

Indonesia Marine Fellows Program - MFP

# FISHERS' WELFARE IN NATUNA WATERS POST IUU FISHING POLICY IMPLEMENTATION

Conservation Strategy Fund | Yayasan Strategi Konservasi | FELLOWSHIP REPORT | December 2018



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**Indonesia Marine Fellows Program - MFP** Applied Economic Research on Fisheries Management and Marine Conservation

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# TABLE OF CONTENT

1. INTRODUCTION	3
1.1 Background	3
1.2 Problem Formulation	3
1.3 Research Objective	5
1.4 Research Benefit	5
1.5 Research Scope	5
1.6 Hypothesis	5
2. LITERATURE REVIEW	5
2.1 Illegal, Unreported, and Unregulated (IUU) Fishing (Concept, Policy, and Implementation)	5
2.1.1 Definition of IUUF	5
2.1.2 IUUF Policy and Its Implementation in Indonesia	7
2.1.3 Sinking Vessels Conducting Illegal Fishing	7
2.1.4 Social Economic Impacts of IUU Fishing	8
2.2 Territorial Sea Jurisdiction	9
2.3 Welfare of Small Scale Fishers	10
2.4 Research Framework	11
3. RESEARCH METHOD	11
3.1 Research Location and Time	11
3.2 Types and Sources of Data	11
3.3 Sampling Method	12
3.4 Data Analysis Method and Procedure	12
4. GENERAL OVERVIEW OF THE RESEARCH LOCATION	14
4.1 General Overview of the Research Location	14
4.2 Respondent Characteristics	16
4.3 General Overview of Fishing Business	19
5. RESEARCH OUTCOME	20
5.1 IUU Fishing Practices	20
5.2 Policy to Eradicate IUU Fishing and Its Implementation	23
5.2.1 Vessel Sinking Policy	24
5.3 Income Change	24
5.3.1 Fisheries Househould (RTP)	24
5.3.2 Fisheries Fleets and Fishing Tools	25
5.3.3 Fisheries Production	26
5.3.4 Perum PELINDO	27
5.3.5 Income from Fisher Business Before and After the Implementation of IUUF Policy in Natura	29
5.4 Adaptive Capacity of Fisners	34
5.4.1 Establishing business groups	34 25
5.4.3 Incurring Debte	JU 27
5.5 Intervention Recommendation	
6. CONCLUSION AND RECOMMENDATION	38
	39

# LIST OF TABLES

Table 1. Definition of IUUF	6
Table 2. Types and Sources of Data on IUUF Practices Identification	11
Table 3. Types and Sources of Data on IUUF Policy and Its Implementation	12
Table 4. Types and Sources of Data on Fishers' Income Change	12
Table 5. Number of Research Respondent	12
Table 6. Data Analysis Objective and Method Matrix	13
Table 7. Operational Definition	14
Table 8. Total Area of Research Villages in 2017	16
Table 9. Number of Respondents in Sedanau, Sabang Mawang, and Sepempang Villages	
based on Age Group	17
Table 10. Number of Respondents in Sedanau, Sabang Mawang, and Sepempang Villages	
based on Education	17
Table 11. Number of Respondents in Sedanau, Sabang Mawang, and Sepempang Villages	
based on Experience as Fishers in Sedanau	18
Table 12. Number of Respondents in Sedanau, Sabang Mawang, and Sepempang Villages	
based on Number of Dependants in Sedanau	18
Table 13. Forms of IUU Fishing Practices in Natuna	21
Table 14. Laws and Regulations related to IUUF Eradication	26
Table 15. Investment Value of Small Fishers by Research Village	30
Table 16. Average Fishers' Depreciation Cost	30
Table 17. Average Fixed Cost Before and After 2015	
Table 18. Average Variable Cost Before and After 2015	
Table 19. T-test Result of Fishers' Income	
Table 20. Types of Government Assistance	

# LIST OF FIGURES

Figure 1. Types of IUU Fishing	7
Figure 2. Profile from the position of Reference, Base, and Boundary Points	9
Figure 3. Framework of Thought	11
Figure 4. Number of Population of West Bunguran, East Bunguran, and Tiga Island Subdistricts	
in Natuna District	15
Figure 5. Occupation by Subdistrict	15
Figure 6. Number of Population by Research Location Village in 2012-2017	16
Figure 7. Recapitulation of the Number of Fisheries Sector Licenses in Riau Islands:	19
Figure 8. Fisheries Business Owner Groups in Riau Islands	19
Figure 9. Illegal Fishing Pratices 2016-2017 in ZEEI - South China Sea Waters	22
Figure 10. Number of Foreign Vessels Committing Illegal Fishing From 2010-2017	23
Figure 11. Number of Fisheries Household by Research Location Subdistrict From 2011 – 2016	25
Figure 12. Tonnage of Fishing Fleets of Fishers in Natuna District	25
Figure 13. Number of Fishing Tools by Research Location	26
Figure 14. Fisheries Production Volume Data 2011- 2016	27
Figure 15. Number of Captured Fish based on Types of Fish Landed in Selat Lampa Port in 2016	28
Figure 16. Number of Captured Fish based on Types of Fish Landed in Selat Lampa Port in 2017	29
Figure 17. Income Change of Small Fishers Before and After 2015	32
Figure 18. Percentage of Fishers' Income Change	33
Figure 19. Number of Cooperatives during 2016-2017 in Research Villages	34
Figure 20. Fisheries Business Groups in Kepri on 2018	35
Figure 21. Fisheries Business Classes in Kepri on 2018	35
Figure 22. Number of Fisheries Elucidators in Kepri Province	37
Figure 23. Strategy to Incur Debt by Small Scale Fishers	37

# **1. INTRODUCTION**

## 1.1 Background

When referring to the mission of the President and Vice President, namely the Nine Priorities (*Nawacita*), one of its key points in need of a more detailed translation is the effort to "Develop Indonesia from the Peripheries". This approach is important considering all the development disparities, regional gaps, and income gaps that have been going on. One striking regional development disparity is the development of small islands compared to large ones. The issues of small and outermost Islands (*PPKT*) as the front terrace of the territory of the Republic of Indonesia are indeed quite complex. In addition to upholding the state's sovereignty, sustainably managing small and outermost islands becomes crucial and strategic to strengthen the state's maritime-based economy. The role of these islands is vital for Indonesia, which consists of 17,504 islands, of which 13,466 are named and registered with the United Nations (UN). Out of these named and registered islands, 92 are located in the peripheries (MMAF, 2015).

Natuna District is located at 1016' – 7019' LU (North Latitude) and 105000"-110000' BT (East Longitude), and is adjacent to the South China Sea in the north and east, Bintan District in the south, and the Malaysian Peninsula to the west (Center for Statistical Data and Information MMAF, 2015). Natuna District is established as a Provincial Strategic Region due to its potential for international seafaring activities. It is located at the northern end of Indonesia, encircled by South China Sea, and is part of the world's seafaring hub (Malacca-Singapore-Phillipines Strait), adjacent to several ASEAN countries. The Malacca-Singapore-Phillipines Strait is narrow, shallow, curvy, crowded, and restricted, and the ALKI I-A seafaring route in the South China Sea is often used as an alternative, as it is in the high seas with wide and deep waters. This route passes from the cluster of Karimun-Barelang-Bintan Islands to the Bunguran Island clusters (Province & Riau, 2016).

In the Asian and Southeast Asian context, Indonesia has the largest sea area. In comparing Indonesia's fisheries sector to other ASEAN countries: 1) Productivity per ship in Indonesia is only 6.7 tons per year, Thailand 137.86 tons per year, and Vietnam 19.48 tons per year, while Malaysia is more than 30 tons per year (processed from FAO data and statistics per nation); 2) Meanwhile, in terms of its contribution to the state's GDP, Vietnam reaches 21%, Malaysia 10%, and Thailand 10%, while Indonesia only sits at 3%; 3) The number of poor people in Indonesia's coastal regions reaches 33,768,000 people (13%), Vietnam 12,440,000 (5%), China 11,750,700 (5%), Phillipines 11,247,000 (4%), and Myanmar 6,209,340 (2%) (FAO, 2010); 4) The contribution of fisheries sector in Indonesia towards GDP (2006) in Indonesia is 1.9%, Malaysia 1.1%, Thailand 1.6%, and Myanmar 9.9%. With the third largest production in the world, fisheries business in Indonesia should have been able to provide more economic benefit to the people and fishers, and contribute significantly to the state's GDP (Adrianto, n.d.).

In the global context - IUU Fishing is also considered a global crime, not only a fisheries crime, but also concerning trafficking humans, slaves, animals, drugs, and other forms of trafficking. It is also related to border issues with neighboring countries, especially in terms of traditional fishers violating other countries' borders (MMAF, 2015). However, the sea fisheries sector also experiences complicated issues, such as overfishing, and Illegal, Unreported, and Unregulated (IUU) fishing. The threat of IUU fishing fleets caused by the restriction of fisheries license granting, while demand for fisheries products increases. IUU fishing does not only endanger marine resources, but also the social-economy lives of traditional fishers, who are still prominent in Indonesia's fisheries industry. Traditional fisheries living in the peripheries especially are hit with many problems. Moreover, a comprehensive policy using a multidimensional approach is needed to eradicate IUU fishing across Indonesia's marine territories.

# **1.2 Problem Formulation**

The problem of poverty and income disparity in coastal communities, especially fishers, remains a disheartening fact in the national economic development. Despite development growing each year, issues in coastal communities are not fully resolved. Therefore, the strategic plan of the Ministry of Marine Affairs and Fisheries (MMAF) aims to achieve two things, namely leveraging the Welfare Index of Marine and Fisheries Community from 40.5 in 2015 to 51 in 2019. The second goal is to increase the growth of Fisheries GDP from 7% in 2015 to 12% in 2019. Efforts to realize this include improving the supervision on marine and fisheries resource

management and using marine resources to develop the economy and welfare of fishers and coastal communities (MMAF, 2016).

But, there are a number of challenges and issues regarding fisheries management in Indonesia that can potentially threaten the preservation of fish and environmental resources, people's livelihood in fisheries, food security, and economic growth from the use of fisheries resources. Some marine areas have experienced overfishing. In addition, Illegal, Unregulated and Unreported (IUU) Fishing practices happening across Fisheries Management Areas of the Republic of Indonesia (WPPNRI), both by Indonesian fishing vessels (KII) and foreign fishing vessels (KIA), have caused loss from social, ecological/environmental, and eonomic aspects (MMAF, 2015), which leads to decreasing number of traditional fishers in Indonesia, from 1.6 million to 864 thousand households (±50 percent), and reduced production of capture fisheries in Kepri region from 2009 (225,469.00 tons) to 133,108.00 tons in 2014 (BPS, 2015).

IUU fishing is a serious threat endangering the conservation of fisheries resources and livelihood of people dependant on fisheries. Because of its negative consequences, a number of eradication strategies have been adopted and implemented, with varying degree of success. In addition to technical approach, there needs to be multi governance approach looking at the fundamental differences between fishers and other stakeholders, as well as managing the government, in terms of their knowledge and interpretation to fishing laws and regulations. Other social factors, such as poverty and interaction with the fisheries situation, are also important to understand (Luomba, Chuenpagdee, & Song, 2016).

IUUF practices greatly impact social, ecological/environmental, and economic aspects of traditional fishers in periphery islands. Fishing fleets dominated by small ships, production system that is not fully integrated, both at the upstream and downstream, lack of knowledge, skill, technological mastery, accessibility to infrastructure and information, as well as lack of minimum facility, have lead to low productivity and competitiveness from traditional fishers, causing economic vulnerability and affecting the adaptive capacity of small scale fishers to their income change.

To reduce fish theft activities by foreign fishers, the Government of Indonesia has issued a policy to sink vessels perpetrating illegal fishing. During 2010-2015, the government has embarked on various efforts to battle illegal fishing, before finally issuing the vessel sinking policy.

Since the government, through MAAF, declared war against IUU Fishing and enforce strict sanctions, it has significantly influenced the change in the number of fishers within the fisheries management area in Natuna Island. In the last two years, the number of Fishers Household (RTP) has increased by 95.25 percent (to 7,066 RTP in 2016, compared to 3,619 RTP in 2014 (BPS, 2015). However, these efforts have left a myriad of social economic injustice issues for fisher communities (Alamsyah, 2017).

The decrease of IUUF in Natuna waters does not automatically improve the welfare of fishers, especially local fishers. The additional number of small scale fishers to one hundred percent has increased competition among local fishers, due to the limited capture areas and traditional fishing fleets. Therefore, the opportunity to enhance fishing outcome resulting from reduced foreign fishers cannot be fully taken advantage of by small scale fishers. Thus, the implementation of IUU Fishing policy will create new social economic issues for small scale fishers. Because of this, there needs to be a policy revision that can strengthen the adaptive capacity and income of small scale fishers brought about by the change of income resulting from the implementation of IUUF policy in Natuna.

From the explanation above, it can be concluded that the important questions that need to be addressed by this research are:

- 1. What is the IUUF practice, policy, and implementation in Natuna?
- 2. How is the IUUF policy being implemented?
- 3. How does the implementation of IUUF policy change of income and adaptive capacity of fishers?
- 4. What is the intervention recommendation to improve fishers' adaptive capacity?

# 1.3 Research Objective

The general objective of this research is to discuss the impact of IUUF policy on the welfare of small scale fishers in Natuna District. Thus, the specific objectives expected from this research are:

- 1. To identify IUUF practices in Natuna
- 2. To asses IUUF eradication policy and its implementation
- 3. To measure the change in fishers' income caused by IUUF eradication policy
- 4. To measure the adaptive capacity of fishers against income change
- 5. To provide intervention recommendation on fishers' adaptive capacity.

## 1.4 Research Benefit

This research is expected to contribute the following benefits:

- 1. Providing recommendation on how to improve IUUF eradication policy
- 2. Strengthening fishers' adaptive capacity against income change
- 3. Strengthening sustainable welfare for small fishers

## 1.5 Research Scope

This research has the following limitations:

- 1. This research assesses fishers' income change resulting from IUUF policy.
- 2. Fishers in this research are defined as small scale fishers.
- 3. Local fishers in this research are defined as fishers from Sepempang Village, Sabang Mawang Village, and Sedanau Village.
- 4. Income change in this research is defined as fishers' income prior to the implementation of IUUF policy (before 2015) and after 2015.

## 1.6 Hypothesis

- 1. The income of small scale, local fishers after the implementation of IUUF policy is higher than prior to the implementation of IUUF policy in Natuna waters.
- 2. The increase of fishers' income is affected by the number of trips, distance to capture, depth, number of seafaring hours, experience as fishers, domicile dummy, rain dummy, tidal wave height dummy, and wind speed dummy.
- 3. In sustaining their livelihood, fishers use loan services from (indebted to) *tauke*, or business owners.

# 2. LITERATURE REVIEW

### 2.1 Illegal, Unreported, and Unregulated (IUU) Fishing (Concept, Policy, and Implementation)

### 2.1.1 Definition of IUUF

The formal use of the term IUU can be found in the Commission XVI<sup>th</sup> Meeting Report in 1997 and in a letter to the Food and Agricultural Organization (FAO) in the same year. IUU Fishing is now generally understood as fishing activities that are inconsistent or in contradiction to the management or conservation actions in place for specific types of fisheries (Agnew & Barnes, 2004). An important element of IUU Fishing is ilegal fishing, which usually refers to fishing without license, fishing in a closed area, fishing using restricted tools, fishing over the quota, or fishing endangered species.

The following are some definitions of IUUF (Agnew & Barnes, 2004); ((MRAG, 2005); (Halford, 2013); (European Parliament, 2014); (FAO, 2015); (Jaelani & Basuki, 2014) (See Table 2.1.) :

Illegal fishi	ng
0	Illegal fishing activities conducted by national/foreign fishing vessels within the Exclusive Economic Zone (ZEE) of a country, in that these fishing activities are not licensed from said country, and in contradiction with prevailing laws and regulations;
0	They are conducted by fishing vessels hoisting the flag of a country that is a member of regional fisheries management organization, but is operating in contradiction with conservation and management provisions adopted by the organization or provisions relevant to prevailing international laws;
0	They are conducted by fishing vessels violating national law or international commitment, including by countries cooperating with relevant regional management organization.
Unregulate	ed fishing
0	In implementing relevant regional fisheries management organization conducted by vessels with no nationality, or by those hoisting a flag from a country not from the organization, or by fishing entities, inconsistent with or in contradiction with conservation and management measures of the aforementioned organization;
0	In a region or for fish stock for which no conservation or management measures apply, and where the fishing activities are conducted inconsistent with state responsibility for marine resource conservation according to international laws.

Unreporte	d fishing
0	Fishing activities that are never reported or incorrectly reported to the authorized institutions, not according to the national laws and regulations;
0	Fishing activities that are done in an area under the competency of a regional fisheries management organization, but are never reported or incorrectly reported, not according to reporting procedure of the aforementioned organization.

The largest practice in IUU Fishing is basically poaching or pirate fishing, namely fishing by another country without license from the party country, or in other words, fish theft by foreigners. The involvement of foreigners in pirate fishing can be categorized into two, which are: 1). Semi-legal theft, which is defined as fish theft conducted by foreign vessels using legal fishing license owned by a local business, using vessels hoisting the local flag or flag of another country. 2). Purely illegal theft, which is fishing in which the foreign vessels use their own flag to fish in another country's territory (Boto, La Peccerella, Scalco, & Tsamenyi, 2012). There are several types of IUFF (Boto et al., 2012):

- a. Illegal/poaching activities, usually stated as fishing without license within a ZEE territory of a country
- b. Other types of illegal fishing, which may be conducted by legally-licensed vessels. Licensed vessels may still fish illegally by breaching the terms and requirements of their license, for example using illegal tools, fishing over the allocated quota, fishing in a closed area and / or season, exceeding the captured fish limit, non or partial data reporting, or submitting inaccurate data
- c. Misreporting, or failing to report, capture, and submit other data that may consist of illegal and unreported fishing. The FAO definition indicates that unreported fishing is not always illegal, even though it clearly has to be considered illegal, since the obligation to report is a part of the national laws and regulations or license provision.
- d. Unregulated fishing. This is well-defined by FAO IPOA. Unregulated fishing includes fishing in an open sea by 'free roamers', which are those who failed to register to the regional management regulation, and refused to comply with conservation and management measures set forth by the regulation. This also

includes fishing in an open sea where regional management regulation is absent. The types of IUU Fishing can be viewed in Figure 1.



Figure 1. Types of IUU Fishing

# 2.1.2 IUUF Policy and Its Implementation in Indonesia

Despite having issued and ratified regulations on illegal fishing, the fact is, Indonesia is still home to a plethora of illegal fishing cases. This can be seen from the fluctuation of Non-Tax State Revenue (PNBP) from the Marine and Fisheries (KP) sector. One of the factors causing this fluctuation is fish theft practices called Illegal, Unreported, Unregulated Fishing or IUU Fishing (Jaelani & Basuki, 2014).

The abundance of potential in Riau Island influences the occurence of illegal fishing there. To reduce fish theft activities by foreign fishers, the Government of Indonesia has issued several policies. Efforts to eradicate IUU Fishing in Indonesia are done by : a). Adopting or ratifying international regulations; b). Reviewing and adapting national legislation if needed; c). Recruiting fisheries and Civil Service supervisors and conducting capacity building; d). Actively participating in RFMO and other international fisheries organizations; e). Playing an active role in RPOA-IUU; f). Implementing MCS through VMS, observer, log book and port examination, g). Establishing and building the capacity of Supervisory Technical Implementing Unit (*UPT Pengawasan*) for Marine and Fisheries Resources (SDKP) at the local level; h). Providing supervisory infrastructure, such as supervising ships and speedboats; i). Building the capacity of Supervising Community Groups (*Pokmaswas*); j). Establishing Fisheries Court.

# 2.1.3 Sinking Vessels Conducting Illegal Fishing

This sinking policy is based on Law Number 31 Year 2004, which was amended with Law Number 45 Year 2009 on Fisheries, which serves as the legal basis to safeguard fisheries resources from exploitation. Base don Articles 85 and 101 of Law No 31/2004 on Fisheries, illegal fishing perpetrators are punishable with a maximum five year prison sentence. The government must swiftly establish fisheries court, whose authority is to determine, investigate, and decide on the criminal aspect of each illegal fishing case. If necessary, the government must be courageous in stopping the poaching of Indonesia's marine riches by acting strict, like sinking foreign fisher vessels. Then, there is also the Minister of Marine Affairs and Fisheries Decree Number KEP/50/MEN/2012 on the National Action Plan to Prevent and Eradicate Illegal, Unreported, and unregulated Fishing (IUU Fishing). This ministrial decree is the implementation form of the Code of Conduct for Responsible Fisheries (CCRF), which was agreed in 1995 by members of Food And Agriculture Organization (FAO) on managing and developing orderly, responsable, and sustainable fisheries, and international actions to combat IUU Fishing) in 2001. This IPOA-IUU Fishing must be followed up by every country, including Indonesia, by developing a IUU Fishing prevention and eradication action plan at the national level (Jaelani & Basuki, 2014).

This vessel sinking is then executed within Riau Islands, including Natuna. Foreign fishing vessels conducting violation are shot, blown up, and sunk by marine law enforcers in Indonesia, Indonesian Navy, Marine Security Coordination Agency (*Bakorkamla*), and MMAF. This is just the beginning. Going forward, strict measures in the form of sinking foreign vessels committing illegal fishing will be continued to instill deterrent effect to its perpetrators. Fishing license moratorium policy, along with instruction to sink fish theft perpetrating vessels, are enforced. Furthermore, sinking foreign vessels can be found in Article 69 paragraph (4) of Fisheries Law, stating that:

- 1) Fisheries supervising vessels are responsible to conduct supervision and law enforcement in fisheries within the fisheries management areas of the Republic of Indonesia.
- 2) Fisheries supervising vessels as mentioned in paragraph (1), may be equipped with firearms.
- 3) Fisheries supervising vessels may stop, examine, bring in, and apprehend vessels believed or suspected to commit violation within the fisheries management areas of the Republic of Indonesia, to the nearest port for further processing.
- 4) In conducting its function mentioned in paragraph (1), fisheries investigator and/or supervisor may conduct special measures of burning and/or sinking fishing vessels hoisting foreign flag based on sufficient initial evidence.

## 2.1.4 Social Economic Impacts of IUU Fishing

IUUF Practices can obstruct the freedom to fish and impede the social economic rights of local fishers. There are seven important categories that are applicable as 'good practices' (Charles, 2010):

- 1) Adopting 'rights-based' approach, linking fisheries rights and human rights
- 2) Ensuring safe access rights for equitable sharing of fisheries resources
- 3) Providing good governance, organizational capacity, and legal space & empowerment
- 4) Adopting integrated system oriented towards community focused approach
- 5) Adopting the appropriate sustainable development approach
- 6) Endeavoring for food sovereignty and household/community welfare
- 7) Incorporating non-fisheries policy actions and livelihood diversification options.

### **Economic Impacts**

Economically, there is an economic loss in the form of direct loss on GNP, where actual income should have been increased in the form of anchoring fee, licensing fee, tax, and other levies paid by legal fishing operators. There are other secondary macro economic effects resulting from the loss of fish and marine resources to illegal vessels. These include the implication to the state budget (export of fish and other marine products, and other taxes), and the work within the fisheries and fish processing sector.

Secondary economic losses include the loss of income and work in other industries and activities within the upstream and downstream supply chain of fishing operations. On the upstream, IUU Fishing decreases demand for fishing tools, vessels and equipment, and other inputs. The downstream side, including fish processing and packaging, marketing, and transportation, suffers negative impacts as well. Reduced fishers' income will also affect the demand for consumption goods by the fishers' families.

### **Social Impacts**

IUU Fishing usually contributes to non-sustainable impacts to the target species and ecosystem. This may reduce productivity, biodiversity, and ecosystem resilience. In turn, this will lead to reduced food security for artisanal fishers. This is extremely important in communities heavily dependant on fish as their animal protein, especially coastal communities. Direct conflicts between IUU and other beneficiaries of the fisheries sector will often occur. Conflicts between industrial IUU and artisanal or semi-artisanal fishers are common. These conflicts may be direct (vessels hitting other vessels) or indirect (taking all the available fish), which often cause accidents, deaths, and injuries among artisanal and other local fishers, which ultimately lead to economic and social consequences (lower captured fish due to injury, income loss) for fishers and their families.

In addition, IUU Fishing practices can cause conflicts between local fisher fleets and foreign fishers, thus limiting local fishers in passing down their captured fish and income for generations to come. (Agnew & Barnes, 2004),

#### 2.2 Territorial Sea Jurisdiction

Territorial Sea Jurisdiction is determined according to Law Number 22 Year 1999 (Rais, 2003). When Indonesia declared its independence in 1945. Indonesia's marine sovereignty was inherited from the laws and regulations of the Colonial Dutch, named "Territoriale Zee en Maritieme Kringen Ordonnantie 1939" (Territorial Sea and Maritime Ordonance 1939). According to this ordonance, each island was surrounded by territorial sea (regional sea) 3 sea mile away, to which the state had full sovereignty, and beyond this 3 miles was considered open sea. Therefore, the Government of Indonesia, under Prime Minister Dioeanda (new spelling"Juanda") in December 13, 1957, declared that Indonesia was an archipelago, with all of its sea among its islands inseparable from its lands, and formed a unitary unit of the national territory. In this declaration, it was also explained that the territorial sea in which the state has a complete sovereignty became 12 sea miles. In Natuna, there is a pocket that cannot be covered by the baseline connecting most outer islands, because it is 100 sea mile away (called the Natuna Pocket). In 1982, UNCLOS was opened by a Convention signing. What was interesting from UNCLOS 1982 was the creation of Exclusive Economic Zone of 200 sea miles, measured from the baseline, which was also used to measure the wide of territorial sea, which was 12 sea miles. Natuna Pocket can be covered because the UN Marine Legal Convention allowed Indonesia to draw a baseline to 100 sea miles. ZEEI is the exclusive economic zone given to Indonesia to solely be used for economic and conservation purposes. ZEEI is not the state's sea regime. With the UNCLOS 1982 coming into effect. Indonesia's marine territory consists of (1) Territorial Sea (Regional Sea), (2) Archipelagic Waters (Archipelago), (3) Deep Waters, (4) Additional Zones, (5) Exclusive Economic Zone, and (6) Continental Shelf.

#### Base Point, Reference Point, and Boundary Point

- Base Point. Base Point is the position located on the beach at low water line around conspicuous and easily spotted places, such as capes and dry beaches (not swampy or mangrove forest beach). This Base Point does not need to be made permanent, because during hightide, this spot will be immersed.
- Reference Point. Since Reference Point is always located under sea surface during hightide, there
  needs to be a permanent Reference Point on the beach, in the form of sturdy concrete pillar, stuck to its
  place, on top of a hard soil, so that it does not sink (set).
- 3) Maritime Boundary Point. Since the sea is not pinned, the Maritime Boundary Point is an imaginary point measured and calculated from the Base Point. Meanwhile, the position of Base Point is measured and calculated from the Reference Point. In the whole process, the Reference Point is a point directly measured with GPS (Global Positioning System) and its coordinate established against the National Geodetic Datum, meaning that the Reference Point is measured and bound in the Horizontal Control Point (latitude and longitude) network system at the national level.



Figure 2. Profile from the positions of Reference, Base, and Boundary Points

Notes: MAT: High Water Line MAR: Low Water Line TA: Reference Point TD: Base Point TB: Boundary Point L: Latitude B: Longitude Measurement: TA (L1, B1); Distance D (in meters) and azimuth TA-TD Distance of TD-TB = 12 sea miles convered to meters Calculated: TB Coordinate (L2, B2)

#### 2.3 Welfare of Small Scale Fishers

Fish and fisheries are important for developing countries. Fish are kept, captured, sold, processed, and consumed. In each step throughout this process, there is an economic and social added value that will be beneficial for developed countries. Hence, from a development perspective, developing and developed countries interact in this sector. The development for fisheries policy approach brings significant potential in reducing poverty (European Commission, 2000).

Welfare is a general concept for anthropology, economy, pscyhology, sociology, and other social sciences. This is often related to financial states, however, welfare goes beyond mere economic or material welfare. This includes subjective elements indicating how a condition is felt, which is different than the observed objective and independent condition. To develop welfare indicator, first we need to know what is important for individuals and communities (Smith & Clay, 2010). This can be measured objectively in time, but people also have an impression or perception whether life is good or bad, becoming better or worse. The way people, households, work groups, and communities feel welfare is important in deciding how satisfied or happy they are (Rodgers, 1976). There are two crucial elements used to measure welfare, namely income (objective element) and work satisfaction (subjective element). In measuring income, we need to know whether we are measuring income per capita, household income, or family income, and whether we are only measuring income from fishing or other sources of income as well, using average or median income, and what units are used to calculate income, whether community, village, or area unit. Developing welfare index emphasizes more on the objective element. Meanwhile, the perception of satisfaction as a subjective element is important to understand and trace the impact of condition and management change from time to time (Smith & Clay, 2010).

The Government of Indonesia has a number of welfare and poverty models; for instance, the Central Statistics Agency measures poverty by focusing on consumption, while the National Family Planning Coordination Agency (BKKBN) focuses on family welfare. International organizations, such as United Nations Development Programme (UNDP), also considers human development issues, defined as life expectancy, literacy rate, education, and purchasing power per capita. These concepts have their own advantage and disadvantages. Therefore, a new poverty and welfare concept is needed to better link monitoring and planning activities. Local characteristics, the interest of the local government, and public perception on poverty and welfare are learned through in-depth community life study, government workshops, and policy analyses (Cahyat, Gonner, & Haug, 2007).

The definition of small scale fishers according to Article 1 of Law Number 7 Year 2016, are fishers conducting fishing to fulfil their daily needs, both those who are not using fishing vessels and those who are using fishing vessels at most 10 (ten) gross ton (GT). Meanwhile, traditional fishers are those who fish in waters granted traditional fisheries rights, which have been used from generation to generation, according to local culture and wisdom.

Most of the world's fishers are small scale fishers who provide fish, the main food source and primary means of livelihood, for millions of people in the entire world. Even though their fisheries technology is not advanced, their system is far more complex, producing various fish species, closely interacting with coastal communities, and using complicated knowledge and management system to achieve their goals. Small scale fisher groups are considered stubborn because they are resistant to proposed solutions, making their actions in contradiction with the policy. A simple policy that is relevant to a number of situations is modernization and rights-based management, which needs to be strengthened at the small scale fishers level, in which their good practices need the perspective of nuances and context (Charles, 2010). To understand the problem of income change for small scale fishers, we need to asses their losses during post harvest season, such as bad transportation and insufficient market information, which causes long storage periods, leading to decreased fish quality, ultimately lowering the selling price.

# 2.4 Research Framework



Figure 3. Framework of Thought

## 3. RESEARCH METHOD

## 3.1 Research Location and Time

This research was conducted from March 2017 to March 2018. The location selection for the research is done purposively, using the following criteria:

- a. Accessibility
- b. Operational cost
- c. Presence of small fisher community
- d. Potential IUUF incidents along with efforts to eradicate them

Based on the abovementioned criteria, three villages representing three islands were established to be the focus of the research, namely Sepempang Village of East Bunguran Subdistrict in Bunguran Island, Sabang Mawang Village of Tiga Island Subdistrict in Tiga Island and Sedanau Village of West Bunguran Subdistrict in Sedanau Island.

# 3.2 Types and Sources of Data

The types of data used in this research were primary and secondary data. Primary data was obtained directly from the field using direct interview to fishers categorized under small scale fishers whose capture areas were vulnerable to IUUF, and where IUUF had occurred. Secondary data was attained from the Marine and Fisheries Office (DKP) of Natuna District, IUUF Task Force, BAKAMLA (Navy), journals, and other supporting documents and materials.

Data	Data Source	Collection Technique
Illegal Fishing	DKP of Natuna District; IUUF Task Force, BAKAMLA (Navy)	In depth Interview
Unreported Fishing	DKP of Natuna District; Business owners (fish collectors); Fishers	and/or direct observation Stakeholder interviews.
Unregulated	DKP of Natuna District	

Table 2. Types and Sources of Data on IUFF Practices Identification

Data		Data Source	Collection Technique
Regulations and literatures related to IUUF eradication	-	Offiial website of relevant institutions. Scientific books and writings.	Literature review
Regulation implementation		DKP of Natuna District and relevant institutions; fish collectors and fishers;	Stakeholder interviews, In Depth Interview and or direct observation

Table 3. Types and Sources of Data on IUUF Policy and Its Implementation

Table 4. Types and Sources of Data on Fishers' Income Change

	Data	Data Source	Collection Technique
• • • •	Characteristics of Fisher Households Fishing Tools Captured Fish Fishing Area Cause of Income Change	Fisher Households	Fisher Household Survey

# 3.3 Sampling Method

The sampling method from fishers is done using non-probability sampling through purposive sampling, namely purposedly selecting individuals to be the sample, using specific criteria. The population size refers to the data of number of local fishers in each research location subdistrict, as detailed in Table 5.

Fishers' Domicile	9	Number of R	TPNumber of	RTPNumber	of
Subdistrict	Village	Per Subdistrict	Per Village	Sample	
Tiga Island	Sepempang Village	447	121	20	
East Bunguran	Sabang Mawang Village	438	81	20	
West Bunguran	Sedanau Village	693	277	20	
Total		1.578	479	60	

Source: Citizenship and Population Office (Disdukcapil) of Natuna (2017)

### 3.4 Data Analysis Method and Procedure

Data obtained in the research is analyzed using two approaches, qualitative and quantitative. Data processing and analysis is done with the computer program Microsoft Excel and SPSS version 21.0. A number of analytical tolos that will be used in the research are:

#### Table 6. Data Analysis Objective and Method Matrix

Analysis	S Objective	Analysis Method
1.	Identifying IUUF practices in Natuna, its policy, and implementation	
2.	Assessing IUUF eradication policy and its implementation	Qualitative Analysis
3.	Measuring fishers' adaptive capacity to income change	
4.	Recommending intervention to fishers' adaptive capacity	
5.	Analyzing fishers' income and its change	Quantitative Analysis

Some of the analyses to be used in the research calculation are:

- Fisher Income Change Analysis Method One loss suffered by fishers who depend their means of livelihood largely on fishing, is the implementation of policies resulting in change of income from fishing. This means a decrease between fishing income after IUUF policy implementation and prior to it.
- a. Income is calculated until September of 2017.
- b. Income change is calculated by deducting the income prior to the impact of IUUF policy implementation with income after the impact.
- c. Fishing income is calculated based on fishing production multiplied by the selling price of fish. Mathematically, the income reduction using income approach according to Soekartawi (1995) can be formulated as follows.

$$\Pi = TR - TC$$

$$\Delta \Pi = \Pi 1 - \Pi 2$$

$$\Delta \Pi = \Pi 1 - \Pi 2$$

Notes :

- $\Delta \Pi$  = Income reduction (IDR)
- $\Delta Y$  = Income reduction (%)
- = Income prior to the implementation of IUUF policy
- $\Pi_1$  (IDR)
- $\Pi_2$  = Income after the implementation of IUUF policy (IDR)
- TR = Total Income (IDR)
- TC = Total Cost (IDR)
- 2. t Testing (Partial Testing)

Partial testing is to test whether each independent variable influences dependent variables or not. The mechanism for t statistic testing according to Juanda (2009) is as follows: Formulating hypothesis

 $H_0$ :  $\beta i = 0$ , is defined as an independent variable that is individually not a significant explanatory or does not influence the dependent variable.

 $H_1: \beta i \neq 0$ , is defined as an independent variable that is individually a significant explanatory to the dependent variable or in other words, this independent variable influences the dependent variable.

#### Compared t value with t table:

- If  $t_{value} > t_{Table}$ ,  $H_0$  is accepted, which states that an independent variable individually influences the dependent variable.

- If  $t_{value} < t_{Table}$ ,  $H_0$  is rejected, which states that an independent variable individually influences the dependent variable.

The operational definition used in report (Law Number 7 Year 2016) is as follows:

Fisher		Is anyone whose means of livelihood is conducting Fishing
Small	Fisher	- Small fisher is the one of the traditional communities in Indonesia who
(Law	No.23	use traditional fishing tools and materials, and is freed from having to own a
Year	2014	business license and tax, and free to fish throughout all fisheries management
Article	27	areas across the Republic of Indonesia.
paragrah &	5)	
Small Fish	ner	- Fisher who conduct fishing to fulfill his/her daily needs, both those who do not use fishing vessel and those who use fishing vessel of maximum 10 (ten) Gross Ton (GT).
Traditiona Fisher	I	Fisher who conduct fishing in traditional fisheries waters that have been used for generations with local culture and wisdom
Fishing		Activity to capture fish in waters not cultured with tools and by using ways that prioritize the principles of sustainability and conservation, including activity that uses vessel/ship to load, transport, store, cool, handle, process, and/or preserve fish
Fishing lic	ence:	Refers to the 'official document providing rights to its holder, as regulated by national regulations, to use a certain fishing capacity for the comercial exploitation of living water resources'
Fishing ve	essel:	This referes to 'every ship in any size used or intended to be used for comercial exploitation of fisheries resources, including supporting ship, fish processing ship, ship involved in transhipment and transport ship equipped for fisheries product transportation, except container ship'
Flag State	):	This refers to a state whose fishing vessel is registered or licensed by law.

Table 7. 0	Operational	Definition
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# 4. GENERAL OVERVIEW OF THE RESEARCH LOCATION

### 4.1 General Overview of the Research Location

Natuna District is located at the coordinate of 1°16' - 7°19' North Latitude, and 105°00' - 110°00' East Longitude, with a coastal line of ± 460 km and total sea area of 262.197,07 Km<sup>2)</sup> and has 154 islands, with 27 inhabited islands (17,53 %) and 127 inhabited (82,47%). The two largest islands are Bunguran Island and Serasan Island. Administratively, Natuna District consists of 15 subdistricts, namely Midai, West Bunguran, North Bunguran, Laut Island, Tiga Island, East Bunguran, Northwest Bunguran, Central Bugnuran, South Bunguran, Serasan, Subi, East Serasan, Bunguran Batubi, West Tiga Island, and Suak Midai Subdistricts. Natuna District is adjacent to:

North: Vietnam and Cambodia

#### East: Eastern part of Malaysia (Sarawak) and West Kalimantan South : Bintan District West: Malaysian Peninsula & Anambas Islands District

The research location is selected from three subdistricts, namely West Bunguran, East Bunguran, and Tiga Island. From West Bunguran subdistrict, respondents are selected from Sedanau Village, from East Bunguran subdistrict, respondents are selected from Sabang Mawang Village. From these three subdistricts, it can be seen that East Bunguran Subdistrict has the highest number of population, which is 70%, followed by West Bunguran 21%, and Tiga Island Subdistrict of 9% (Figure 4). The high number of population in East Bunguran is because this subdistrict is close to the capital of the District, whereas Tiga Island Subdistrict is the area of Integrated Marine and Fisheries Center (SKPT) of Selat Lampa.



Figure 4. Number of Population in West Bunguran, East Bunguran, and Tiga Island Subdistricts in Natuna District (*Disdukcapil* Natuna, 2017)

Furthermore, if seen from the occupation of the people in these three subdistricts, it is found that the highest number of fishers is located in West Bunguran Subdistrict, followed by Tiga Island, and the least amount of fishers is in East Bunguran Subdistrict. For Civil Service/Retired/Employee/Honorary Employee, most of them are located in East Bunguran Subdistrict (Figure 5).



Figure 5. Occupation by Subdistrict

When we examine the population growth of the three research location villages from 2012 – 2017, it is found that the population of Sedanau Village experienced drastic decrease in 2013 and bounced back in 2014, but for Sabang Mawang Village, the population growth is stable from year to year. This explains that Sedanau Village was known as an area vulnerable to illegal fishing in 2013, then since IUUF policy was implemented, fishing as a means of livelihood went back to become the hope for the local people, and the number of people once again increased. Meanwhile, Sabang Mawang Village was known to have a stable population growth because this area experienced rapid growth along with the development of Integrated Fisheries Industrial Zone in Selat Lampa area. Also, Sepempang Village in East Bunguran Subdistict was also known to have a stable population growth, because in this area, the people were not affected by IUUF activities too much, since most of them were civil servants or employees. In 2017, this area only experienced a small population growth due to good economic growth in the capital of the District. (Figure 6).



Figure 6. Number of Population by Research Location Village in 2012-2017

The total land area of each research village can be viewed on Table 8 below.

No	Subdistrict	Research Villages	Land Area (Km2)
1	East Bunguran	Sepempang	146,46
2	Tiga Island	Sabang Mawang	67,87
3	West Bunguran	Sedanau	448,46

Table 8. Total Area of Research Villages in 2017

Source: Dukcapil Natuna District, 2017

# 4.2 Respondent Characteristics

Respondent is one of the main source of primary data needs in a research done through questionnaire. Therefore, their identity needs to be obtained, because it wil serve as consideration in analyzing and concluding research outcome. For the needs of respondent data analysis, the following aspects will be presented: age, most recent education, period of working as fishers, and number of family members of the respondent. These aspects are attained based on questionnaire answer from respondents in research locations. In this research, respondent characteristics consist of age, education, experience as fisher, and type of fishing tool. These are acquired based on interview to 60 respondents.

### 1. Respondent's Age

Age is an indicator used to see one's productivity period to conduct an activity that generates results and is useful, both to meet their needs and the need to fulfill their responsibility as head of the family, or to help their family in covering for their daily needs. The age of the respondents by research location can be seen in Table 9 below.

		Number			
No Age Group	Sedanau	Sabang Mawang	Sepempang	Percentage (%)	
1	25 - 35	11 (55%)	4 (20%)	14 (70%)	48,33
2	36 - 46	8 (40%)	12 (60%)	3 (15%)	38,33
3	> 47	1(5%)	4 (20%	3 (15%)	13,33
	Total	20	20	20	100,00

Table 9. Number of Respondents in Sedanau, Sabang Mawang, and Sepempang Villages based on Age Group

Source: Processed Primary Data, 2018

The above table describes that there are three respondent age groups in three research locations, namely Sedanau, Sepempang and Sabang Mawang. For respondents in Sedanau, the age range is 25-35 years old with a percentage of 55,00 %, 36-36 years with a percentage of 40,00 % and > 47 years with a percentage of 5,00. Respondents in Sabang Mawang are age group 25-35 years with a percentage of 20,00 %, age group 36-36 years with a percentage of 60,00 % and > 47 years with a percentage of 20,00 %, age group 36-36 years with a percentage of 60,00 % and > 47 years with a percentage of 20,00%. Whereas the age groups for respondets from Sepempang are 25-35 years with a percentage of 70,00 %, 36-36 years with a percentage of 15,00 % and > 47 years with a percentage of 15,00%. Based on this data, it can be concluded that the average fisher respondent's age is around 25-46 years old. This is also caused by their educational background and experience of only working in fisheries sector, especially fishing. In addition, by looking at the age, it is clear that people who are relatively young and have entered the productive age will have stronger and more responsive physical capabilities compared to older fishers, with limited physical capacity and relatively slow movement.

#### 2. Respondent's Education

Education is also a factor that determines the quality of life and an effective facility in developing human resource quality, especially in terms of work productivity. In addition, relatively high educational background will influence the respondent's attitude, behaviour, and way of thinking. Respondent's education in this research is defined as formal education that has been obtained by respondents. Furthermore, the elaboration on respondents by edication can be seen in Table 10 below:

		Number of Respondents and Percentage			Number of
No	Educational Level	Sedanau	Sabang Mawang	Sepempang	Respondents and Percentage
1	Not in School/Not Graduated from Elementary School (SD)	4(20%)	2 (10%)	7 (35%)	13 (21,67%)
2	Elementary School (SD)	9 (45%)	11 (55%)	5 (25%)	25 (41,67%)
3	Junior High School (SMP)	4 (20%)	4 (20%)	4 (20%)	12 (20,00%)
4	Senior High School (SMA)	3 (15%)	3 (15%)	4 (20%)	10 (16,67%)
Total		20	20	20	100,00

Tabel 10. Number of Respondents in Sedanau, Sabang Mawang, and Sepempang Villages based on Education

Source: Processed Primary Data (2018)

The above table describes that the education of fishers in three research locations is relatively low in general. This is also shown by the sheer umber of respondents with educational level of Elementary School graduates, namely 45 % in Sedanau, 55% in Sabang Mawang, and 25% in Sepempang, and those who never went to school and did not graduate from elementary school, namely 20% in Sedanau, 10% in Sabang Mawang, and 35% in Sepempang. Meanwhile, the least is the number of respondents completing their Senior High School education. This is caused by their social economic aspect, making them unable to complete higher levels of education. The fishers think it is more important to work to meet their needs instead of pursuing better education.

3. Respondent's Experience working as Fisher

The experience of someone working as a fisher is an important aspect in this research to reveal the fishing business condition before and after IUUF policy in Natuna. The respondent's experience as fisher can be seen in Table 11.

No E (y	Experience	Number of Respondents and Percentage			Number of
	(years)	Sedanau	Sabang Mawang	Sepempang	Respondents and Percentage
1	1-10	13 (65%)	7 (35%)	9 (45%)	29 (48,33%)
2	11-21	4 (20%)	9 (45%)	6 (30%)	19 (31,67%)
3	> 21	3 (15%)	4 (20%)	5 (25%)	12 (20,00%)
Tota	I	20	20	20	100,00

Table 11. Number of Respondents in Sedanau, Sabang Mawang, and Sepempang Villages based on Experience as Fishers in Sedanau

Source: Processed Primary Data (2018)

Table 11 above indicates that the largest number of people by experience working as fishers is dominated by respondents who have been working 1-10 years and 11-12 years, respectively 65 % and 20% for respondents in Sedanau, 35% and 45% for respondents in Sabang Mawang and respondents who are in Sepempang have percentages of 45% and 30%, while respondents working for more than 20 years are 3,00 %, for respondents in Sedanau, 20% in Sabang Mawang and 25% in Sepempang.

In general, the average respondents have had a relatively lengthy experience working as fishers. Learning this experience aspect can lead us to know the information on the changes of economic condition caused by the implementation of IUUF policy.

### 4. Respondent's Number of Dependants

The aspect of the number of family members in each household can negatively impact family, because they can be burdens that must be covered by the head of the family. So, more family members means more needs to be fulfilled, particularly the needs for clothes and food. But on the other hand, high number of dependants as a part of the family may turn into worker contribution in the family to lighten work and improve the family's income or earnings (Daud, 2005). To learn about the respondents' dependants, please look at the following table:

Table 12. Number of Respondents in Sedanau, Sabang Mawang, and Sepempang Villages based on Number of Dependants in Sedanau

	Number	Number of	Number of Respondents and Percentage			Number of
No	Dependants	01	Sedanau	Sabang Mawang	Sepempang	Respondents and Percentage
1	1 - 3		8 (40%)	10 (50%)	9 (45%)	27(45,00%)
2	> 4		12 (60%)	10 (50%)	11 (55%)	33 (55,00%)
Tota			20	20	20	100,00

Source: Processed Primary Data (2018)

The table above indicates that the percentage of fishers in research locations with more than 4 people as their family members are 60% respondents from Sedanau, 50% respondents from Sabang Mawang and 55% respondents from Sepempang. Therefore, it can be concluded that in general, families located in research locations are those dominated by middle class families with 4 to 5 family members. We found that the cause of respondents with relatively young age with more than 4 people as dependants is most fishers marry at a young age.

## 4.3 General Overview of Fishing Business

In general, fisheries business sector is not too attractive for investors. This can be seen from the decreasing number of fisheries license from year to year (2015-2017), despite the government's relentless effort to eradicate illegal fishing in these areas (Figure 7).



Figure 7. Recapitulation of the Number of Fisheries Sector Licenses in Riau Islands

Source: Capital Investment Office of Kepri (2017)

A different condition occurs for fisheries business owners from Riau Islands Province, where there is an increase from 2012-2015 (Figure 8). This indicates that the marine and fisheries sector remains the primary means of livelihood, especially for those living in coastal areas.



Figure 8. Fisheries Business Owner Groups in Riau Islands

The same goes for fishers in Natuna District, where fisher is the primary means of livelihood, and they depend their lives on the marine and fisheries sector. Full time fishers are people with primary means of livelihood as fishers, and are heavily depending on fishing activity, and conducting other work only as a sidejob when they are not fishing. Part time fishers are people conducting fishing as their sidejob, while their primary job is a farmer, merchant, and so on. Fishers in the research locations are generally full time fishers, in which fishing is their primary means of livelihood. Besides working as fishers, most of them also work as farmers, managing cloves and coconut plantations.

The lives of fisher communities in the research locations are considered simple. A small number of captured fish are consumed by the fishers or sold to the people around the fish landing site. The remaining fish are sold to business owners/collectors. They determine the price of fish sold, so fishers will receive money from each collector.

Fisher is a means of livelihood that has existed for a long time and is passed down for generations. The job of Natuna people is dominated by capture fishers. Fishing business is generally very traditional, using simple fishing equipment and small vessel of 3-5 GT. Fishers in the research locations still use very traditional vessels and fishing tools because they have yet to accept changes to more modern tools. Usually, fishers will emphasize on their experience as fishers rather than using advanced technology.

This attitude will prove to be a challenge when their region (Natuna) will be the focus of the government in developing fisheries industry. The selection of Natuna to be an Integrated Marine and Fishers Center (IMFC/*SKPT*) is appropriate, considering that Natuna does not only have a large oil and gas potential, but its sea is also home to abundant fisheries riches. This region, which is directly adjacent to Malaysia, Vietnam, and Cambodia, has a total capture fisheries potential of up to one million ton per year. The three fish groups with the highest potential are large pellagic fish of 621 thousand tons, demersal 334 thousand tons, and small pellagic 66 thousand tons per year. SKPT is also developed to improve capture fisheries management from 9.3 to 40 percent of the conserved fish stock in Natuna.

This large potential makes capture fisheries business sector, especially in Natuna, is 100 percent closed from foreign involvement, according to Presidential Regulation Number 44 Year 2016 on List of Businesses Closed and Open for Foreign Investment. The restriction on foreign investment in capture fisheries is intended to open a larger access to local investors. Specifically in the fish processing industry, foreign investment is open up to one hundred percent.

# 5. RESEARCH OUTCOME

## 5.1 IUU Fishing Practices

IUUF Practices that often occur in Natuna waters are not only done by foreign fishing vessels, but also by Indonesians. The institutional capacity of fisheries supervisors in conducting supervision operations is still limited, both from facilities and human resources, as well as its operational fund. This makes it challenging to carry out its duties and function optimally, especially with a vast fishing area to cover, which of course needs strong institutional fisheries supervision capacity.

In addition, coordination among institutions has not been running optimally, causing many violations to occur at the sea, both in quantity and quality. For example, the presence of Supervisory Community Group (*POKMASWAS*) expected to provide baseline information has not been functioning and coordinating properly with the marine and fiheries resource supervisors (*PSDKP*). Facilities and infrastructures used for law enforcement in the sea are very lacking. Supervisors are not equipped with sufficient transportation and equipment, thus making them unable to do much despite seeing violations at sea, especially those conducted by foreign vessels.

Based on data obtained from the Working Unit of Marine and Fisheries Resources Supervision (SATKER PSDKP) of Natuna, the forms of IUU Fishing practices that generally occur in Natuna waters are categorized as

illegal fishing, which is typically done by fishers from Vietnam. For the unreported category, SATKER PSDKP Natuna has not found any violation.

Illegal Fishing Practices by Fishers from Vietn	lam			
Form of Violation	Criminal Decision	Fishing Tools		
Conduct fishing in WPPN RI without SIUP and SIPI. Conducted by Vietnamese and some use Fishing Vessels with Malaysian flag but commandeered by Vietnamese	Fine of 1.5 billion rupiah. If not paid is replaced by 4 months of prison sentence.	Hand Line and Gill Net		
Conduct fishing in WPPN RI without legal	Fine of 1.5 billion rupiah. If not	Pair Trawl and		
license documents from the Government of Indonesia, namely Fishing License (SIPI) and use illegal fishing tools that damage fish resources.	paid is replaced by 4 months of prison sentence	Trawl		
Conduct fishing without legal license documents from the Government of Indonesia, namely Fishing License (SIPI) or Fisheries Business License (SIUP) or Sailing Approval Letter (SPB).	Fine of 1.5 billion rupiah. If not paid is replaced by 4 months of prison sentence	Hand Line and Gill Net		
Praktek Unregulated Fishing Practices by Fish	hers from Indonesia			
Fishing together using potassium cyanide	-	With the help of a compressor.		
Unreported Fishing Practices				
Unreported fishing are not found because all vessels departing to and coming from the sea reported to the PSDKP Natuna office, and all reports are recorded in the office's files, thus the office can know which vessel are feasible to be operational.				
Source: SATKER PSDKP Natuna (2017)				

Table 13. Forms of IUU Fishing practices in Natuna

From interviews with local fishers, it is found that before IUUF policy was implemented, a lot of fishers in Sedanau Village committed violations by using non-environmental friendly fishing tools. However, since it was implemented, no one has committed the same violation.

From data obtained from the Office of Supervisory Unit of SDKP Natuna (2017), it is found that during 2016-2017, illegal fishing practices flourished, with the perpetrators being fishers from Vietnam and one from Malaysia (14/4/2016). There were also unregulated fishing practices conducted by Indonesian fishers in 6 cases (6 vessels). The entire illegal fishing practices from 2016-2017 can be seen in Figure 9.



Figure 9. Illegal Fishing Practices 2016-2017 in ZEEI - South China Sea Waters

Post apprehension, the perpetrating crews are handed over to the Natuna District Prosecutorial Office, PSDKP Batam base, and Office of Supervisory Unit of SDKP Natuna, and are deported back to their home country, while the captain will be made a suspect. All of the apprehensions occured in ZEEI – South China Sea waters. All vessels are fishing vessels with tonnage between 19 – 115 GT, but mostly are above 40 GT. The fishing tools used by the Vietnamese vessels are Pair Trawl, Squid Line, Hand Line and Gill Net, but mostly use Pair Trawl, with evidence of up to 1 ton of captured fish per vessel. All apprehended evidence are confiscated to be destroyed.

The articles charged to IUUF perpetrators from Vietnam are Article 93 paragraph (2) jo Article 27 paragraph (2) Law Number 45 Year 2009 on the Amendment of Law Number 31 Year 2004 on Fisheries jo Article 102 Law Number 31 Year 2004 on Fisheries and/or Article 85 jo Article 9 Law Number 45 Year 2009 on the Amendment of Law Number 31 Year 2004 on Fisheries jo Article 102 Law Number 31 Year 2004 on Fisheries jo Article 55 paragraph (1) of the Criminal Code.

In addition to Vietnamese and Malaysian fishers, there were also Indonesian fishers using non-environmental friendly fishing tools, namely Potassium with the help of a compressor. They used 3 GT vessels in the Waters of Penyumpak Midai, and was apprehended by *Pokwasmas* Midai. There were 6 fishing vessels with 18 crews committing these violations.

These Indonesian IUUF perpetrators were charged with Article 86 paragraph (1) jo Article 12 paragraph (1) Law Number 31 Year 2004 on Fisheries jo Article 55 paragraph (1) on the 1st Criminal Code or Article 84 paragraph (1) jo Article 8 paragraph (1) Law Number 31 Year 2004 on Fisheries jo Article 55 paragraph (1) on the 1st Criminal Code or Article 85 jo Article (9) Law Number 45 Year 2009 on the Amendment to Law Number 31 Year 2004 on Fisheries jo Article 55 paragraph (1) on the 1st Criminal Code jo Article 55 paragraph (1) on the 1st Criminal Code jo Article 100B Law Number 45 Year 2009 on the Amendment to Law Number 31 Year 2009 on Year 2009 on the Amendment to Law Number 31 Year 2009 on Ye

From 2010 – 2017 (see Figure 10), we can see the number of vessels coming into the ZEEI – South China Sea waters and conducting illegal fishing practices. Thus, we can conclude that the number of illegal fishing practices has not shown a significant reduction, only in the last two years, there have been no more fishers from Thailand, but more dominated by Vietnamese fishers (98,5%). On the other hand, unregulated fishing practices tend to be conducted by fishers from Indonesia. They are conducted by small scale fishers, which is apparent from the vessel tonnage being used, which is 3 GT. Overall, none of the respondent fishers have committed IUU Fishing practices.



Figure 10. Number of Foreign Vessels Committing Illegal Fishing From 2010-2017

From the three research locations, it was found that small fishers most vulnerable to IUU Fishing practices were located in Sedanau Village of West Bunguran Subdistrict. IUU Fishing practices in this region were not only conducted by foreign fishers, but also by local fishers from Sedanau Village. Prior to 2015, there were fishers who fished using restricted fishing tools, such as trawl, but afterwards, there was indication of fish bombs being used as fishing tools.

# 5.2 Policy to Eradicate IUU Fishing and Its Implementation

As efforts to support IUUF eradication, the Indonesian Government has conducted review and adjustment to national legislations. Some of the relevant laws/regulations can be seen in Table 14. The implementation of such regulations becomes a dilemma for small scale fishers, due to their very limited fleets.

Regulation	Impact of Policy Implementation
Law Number 23 Year 2014 on Local Government	<ul> <li>In sub-division of Marine, Coastal, and Small Islands, districts/cities do not have the authority in supervision, marine space management, license issuing, and marine space utilization, both under and over 12 miles</li> <li>In the sub-division of Capture Fisheries, districts/cities only have the authority to empower small fishers within the districts/cities, and manage and organize Fish Auction Site (<i>TPI</i>).</li> </ul>
Minister of Marine Affairs and Fisheries Regulation Number 71/Permen-KP/2016 on Fishing Routes and Fishing Tools Placement across Fisheries Management	Narrowing down the use of fishing tools by small fishers, which results in decreased captured fish. The fishing tool still often used by fishers in West Bunguran Subdistrict is fish net ( <i>bubu</i> ).

Regions in Indonesia	
16 Year 2016 on Fisher Card	Fishers do not understand the benefit of fisher card. This is indicated by the small number of fishers, only 25%, who own a fisher card. As a result, many fishers are not updated on the database related to protection, mentoring, and empowerment in implementing ministerial programs
Law Number 7 Year 2016 Minister of Marine Affairs and Fisheries Regulation Number on Protection and Empowerment of Fishers, Fish Farmers, and Salt Farmers	In its implementation, some fishers have not received assistance in business development facilities. Moreover, fishers have not gained wide access to financing institutions and safety and security assurance
Minister of Marine Affairs and Fisheries Regulation Number 15 Year 2016 on Living Fish Tranportation Vessels	In its implementation, this is only done by large scale business owners from the chinese descendant groups. Local fishers are only limited to small scale fishers with limited capital.
Law Number 31 Year 2004 on Fisheries	Conducting supervision tasks is hindered by limited human resource and supervisory infrastructures and facilities, resulting in weak supervision process. Thus, IUUF practices remain intact. In addition, it is common to find local fishers that do not carry an operational feasibility letter. Article 60 of Law Number 31 Year 2004 has not been well- implemented. This is indicated by the large number of fishers who have not received training, education, and low interest credit scheme program. They also have yet to get used to forming business groups.

Source: Processed Primary Data (2017)

# 5.2.1 Vessel Sinking Policy

This sinking policy is based on Law Number 31 Year 2004, which was amended with Law Number 45 Year 2009 on Fisheries. This Law serves as the legal enforcement to conserve fisheries resources and prevent exploitation. In addition, foreign vessel sinking can be found in Article 69 paragraph (4) of Fisheries Law, which states that: (1) Fisheries supervising vessels shall carry out supervision and law enforcement in fisheries across fisheries management regions in the Republic of Indonesia. (2) Fisheries supervising vessels as mentioned in paragraph (1) may be equipped with firearms. (3) Fisheries supervising vessels may stop, examine, carry, and apprehend vessels alledged or suspected to have committed violation within fisheries management regions in the Republic of Indonesia. (4) In carrying out their function as mentioned in paragraph (1), fisheries investigators and/or supervisors may conduct special action in the form of burning and/or sinking foreign-flagged fisheries vessels, based on sufficient initial evidence.

# 5.3 Income Change

### 5.3.1 Fisheries Househould (RTP)

Before discussing about fishers' income, one of the impact of IUUF eradication policy can be seen from the number of fisheries household (see Figure 11).



Figure 11. Number of Fisheries Household by Research Location Subdistrict From 2011 - 2016

Looking at the trend of households from before 2015, it is found that the trend of increasing number of fisheries households and a significant rise in RTP occurred in 2015. However, in the following year (2016), the number of RTP once again showed a decreasing trend. This indicates that the implementation of IUUF eradication policy greatly enforced in 2015 provided new hope for people to turn to fisheries as their primary means of livelihood, leading to a significant rise of the number of fishers during 2015. But then, efforts to obtain higher income as fishers were not supported by sufficient infrastructures and facilities, especially fleets, fishing tools, and operational costs. Furthermore, fishers in this region were again faced against foreign fishers conducting illegal fishing, dominated by fishers from Vietnam.

It is found that increasing number of RTP after IUU Fishing eradication policy implementation actually generated new problems for small scale local fishers, such as creating heavy competition in capturing fish, leading to fishing with any means necessary. This tight competition among local fishers was also caused by limited distance and fishing area that can be covered by local fishers, according to their fleets. As a result, local fishers started to commit violation in fishing, like using fishing tools that disrupt fish conservation at the surrounding seas, namely using potassium. This condition occurred in West Bunguran Subdistrict, which caused a decline in net income received by small scale fishers from Sedanau Village. The trend of decreasing number of fisheries household also occurred in two other research locations, Sepempang and Sabang Mawang Villages.

# 5.3.2 Fisheries Fleets and Fishing Tools

The fishing fleets used by fishers are mostly those with 1 - 5 GT, and the least used are fleets with 20 - 30 GT (Figure 12).



Figure 12. Tonnage of Fishing Fleets of Fishers in Natuna District

There are various types of fishing tools used by fishers from three research location subdistricts, namely hand line, trolling line, *bagan*, beach net, *sero*, *rawai*, fish net (*bubu*), *kelong*, *tangkul*, and others. From all of them, *bubu* is the one mostly used, and the least used is *sero*. *Bubu* is mostly used by fishers from West Bunguran Subdistrict and Sedanau Village as the research location sample, while East Bunguran Subdistrict (Sepempang Village) and Tiga Island Subdistrict (Sabang Mawang Village) mostly use hand line. *Bubu* is one of the fishing tools that got restricted, and this was enshrined in the Minister of Marine Affairs and Fisheries Regulation Number 71/Permen-KP/2016 on Fishing Route and Fishing Tools Placement within the Fisheries Management Region of the Republic of Indonesia. Overall, fishing tools that are used can be seen in Figure 13.



Figure 13. Number of Fishing Tools by Research Location

### 5.3.3 Fisheries Production

Fisheries production in Natuna District from year to year indicates an increase, with a significant rise occurring from 2015 to 2016. Between the three research locations, the highest production is at West Bunguran Subdistrict, with Sedanau Village as its research location, followed by Tiga Island Subdistrict (Sepempang Village), and the lowest production is held by East Bunguran Subdistrict (Sabang Mawang Village). Increasing fisheries production is one of the positive impacts of reduced illegal fishing practices committed by foreign fishers in the region, and increased local fishers (Figure 14). West Bunguran Subdistrict has fishing areas most vulnerable to IUU Fishing violations, both by foreign and local fishers. In addition, this region has the highest percentage of fishers and fleets compared to the other two subdistricts. After 2015, it was found that foreign fishers fishing in the region has begun to decline. Foreign fishers from Thailand could not even be found anymore. These Thai fishers usually used the highest fishing vessel tonnage, obtaining a very large number of fish (over 1 ton per vessel/fishing). Furthermore, the second dominating fishing vessels after Thailand that has been reduced are fishers from Vietnam. This condition lead to better fish captured by local fishers, larger than prior to 2015.

Meanwhile, fishers in East Bunguran and Tiga Island Subdistricts are considered more developed and experienced better condition since the implementation of IUU Fishing eradication policy, and more attention given to Natuna from the government than ever before.



Figure 14. Fisheris Production Volume Data 2011-2016

Source: Satwas Natuna Office, 2017

Therefore, increasing number of production is expected to improve income received by local fishers.

# 5.3.4 Perum PELINDO

MMAF is currently establishing Selat Lampa Fishing Port (PPSL), located in Selat Lampa, Natuna. The establishment of this port is intended as a place for fishers/fishing vessels operating in Natuna waters to sell their fish. In Selat Lampa Fishing Port, there will also be cold storage and fuel station for fishing vessels landing their fish in PPSL. PPSL also collaborates with PELINDO as the cold storage manager. Cold Storage is used as the storage facility to keep captured fish that have been landed at the port. Prior to being stored in Cold Storage, fish are first kept in the Air Blast Freezing (ABF) Storage to cool the newly landed fish.

There are a number of benefits obtained by fishers landing their captured fish in PELINDO, namely they get ice block and fuel subsidy, then for price, PELINDO applies a stable price policy, so they will buy using the same price despite northern season where the captured fish decrease. Thus, there is no price fluctuation like if fishers sell directly to the market or collectors/business owners. Then, PELINDO will still take in any number of fish, large or even small number. In order to be able to land fish in PPSL and to store them in PELINDO's cold storage, fishers must first acquire recommendation letter from the port master. However, it is unfortunate that this facility has not been utilized optimally by fishers in Ranai, since they assumed they needed greater cost, especially fuel, because Ranai and Selat Lampa are quite far, requiring 1.5 - 2 hour trip on land. This is also felt by fishers in islands a little further away from Selat Lampa, for example in Kelarik. Since the distance with *pompong*/small ship to Selat Lampa is approximately 2-3 hours, this will add the fuel variable cost.

# **Cold Storage**

The fish landed by fishers are then recorded and carried to cold storage. The following are the overall steps:

- 1) Fishers arrive in Selat Lampa Fishing Port, then land their fish.
- 2) The types and volume of landed fish are recorded by PELINDO staff

- 3) The recorded and weighed fish are then calculated, then the equivalent cash is paid by PELINDO to fishers. This is because the payment system is using direct payment after fish are landed.
- 4) Then, the fish are brought into the receiving room, where they will be separated by type and sorted by size.
- 5) After being sorted by type and size, the fish are weighed. They are then usually organized in medium sized shelves based on the size of fish.
- Then they are cooked/frozen for 18-20 hours with a temperature of (- 300C) (-350C) in Air Blast Freezing (ABF)
- After the frozen process, the fish are put into cold storage, with a temperature of -400°C or more. The fish already kept in cold storage are usually shipped upon demand from suppliers, which are usually from Batam or the surrounding large cities.

With the presence of Selat Lampa Port with complete facilities to store fishers' captured fish, the number of fish coming into PELINDO within the last two years has increased. The number of fish coming into Selat Lampa Port in 2016 and 2017 based on types of fish can be seen in Figure 15.



Figure 15. Number of Captured Fish based on Types of Fish Landed in Selat Lampa Port in 2016



Figure 16. Number of Captured Fish based on Types of Fish Landed in Selat Lampa Port in 2017

Perum PERINDO is beneficial for small fishers. It is also useful to add family income for fisherwomen by becoming daily workers at PERINDO. There are 85 fisherwomen working in shifts per week. Their job is to sort fish that will be packed and stored into cold storage, pack water to make ice cubes, and clean the fish. This job is actually not economically beneficial yet for women, due to their status of daily workers with daily wage of Rp. 50,000,- bringing their own lunch. The women working daily at PERINDO are aged 45 – 60 years on average, with elementary school completion as their highest education.

# 5.3.5 Income from Fisher Business Before and After the Implementation of IUUF Policy in Natuna

Income is the earning obtained from selling fish captured by fishers deducted by saling cost converted into money. In Natuna, generally fishers are still very traditional and still use vessels ranging from  $\pm$  3-5 GT. Most of the people who depend their lives on marine resources are people living in islands surrounding Natuna District, with the research locations being Sabang Mawang, Sepmpang, and Sedanau Villages. In addition to being selected because their average population are fishers, these locations are targeted by foreign fishers, such as those from Vietnam, Thailand, and China, to commit illegal fishing practices. So, to examine whether there is an influence to the economical aspect of fishers prior to and before the implementation of IUUF eradication policy, we need to take a look at their income. To answer the research objective, the researcher will be comparing fishers' income before and after 2015.

# a. Investment

Investment is the conversion of cash at the present time to receive cash flow or cash flow savings in the future. The primary objective of investment is to acquire more benefits after the business is implemented. These benefits may be in the form of production result and profit (Soekartawi, 2003).

The types and value of investment used by fishers in order from the highest are fishers from Sabang Mawang Village in Tiga Island Subdistrict, fishers from Sepempang Village in East Bunguran Subdistrict, and Sedanau Village in West Bunguran Subdistrict.

		•	Ū	
No	Village	Average Investment	Percentage	
1	Sepempang (East Bunguran Subdistrict)	20.245.000	33,37	
2	Sedanau (West Bunguran Subdistrict)	19.026.500	31,36	
3	Sabang Mawang (Tiga Island Subdistrict)	21.395.000	35,27	

Table 15.	Investment	Value	of Small	Fishers	by	Research	Village
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Source: Processed Primary Data (2017)

According to data on the Table above, we can see that the average investment from fishers in 3 research locations is not too different. The difference of investment from each fishing business depends on the size of vessel and fishing vessel engine. However, generally the the size of vessel and fishing vessel engine is not much different, namely 3-5 GT, and engine with the power of  $\pm$  24 PK, with brands including Yanmar, Jhiandong and Thianli. In each use, investment will depreciate, subject to the duration of these activities. The depreciation value of such investment can be seen in Table 16.

60.666.500

100.00

Table 16. Average Fishers' Depreciation C	ost
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No	Village	Average Depreciation	Persentage (%)
1	Sepempang (East Bunguran Subdistrict)	7.624.921	33,35
2	Sedanau (West Bunguran Subdistrict)	7.171.683	31,37
3	Sabang Mawang (Tiga Island Subdistrict)	8.063.810	35,27
Total		22.860.413	100,00

Source: Processed Primary Data (2017)

## b) Fixed Cost

Fixed cost is the minimum cost that must be disbursed by a company to be able to produce goods or services. This cost is not affected by the number of products or services generated, and has a fixed value that does not change (Mulyadi, 2005).

Components of fixed cost in fishing business activities in Natuna are depreciation and maintenance, and are detailed in Table 17.

No	Village		Average fixed cost before 2015	Percentage (%)	Average fixed cost after 2015	Percentage (%)
	Sepempa	ing				
1	(East	Bunguran	4.436.083	33,24	4.209.633	32,09
	Subdistric	ct)				
	Sedanau					
2	(West	Bunguran	4.189.633	31,39	4.189.633	31,93
	Subdistric	ct)				
	Sabang N	/lawang				
3	(Tiga	Island	4 720 750	35 37	4 720 750	35 98

#### Table 17. Average Fixed Cost Before and After 2015

Source: Processed Primary Data (2017)

Subdistrict)

Based on the fixed cost table above, the average expense for fishing by each fisher in 3 villages prior to and after 2015 is relatively similar, even in Sedanau and Sabang Mawang Villages, in which based on interview, there is no difference for fixed cost, since investment depreciation is still within the same year. There is also no difference in the active age of each asset and maintenance cost.

100,00

13.120.017

100,00

13.346.467

#### c) Variable Cost

3

Variable cost is the cost that depends on the number of products and services generated. The more product to be generated, the higher the variable cost will be, and vice versa. Material production cost is an example of this type of cost. (Mulyadi, 2005).

No	Village	Average variable cost before 2015	Percentage (%)	Average variable cost after 2015	Percentage (%)
1	Sepempang (East Bunguran Subdistrict)	85.435.350	34,44	101.042.700	33,11
2	Sedanau (West Bunguran Subdistrict)	85.852.850	34,60	102.530.200	33,60
3	Sabang Mawang (Tiga Island Subdistrict)	76.815.900	30,96	101.619.425	33,30
Total		248.104.100	100,00	305.192.325	100,00

Table 18. Average Variable Cost Before and After 2015

Source: Processed Primary Data (2017)

According to the variable cost table above, there is an indication of increasing cost to sail due to the price increase on rations. Despite this price rise, fuel price had decreased after 2015 due to the establishment of one fuel pricing by the government. From this table, we can see that a significant variable cost is disbursed by fishers in Sabang Mawang Village, in which based on interview, is caused by high ration prices.

#### d) Business Net Income

Income is the output gained from business management, and is calculated by deducting production outcome by cost disbursed within one period (Mahyono and Seto, 2004). Sometime prior to 2015, or before the strict enforcement of IUUF policy, fishers around Natuna are concerned with foreign vessels also utilizing marine resources in Natuna waters. Furthermore, foreign fishers use trawl and pair trawl, which are destructive fishing tools. This resulting in small number of fish captured by the Natuna traditional fishers, and the captured fish are small in size. Fortunately, after the strict implementation of IUUF policy, fishers have starting to feel the positive impact. Fishers get large fish and do not need to travel too far to capture fish. Generally, Natuna's traditional

fishers look for fish with a distance of maximum 120 miles to the border. This is because with said policy, foreign vessels rarely conduct IUUF activities in Natuna waters. Increasing captured fish will surely influence income rise. The income structural change can be seen in the following Figure 17.



Figure 17. Income Change for Small Fishers Before and After 2015

Source: Processed Primary Data (2017)

When calculating the percentage of income change before and after 2015, it was found that the largest income change occurred to small fishers from Sepempang Village of East Bunguran Subdistrict (Figure 18). This was caused by a number of issues: 1) this village is located very closely to the capital of Natuna District. The capital has the most densely populated area compared to other areas. As the capital, it also has more complete infrastructure and facilities, such as marketplace. Fishers can directly sell their captured fish to buyers (surrounding communities), thus increasing their profit. Moreover, fishers from Sepempang Village have easier access to information and financial institutions such as banking and cooperative. Also, this village has district level office complex, housing the cooperative office, marine and fisheries office, and so on. Therefore, fishers can acquire information on government program swiftly through various socialization and training activities from a number of government institutions. Supported by better education than other villages, fishers in Sepempang Village are faster to adapt to change. Since fishers in Sepempang Village are used to working in groups (forming fisheries business groups), they became members of the cooperative and have the most cooperative members compared to the other two villages. In addition, fishers here receive the highest fishers insurance compared to fishers from other villages; 2) Sepempang Village has the most fishers experiencing the benefit of IUUF practices reduction. This is indicated by their sailing distance to capture larger size and more fish, which was not as far as prior to the implementation aof IUUF eradication policy. Previously, fishers are worried when facing foreign fishers with large size fishing fleets, and are always intimidated by foreign fishers, decreasing their sense of security when sailing; 3) The dependency to business owners by fishers from Sepempang Village is less than the other two villages. Fishers understand the benefits of financial institution and cooperative. Most fishers are included as members of fishers cooperative. Banking service is used to develop household by fishers' spouse, such as making fish chips, fish meatball, and others under several government institutions, namely business development division of Marine and Fisheries Office, Industry Office, Cooperative Office, and small business and others.

After Sepempang Village, the village that experienced greater income is Sabang Mawang Village in Tiga Island Subdistrict. This area is located near Selat Lampa Fishing Port as the Integrated Marine and Fisheries Business Center (IMFBC or *SKPT*). Over time, fishers in this area have begun to release themselves from dependency to

business owners and sell her fish to PERINDO, using a more stable price compared to the price set forth by the business owner.

Meanwhile, small fishers from Sedanau Village have the lowest income despite its reported increase in fish production. This is because the area is far from access to market and information. Furthermore, the dependency factor to business owners (*tauke*) due to existing debt, has resulted in fishers directly selling their fish to business owners with a steep price that is more profitable for the business owners and directly reducing their debt. The long distance to marketplace also result in high cost to fulfill their daily needs, since goods are price quite high compared to prices at the downtown.



Figure 18. Percentage of Fishers' Income Change

After calculating income, to test whether there is income difference before and after IUUF policy is implemented to fishing business, we conducted T-test using SPSS. After the data is processed, the following T-test results are obtained.

Table 19.	T-test Result of I	Fishers' Income
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Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
Incomo	Equal variances assumed	11.556	.001	-17.323	118
Income	Equal variances not assumed			-17.323	92.499

Based on T-test result on fishers' income change before and after 2015 (IUU Fishing policy implementation), there is a significant difference, or there is income change with a value of sig .001 at trust level of 95%.

As IUUF practices decreased in Natuna waters, the opportunity for local fishers in utilizing marine resources increased. One of the positive impacts of IUUF eradication is increasing fish captured by fishers, accompanied

by improving income. However, in reality, fishers' welfare has not improved much due to their high dependency on the culture of owing money to business owners, not used to saving some of their income for unexpected needs, and prices of daily groceries and cost of sailing for fishers are relatively high due to the extremely far distance between their homes and marketplace.

## 5.4 Adaptive Capacity of Fishers

Up to 2017, illegal fishing practices were still committed by foreign fishers in Natuna waters, which put local fishers, especially small fishers, at a disadvantage. To face income fluctuation resulting from illegal fishing practice fluctuation, small scale fishers must be able adapt to these changes. There are several adaptation strategy undertaken by fishers:

### 5.4.1 Establishing business groups

Small scale fishers located at research locations usually work individually, with the assistance from family members, and generally they are not used to working in groups. However, with changing income, fishers are beginning to understand the importance of working in groups. With groups, it is easier for fishers to obtain various information, making it easier for them to receive assistance from government programs. Adaptation in the form of working in groups can be seen by the increasing number of established cooperatives within the last year (2017).



Figure 19. Number of Cooperatives during 2016-2017 in Research Villages

Then, fishers' businesses were growing in multiple fields, with the highest number of business groups in fishing, with beginners as the highest number of classes (Figure 20 and 21).



Figure 20. Fisheries Business Groups in Kepri on 2018

As for the number of fisheries business classes in Kepri Province, please see Figure 21.



Figure 21. Fisheries Business Classes in Kepri on 2018

### 5.4.2 Utilizing government assistance

The adaptive capacity of small scale fishers at the research locations in addressing income change caused by the implementation of IUUF policy in this región can also be seen in the fishers' strategy in utilizing assistance program from the government. Government's attention to IUU Fishing eradication in Natuna District is significantly high. This is shown when Selat Lampa area is selected as an Integrated Marine and Fisheries Center (SKPT).

In 2017, there are a number of assistances from the government to local fishers, in line with efforts to support the development of SKPT areas (Table 20).

No	Type of Assistance	Description		
1	Vessel	Assisting Vessels of SKPT Natuna (60 units) 5 GT Vessels (50 units) 10 GT Vessels (5 units)		
		20 GT Vessels (5 units)		
2	Fishing Tools (API)	- Gillnet : 508 units - <i>Bubu</i> : 258 units - <i>Rawa</i> i : 621 units		
3	Marketing	- PERINDO		
4	Supporting Facilities	<ul> <li>Fisher barraks, kiosks/small shops, cooperatives</li> </ul>		
5	Electricity, Fuel	<ul> <li>The establishment of fuel stations in several locations</li> <li>One price fuel and free fuel program for small fishers</li> </ul>		
6	Land Certificate & Fisher Insurance	<ul> <li>Land certification is granted for free to fishers</li> <li>In the form of life insurance for fishers</li> </ul>		

Table 20. Types of Government Assistance

Source: Processed Primary Data (2017)

From data on recipients of vessel assistance, not all fishers obtained them, because the assistance was intended for fisher groups. There are new target beneficiaries who will receive the vessel assistance, namely farmer groups. It is found from stakeholder interviews that farmer groups are considered to be more in control in saving their income from fishing. This is due to their experience in planting, where the harvest season can be planned and predicted. Vessel recipients are mostly small scale fishers, reaching 83.3 percent. This is indicated by the tonnage of the vessels, where 50 units have 5 GT tonnage. The issue claimed by vessel receiving fishers is that the fleets are not suitable with the characteristics of the area in which they fish. It is found that these vessels are made in Madura. The physical specification of these vessels is made of fiber, therefore is considered to be ineffective to face huge waves when used.

Then, for marketing, the government assists small scale fishers by purchasing according to the current market price. This is done by PERINDO. Thus, this is quite helpful for fishers to improve their income. PERINDO is ready to buy any number of fish, and they will pay in cash.

Until today, the government's assistance programs are very helpful for small scale fishers in Natuna. However, all of these programs are given to community groups, not individuals. Therefore, not all fishers can receive the assistance. Those who are not a part of a fisher group or business community will always be lacking both in information and socialization of these assistances.

Also, for fuel, the government through PERTAMINA grants special price for fishers (subsidized price). There is even a free fuel program for small fishers, using a specific mechanism on the administration of purchasing PSO fuel by fishers from the local Fisheries Technical Implementing Unit (*UPT*). Furthermore, for fisher insurance program in 2017, according to data, the implementation level among Natuna fishers is only 25%. This is becase fishers are always reluctant in managing the administration aspect of the insurance program.

High government attention to empower local fishers is indicated by increasing number of elucidators mentoring fisher communities, as shown in Figure 22.



Figure 22. Number of Fisheries Elucidators in Kepri Province

# 5.4.3 Incurring Debts

Fishers are always faced with seasonal change and natural condition, affecting the number of sailing trips and captured fish. Regarding the influence of the implementation of IUU Fishing eradication policy, it has not changed the living pattern of farmers, who are very dependant on incurring debts. Almost all fishers incur debts from '*tauke*' or business owners. The culture of incurring debts from business owners has been going on for generations. For fishers, business owners have helped them in meeting their needs in rought times, and fulfilling their daily needs. The establishment of financial institutions such as banking and cooperative do not necessarily change the source of loans for farmers, despite a few of them wanting to shift their dependency to business owners to a legal financial institution. Incurring debts from business owners is the lowest adaptive capacity in addressing income change among small scale fishers, because this has caused fishers to not have savings for their family's future, leading them to never make financial planning to attain a better life. This can be seen in Figure 23.



Figure 23. Strategy to Incur Debt by Small Scale Fishers

Fishers are under the general opinion that the presence of *tauke* (business owners) in their villages is very helpful, especially for those having financial difficulties. According to fishers, the loan process is fast and always approved, thus they can get any amount of loan from business owners for all household needs, including for their children's wedding party and education. The fishers' dependancy to business owners has been going on for a

long time and for generations, and fishers are reluctant to release themselves from taking out loans from business owners, leading them to also sell their fish to these business owners.

## 5.5 Intervention Recommendation

IUUF practices were still occuring fluctuatively from 2015 to 2017, despite the implementation of vessel sinking policy during that time. It can be concluced that this vessel sinking policy has created income change for fishers, namely their income has increased. However, this does not mean that their welfare is improving. This is the perception conveyed by most of the respondents during research. This condition is indicated by fishers' low access to education, information and communication, market, financial institution, and fishing technology (fishing tools, fishing fleets, and fishing areas). Therefore, there are several interventions that can be done to improve future policies:

- 1. Strengthening fishers' adaptive capacity through government assistance programs, releasing dependancy to business owners, and establishing intrastructures and facilities for local fish markets
- 2. Strengthening local capacity to manage fisheries and combat IUU Fishing by:
  - a. Creating capacity, management, and technical institutions, making fishers able to control their own vessels and foreign fishing vessels
  - b. Promoting and funding small scale cooperation with developed fisheries industry (government program) and Natuna provincial government to identify and target IUU capture operations
  - c. Developing access agreement on handing over captured fish
  - d. Funding training programs for small fishers
  - e. Easing the administration process
  - f. Easing the licensing process
- 3. Promoting active and effective participation from small fishers in fisheries governance
- 4. Encouraging small fishers to work in groups by establishing business groups and becoming members of the cooperative
- 5. Approaching villages, especially those that are vulnerable to IUUF practices like Sedanau Village of West Bunguran Subdistrict, as the focus of intervention to improve adaptive capacity.

### 6. CONCLUSION AND RECOMMENDATION

- 1. From three research locations, it is found that the area most vulnerable to IUU Fishing is Sedanau Village in West Bunguran Subdistrict, and the least number of IUU Fishing practices is at Sepempang Village in East Bunguran Subdistrict.
- 2. As an impact of the implementation of IUU Fishing eradication policy, there is income change, which tends to show an increase. The highest change occurs in Sepempang Village in East Bunguran Subdistrict, followed by Sabang Mawang Village in Tiga Island Subdistrict, and Sedanau Village in West Bunguran Subdistrict. Another positif impact is fishers have begun to familiarize themselves with institutions such as cooperatives. Also, the highest education level and productive age fishers are in Sepempang Village.
- 3. Government assistance programs greatly influence fishers' welfare. This is indicated by the highest income change percentage of fishers in villages often receiving government program socialization, training, and assistance. As a result, all fishers now have their own fishing fleets, open side businesses such as household fisheries industry, possess better knowledge on cooperative, and establish multiple business groups.

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