



Framework for Managing Illegal, Unreported and Unregulated Fishing in ASEAN

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Abstract

Illegal, unreported and unregulated (IUU) fishing account for some USD6 billion of fish catch a year and thus bring significant losses to the economies of the Association of Southeast Asian Nations (ASEAN) fishing nations. In this paper, a framework incorporating economics, social and institutional drivers for addressing IUU fishing is presented. The economic rents from fishing are among the main drivers contributing to IUU fishing. The Food and Agriculture Organization (FAO), International Maritime Organization (IMO), and regional bodies plan of action (RPOA) are examined for effectiveness in reducing IUU fishing. Approaches for reducing the economic rent or profit from IUU fishing are developed, and directions for reducing IUU fishing through the RPOA are suggested. The suggestions include improved registration of fishing vessels, preventing entry of illegal fish products and most importantly, developing co-management of fisheries and improving monitoring at landing sites. In addition, governments in ASEAN countries must work in tandem with the stakeholders involved such as fishers, fisher agencies or associations to exchange information for reducing IUU fishing.

Keywords: ASEAN fisheries, co-management, monitoring fish landing sites, economic rent framework, IUU fishing

Introduction

Following an international plan of action for illegal, unreported and unregulated fishing (IPOA-IUU), IUU fishing is divided into three categories. The three categories are illegal fishing, unreported fishing and unregulated fishing and are well explained in the FAO, 2001 publication.

IUU fishing cannot be overlooked because it is a major threat to maritime and resource security. The most common activity in IUU fishing is violation of the fish conservation and management measures such as catch quotas and bycatch limits set by local and international regulations (FAO, 2001). IUU fishing is important and significant because IUU fishing leads to the underreporting of catches and can result in ineffective policy prescriptions on the health of the fisheries resources. IUU fishing can damage the livelihood of fishers by reducing the stock of fish in a fishing area or zone. Also, IUU fishing threatens

targeted fish species and the surrounding ecosystems, weakening conservation efforts and the management measures of the ASEAN countries in managing the fisheries sector (SEAFDEC, 2015). Although the literature on IUU fishing has been discussed extensively, limited studies on IUU fishing are documented in ASEAN (Septaria, 2016; Morgan et al., 2007). The governments of ASEAN might also have little information on how to combat IUU fishing. Thus, this study addresses the issue of IUU fishing in ASEAN and provides a conceptual basis for analysing IUU fishing in the ASEAN region. Furthermore, recommendations for ASEAN countries to combat IUU fishing are provided.

This paper is divided into five sections. In section one, IUU fishing, in general, is discussed. The background of IUU fishing in ASEAN and the existing instruments and guidelines are presented in section two. In section three, the methodology and the framework for analysing IUU fishing is taken up. In section four, the

analysis of the drivers of IUU fishing is explained using the framework developed in this paper. In section five, the conclusions and recommendations for reducing IUU fishing in the ASEAN region, drawing from the framework developed in this paper is presented. This paper is a mixture of a review of literature and original insights into the problem of IUU fishing using a framework to analyse the IUU problem.

State of the Fisheries Sector in the ASEAN Region and ASEAN Guidelines for Managing IUU Fisheries

Association of Southeast Asian Nations (ASEAN) consists of about 600 million people. ASEAN is a major fish producer and consumer. The ASEAN fisheries contributed about a quarter of the total world marine capture fish production of 90.63 million tons in 2016 (FAO, 2018). The top four fish producing nations in ASEAN are Indonesia, Thailand, Vietnam and the Philippines (Invest in ASEAN, 2018). The fisheries sector is an important source of employment and income in ASEAN. In Indonesia alone, there is a total of 2.6 million fishers (FAO, 2018). The number of fishers, fisheries production, exports, imports and fishing vessels in ASEAN is as shown in Table 1.

Table 1. Fisheries production, exports, imports and number of fishers and vessels in ASEAN.

Countries	Production (tons)	Exports (USD M)	Imports (USD M)	Fishers (Numbers)	Fishing vessels
Brunei	4,353	2.43	42	341	36
Cambodia	566,695	45	6.60	-	98,693
Indonesia	6,016,525	3,592	351	2,602,000	625,708
Laos	34,105	0.01	6.50	-	-
Malaysia	1,458,126	795	1,065	136,514	56,211
Myanmar	2,702,240	653	16	2,979,200	28,455
Philippines	2,137,350	808	246	1,907,435	6,371
Singapore	8,161	356	1,074	625	30
Thailand	1,559,746	6,565	3,107	160,000	25,002
Vietnam	2,711,100	8,029	815	530,000	28,719

Source: Food and Agriculture Organization, 2018.

From Table 1, Indonesia is the largest harvester of fish in ASEAN, with total landings of 6 million tonnes, followed by Vietnam (2.71 million tonnes) and Myanmar (2.70 million tonnes). A large number of fishers (about 8.5 million) dependent on the limited fisheries resources pushes the earnings of the fishers in ASEAN to very low levels. For example, in the Philippines, legal fishers earn USD6 a day, around 2kg of the retail value of fish, hardly meeting subsistence living standards (ILO, 2014). A large number of fishers in the ASEAN region is also one of the social factors that lead to IUU fishing. Too many poor fishers in ASEAN contribute to the fishers committing IUU fishing to obtain income for their livelihood.

IUU fishing in ASEAN

ASEAN countries experience tremendous economic losses from IUU fishing. The economic losses from IUU fishing of selected ASEAN countries, Africa, Europe and the World are presented in Table 2.

Table 2. Economic losses from IUU fishing.

Countries/Region	Illegal fishing losses(USD M)
1. Brunei	13
2. Indonesia	3000
3. Malaysia	334
4. Philippines	620
5. Thailand	500
6. Vietnam	1600
7. Africa	1351
8. Europe	1400
9. World	10000-23500

Source: Havoscope (2019).

The economic losses from IUU fishing for three Southeast Asian countries are large, typically some 20% of the total value of fish landed in those countries and represent a significant loss to the economy of these countries. Indonesia has the largest economic loss in ASEAN, contributing USD 3 billion loss a year. It is followed by Vietnam, which records USD1.6 billion losses a year (Havoscope, 2019).

There are different views of IUU fishing for developed and developing countries. The driving force of IUU fishing in ASEAN is the absence of adequate regulatory control over national fishers and fishing vessels, and insufficient effective management tools to manage fishing capacity. The weak enforcement of fishing legislations, the evading the payments of fishing fees and taxes, the absence of adequate maritime boundary agreements and incompatible legal frameworks for combating IUU fishing all contribute to IUU fishing. ASEAN has very weak vessel licensing system and catch and effort data system and monitoring, control and surveillance (MCS). ASEAN has identified IUU fishing by both national and foreign fishers in their Exclusive Economic Zones (EEZ) as a major issue. Furthermore, many ASEAN fisheries are poorly managed with limited concern for fisheries conservation. On the other hand, the regulatory control over national fishers and enforcement of fishing legislations are strong in developed countries. The developed countries also have better management tools such as transferable quotas for fisheries management and conservation (SEAFDEC, 2015).

The second reason for the difference between developing countries and developed countries is the fishers in developing countries are mostly poor and artisanal. Therefore, the developing countries also include IUU fishing as IUU activities by small-scale, artisanal vessels in their own waters, and in some

circumstances in the EEZs of other states (Meere and Lack, 2008) whereas the fishers in developed countries are not largely artisanal. The problems of ASEAN fisheries are more complex than the developed countries. ASEAN fisheries policymakers have to consider the more complex problems of ASEAN artisanal fisheries to formulate effective ASEAN guidelines for combatting IUU fishing. SEAFDEC, in consultation with the ASEAN member states, developed the existing ASEAN guidelines for combatting IUU fishing (SEAFDEC, 2015).

Among the key problems of ASEAN fisheries are; weak licensing and vessel registration, high cost of monitoring fishing vessels, limited resources for monitoring and enforcement, poor and unsafe working conditions for fishers especially in Indonesia and Myanmar, weak port controls, low levels of fines for violation of fisheries regulations, non-transparent agreements between fishers and fisheries management agencies, low awareness of IUU fishing and the needs for conservation and sustainability of fisheries resources, destructive fishing methods and gears, poor traceability of fish products along the supply chain, transnational nature of the fisheries industry and vessels involved in harvesting fish, poor and ineffective translation of the ASEAN fisheries framework for managing fisheries into laws for enforcement and the use of fishing vessels for drug and human trafficking. (SEAFDEC, 2015; FAO, 2016; Pomeroy et al., 2016)

ASEAN guidelines for managing IUU fishing

ASEAN has joint approaches for managing fisheries resources and combating IUU fishing through consultation and hearing of views and proposals through SEAFDEC Meetings, as required by Strategic Plan of Action for ASEAN Fisheries (SPA) under action program 6.3 and POA 8, 21 and 22. There are dialogues held among the ASEAN Member States on issues related to IUU Fishing. ASEAN also formulates ASEAN Guidelines for Preventing IUU Fishing and enforces it through the ASEAN Fisheries Supply Chain. ASEAN fishing nations promise to regulate transshipments and landing of fish across borders and strengthen the management of fisheries together in the high seas and RFMO areas. All ASEAN Members hold bilateral or multilateral enforcement activities in the seaways.

For example, Cambodia and Vietnam have collaborative measures through Memorandum of Agreement signed to combat IUU fishing, trilateral agreements between Malaysia, Indonesia and Singapore to conduct patrol activities for IUU fishing in the Straits of Malacca and Sulu-Sulawesi Sea. All ASEAN Members also are encouraged to develop their respective National Plan of Action (NPOA) to prevent and eliminate IUU Fishing. Brunei, Indonesia, Malaysia, Philippines, Thailand and Vietnam have adopted the NPOA-IUU. Cambodia is yet to publish a NPOA on IUU while the other ASEAN Members are in the process of developing it. Activities undertaken by ASEAN Members include the following: Improved registration and licensing of fishing vessels, intensification of activities and development of the country's capacity for fisheries surveillance, establishment of ad hoc fisheries courts, implementation of Vessels Monitoring System (VSM), development of community-based fisheries surveillance system and strengthening capacity for fishers to enhance their awareness of fisheries regulations (Williams 2013).

Methods

In this section, we develop a framework for analysing the level of IUU fishing. The framework is presented in Figure 1.

The positive (+) sign indicates positive impact and the negative (-) sign indicates negative impact. There are three drivers namely economic drivers, social drivers and institutional drivers that affect the level of IUU fishing, as shown in Figure 1. The increase in costs of illegal fishing would decrease the level of IUU fishing. The increase in benefits such as profits of IUU fishing would increase the level of IUU fishing. Details of the impacts of the economic drivers on IUU fishing are further explained by using the framework of IUU fishing, as shown in Figure 2. Social drivers such as an increase in population and an increase in education levels of fisher's children are crucial in affecting the level of IUU fishing. Increase in population would increase IUU fishing. Increase in the educational opportunities for children would decrease the IUU fishing, given that the children are more aware of protecting the fisheries resources when they are better educated. Finally, institutional drivers such as proper laws and regulations and good enforcement of the laws could reduce the level of IUU fishing.

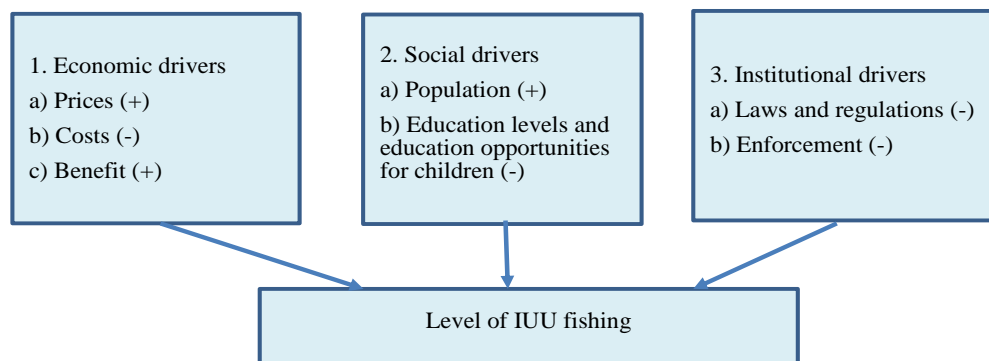


Fig. 1. Framework for analysing the level of IUU fishing.

Figure 2 depicts the economic rents obtained and the fishing efforts of engaging in IUU fishing. From Figure 2, the economic rents of engaging in illegal fishing activity are calculated from total revenue minus total cost. Total revenue is increasing at a decreasing rate and is shown in the curve TR. Total cost is a straight line and increasing at a constant rate. The original total cost line is TC1. When there is a lack of regulation, more fishing effort will be imposed on the fishery, thus resulting in less profits for all the fishers. 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 or is less than TC3, and thus there is no fishing effort as there will be no economic rent at TC3.

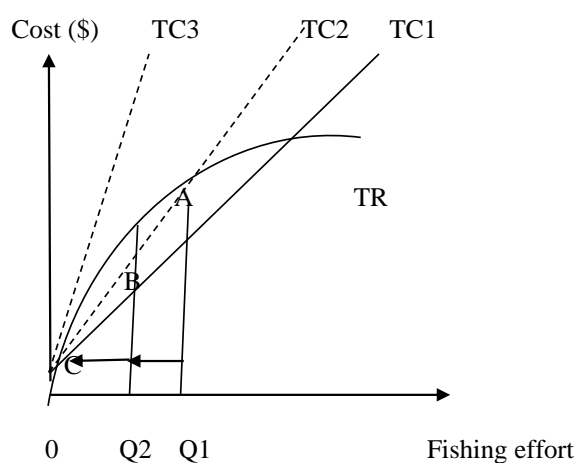


Fig. 2. Framework of economic rents for reducing IUU fishing.

Analysis of Drivers of IUU Fishing

Drivers of IUU fishing

Using our framework, there are three main drivers of IUU fishing. These are economic, social and institutional drivers. These drivers are also mentioned in the article by Gallic and Cox (2006) and Agnew and Barnes (2004) but without reference to a framework.

Economic drivers of IUU fishing

The main economic drivers of IUU fishing are overcapacity, ineffective management and subsidies (Gallic and Cox, 2006; Agnew and Barnes, 2004). Fishers will engage in illegal fishing if the expected economic benefit (the surplus value they obtain after deducting the costs of fishing from the value of landings or rent in resource economics term) exceeds the cost of fishing. Overcapacity in fishing results from the imbalance between fishing capacities and fishing possibilities (such as the level of fish stocks) in the domestic fleet or inappropriate allocation of

fishing rights. The overcapacity in the fishing vessel is well connected to inappropriate management regime. In the ASEAN countries, the fishers in the member state will engage in IUU fishing in response to fishing restrictions set by member states that affect their fish catches. The overlapping fishing area boundaries of the ASEAN countries and the fishing regulations of the countries lead to IUU fishing as well.

Another economic driver of IUU fishing is the subsidies provided by the government of the ASEAN countries to the fisheries sector (Gallic and Cox, 2006; Agnew and Barnes, 2004). The objective of giving subsidies is to help develop and reduce the cost of fishing in the ASEAN region. The subsidies also help to increase the fishing capacities in the member states. 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 by reducing subsidies to fishing activities in the member countries.

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 (FAO, 2018). 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.

Social drivers

Social drivers refer to the poor social conditions such as high population pressure, low levels of education that motivates the fishers to engage in IUU fishing (Gallic and Cox 2006). In other words, the social background of the fishers leads the fishers to commit crimes and violate sea regulations. Different lifestyles might lead the fishers to have different fishing behaviour. In some poor countries in ASEAN region such as the Philippines and Indonesia, the fishers tend to engage in IUU activities and are employed in the FOC vessels. The abundance of cheap labour motivates the illegal fishing operators to employ the fishers from the Philippines and Indonesia to commit IUU fishing in the ASEAN region (Gallic and Cox, 2006).

Furthermore, the large number of fishers in the ASEAN region (about 8.5 million) and low earnings from fishing is also one of the social drivers that lead to IUU fishing (FAO, 2016). For example, in the Philippines, legal fishers earn USD6 a day, around 2kg of the retail value of fish, hardly meeting subsistence living standards (ILO, 2014). The poor domestic

economic prospects force the fishers to work in fishing vessels engaged in IUU activities. These fishing vessels do not respect workers' rights as the fishers are discriminated and operate under poor and unhealthy working conditions, often not following the standards set by ILO and IMO regulations. For example, 26.3 per cent of the fishers in Thailand felt that they did not have sufficient rest since they worked 17–24 hours a day. And these excessive working hours violate ILO fishing work convention, 2007, which states that fishers be given regular rest to ensure safety and health" (ILO, 2014). The illegal fishing operators do not provide any safety and health protection to the fishers working on their vessels in the ASEAN sea region. Furthermore, ILO (2014) reported that 56.4 per cent of Myanmar fishers and 46.7 per cent of Cambodian fishers receive a monthly wage of about USD139 (equivalent to about USD4.60 daily wage compared to the USA federal minimum wage of USD7.25 per hour). The low wages motivate the fishers to commit IUU fishing to earn more to support their families.

The emergence of the organised IUU fishing operations in recent years has accelerated the development of IUU fishing activities in ASEAN. The organised activities of the IUU fishers reduce the cost and risk of IUU fishing, fraud in fisheries and the avoidance of registration of fishing operations (Gallic and Cox, 2006). The organised 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 organised IUU fishing operations in Europe is the Galician syndicate, in Northwest Spain. The Galician Syndicate or mutual society involves deep-sea fishing operators that operate in Northwest Spain. The syndicate engages in illegal fishing activities of toothfish to reap benefits at the expenses of the nation's owning the sea resources. 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 (Gallic and Cox, 2006).

Institutional drivers

Institutional drivers are related to the international legal framework designed to conserve the fish species. Under the current legal framework provided by the United Nations Law of the Seas (UNCLOS), some illegal fishing activities are allowed beyond the control of national and international regulations. This could lead to illegal fishing activities as the member nations could not regulate fishing activities outside their EEZ.

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 (Gallic and Cox, 2006) The sanctions and penalties imposed by the ASEAN countries do not work effectively against

illegal fishing vessels. The illegal fishers violate the regulations and are not penalised, and they are free to commit illegal fishing activities in the high sea in the ASEAN region. In other words, illegal fishers 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. Enforcement costs are high. Viswanathan et al. (1997) state that the enforcement costs constitute 25 to 50 per cent of total government expenditure on fisheries management. The resources spent on enforcement activities are, however, small in relation to the total value of fisheries in the ASEAN region given the high cost of enforcement. Routine checks on illegal fishing vessels are limited in the ASEAN region. Low inspection on the ASEAN sea region will lead to the 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 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 in order of Corruption Perception Index 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 councillor, Philippines illegal fishing activity is rampant because the Philippines lacks in equipment and the personnel capacity to man the city's waters (Alangilan, 2015). Thus, the illegal fishing vessel operators could escape from paying hefty fines because they have modern technologies to protect them from detection. The illegal fishing vessel operators are, therefore, not apprehended.

In brief, three main drivers lead to IUU fishing in the ASEAN region. The most dominant driver for IUU fishing is economics. According to The Economist magazine dated January 2015, one out of five fish sold in restaurants are caught illegally, representing 20 per cent 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. Unless the quantum of illegal gains the fishers are making from IUU fishing is reduced, there is limited prospect for reducing the IUU fishing problem. One way is to trace the supply of the illegal catch in the markets and impose a tax on the catch.

Recommendations

There are several ways recommended in this paper using the framework of economic rent to curb IUU fishing activities in the ASEAN region. Economic rent is defined as the total benefit obtained from the illegal fishing business. Economic rent is obtained from the total revenue by subtracting the total cost. The idea of reducing IUU fishing is to minimise the economic rent because economic rent incentivises the illegal fishing operators to commit IUU activities.

Association of Southeast Asian Nations (ASEAN) has already adopted a guideline for preventing IUU fishing. The guidelines were discussed at The Seventeenth Meeting of Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) in Thailand on 4-5 December 2014 (ASEAN-SEAFDEC, 2014). Based on the ASEAN Framework of Economic Rents on Reducing IUU fishing developed in this paper, the guidelines outlined in the ASEAN-SEAFDEC meeting is assessed. There are two ways of reducing economic rents as an effort to reduce IUU fishing, namely decreasing revenue and increasing the costs of IUU fishing. Therefore, preventing the entry of illegally fish products from coming into the market is required to handle this problem.

Preventing IUU fishing products from entering the market

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, and 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 deters the illegal operators from engaging in IUU fishing or reducing their efforts in IUU fishing.

Ecolabelling of the fish products has been suggested as an approach to separate legal fish supply from the illegal fish supply. However, certification for small-scale fisheries remains a challenge, and the cost of certification is often too high for fishers to bear as such certification will require more support from the government or non-governmental agencies to gain ground in the ASEAN countries.

Separation of landing sites

Another measure to reduce IUU fishing in the context of small-scale fisheries in ASEAN is to separate landing sites for small-scale fishers and commercial fishers and better monitoring of the fish landing sites. The development of port and landing sites with better

surveillance and monitoring capacities by the states will be the way forward to handle the IUU problems.

Improved registration and licensing of fishing vessels

Proper registration and licensing systems for fishing technologies and gears are 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 by reducing their fish revenues as well as increasing the costs of registering the illegal vessel.

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

The ASEAN must combine their efforts to pool their resources and conduct monitoring, control and surveillance on every illegal ship that enters into their territorial water. Enforcement must be institutionalised to foresee the efforts to conduct MCS to dampen the IUU fishing. Proper negotiations among ASEAN countries are needed to resolve any conflicts arising from IUU fishing. Indonesia has destroyed 41 IUU fishing boats that enter Indonesia's territorial water in the year 2015 (Septaria, 2016). This instigates or provokes other ASEAN member countries to retaliate by doing the same actions. Thus, setting up an ASEAN mechanism to discuss and manage IUU issues is a move in the right direction.

ASEAN member countries must ensure that all fishing vessels that pass the ASEAN territory must have the electronic devices such as a blip that is installed on the vessels. This blip allows the detection of fishing vessels by the enforcement personnel in ASEAN. Any illegal fishing vessels suspected of not having a blip should be prosecuted, and the belongings on the vessels are forfeited. ASEAN should set up a mechanism for installing of electronic devices on the ASEAN legal vessels. The increase in the number of patrol ships on the sea and regular monitoring activities at sea increases 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.

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 sea. The activities of the illegal fishing operators can be detected and monitored easily and trigger the need for illegal fishing operators to stop IUU fishing activities. The illegal fishing operators might buy more sophisticated technologies to prevent themselves from being caught, but buying of new sophisticated technologies will increase 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

Special fisheries courts are being set up to enhance the effectiveness of enforcement of fisheries laws on illegal fishing operators that violate the laws (Rose, 2014). The fisheries courts act as a mechanism to deal with the illegal fishing cases and bring the violators to justice. Courts act as a mechanism to impose a fine on the illegal fishing operators. For example, Rose (2014) in his book entitled *Following the Proceeds of Environmental Crime: Fish, Forests and Filthy Lucre*, records that Indonesia has established fisheries courts in Jakarta, Medan, Pontianak, Bitung and Tual to investigate criminal fisheries in Indonesia. This is in line with the Indonesia Law No. 45, 2009 to provide investigation, prosecution, the punishment of IUU fishing.

Hefty 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 licenses to illegal fishing operators, such as those in Indonesia and the Philippines (Rose, 2014).

Developing fisheries co-management

Co-management is crucial in combating IUU fishing (FAO, 2014). Co-management is defined as the cooperative management and responsibility-sharing of the fisheries resources between the government and the community of local fishers (Pomeroy and

Williams, 1994; Sen and Nielsen, 1996). Fisheries co-management is used to solve the conflicts between government and fishers and over-exploitation activities (Abdullah et al., 1998). Fisheries co-management is seen as an alternative to centralised command and control fisheries management to solve the conflicts. Overexploitation of fisheries resources is one of the outcomes of illegal fishing activities (FAO, 2014). Thus, fisheries co-management can combat IUU fishing by engaging community effort to obtain better information on IUU fishing. Thus, the transaction costs of managing IUU fishing can be reduced. The transaction costs here refers to information cost of IUU fishing, collective fisheries decision-making costs and collective operational cost in IUU fishing.

There are a few approaches for fisheries co-management. Firstly, fishers are empowered to provide adequate IUU fishing information to government and government authorities can act fast in detecting and apprehending the IUU fishing vessels. Governments in ASEAN countries need to provide incentives such as monetary rewards to motivate the fishers to expose IUU fishing information to the government. In the co-management approach, fishers are consulted by the government before the introduction of regulations on IUU. Thus, fishers are given the responsibility to design, implement and comply with laws and regulations with the government's advice and assistance. 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 disputes and IUU fishing. For example, Malaysian trawlers are reported to have poached or made regular incursion into Kabupaten Sambas coast in West Kalimantan Province (the northern tip that borders Malaysia) (Septaria, 2016). 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 a vast area of sea and is hard to detect and thus requires regional co-management. Therefore, 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.

Mapping the sea resources

ASEAN's weakness is they do not know the state of the fisheries resources in their waters (SEAFDEC, 2017). ASEAN should employ their marine scientists to do the mapping of the type of fish species in their region. The identification of fish species will enable ASEAN countries to manage their ocean resources more sustainably. The identification of fish surrounding areas also enables ASEAN countries to

create marine protected areas to protect the diversities of fish species. The ASEAN countries should properly document databank of all information on fish including fish species, fish breeding behaviour, size of fish and fishing grounds. The marine scientist, biologist and aquaculture expert should be employed to study migratory fish species so that ASEAN can manage their fisheries resources better and ensure the sustainability of fisheries resources.

Cooperation within ASEAN

Fisheries management and ways to tackle IUU fishing are different for the countries in ASEAN. At the moment, different ASEAN countries set different regulations for the sea. ASEAN member countries must discuss their fisheries management and reach a consensus. ASEAN member countries need to come to a consensus on the options available for fisheries management to tackle IUU fishing.

In-depth understanding of fishers' condition

In-depth study of fishers is important to understand the weakness of the fishers. The socio-economic conditions of the fishers are not well understood in many ASEAN countries. The poverty level and the education level of the fishers have to be understood to design the right development programs for the fishers. For example, if the social status or the fishers are poor, this means that the fishers may need support to obtain capital to improve their productivity. A lack of alternative employment leads to IUU fishing. The education levels of fishers in Indonesia, Malaysia, Philippines and Vietnam are low (Tietze, 2016). Thus, the job options for the fishers are not much. There are lots of fishers in these three countries coupled with lack of jobs for the fishers. The incomes of fishers are low, and this leads to engagement in illegal fishing (Tietze, 2016). The sea is to a large extent, an open-access fishing ground that enables easy access to fishing. Thus, it is no surprise that fishers engage in IUU fishing. Understanding the socio-economic condition of fishers is crucial for the ASEAN governments to allocate funding to resettle the poor fishers into other activities such as aquaculture. The marine science universities in ASEAN must educate the fishers in ASEAN on the dangers of IUU fishing. More research on job options for fishers is required. Strong collaborations between ASEAN member countries are important to pool resources to develop research on job options of fishers and fund marine science universities to do research in this crucial area

Developing alternative employment opportunities

Fishers need alternative employment to keep them away from fishing. IUU fishing can be reduced if fishers can find alternative employment within their regional economies. Regional economic development

will be a key factor in reducing IUU fishing. Aquaculture stands as an important alternative to absorb some of the fishers and also provide for fish consumption and trade requirements. Other economic activities such as regional tourism and food outlets and the development of services sectors could be important alternatives.

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 the ASEAN region if no actions are taken. In this paper, a framework incorporating economic, social and institutional drivers are used to analyse IUU fishing in the ASEAN region. The main idea in combating IUU fishing utilising this approach 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 Seventeenth Meeting of Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) in Thailand on 4-5 December 2014 are analysed using the economic rents framework developed in this article. These guidelines are 1) preventing the entry of illegal fish products from entering ASEAN market, 2) improved registration and licensing of fishing vessels, 3) intensification of activities and development of country's capacity for fisheries surveillance and implementation of a Vessels Monitoring System (VMS) to enhance fisheries management and 4) the establishment of *ad hoc* fisheries courts to manage the illegal fishing law cases effectively. With the ASEAN guidelines in place and the use of the economic rents framework to raise the cost of illegal fishing and to reduce the revenue from illegal fishing, it is believed that the IUU fishing can be reduced. However, regional efforts from ASEAN must be enhanced to implement the ASEAN guidelines successfully. All countries in ASEAN must work together with the stakeholders involved to exchange information on IUU fishing efficiently. The impact of the ASEAN guidelines and regional efforts on reducing IUU fishing, however, is not clear right now, and further monitoring and analysis of drivers used in the framework can improve the ASEAN IUU guidelines effectiveness in the future.

The role of co-management of the fisheries is important to combat IUU fishing. The ten ASEAN countries should cooperate in fish farming and in the different types of aquaculture to relocate the surplus fishers in ASEAN. The aquaculture activities are needed for the fishers to supplement the income associated with the loss of marine fishing when the fishers cannot go to sea during monsoon season. Strategic locations for aquaculture farming are needed and must be identified by ASEAN

governments. The ASEAN fishers must capitalise on the opportunities to breed freshwater and brackish water fish through aquaculture farming projects financed by the ASEAN government. If the ASEAN fishers' loss of income from marine fishing is substituted with the income from aquaculture farming, the IUU fishing in ASEAN can be significantly reduced. With the increase in income of fishers from aquaculture, the activities of IUU fishing in ASEAN can be reduced. With 600 million populations in ASEAN, fisheries will continue to be an important source of food and thus managing illegal fishing is crucial to protect this important resource.

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