressure on coastal areas.

- IUU fishing activities are definitely popular. Particularly, the lobster seed driftnet have the smallest mesh size of just 2mm.

- The landing in coastal Tuy An district areas are gradually increase overtime. The mainly fished species are scads, anchovy, mackerel,

crayfish, shrimp etc.

- The coastal fishing activities take place throughout the year and focusing more pressure from January to September because of the favorable weather.

- Fishing activities catching all types of fish, including juveniles and immature and reproduction. That strongly adverse effect on the coastal marine as well as the fish's habitat environment.

- The solutions should be implemented such as: making alternatives from prohibited fishing gears to off-shore fishing in various forms; strictly managing registration of fishing activities in near-shore waters; priority to develop offshore fishing boats like purse seines, gill nets and logistic services.

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