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Illegal , Unreported and Unregulated Fishing in ASEAN

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Abstract

Illegal, Unreported and unregulated (IUU) fishing brings great losses to the economies. Understanding the reasons contributing to IUU fishing is crucial in reducing it. The factors are economic, institutional and social factors. This paper shows that economic factor is the main factor contributing to IUU fishing. This paper also highlights the two possible ways to curb the IUU fishing. One way is to reduce the revenue from IUU fishing and another way is to increase the cost of IUU fishing. There are three costs incurred in IUU fishing that can be reduced namely the operating, capital and risk costs. A framework of reducing the economic rent or profit of IUU fishing is developed and guidelines for reducing IUU fishing are also suggested. The guidelines are improved registration of fishing vessels, preventing entry of illegal fish products and most importantly, developing co-management of fisheries. All governments in ASEAN must work together with the stakeholders involved such as fishers, fishermen agencies or associations to exchange information to reduce transaction cost of IUU fishing.

Keywords: Illegal, unreported and unregulated (IUU) fishing, co-management, fishing guidelines, economic rent framework.

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1. Introduction

Illegal, Unreported and Unregulated (IUU) fishing is defined as fishing activities of vessels that contravene the national law and regulations of a country (MIMA, 2014). Besides that, those fishing activities by foreign vessels in regional fisheries management organization (RMFO) are also termed as IUU fishing. The most common activity in IUU fishing is violation of the fish conservation and management measures such as quota catch and bycatch limit set by international regulations. IUU fishing is important and significant because IUU fishing underreport catches and can lead to wrong policy prescriptions on health of the fisheries resources. IUU fishing deprives people of the food and their livelihood. Besides that, IUU fishing also threatens target fish species and the surrounding ecosystems, weakening conservation effort and the management measures of the ASEAN Fisheries Management Organization to manage the fisheries sector. The economic loss of illegal fishing is damaging. In Indonesia alone, the IUU fishing has caused the country to lose US \$ 3 billion (Sembiring, 2009). Thus, initiatives and approaches are needed to combat IUU fishing. This paper aims to investigate the issue and options facing ASEAN and the member states, and explore legal administrative measures to reduce the harmful IUU fishing. This paper also attempts to develop economic framework to address the IUU fishing in ASEAN.

Table 1: Economic losses of IUU fishing in Southeast Asian countries per year

Country	Economic losses from illegal fishing (US \$ millions)
1. Indonesia	3000
2. Malaysia	334
3. Philippines	620

Source:

1. Havoscope, Global Market Black Information
2. Other countries of ASEAN do not have data of economic losses from illegal fishing.

Table 1 shows the economic losses from IUU fishing for three Southeast Asian countries are large and represent a significant loss to the economy of these countries. Thus, efforts to reduce the illegal fishing are required.

2.0 Reactions and control of IUU fishing drivers of IUU fishing

There are three main factors that drive IUU fishing. These are institutional, social and economic factors. These factors are well discussed in the article by Gallic & Cox (2006).

2.1 Economic causes of IUU fishing

The main economic causes of IUU fishing are overcapacity, ineffective management and subsidies. Individuals will commit illegal fishing if the expected economic benefit (the rent in resource economics term) exceeds the cost of fishing. Overcapacity in fishing is resulted from the imbalances between fishing capacities and fishing possibilities in the domestic fleet or inappropriate allocation of fishing rights. The overcapacity in fishing vessel is well connected to inappropriate management regime. In the ASEAN countries, the fishers in the member state will commit IUU fishing due to some restrictions set by member states that affect the fish catches. The overlapping fishing area boundaries of the ASEAN countries and the fishing regulations of the countries can lead to IUU fishing.

Another economic cause of IUU fishing is the subsidies provided by the government of the ASEAN countries. The objective of giving subsidies is to help develop and reduce the cost of fishing in the ASEAN region. The subsidies also help to transfer the fishing capacities in the member states. However, there is a limitation to the subsidies. The subsidies thus induce expansion in the IUU fishing capacities locally and internationally. In other words, subsidies promote IUU fishing. One way to fight against IUU fishing is to increase the cost of IUU fishing capacities.

Individual fisher income is a strong motivation for illegal fishing. In principle, the individual fisher will have lower incentive to engage in IUU fishing if higher income is generated from legal fishing. Most fishers

engaging in IUU fishing are poor and undertake illegal fishing activities in countries that have weak and poorly enforced fisheries management regimes. Thus, increasing the income of fishers in domestic fisheries is crucial to reduce IUU fishing. Capacity restrictions in national fleets are required in managing the transition towards economically viable fleet structures.

2.2 Institutional Factors

Institutional factors are related to the international legal framework designed to conserve the fish species. Under the current legal framework provided by the United Nation (UNCLOS), some illegal fishing activities are allowed beyond the control of national and international regulations. This could lead to illegal fishing activities as the fishers can capitalize on the loopholes and violate the regulations.

For example, the illegal, unreported and unregulated fisheries (IUU) or the Flag of Convenience (FOC) vessels are not prohibited from fishing in the high seas under the current maritime law. The sanctions and penalties imposed by the ASEAN countries do not work effectively against illegal fishing vessels. The illegal fishers that violate the regulations could not be penalized and they are free to commit illegal fishing activities in the high sea in ASEAN region. In other words, the illegal fishers or flag of convenience can hardly be punished if they fish illegally. Thus, excessive fishing will take place and lead to unsustainable fisheries in the ASEAN region.

Insufficient monitoring, control and surveillance in the ASEAN region further aggravate the problem of illegal fishing activities. The resources spent on enforcement activities are small in relation to the total value of fisheries in the ASEAN region. Viswanathan et al. (1997) state that the enforcement expenditure constitutes 25 percent to 50 percent of total fisheries expenditures. Routine checks on illegal fishing vessels are limited in the ASEAN region. Low inspection on the ASEAN sea region will lead to low probability of illegal fishers being detected and apprehended, sometimes even within the national Exclusive Economic Zone (EEZ). This is further aggravated by the insufficient level of sanctions to curb the illegal fishing activities. The presence of corruption among the enforcement agencies is another serious issue, as indicated by the Corruption Perception Index, which shows that six out of 10 countries in ASEAN have very high corruption index (Wang, 2012). The six countries are Indonesia, Vietnam, Philippines, Laos, Cambodia and Myanmar.

In addition, the illegal fishing vessel operators have more advance technologies to shield themselves from being caught by the officers in the ASEAN region. According to Alfredo Bacaltos, Philippines Talisay city councilor, Philippines illegal fishing activity is rampant because Philippines is lacking in equipment and the personnel capacity to man the city's water (Alangilan, 2015). Thus, the illegal fishing vessel operators could escape from paying huge amount of fines because they have modern technologies to protect them from detection. The illegal fishing vessel operators are therefore not apprehended.

2.3 Social factors

Social factor in fishing activities refers to the social nature of a country or the fishers (Gallic & Cox, 2006). Social factor is often related to the poor economic condition and prospect of a country that motivates the fishers to engage in IUU fishing. In other words, the background of the fishers might lead the fishers to commit crimes and violate sea regulations. Different lifestyles might lead the fishers to have different fishing behavior. In some poor countries in ASEAN region such as Philippines and Indonesian, the fishers in those countries tend to commit IUU activities and provide a cheap labour pool for IUU/ FOC vessels. The abundance of cheap labour motivates the illegal fishing operators to employ the fishers from Philippines and Indonesia to commit IUU fishing in ASEAN region.

Furthermore, the excessive supply of fishers in the ASEAN regions is also one of the social factors that lead to IUU fishing. Table 2 shows the number of fishers in ASEAN regions. The large number of fishers dependent on the limited fisheries resources pushes the salaries of the fishers in ASEAN to very low level. For example in Philippines, legal fishers earn \$6 a day, around 2kg of the retail value of fish, hardly sufficient to survive a subsistence living. (ILO, 2014). The poor domestic economic prospects may force the fishers to accept the job and work in IUU fishing vessels. These IUU fishing vessels do not respect workers rights as the poor fishers are

discriminated and operate at low standard and healthy conditions, not following the standards set by ILO and IMO regulations. For example, 26.3 percent of the fishers in Thailand felt that they did not have enough good rest since they worked 17- 24 hours a day and this excessive working hours violate ILO work in fishing convention, 2007 which states that fishers are given regular rest to ensure safety and health”. (Page, xi, ILO, 2014). The cost of providing safety standards for the fishers by illegal fishing operators are closed to zero in the ASEAN sea region. Furthermore, ILO (2014) reported that 56.4 percent of Myanmar fishers and 46.7 percent of Cambodian fishers receive a monthly wage of about US \$139 (equivalent to about US\$ 4.60 daily wage). The low wages motivates the fishers to commit IUU fishing to earn more to support their families.

Table 2: Production, exports, imports and fishers and vessels 2012

Countries	Production (tons)	Exports (US\$ millions)	Imports (US\$ millions)	Fishers (Numbers)	Fishing vessels
1. Thailand	1,834,573	8,078	3,107	160,000	-
2. Vietnam	2622,200	6,277	815	530,000	-
3. Malaysia	1477281	795	1,,065	136,514	54,235
4. Indonesia	5813800	3,592	351	2,748,908	805,730
5. Philippines	2322850	808	246	1,907,435	-
6. Myanmar	3579250	653	16	2,979,200	30,349
7. Singapore	-	356	1,074	-	-
8. Cambodia	566695	45	6.60	-	-
9. Brunei	-	2.43	42	-	-
10. Lao	34105	0.01	6.50	-	-

Source: FAO

The emergence of the organized IUU fishing operations in recent years has accelerated the development of IUU fishing activities in ASEAN. The activities committed by this organized IUU fishers are reducing the cost and risk of IUU fishing, fraud in fisheries and the avoidance of registration of fishing operations (Gallic and Cox, 2006). The organized IUU fishing operations are prevalent in the European countries but are also slowly developing in the ASEAN sea region. One of the most prominent examples of organized IUU fishing operations is the Galician syndicate, in Northwest Spain. The Galician Syndicate or mutual society involves deep sea fishing operators that operates in Northwest Spain. The syndicate engages in illegal fishing activities of toothfish to reap benefits at the expenses of the sea resources. The main players involved in Galician Syndicate are Antonio Vidal and his son, Tono, owning and operating registered fishing vessels in Uruguay and Spain for commercial activities. This Galician syndicate is reported by the Coalition of Legal Toothfish Operators (COLTO), a coalition formed in Spain to wipe out the illegal fishing of toothfish.

In a nutshell, there are three main factors that lead to IUU fishing n ASEAN sea region. The most dominant factor that causes IUU fishing is the economic factors. According to The Economist magazine dated January 2015, one fish out of five fishes sold in restaurants are caught illegally, representing 20 percent of the fish caught. The illegal fisheries business can swoop up a staggering \$ 23 billion (RM70 billion a year), almost half of Malaysian annual GDP. The huge amount of money earned by illegal fishing operators in illegal fishing business incentivizes them to intensify the IUU. Thus, some possible actions should be taken to combat IUU fishing activities.

2.4 Possible actions to curb IUU fishing activities

There are a few possible ways to curb IUU fishing activities in ASEAN region. A more comprehensive analysis on economic rent is needed to curb IUU fishing. Economic rent is defined as the total benefit obtained from the illegal fishing business. Economic rent is obtained from the total revenue subtracting total cost. The idea of reducing IUU fishing is to reduce the economic rent because economic rent incentivizes the illegal fishing

operators to commit IUU activities. The discussions below focus on two aspects of economic rent reduction to overcome IUU fishing. The first section examines actions to reduce total revenue and the second section examines ways to increase costs associated with illegal fishing activities.

3.0 Possible ways to reduce total revenues

3.1 Improving the effectiveness of the current legal framework for the sea

Since there are loopholes and weaknesses in the current legal framework that allow the illegal fishing activities, sets of actions need to be taken to increase the effectiveness of the current framework. There is a need for the ratification of all international conventions that such as UNCLOS by all flags state members. A good legal framework can dampen the illegal fishing activities because it reduces the revenue from committing illegal fishing. Cooperation among ASEAN countries to develop a minimum and enforceable standard is crucial for combating IUU fishing activities. The establishment and formation of Regional Fisheries Management Organization (RFMOs) can intensify the efforts for eliminating IUU activities. Co-operative surveillance of illegal fishing vessels operators could be carried out to monitor and undergoing surveillance within ASEAN sea region. Commitment of the member states in the ASEAN region on sharing the platform costs and information can increase the effectiveness of improving the MCS capacities. As some of the countries like Myanmar and Cambodia are poor in resources, the other state members in the ASEAN region can pool the resources in term of financial and non-financial and share the resources with these poor countries who are lacking the resources to fight IUU fishing activities.

3.2 Reducing the value of IUU catches

Some measures can be taken to prevent the illegal fish catches from being turned into revenues for the illegal fishing operators. Preventing the illegal fish from entering the regular trading market is a measure to reduce the revenue of illegal fishing operators. Trade barriers aimed at illegal fishing operators can be implemented to deny the illegal fishing trade. For a good explanation of trade barriers to curb illegal fishing activities, can refer to Stokke (2009). National legislation and Protection Act is a way to provide sanctions to illegal fishing activity and reduces the revenue from IUU catches. For example, USA Pelly Amendment to the Fisherman Protection Acts provides trade sanctions to seafood or fish related products traders that violate or undermining the international conservation agreements. The laws against the illegal fishing operators need to be upheld by the government to protect the legal fishers' livelihoods and conserve the fish species in the sea.

Other trade restrictions such as trade embargoes and other forms of import restrictions for illegal fisheries products can be strictly enforced to reduce the revenue of the illegal fishing operators. Besides, ecolabelling is a useful mechanism to prevent illegal fishes in the market. Ecolabelling is a tool that label and certify the registered legal fisheries products that enter the market. All the ASEAN countries should ratify the use of ecolabelling on their seafood products. Ecolabelling deter the entering of the illegal fisheries products because only the fisheries products labeled with ecolabelling is allowed to enter the fish regular markets and trade inside the ASEAN region (Gardiner & Kuperan, 2004). The ASEAN region should also adopt a Catch Documentation Scheme designed at preventing IUU fisheries that enter the ASEAN countries just like their Western Counterparts has done. In 1999, the Convention for the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) adopted the Catch Documentation Scheme designed at preventing the illegal toothfish in entering the CCAMLR member countries.

The understanding of the motive of regular fishers entering illegal fishing activities is important to formulate possible actions to reduce revenue in IUU fishing. The revenues obtained from illegal fishing, \$30 billion, as reported by The Economist magazine, is huge compared to the revenues in the regular catches. Thus, it is vital for the government to increase the price of the regular catches, a component of the revenue of the regular catches, to deter fishers from entering illegal fishing activities. The relative difference in revenues between IUU fishing and regular catches can be minimized through increasing the price of regular catches. Through this measure, the probability of fishers entering illegal fishing activities is minimized because they can earn good revenue from

legal regular catches.

3.3 Increasing the operating costs of IUU fishing

One aspect of reducing the economic rent from illegal fishing activities is to increase the cost. By increasing the cost of IUU fishing, the economic rent can be reduced, the probability of committing illegal fishing activities will be reduced. The components inside the cost function need to be examined thoroughly to combat IUU fishing (Refer to Figure 1).

The first measure to increase operating cost of IUU fishing is eliminating the tax haven and addressing the tax distortion that may sustain IUU fishing activities. Charging tax to the illegal fishes landed on the port is crucial to curb IUU fishing activities. Inspection on the illegal fishes and the illegal vessels is needed to deter the illegal fishing operators from landing the fish on the ports. Restrictions on the fishing input goods for illegal fishing can be implemented and enforced by the fishing officers. Countries must stop giving IUU vessels the ice to store the fish, navigation to navigate the fish stocks and technology to detect the location of the fish unless the fishing vessels register with the fisheries departments. All countries in ASEAN region must work together to inform the state members once the illegal fishing vessels are suspected in the sea.

Another aspect of the operating cost of IUU fishing is the crew cost. Crew cost is an area where strong incentives to engage in IUU/FOC fishing exist (Gallic and Cox, 2006). There are two ways to increase the crew cost of IUU fishing. Firstly, there is a need of all flag states in ASEAN region to pursue ratification and implement the international convention on protecting and upholding the working conditions of the workers, in particular the ILO conventions. All countries in ASEAN must protect the welfare of the fishers and increase the wages of fishers. Secondly, governments in ASEAN must find ways to address the problem of unskilled workers in developing countries. The initiative is aimed at increasing the opportunity cost of labour and preventing them from entering illegal fishing activities to earn huge profits. Unskilled workers included fishers can be trained by the government in ASEAN through government agencies such as the Majlis Amanah Rakyat (MARA) under the Ministry of Rural and Regional Development in Malaysia, an organization with the aim of developing successful and innovative entrepreneurs through the provision of skills and trainings to the workers in Malaysia. Upon training, the government must provide job opportunities for them and absorb the workers and fishers to work in the public or private sector. For example, the trained fishers can work in the aquaculture sector to earn a lucrative income and preventing them from entering illegal fishing activities. Providing alternative livelihood opportunities ensures the human rights are upheld and respected in the fight against IUU fishing.

3.3.1 Increasing capital costs of IUU fishing

There are two parts of costs involved in IUU fishing. The costs are operating costs and capital costs. One possible way of combating IUU fishing is through increasing the capital costs of IUU fishing. Scrapping off the old vessel is a good avenue to deter illegal fishing vessel from operating. Setting up the time-limit scrapping programs can help to manage the vessels that are registered. For example, a vessel can be limited for 10 years operating on the sea then the vessel needs to be scrapped. The applications of registration of new vessels need to be monitored and scrutinized carefully to avoid the registration of illegal fishing vessels. Stringent application procedures for new vessels are carried out to increase the capital cost for operating illegal fishing vessels. Government can fund the new vessels for the legal fishing operator to help reduce the burden of the fishing operators. Besides, the use of the time-scrapping programs could help to reduce the global imbalances between fishing possibilities and fishing capacities and result in increase in the price of the remaining vessels. The high price of the remaining vessels will deter the illegal fishing operators to enter IUU fishing because it is not profitable to buy new vessels at a very high cost.

The second set of action to increase capital cost of IUU fishing is to restrict outward investments. Citizens who are willing to invest their capital abroad on buying vessels and operate in the flag of convenience (FOC) need to report to the fiscal authorities. Flag of convenience (FOC) refers to the foreign states in which the IUU fishing is usually operated (Llacer FJM, 2003; ITF, 2002). With such a measure, the fisheries officers can monitor the actions

and the activities of the fishing operators. Fiscal authorities will report the activities abroad of the fishing operators to the fisheries officers. The activities of the operators fishing abroad are traced and detected by the fiscal authorities and the fisheries department.

3.3.2 Increasing the cost of risks of engaging in IUU activities

The costs of risks are the fear factors that restrict the illegal fishing operators from engaging in IUU activities. The costs of risks comprise of the costs related to the fraud, corruption costs, other types of avoidance behavior and costs of expected sanctions.

Kuperan and Sutinen (1998) used the deterrence model to study the compliance behavior of fishermen. They pointed out that penalties should be implemented to prevent fishers from committing illegal activities. Thus, higher penalties should be imposed on the illegal fishing operators that commit IUU fishing. The penalties can be divided into monetary form and non-monetary form. Higher fine in monetary form should be imposed on the illegal fishing operators so that costs charges can reduce the profit margin of their business. However, capacity of enforcement officers needs to be expanded to increase the surveillance on the illegal operators. With the capacity expansion, it is more effective to manage and prosecute the illegal fishing operators that violate the rules and regulations. The non-monetary penalties include increasing the jail term and confiscating all the properties once the illegal fishing operators are apprehended. Strict penalties imposed will definitely inflict fear factor that will psychologically affect the illegal fishing operators to think twice before committing a crime because they have to bear higher costs once caught by the enforcement officers.

Collaborations between the states in the ASEAN region need to be enhanced to promote better monitoring and surveillance (MCS) capacities. The states need to share resources and information to be effective in combating the IUU fishing. The states could probably widen up the surveillance areas and create the 'extra-territorial' surveillance like what the American have done with the implementation of Lacey Act (Gallic & Cox, 2006). Lacey Act is an American provision for prosecution that allows for the prosecution by a government of a national who violates or contravene a foreign law. ASEAN can work collaboratively to set out the law regulation and frameworks that prosecute the illegal fishing operators that violate the fishing laws in other nations within ASEAN territory.

Developing an ASEAN Framework of Economic Rents for Reducing IUU Fishing

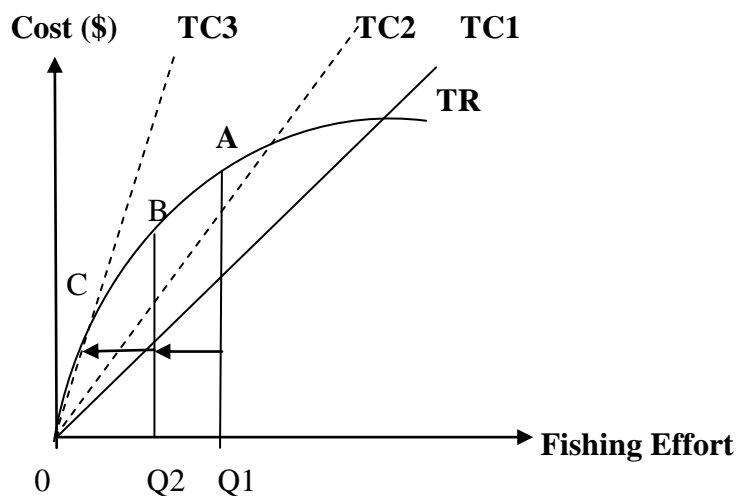


Figure 1

Figure 1 depicts the economic rents obtained and the fishing efforts of engaging in IUU fishing. From Figure 1, the economic rents of engaging in illegal fishing activity is calculated from total revenue minus total cost. Total

revenue is increasing at a decreasing rate and is shown in line TR. Total cost is a straight line and increasing at a constant rate. The original total cost line is TC1. Fishing effort of illegal fishing operator happens at point Q1 at which the total economic rent is the highest. When the government increases the cost to TC2, the fishing effort reduces from Q1 to Q2. If the government increases the cost further to TC3, the fishing effort reduces further from Q2 to 0. The line TR is equal to TC3 and there is no fishing effort occurs at cost TC3 because there will be no economic rent at TC3.

4.0 Developing ASEAN Guidelines for Reducing IUU fishing

ASEAN has already adopted a guideline for preventing the entry of IUU fishings. The guidelines have just being discussed at The Seventeenth Meeting of Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) at Thailand in 4-5 December 2014 (ASEAN-SEAFDEC, 2014). Based on the ASEAN Framework of Economic Rents on Reducing IUU fishing developed in this article, the guidelines outlined in the ASEAN –SEAFDEC meeting is assessed. There are two ways in reducing economic rents as an effort to reduce IUU fishing namely reducing revenue and increasing the costs of IUU fishing.

4.1 Preventing the Entry of Fish and Fish Products from IUU Fishing

This measure aims at reducing the revenue earned from IUU fishing. With the bar of the entry of fish and fish products from IUU fishing into the supply chain, the sales from the IUU fishing will be reduced. The quantity for IUU fishing sold is reduced in the market, this leads to the reduction of revenues from IUU fishing. Revenue is the quantity of IUU sold multiply by the price of the IUU product. The economic rent of IUU fishing is reduced as a result of the reduction in revenue from IUU fishing. IUU fishing becomes not profitable and deter the illegal operators to engage in IUU fishing or reduce their efforts in IUU fishing.

Ecolabelling of the fish products can be seen as a way to give certification to the legal fish supplied in the market. USEPA (1993) defines the ecolabelling certification as making relevant environmental information available to appropriate customers. The ecolabelling approach not only reduces the revenue from IUU fishing and catching efforts from IUU fishing but also protect the consumers from consuming illegal fish products. Illegal fish products without ecolabels are prohibited from entering the ASEAN market and be sold to the customers. The fish caught from IUU fishing activities cannot be marketed and will reduce the revenue from IUU fishing. Thus, the combating effort of IUU fishing is successful.

4.2 Improved registration and licensing of fishing vessels

Proper registration and licensing systems for fishing technologies and gears is also highlighted in the ASEAN guidelines for combating IUU fishing. States must work together to ensure the IUU fishing activities are restricted from entering the ASEAN market when ASEAN Economic Community commence in the year 2015. Strict regulations are imposed on the vessel to ensure legal registration of the vessel. Specifications of the vessels include photographs of vessels, standard vessel markings (colour coding and marking) need to be accurately checked on each vessel. Vessels that do not comply with the specifications could not land their fish products on the port and to be sold in the market. The registration of the vessels exerts cost pressures on the illegal fishing operators to continue their IUU fishing. The illegal fishing operators would have to register the vessels to ensure that the fish products could be marketed in the ASEAN region or otherwise their fish products would not be marketed. The improved registration of vessels approach inflicts double harm on the illegal fishing operators in reducing their fish revenues as well as incurs high costs of registering the illegal vessel.

4.3 Intensification of activities and development of the country's capacity for fisheries surveillance

The ASEAN nations have promised to intensify the activities of country's capacity for fisheries surveillance. The activities include increase monitoring of illegal vessels at sea, from air or in ports. The countries

in ASEAN will collaborate to wipe out illegal fishing vessels. The intensification of surveillance activities increases the cost of risks of engaging in IUU fishing. The illegal fishing operators will have the vessels confiscated or fined with heavier penalties once get caught in the seas. The increase of patrol ships on the sea and regular monitoring activities at sea increase the probability of the illegal vessels being apprehended. The economic rents of the fishing activities are reduced because the cost of engaging in IUU fishing is higher. The last resort of the illegal fishing operators is to stop IUU fishing.

4.4 Implementation of a Vessels Monitoring System (VMS) to enhance fisheries management

The employment of technology such as the vessel monitoring system to enhance fisheries management can increase the cost of risk for illegal fishing operators. The upgrading of new technology system by ASEAN countries to provide accurate data and information on the activities of fishing vessels expose the illegal fishing operators to more risk of being caught at the sea. The activities of the illegal fishing operators can be detected and monitored easily and trigger the need of illegal fishing operators to stop IUU fishing activities. The illegal fishing operators might buy more sophisticated technologies to prevent themselves from being caught, but the buying of new sophisticated technologies add up the costs of capital and make the entire IUU fishing business not profitable. The economic rent of the IUU fishing activities is thus reduced and the catching effort for IUU fishing reduced.

Establishment of *ad hoc* fisheries courts

The fisheries courts are being set up to enhance the effectiveness of enforcement of fisheries laws on illegal fishing operators that violate the laws. The fisheries courts acts as a mechanism to deal with the illegal fishing cases and bring the violators to justice. Courts act as a mechanism to fine the illegal fishing operators. For example, Rose (2014) in his book entitled *Following the Proceeds of Environmental Crime: Fish, Forests and Filthy Lucre* record that Indonesia has established fisheries courts in Jakarta, Medan, Pontianak, Bitung and Tual to investigate criminal fisheries in Indonesia, in line with the Indonesia Law No. 45, 2009 to provide investigation, prosecution, punishment of IUU fishing . Heavy fines on the illegal fishing operators dampen their ambition to go for illegal fishing activities. The high costs of risks in engaging in IUU fishing adds up the burden of the illegal fishing operators to engage in IUU fishing. The fisheries courts should be set up in all the ASEAN countries so that the illegal activities cases can be handled in a steadfast way and deter the illegal fishing operators from engaging in IUU fishing. The fisheries courts could also be used to combat corruption among fishing officers in awarding licences to illegal fishing operators, such as those in Indonesia and Philippines (Rose, 2014)

4.5 Developing fisheries co-management

Co-management is crucial in combating IUU fishing (FAO and OECD, 2014). Co-management is defined as the cooperative management and responsibility sharing of the fisheries resources between government and the community of local fishers (Pomeroy & Williams, 1994; Sen and Nielsen, 1996). Fisheries co-management is used to solve the conflicts between government and fishers and over exploitation activities (Abdullah, Kuperan & Pomeroy, 1998). Fisheries co-management is seen as an alternative to centralized command and control fisheries management to solve the conflicts. Overexploitation of fisheries resources can happen because of illegal fishing activities (FAO, 2014). Thus, fisheries co-management can combat IUU fishing by reducing the transaction costs in IUU fishing such as information cost of IUU fishing, collective fisheries decision-making costs and collective operational cost in IUU fishing.

There are a few ways suggested for fisheries co-management. Firstly, fishers are empowered to provide adequate IUU fishing information to government and government can act fast in detecting and executing the IUU fishing vessels. Government in ASEAN countries need to provide incentives such as monetary rewards to motivate the fishers to expose IUU fishing information to the government. Besides that, fishers are merely consulted by government before regulations on IUU fishing are introduced so that the fishers are given the responsibility to design, implement and enforce the laws and regulations with advice and assistance from the government. These

joint efforts will result in effective combat of IUU fishing.

Fisheries conflicts among countries require the efforts of co-management of ASEAN countries to solve the conflicts and IUU fishing. For example, Malaysian trawlers are reported to have poaching or regular incursion into Kabupaten Sambas coast in West Kalimantan Province (the northern tip that borders Malaysia). The issue of illegal fishing of Malaysian fishing boat in Indonesia waters requires regional monitoring control and surveillance (RMCS) Network to address it. Surveillance at sea is expensive because IUU fishing can cover vast area of sea and is hard to detect and thus requires regional co-management. Thus, joint efforts of inspections and surveillance by ASEAN countries are important to detect the illegal fishing activities bordering the ASEAN sea region and speed up the efforts to combat IUU fishing.

5.0 Conclusion

It is imperative to address the issue of illegal fishing activities in ASEAN. IUU fishing would result in the extinction of fish species and threaten the livelihood of the local fishers in ASEAN region. In this article, an ASEAN framework of economic rents aimed at combating IUU fishing is developed. The main idea in combating IUU fishing illustrated in this framework is to reduce the economic rents of the IUU fishing. The economic rents can be reduced by increasing the costs of IUU fishing or reducing the revenues of IUU fishing.

Guidelines in the ASEAN framework outlined in the The Seventeenth Meeting of Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) at Thailand in 4-5 December 2014 are analyzed using the ASEAN economic rents framework developed in this article. The guidelines are preventing the entry of illegal fish products from entering ASEAN market, improved registration and licensing of fishing vessels, intensification of activities and development of country's capacity for fisheries surveillance, implementation of a Vessels Monitoring System (VMS) to enhance fisheries management and the establishment of *ad hoc* fisheries courts to manage the illegal fishing law cases effectively. With the ASEAN guidelines in place that adhere to the economic rents framework, it is believed that the IUU fishing can be combated. However, regional efforts from ASEAN must be enhanced to successfully implement the ASEAN guideline. All countries in ASEAN must work together with the stakeholders involved to exchange information of IUU fishing in an efficient manner.

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