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Sustainable Ecolabelled Seafood from the East China Sea:

Regional and General Regulatory Regimes

A Dissertation in Law

by

Platinasoka Lin

Submitted

for the Degree of Doctor of Juridical Science

With Supervisor

Professor William E. Butler

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The dissertation of Platinasoka Lin was reviewed and approved* by the following:

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Abstract

The aim of this work to conduct a systematical review of fisheries management and to be an easy-understood guidebook for building an ecolabelling scheme of fisheries in the East China Sea, and also for Asian countries having plights of lacking good marine scientific research, advanced fisheries management, and public marine conservation awareness.

For this purpose, details of ecolabelling mechanism and the definitions of sustainable seafood are explored and a scoring checklist for ecolabelled seafood is created as a check tool, together with a certification standard, named “ProFish”. This work examines multiple types of legal documents, among them international conventions related to fisheries and marine protected area, FAO agreements, WTO fisheries subsidies negotiation history and existing fisheries agreements in East China Sea, Landing Declaration and Sales Notes in the European Union and Norway, to seek legal tools and guidelines that can help Taiwan upgrade fisheries managements and marine health status better.

Domestic fisheries regulations of East China Sea littoral countries, including Japan and China, are comprehensively compared. The ownership of and the legal transfer of property in marine life, capital-labor relations in fisheries, input and output controls over fishing capability, and fishery managers identity are illustrated in detail.

Furthermore, sharks, crabs, mackerels, neritic squid, and mahi-mahi fishing regulations among Taiwan, Japan and China are reviewed thoroughly. Preliminary assessments of five fisheries in Taiwan are evaluated by ProFish checklist, and mackerel has the highest potential to become the first seafood certified a sustainable ecolabel.

This work concludes that a more centralized fisheries management competent authority can resolve most obstacles. A quasi-governmental-based accreditation organization is suggested for the government first in order to promote a seafood ecolabelling scheme smoothly in Taiwan. Establishing a Ministry of Oceans and Fisheries is important. It is vital to introduce AI technologies into fisheries management measures to meet the need of monitoring and surveillance fishing activities at any time. Setting up nanometer-sized marine protected areas first to form a network is the best policy in politically-difficult regions. Reducing the fishboat fuel subsidy and introducing a higher subsidy for mandatory closed fishing seasons is necessary to develop a sustainable fishery industry.

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Abbreviation

AIS: Automatic Identification System

CWF: Convention (No. 188) Concerning Work in the Fishing Sector

EEZ: Exclusive Economic Zone

e.g.: for example

EPA: Environmental Protection Agency

EU: the European Union

FAO: Food and Agriculture Organization of the United Nations

i.e.: id est; that is, in other words

ILO: International Labor Organization

IUU: Illegal, Unreported, Unregulated fishing

MEL Japan: Marine Ecolabel Japan

MCS: Monitor, Control, and Surveillance

MPA: Marine Protected Area

MSC: Marine Stewardship Council

NM: Nautical Mile

NOAA: National Oceanic and Atmospheric Administration, the United States Department of Commerce

SOFIA: The State of World Fisheries and Aquaculture - FAO

TAC: Total Allowable Catch

UN: United Nations

UNCLOS: 1982 United Nations Convention on the Law of the Sea

VDR: Voyage Data Recorders

VMS: Vessel Monitoring System

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PART I. KNOWING THE TOPIC

Chapter 1 Introduction

1.1 Purpose of Study

More than 50% of oxygen on the planet comes from the oceans, even more than the percentage of oxygen that the world's rainforests produce. How do we protect the ocean? Born in an island nation, Taiwan, encircled by the Pacific Ocean, the East China Sea, and the South China Sea, the author of this dissertation has devoted her time to campaigns for environmental protection and marine conservation since 2006, ranging from organizing coastal cleanup activities to lobbying for Acts in the Taiwan Congress, the Legislative Yuan. The present author had full-time jobs as a marine campaigner in Taiwanese non-governmental environmental groups. In 2013 she founded and became the chairwoman of a non-profit marine conservation organization, *Oceanus Honors Gaia*, focusing on marine affairs, law-making and enforcement. However, the deeper the present author became involved in, the greater the need for her to research innovative legal solutions because every appeal that environmental groups proposed to the Taiwan Government always encountered tremendous obstacles in fishery regulations and fisheries industries in the past decade.

There is a vast chasm between the current legal regimes of coastal and offshore fisheries management and the vision of modern green consumption of Earth-friendly wild-caught seafood in Taiwan. Although making products greener is becoming a mainstream and moving toward being a requirement globally, key elements needed for environmental ecolabelled products are hardly found in Taiwan's Fisheries Act and practices, including the

lack of primary responsibility of fishermen to disclose the source of aquatic products. That was the situation when this SJD dissertation was commenced in summer 2014.

From the point of view of an environmentalist, gratitude should be expressed for the European Union yellow card warning to Taiwan pelagic fisheries in October 2015¹. The Taiwan Fisheries Agency finally began to carry out reforms, including promoting the mandatory system of a “Landing Declaration” for coastal and offshore fisheries to collect fisheries data. However, as of the end of June 2017, the rate of submitting by fishing boats was only 13%.² There is a long road ahead.

Therefore, the purpose of the study is to accelerate comprehensive legal reforms to improve the regime of fisheries management and create ecolabelled seafood in Taiwan domestic supermarkets as soon as possible, even though the European Union lifted a yellow card warning on 27 June 2019, there is still a long journey for Taiwan’s inshore, coastal, and offshore fisheries to make progress. The experience of Taiwan and the various suggestions in this dissertation are suitable for countries with similar backgrounds.

1.2 Research Methodology and Delimitation

The aim of this study is to review and propose reforms of the fisheries management institutions and policies in Taiwan and establish a feasible seafood ecolabelling system for Taiwan and other countries with similar fisheries management and consumer market conditions. According to a statistical analysis by the Taiwan Fisheries Agency, the primary

¹ European Commission - Press release, Brussels, 1 October 2015
Fighting illegal fishing: Commission warns Taiwan and Comoros with yellow cards and welcomes reforms in Ghana and Papua New Guinea (online).

https://ec.europa.eu/fisheries/fighting-illegal-fishing-commission-warns-taiwan-and-comoros-yellow-cards-and-welcomes-reforms-ghana_en

² <https://money.udn.com/money/story/5648/2867652>

source of seafood for the Taiwan domestic consumer market is the coastal and offshore fisheries in the Taiwan Exclusive Economic Zone (EEZ), not from the pelagic fisheries³ on the high seas. In addition, the catch yield from the offshore fisheries in the East China Sea occupies the highest proportion amongst all EEZs of Taiwan. Therefore, the principal research undertaken in this dissertation is mainly to review the fisheries regulations embodied in international and domestic law from the standpoint of ecological preservation and sustainable fisheries management.

Second, this dissertation makes reference to a wide range of seafood ecolabel schemes and devised a new sustainable seafood ecolabelling scheme called “*ProFish*”. The ProFish has been utilized as a research measurement checklist for evaluating whether fisheries operations are sustainable in this study. Five kinds of Taiwan fisheries, mainly based in the East China Sea, are selected for the academic assessment of sustainability and to determine legal provisions and policies that could generate improvement.

The figures and data sources used in this dissertation mainly came from Mandarin website searches and material from Taiwan governmental agencies’ internal meetings, which are usually not open to the public or on the internet. The present author obtained these materials as a member of several governmental committees in Taiwan since 2016, including:

- (a) Task Force for Maritime Affairs of Executive Yuan, which was transformed into the Ocean Affairs Council of the Executive Yuan in April 2018.
- (b) Advisory Task Force for Mackerel Fishery, Advisory Task Force for Neritic Squid Fishery, and Advisory Task Force for Landing Declaration of Fisheries Agency, Council of Agriculture, Executive Yuan;

³ According to the Taiwan Fisheries Agency report, 90 % of the catch yield from pelagic fisheries by Taiwan fishing vessels is exported to other countries, not consumed in Taiwan.

- (c) Maritime Environmental Protection and Conservation Professional Consultation of Coast Guard Administration, Executive Yuan;
- (d) Petition Deliberation Committee, and the Human Rights Task Force of Environmental Protection Administration, Executive Yuan;
- (e) National Parks Planning Committee of Ministry of the Interior.

Therefore, several arguments made in this dissertation had been submitted by the present author to executive agencies and petitioned to Presidents and Premiers of Taiwan, the Fisheries Agency, and the Taiwan Congress. Many arguments offered have been discussed in official meetings within the governmental administrations during the past three years, and some were answered with specific executive feedback. This feedback has been taken into account, and practical adjustments to the academic arguments were made as well.

The foregoing is a crucial research source which greatly facilitated this dissertation. Some proposals mentioned herein were implemented as policies. However, other proposals not yet adopted are embodied in this dissertation, such as the suggestion that the Taiwan Government should establish a Ministry of Oceans and Fisheries, not merely an Ocean Affairs Council.

1.3 Structure of Study

The primary goal of this study is to strengthen the domestic regulation of fisheries management in Taiwan, address the challenge of ocean governance fighting against illegal, unreported, unregulated fishing (IUU fishing), and support the establishment of a quasi-governmental-based ecolabelled seafood program, which is expected to be accepted internationally in the future. Therefore, three parts are divided into fourteen chapters which develop and illustrate the arguments of the dissertation.

The first part defines the concept of sustainable seafood in chapter one, introduces current green consumption and government procurement systems in several countries, and outlines the contours of the East China Sea.

The second part reviews and suggests reforms of current legal tools in international law and Taiwan's domestic law in order to promote ocean conservation and sustainable fisheries. Chapter five identifies relevant international regulations which are useful to the domestic regime, including hard law and soft law in the global context of environmental protection awareness and actions.

In order to locate the barriers in Taiwan domestic legal regimes, chapters six, eight, and nine address such important questions as who is a fisherman, who owns the fish in the sea, who is in charge of fisheries management, how does the government collect fisheries data, and so on. For the past ninety years, the Fisheries Act of Taiwan has lacked the logic of modern administrative law and public law and has no satisfying answers to the questions above. Regulations are mostly confusing.

Five fisheries in the East China Sea are taken as examples to support the present author's arguments in Chapter Seven. The gap between the existing legal regime and the requirement of ecolabelled seafood is analyzed, and the map for future legal advance is depicted. Both the policy and enforcement powers are examined and recommendations made.

The third part lies outside the traditional legal system. There is a need to think about something new and urgent for a modern country in the era of Cloud Technology and the upcoming Quantum Computer Age. This will be valuable to neighboring countries such as

Vietnam, which was given a “yellow card” for illegal fishing by the European Union in October 2017.⁴

1.4 Significance of Study

This study is the first in Chinese to undertake a comprehensive legal review of Taiwan’s Fisheries Act from the standpoint of an ocean conservation campaigner and also the first to put forward recommendations for reforms of the legal regime of fisheries. There is no academic textbook discussing Taiwan’s “Fisheries Act” thoroughly, although there are numerous books about the law of the sea.

Moreover, in order to make the case for establishing an ecolabeling scheme, the proposals in this study for law reform mainly integrate new sustainable fisheries management policies and guidelines of the Food and Agriculture Organization of the United Nations (FAO) into the traditional fisheries perspective that Taiwan's fishery industries have absorbed for decades. This is a challenging task.

In sum, this dissertation has significant reference value for environmental groups, especially in civil law countries, to advocate on behalf of ocean conservation and sustainable fisheries.

⁴ European Commission warns Vietnam over insufficient action to fight illegal fishing 23/10/2017 (online).

1.5 Definitions of Key Terms

In this dissertation, several key terms used frequently have to be defined and clarified by the present author from her national society cultural background and thinking context to let the work goes onward smoothly.

First, the present author has referred to some website⁵ discussion and definitions that, when inshore fisheries, coastal fisheries, offshore fisheries, and pelagic fisheries are mentioned, they represent the perspective of the captain of a fishing boat or a fishing vessel located in the sea area distant from the coastline as below:

Inshore: fishing boat works in the waters within 3 nautical miles from the coast.

You can sometimes see land on either side of the boat.

Coastal: fishing boat works in the waters within 3 to 12 nautical miles from the coast.

You can sail about an hour to three towards the coast and see it.

Offshore: fishing boat works in the waters within 12 to 200 nautical miles from the coast.

All you can see is blue water, and if you sail all day towards the coast, you still will not see the land.

Pelagic: fishing boat works in the waters outside 200 nautical miles from the coast.

Second, “fishing boat” and “fishing vessel” are used interchangeably, and the former sometimes covers the latter, though the Taiwan Government often translates the Chinese word “漁船” only as “fishing vessels” in English documents. In order to express the concept discussed directly, the author roughly classifies ships into two kinds according to Taiwan fisheries industrial status as below:

⁵ See <http://forums.sailinganarchy.com/index.php?/topic/125395-inshore-vs-coastal>

Fishing Boat: when the term is used in this dissertation, it usually refers to small-scale fishing crafts less than 100 tons working in the waters within 200 nautical miles from the coastline. The concept is as the same as what is in the section 6.6.2 of Chapter 6, *Motorized Fishing Boat Grading Recommendations*, given by the present author that “tiny, small, medium” fishing boats. However, it contains small and large fishing crafts, boats and vessels concept meanwhile in article contexts.

Fishing Vessel: when the term is used in this dissertation, it usually refers to large-scale fishing crafts more than 100 tons working in the waters out of 200 nautical miles from the coastline, or it is the Taiwan official term. The concept is as the same as what is in the section 6.6.2 given by the present author that “large and giant” fishing boats.

Third, the Taiwan Government usually translates the Chinese word “漁船船員” only as “crew member” in English documents, but in order to express the concept discussed clearly, the present author classifies fishing workers into “fisherman” and “fisher” used in this present work according to author’s practical experience as below:

Fisherman: mainly refers to master of fishing boat, Taiwanese captain, and Taiwanese fishing laborers, who speak Mandarin and Taiwanese, have the right to vote in Taiwan elections, and sometimes go to the governmental buildings or the Taiwan Congress collectively to protest against the fisheries polices. Sometimes, it contains foreign fishing workers concept meanwhile in article contexts.

Fisher: a term used in the *2007 C188 Work in Fishing Convention* which is expected to protect the human rights of the fishing laborers on the fishing boats. Herein, fishers are usually meant to be foreign crew members working on a Taiwanese owner’s fishing boat, unable to speak Mandarin and Taiwanese, cannot read Chinese characters. They are not Taiwanese citizens, have no voting rights, and rarely participate in the formulation of fishery policies. They are real disadvantaged laborers who are in a worse position than others or lacking competitive ability.

Chapter 2 What is Sustainable Seafood?

In this chapter, we consider why we need to explore what sustainable seafood is.

2.1 Ocean Crisis: Depletion of Marine Life

Fishing is an ancient human activity. Fish and seafood remain an essential source of protein and essential nutrients in the world. Protein from fish is a crucial nutritional component in some densely populated countries⁶ such as the East Asian countries surrounding the East China Sea. Consuming fish is particularly important as a lifestyle.

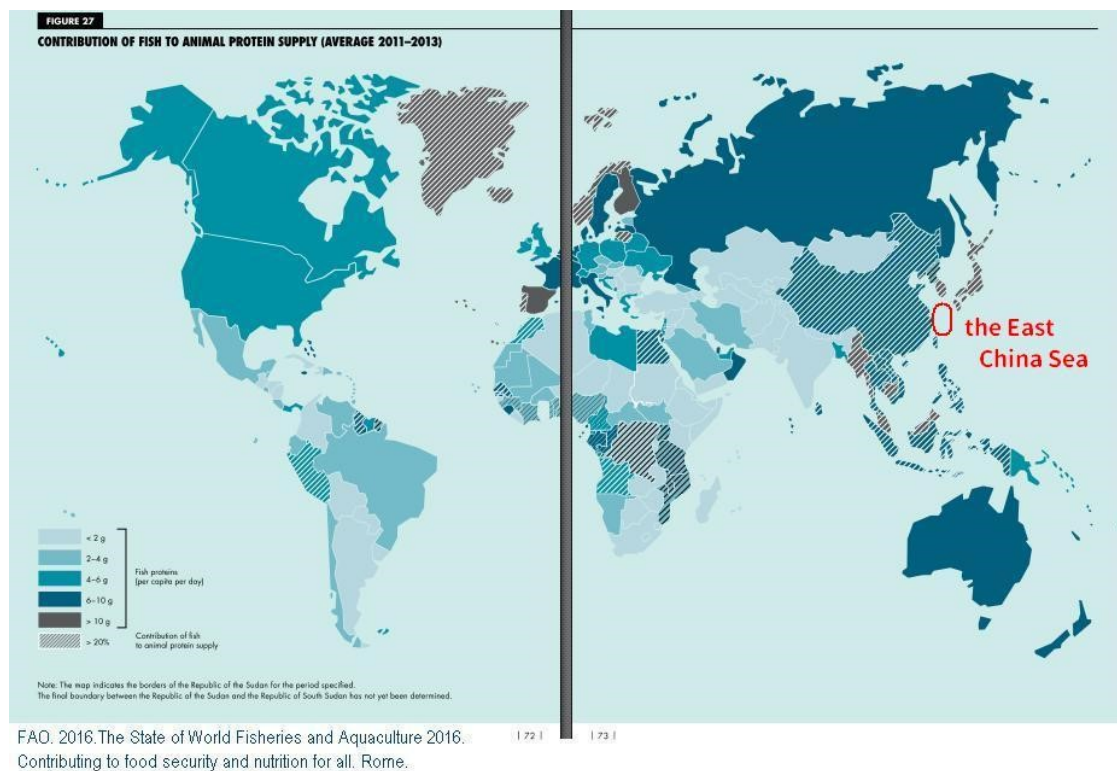


Figure 1: Contribution of Fish Animal Protein Supply (Average 2011-2013)

From FAO SOFIA

⁶ Report of a Joint WHO/FAO Expert Consultation. (2003). *Diet, Nutrition and the Prevention of Chronic Diseases* (pp. 23) (online).

In addition, in the modern industrial food chain, fishmeal and algae can be used as animal feed for livestock and poultry and as fertilizers for crops. Among them, aquaculture is the largest user of fishmeal.⁷

However, although people know that a healthy marine ecological system and a sustainable fishery are significant for the Earth's ecology and human society, the development pressure being forced upon the sea is becoming greater by reason of the global population growth and increased consumer capability, improvement of fishing technology, and higher capacity of fishing. Aside from these, many reasons contributed to the collapse of marine ecological resources. For example, subsidies from governments led to continuing destructive fishing practices. The incompetence of fisheries management and weak law enforcement are damaging ocean health. In Asia, inaccurate and unclear fishing statistics make the plight of fisheries management more difficult.

In the East China Sea, Japan, Korea, and Taiwan are deeply influenced by China's rising consumer power and unbridled illegal fishing activities conducted by Chinese fishing vessels. Marine resource management of each country is severely challenged and interfered with by fishing vessels from China violating territorial waters. In April 2013, a local Chinese newspaper, Qianjiang Evening News, for the first time in great detail reported the embarrassing moment of fishermen that "there are no fish to fish in the East China Sea". This news caught the attention of the Chinese government, and they have been reinforcing fisheries management for the past five years. However, there is a long way to go to reach an ideal and balanced fisheries management.

⁷ Hasan, M.R. (2017). *Feeding Global Aquaculture Growth*. FAO Aquaculture Newsletter, 56, pp. ii-iii (online).

Therefore, for the past twenty years, international organizations and environmental groups have begun to pay attention to the “sustainable seafood” issue. Although there is a wide range of definition with regard to “sustainable seafood”, the consensus globally agreed is that any fishing activities which violated regulations of any nations or international organizations are deemed to be “non-sustainable seafood”.

Second, academically speaking, the seafood obtained from fishing methods which destroy the marine environment and marine ecology are usually deemed to be non-sustainable seafood by marine scholars and environmental groups. For this reason, scholars and environmentalists will probably continue to ask governments to take actions against non-sustainable seafood, such as the great white shark meat at the top of the biological chain. Besides, academically or from the point of view of consumers, there are seafood issues under debate that need to be resolved by brainstorming from all fields in terms of law and regulations. For example, the bycatch of dolphin, non-targeted fish species, or the exploitation of vast quantities of juvenile fish being viewed as non-sustainable seafood.

Last, in order to smoothly discuss and evaluate the degree of sustainability for various fisheries, an evaluation standard of sustainable seafood ecolabel named “**ProFish**” devised by the present author is introduced in this chapter; this evaluation standard is a basis for evaluating the sufficiency of fisheries management, law, and regulations. This seafood ecolabel design also is consistent with the topic of this dissertation: “Sustainable Ecolabelled Seafood”. It is believed that ecolabels can help guide the development of the fishery industries towards environmentally-friendly practices because ecolabels are able to drive the power of consumers, retail purchases, and government or corporate green procurement.

2.2 Fish Caught by IUU Fishing Are Not Sustainable Seafood

Illegal fishing damages the ocean and the economy. However, the fewer fish there are, the more desperately fishermen want to catch them. Unreported fishing means the inability to understand and assess marine resources accurately. Unregulated Fishing often takes advantage of legal loopholes to escape the regulations and requirements of catch reporting.

The issue of illegal, unreported, and unregulated (IUU) fishing in worldwide fisheries and local ocean conservation is an increasing global concern. Due to the lack of political will, priority, capacity, and resources to implement laws and regulations, existing international instruments addressing IUU fishing are not very effective. Environmentalists propose that their country combat IUU fishing. In the context of the 1999 Code of Conduct for Responsible Fisheries and its objective of sustainable fisheries, the FAO developed a global plan in 2001: International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, (IPOA-IUU).⁸

The IPOA-IUU is a voluntary instrument that applies to all States and other entities and to all fishermen. Based on the IPOA-IUU, many countries have formulated a mechanism to combat IUU fishing within the system of domestic laws in their own administrative style.

Take the United States, for example. In December 2016, the United States National Ocean Council Committee on Illegal, Unreported and Unregulated Fishing and Seafood Fraud (NOC Committee)⁹ established the Seafood Import Monitoring Program to deal with

⁸ See <http://www.fao.org/fishery/ipoa-iuu/en>

⁹ See <https://www.iuufishing.noaa.gov/About/NOCCommitteeHistory.aspx>:

The NOC Committee was established to take the place of a 2014 Presidential Task Force on Combating IUU Fishing and Seafood Fraud in April 2015. The NOC Committee is comprised of the same fourteen federal agency members as the Task Force and continues to be co-chaired by NOAA and the Department of State. (To be continued)

IUU fishing seafood entering the United States market officially. The new rule, in effect as of 1 January 2018, established reporting and record-keeping requirements from the point of harvest to the point of entry into United States commerce for certain seafood species. This first phase of the program applies to those imported fish identified as particularly vulnerable to illegal fishing and fraud, such as Atlantic cod, Pacific cod, King Crab, Mahi-mahi, grouper, sharks, and so on.

Taiwan announced its “National Plan of Action of the Republic of China (Taiwan) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing” in April 2013, but it lacks specific effective measures. The Taiwan Government takes the Plan seriously because the EU issued a "yellow card" warning to Taiwan for insufficient cooperation on combating IUU fishing in October 2015.

2.2.1 Illegal

Illegal fishing undermines every country’s efforts to conserve and manage fish stocks in wild capture fisheries. This leads to the loss of short and long-term social and economic benefits and has negative effects on food security and environmental protection.

In the IPOA-IUU, the definition of illegal fishing refers to activities:¹⁰

- (1) *“conducted by national or foreign vessels in waters under the jurisdiction of a State, without the permission of that State, or in contravention of its laws and regulations”;*
- (2) *“conducted by vessels flying the flag of States that are parties to a relevant regional fisheries management organization but operate in contravention of the conservation and management measures adopted by that organization*

Following its establishment, the NOC Committee immediately formed federal working groups for each Recommendation detailed in the Action Plan.

¹⁰ Report of Food and Agriculture Organization of the United Nations. (2001). *International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing*. (p. 2) (online).

and by which the States are bound, or relevant provisions of the applicable international law”; or

- (3) *“in violation of national laws or international obligations, including those undertaken by cooperating States to a relevant regional fisheries management organization”.*

The definition of illegal fishing is unambiguous, and illegal activities are easy to identify, but whether a country implements law enforcement or not is another matter. In Taiwan, the Coast Guard is in charge of policing illegal activities, and the Fisheries Agency is in charge of issuing to fishermen an official notice of illegal fishing when fishing vessels violate fisheries laws and regulations. The original intention of the division of labor was satisfactory, but it has led to an unexpected problem. Because the Taiwan Coast Guard does not have the right to issue a ticket to the captain directly, it cannot effectively deter fishermen from illegal fishing on the spot. Moreover, given the endless numbers of Chinese vessels that cross the border and engage in illegal fishing, the Taiwan Coast Guard does not have enough vessels to expel or detain Chinese fishing boats. Large numbers of cross-border Chinese fishing boats in the East China Sea plague Japan and South Korea as well.

2.2.2 Unreported

In the IPOA-IUU, the definition of unreported fishing refers to activities:

- (1) *“which have not been reported, or have been misreported, to the relevant national authority, in contravention of national laws and regulations;”* or
- (2) *“undertaken in the area of competence of a relevant regional fisheries management organization which have not been reported or have been misreported, in contravention of the reporting procedures of that organization.”*

The fish stocks of many common and crucial economic fish species in the world have declined, such as tuna. In order to ensure sustainable fisheries, it is vital to obtain the correct catch figures as an essential reference tool in formulating fisheries policies.

Therefore, regional fisheries management organizations attach great importance to the landing declaration of important species.

Although the Taiwan Fisheries Agency has published the "Fisheries Statistical Yearbook" for decades, they are often regarded as having no reference value. The reason is not difficult to understand. This annual report was usually filed by local government officials, who without engaging in fishing by themselves, interview fishermen and estimate some figures. Take the mackerel caught in the East China Sea, for example. Before 2014, the fishing ports located in the Keelung City of Taiwan did not have a weighbridge. In the past, the annual fishery report showed that Keelung fishing vessels caught about 300 tons of mackerel per year. However, after the weighbridges were set up in Keelung Chen-Pin Fishing Port and Badouzi Fishing Port in 2014 and fishing boats were forced to weigh the mackerel yield, the figure of mackerel yield in the East China Sea in 2014 increased to 52,000 tons, an increase of 173 times that of 2013.

On 18 March 2015, the Taiwan Fisheries Agency finally issued the "Regulations on the Reporting of Landing Declaration", requiring offshore and inshore fishing boats to declare the weight of fish catch unloaded. On 20 January 2016, the Taiwan Fisheries Agency issued the "Act for Distant Water Fisheries". Now the fish unloaded from Taiwanese offshore fishing boats must be weighed in accordance with the Act for Pelagic fisheries and relevant regulations. On 24 April 2018, the original name of the "Regulations on the Reporting of Landing Declaration" was amended to "Regulations on the Reporting of Landing Declaration for Coastal Fishing Vessels". The amended regulation requires that fishing boats weighing more than ten tons must file their landing declaration for each voyage.

However, the implementation of the regulations is far from satisfactory. As of June 2017, only 13% of the voyages filed the landing declarations.

How to improve the compliance rate of filing landing declarations is a top priority task for Taiwan coastal and offshore fisheries management. Related recommendations are discussed in Chapters Eight and Chapter Ten below.

2.2.3 Unregulated

In the IPOA-IUU, the definition of unregulated fishing refers to fishing activities:

- (1) *“in the area of application of a relevant regional fisheries management organization that are conducted by vessels without nationality, or by those flying the flag of a State not party to that organization, or by a fishing entity, in a manner that is not consistent with or contravenes the conservation and management measures of that organization”*; or
- (2) *“in areas or for fish stocks in relation to which there are no applicable conservation or management measures and where such fishing activities are conducted in a manner inconsistent with State responsibilities for the conservation of living marine resources under international law.”*

As to the first point, the best example is the Flag of Convenience (FOC) fishing boat. Flag of Convenience refers to a business practice whereby a ship's owners register a merchant ship in a ship register of a country other than that of the ship's owners, and the ship flies the civil ensign of that country, called the flag State. The term is often used pejoratively, and the practice is regarded as contentious.¹¹

Taiwanese were well-known for having flag of convenience ships to catch tuna on the high seas. Due to the pressure from international fisheries organizations, Taiwan has been increasingly strict in the management of pelagic fishing in the past twenty years. Some Taiwanese registered their Taiwanese fishing vessels in other countries, even landlocked

¹¹ See https://en.wikipedia.org/wiki/Flag_of_convenience

countries, such as Mongolia – countries whose fisheries management is not strict. These Taiwanese-investor flag of convenience fishing vessels circumvent conservation management requirements and sometimes obtain fishery quotas of other countries in regional fisheries management organizations.

Taiwan pelagic fisheries have an important position among world fisheries. Conservationists have long warned that several tuna stocks are declining, and regional international fisheries management organizations have adopted strict quota management systems. Taiwan imposed restrictions on the construction of pelagic fishing vessels and no longer allows new pelagic fishing vessels. Therefore, some Taiwanese purchased old or new fishing vessels to register them abroad with countries who allow flags of convenience. Some vessels illegally caught tuna without quota control on the high seas. The illegal catch sold by Taiwanese fishing vessels is commonly known as “fish laundering”.

At the annual meetings of ICCAT in 2004 and 2005, Japan and the United States severely criticized some Taiwanese fishing vessels for illegal fishing of bigeye tuna in the Atlantic. Japan accused Taiwan of exceeding its allowable quota by 4,000 tons in the last five years and suggested a reduction in Taiwan's quota. Japan also reported two recent illegal cases involving Taiwanese captains engaging in “tuna laundering” and estimated that Taiwan secretly catches about 18,000 tons of bigeye tuna each year.¹²

Taiwan was penalized at the annual meeting of ICCAT 2005 under ICCAT Resolution 05-02.¹³ Taiwan's 2006 quota of bigeye for the Atlantic was cut from 16,500 to 4,600 tons,

¹² Chiu, Yu-Tzu. (2004, November 27). Taiwan penalized after exceeding fishing quota. *Taipei Times*, 2. Retrieved from <http://www.taipeitimes.com/News/taiwan/archives/2004/11/27/2003212734>

¹³ Recommendation by ICCAT Regarding Control of Chinese Taipei's Atlantic Bigeye Tuna Fishery. (2005, February). Retrieved from <https://www.ofdc.org.tw/components/Editor/ICCAT/files/05-02.pdf>

which was worth about US\$100 million to the industry. And the numbers of Taiwanese vessels permitted to fish in the Atlantic were reduced from 100 to 15.

However, after Taiwan strengthened the management of Taiwanese pelagic fisheries, drastically reduced the number of fishing vessels, and promised to legislate to control Taiwanese investing in the operation of non-Taiwanese flag vessels, Taiwan was finally re-accepted by ICCAT member countries, and Resolution ICCAT Res. 05-02 was replaced by ICCAT Res. 06-01¹⁴ in the 2006 annual meeting; the quota of Taiwan for bigeye tuna was returned to the level of 14,900 tons in 2014.

The Taiwan Fisheries Agency drafted the “Act to Govern Investment in the Operation of Foreign Flag Fishing Vessels” in 2006. The Legislative Yuan of Taiwan adopted the Act in 2008. This Act exceeds the scope of the duties of the flag State set out in Article 94 of the United Nations Convention on the Law of the Sea. Therefore, in Taiwanese fishing industry circles, it is considered that this Act was an abnormal outcome of international pressure.

In addition to stricter management of pelagic fishing vessels, the Taiwan Fisheries Agency is beginning to strengthen conservation measures for living marine resources in the territorial waters and exclusive economic zone. This aspect is the main focus of the present dissertation. Details are discussed in Chapters Six and Seven.

¹⁴ Recommendation by ICCAT Regarding Chinese Taipei. (2006, June). Retrieved from <https://www.ofdc.org.tw/components/Editor/ICCAT/files/06-01.pdf>

2.3 Fish Caught by Destructive Practices Are Not Sustainable Seafood

2.3.1 Poison, Electricity, and Explosives

Although fishing with the use of toxic substances, electricity, or explosives targets specific species in the ocean, all non-target species, including plankton and young fish, will be affected; they will either die or lose the ability to reproduce. Therefore, the aforementioned three fishing methods are categorized as being the most severely destructive. In Taiwan anyone who carries on fishing by using toxic substances, electricity, or explosives is subject to imprisonment for a term not exceeding five years.

How these methods are practiced and their impacts are introduced below:

Use of Toxic Substances

Toxic means fishing by using poisonous substances. Fishermen dissolve poisonous substances such as cyanide in water and cast the solution into sea or river tracks to poison the fish. The dead fish float on the surface, and the fishermen quickly catch them in fish nets.

The residual cyanide in the fish harms consumer health, but also kills the animals in the area. When the poisoned dead carcasses sink to the bottom of the river or float adrift along the river tracks, they pollute the water and surrounding environment, destroying the ecological system and adversely affecting fishery resources.

Use of Electricity

Electricity means fishing by using electric power. This practice can be divided into two categories: "fishing boat equipped with electrified fishing gear net" and "personnel using simple electrified fishing gear". It is immaterial which method fishermen prefer. The ultimate goal is to utilize electricity to kill or knock out fish in order to catch them when they are

afloat. However, the electric current discharged into the water will cause damage to the gonads on fish in the vicinity, making them infertile. Simultaneously, the electric current will kill all the fish eggs, shrimp eggs, and loach eggs in the water. The electricity will harm invertebrates. Anywhere that voltage was discharged can exterminate fish and damage ecological systems, and this can affect the regeneration of the fisheries, ultimately causing the depletion of fisheries resources.

Use of Explosives

Explosives means a fisherman engages in fishing by using bombs. He casts dynamite into the water where a school of fish gathers and detonates the explosive devices, killing all the fish. When they are dead and afloat, simple fishing nets are used to collect them. However, the explosive shockwaves not only cause the death of fish, shrimp, clams, starfish, and sea urchins, but also demolish the seabed habitat. The benthos moves to other places. Those that cannot move are subjected to depletion of food supply, and ultimately die away. The entire regional ecosystem is destroyed.

Fishing by using toxic substances, electricity, or explosives not only damages aquatic flora and fauna, but also leaves impregnated fish, shrimp, and young fish unable to survive. This behavior is tantamount to the extermination of all aquatic life. As a result, marine ecological resources suffer severe damage and ultimately face depletion.

Laws in Taiwan

In Taiwan, Article 48 of the Fisheries Act provides that “Aquatic creatures shall not be caught or harvested by the use of (1) toxic substances; (2) explosives or other dynamite; (3) electricity or other narcotics”.

Article 19 in the Wildlife Conservation Act stipulates that “Hunting shall not be undertaken by the following methods: (1) use of dynamite or explosives; (2) use of poisons; (3) use of electricity, narcotics or other paralytic methods; (4) use of nets set up on land; (5) use of firearms other than an authorized hunting rifle; (6) use of traps, snares, or other hunting equipment; (7) use of other prohibited items or methods declared by the authorities”.

No law or regulation prohibits the general public or fishermen from carrying fishing gear made of explosives, toxic substances, or electricity on board the fishing boat nor to go fishing in the sea. Therefore, illegal fishing by the use of explosives, poisons, or electricity is often encountered. It is difficult for coast guard personnel to obtain such evidence as photographs of people violating the law.

Accordingly, it is suggested that the Fisheries Act in Taiwan should be amended in order to prohibit fishing boats or general leisure boats from carrying fishing gear that consists of explosives, poisons, or electricity. This approach can be seen in the Fisheries Act of the People's Republic of China and is worthy of being replicated.

Laws in China

China’s Fisheries Act¹⁵ not only prohibits fishing with the use of toxic substances, electricity, or explosives, but prohibits people from manufacturing, selling, or utilizing banned fishing gear. Article 30 provides:

“The use of explosives, poisons, electricity, and any other means in fishing that impairs fishery resources is prohibited. The manufacture, sale, and use of banned fishing gear are prohibited. Fishing in restricted fishing areas and during closed fishing seasons is prohibited. The use of fishing nets with mesh smaller than the specified minimum size is prohibited. The proportion of young fish in one catch

¹⁵ See <http://www.6law.idv.tw/6law/law-gb/%E4%B8%AD%E8%8F%AF%E4%BA%BA%E6%B0%91%E5%85%B1%E5%92%8C%E5%9C%8B%E6%BC%81%E6%A5%AD%E6%B3%95.htm>

may not exceed the specified level. The sale of catch illegally harvested in the restricted fishing areas and during closed fishing seasons is prohibited”.

The penalty for a violation is specified in Article 38 of the same Act:

“Where a person uses explosives, poisons, electricity, or other means in fishing which harms fishery resources, engages in fishing in violation of the regulations on restricted fishing areas and closed fishing seasons, uses banned fishing gear and methods or fishing nets with mesh smaller than the minimum size, or takes young fish whose proportion exceeds the specified level, his catch and illegal revenue therefrom shall be confiscated and he shall be fined not more than RMB 50,000 yuan. If the circumstances are serious, his fishing gear shall be confiscated and fishing license revoked. If the conditions are unusually severe, his fishing vessel may be confiscated. If a crime is committed, he shall be investigated for criminal responsibility in accordance with law.

Where illegally harvested catch is sold in restricted fishing areas and during closed fishing seasons, the administrative department for fisheries under the people's government at or above the county level shall investigate and handle the case without delay.

*Where a person manufactures or sells banned fishing gear, the illegally manufactured and sold fishing gear and his illegal gains therefrom shall be confiscated and he shall also be fined not more than 10,000 yuan”.*¹⁶

2.3.2 Bottom Trawling

There are many kinds of trawling methods, one of which is bottom trawling, also known as the "ocean's bulldozer". This fishing practice belongs to non-selective, mobile fishing gear, and is among the highly "efficient fishing" gears. However, this method of fishing obviously had generated concern of overfishing.

A trawler works as follows: the trawl-net is cast down to the seabed and dragged by the fishing boat when moving forward. At the bottom of the trawl-net, rolling wheels and iron chains are added, and sometimes the net will be electrified. Fish, clams, shrimp, and crabs hidden in the coral knolls or sandy mud are driven out by the electricity or the sound made by

¹⁶ All Articles are translated and revised by the author from the original Chinese.

the metal chains. As the trawler moves forward, those sea creatures are captured by the net. When finished, the trawl-net is pulled up back to the boat. Marine creatures caught will be categorized on the fishing boat afterward.

Because of its tremendous destruction to marine ecology, trawling is being regarded as a non-sustainable fishing method by most environmental groups and many academic units worldwide. Even though the mesh on the trawl-net is enlarged to let the smaller fish pass through, when bigger fish are caught, they block the mesh. This practice ultimately results in smaller fish, regardless of species or size, being caught by the bigger-sized mesh trawl-net.

Because of its non-selectivity of the target catch, the bottom trawler readily scoops up bycatch nontargeted fish. The ratio of bycatch is high with this fishing method. Sea turtles and dolphins often fall victim to bottom trawlers. Furthermore, the majority of the non-targeted fishing is deemed to be seafood with low economic value and often is sold at a low price as food pallets or thrown back into the sea, wasting marine resources and killing life unnecessarily.

Most importantly, when fishing is in progress, bottom trawling deployed at the bottom of the sea will level the entire seabed, including the coral reef habitat for fish or the sea terrain. This fishing method can cause incalculable damage to the sea habitat and resources, affecting the regeneration of marine fish resources. Twenty years would hardly be enough for the whole damaged area to recuperate.

Fisheries Act of Taiwan: Trawler Regulations and History of Amendment

On 24 November 1999, the Taiwan Government promulgated an official notice entitled "*Closed Fishing Areas for Trawler Fishing Boat and Its Related Limitations in Taiwan*", pursuant to Article 44 of the Fisheries Act. For resource management purposes and fisheries

structure adjustment, the competent authority may promulgate regulations on the restriction or prohibition of fishing in specified areas and/or the fishing season. The notice stipulated that trawlers of less than 50 metric tons engaging in fishing within three nautical miles of the coast and trawlers larger than 50 metric tons fishing within twelve nautical miles of the coast are prohibited.

However, a high percentage of trawlers violated the law during the past twenty years. Most habitats around Taiwan were severely damaged. When fishing boats were apprehended violating the rules, they contended that they were merely washing their fishing nets in the sea rather than fishing and sought to avoid punishment by finding legal loopholes.

In order to encourage the Taiwan Coast Guard Administration to more efficiently enforce the law against fishing boats and to assist the Taiwan Fisheries Agency prevail against offending fishing boats in the Administrative Court, the present author proposed initiatives to amend the Fisheries Act since 2011. The present author insists that it is essential to introduce a clearer definition of illegal trawling behavior by stipulating the constituent elements of a violation which do not necessarily require that fish be caught in the trawl-net.

In December 2016 this initiative finally gained support from the then Premier of Taiwan, Mr. Lin Chuan, and the Fisheries Act was amended in February 2017. The Fisheries Agency promulgated an amended official notice “Closed Fishing Areas for Trawler Fishing Boat and Its Related Limitations in Taiwan”. In addition to keeping the original prohibition of trawlers engaging in fishing within three nautical miles from the coast, specific wording was added which prohibited the “casting and deployment of trawler-net within three nautical miles”.

Article 2 of Trawler Regulation originally stipulated that particular fisheries resources requiring a trawler fishing method were regulated by a local governing authority and might be used only after informing the central competent authority; that is, the Fisheries Agency by approval for reference. After amendment of the Fisheries Act in 2017, the right of inspection was retained for the central competent authority by changing from "approval for reference" to "approval". The right to impose a penalty was changed from the local to the central governing body. This reform increased the frequency of penalties being imposed. The purpose was to reduce the pressure of influence lobbying from locally elected representatives.

The latest amendment includes prohibiting fishing boats from carrying or using any rolling wheel fishing gear equipment. The rolling wheel type of fishing gear was designed to prevent the gear from being stuck on seabed reefs. When deployed, rolling type fishing gear can tow away fish and reefs simultaneously and cause tremendous damage to coral reef ecology. Therefore, a definitive law must be adopted to prevent this from happening.

In fact, on 13 January 2013, the Penghu County Government issued an official notice: *“Prohibition against installing rolling wheel type fishing gear on fishing vessels equipped with trawl-net which conduct fishing within 12 nautical miles of coast in Penghu County”*. The penalty is provided in Article 61 of the Fisheries Act:

“... shall be subject to imprisonment not exceeding six months, short-term imprisonment, or in lieu thereof or in addition thereto a criminal fine not exceeding thirty thousand New Taiwan Dollars”.

This penalty is more severe than the *“the closed fishing zone for trawler fishing vessels and its related limitations in Taiwan”* issued under the Fisheries Act by central competent authority. Violators are subject to criminal responsibility.

2.3.3 Improper Use of Gillnet

The gillnet is designed to let the fish crash into the mesh of the gillnet so that the fishing net entangles the fish. When trapped, the fish in the net cannot escape. The gillnet is a passive fishing method. Chasing schools of fish is not necessary. Therefore, the fuel required for this type of fishing is less. However, the disadvantages of this method are: when fish are trapped in the gillnet for a period of time, some may die. This fishing practice may result in fish being less fresh.

There are many kinds of gillnets. When deployed on an even sandy seabed without reefs, this may be a good fishing practice. However, restrictions on how long to place gillnets in the sea should be imposed. Otherwise, this method will damage the marine ecology.

The general public understands that the fishing method having the greatest adverse impact on marine ecology is the driftnet, known as "Wall of Death". A large-scale driftnet is hundreds or thousands of meters in size; it drifts with the sea current and meanders for several nautical miles. This invisible wall is an efficient method for catching squid or highly migratory tuna. Compared to traditional fishing gears, the efficiency of this method is several times higher and economical in fuel-expenditure.

The driftnet, however, is a non-targeted fishing method. Marine creatures such as whales, sharks, sea lions, or dolphins can be trapped by the driftnet. Seagulls can be entangled by a net if they are not careful. Large-scale driftnet use affects the environment adversely. Deployment on the high seas is suspended comprehensively since the United Nations adopted such an agreement on 1 January 1993.

A multi-layered gillnet likewise severely deprives the sea of its marine ecological resources. This gillnet consists of more than three layers of ordinary gillnet. Fish of any size, once trapped in the net, are unable to escape, causing non-targeted fishing. Fishing gear is easily stuck in reefs, damaging marine habitats. The stock gillnet fishing gear can result in "ghost fishing" and prejudices marine ecological protection.

Cracking down illegal use of the gillnet is difficult. The Coast Guard or rangers of Marine National Parks have to pull up the gillnet in order to determine what kind of net it is.

Status Quo of Use of Gillnet Fisheries in Taiwan

According to the 2016 fisheries statistical report prepared by the Fisheries Agency in Taiwan, the total number of fishing boats and rafts in Taiwan is 22,567. 40% of all the fishing boats and rafts use gillnets, including 1,625 of less than 100-ton fuel-powered fishing boats, 20 of the non-fuel powered sampan, 7,165 of fuel-powered fishing rafts, and 169 of non-fuel powered fishing rafts.

Another statistical source from *Fisheries Extension*, no. 369, published by the Fisheries Agency, claimed that the total number of fishing boats and rafts in Taiwan is 22,070. Of all the fishing boats and rafts, those less than 100 tons and registered as gillnet fishing boats on the fisheries license comprised 8,913 boats. In addition, 4,732 fishing boats and rafts use other fishing methods but are equipped with gillnets and practice gill net fishing part of the time. The total number of fishing boats that use gillnet fishing method is 13,645, which comprise 60% of all fishing boats in Taiwan.

The catch yield of inshore and coastal fisheries by gillnet is 3,123 tons; offshore fisheries by gillnet, 6,833 tons.

Laws in Taiwan Regarding Gillnet

The 1995 "Driftnet Fisheries Management Regulation" was adopted in Taiwan. In principle, using a driftnet outside the Exclusive Economic Zone is prohibited in Taiwan. The regulation also stipulated: "*fishermen conducting driftnet fishing within 200 nautical miles of Exclusive Economic Zone in Taiwan is must be approved by the competent authority. The total weight of the fishing boat shall not exceed 100 tons, and the driftnet gear in use shall not exceed 2.5 kilometers*". This prohibition is a nation-wide regulation of principle.

Many small-scale artisanal fishery fishermen in East Asia own small fishing boats, and might use driftnets hundred-meter long, less than 2.5 kilometers, to fish. From the point of view of an environmental activist, this regulation is equivalent to "using gillnet in Taiwan is permitted, including driftnets and multi-layered gillnets". Therefore, in 2002, some local governments, such as Penghu County, issued an official notice: "Regulations on Prohibiting the Use of Multi-Layered Gillnets within 12 Nautical Miles from the Shore in Penghu County" to impose stringent fisheries management. In 2016, the Council of Agriculture in Taiwan adopted: "Measurements Regarding Promoting the Usage of Gillnet Beyond Three Nautical Miles of Coastal Zone," in order to give guidance to the inshore fishing boats and rafts equipped with gillnets and transform them into using angling gear. The purpose of this policy was to maintain and rehabilitate the marine habitats and fisheries resources in Taiwan.

2.4 Fish Playing Key Ecological Roles Are Not Sustainable Seafood

2.4.1 Endangered Species

On this planet, because of over-hunting, poaching, destruction of the environment, population downsizing, and shrinking habitats, wild species face a high probability of extinction. The extinction of a critical species can damage the local food chain, cause instability of the ecosystem, and ultimately lead to a collapse of the entire ecosystem. This situation is prevalent on land and in the marine ecosystem.

In 1963, the International Union for Conservation of Nature and Nature Resources (IUCN) drafted a multilateral treaty signed by more than 80 countries in Washington D.C., known as “CITES,” Convention on International Trade in Endangered Species of Wild Fauna and Flora. This Convention entered into force on 1 July 1975. 183 countries are parties to the treaty.

The CITES seeks to protect species of wild animals and plants by controlling international trade. Species of wild animals and plants are divided into three categories in the Appendix. Appendix 1 is a list of species threatened with extinction and can or may be affected by international trade; commercial trade of these wild-caught specimens is illegal. The list in Appendix 2 refers to species of animals and plants not necessarily threatened with extinction but may become so if international trade is not stringently controlled. International trade in these species in Appendix 2 lists ensures that their place of origin is legal without affecting the survival of those species. Importing and exporting of the species on the list is monitored by registered tracking. The Lists in Appendix 3 contain species that a member State believed needed trade control in order to limit or prevent them from being exploited. A list of species can be proposed to Secretariat at CITES by a member State. Any State can

unilaterally choose to regard the species on the list recommended by a member State as endangered species and to allow the species to be controlled under this Convention.

In Taiwan, the legal validity of Wildlife Conservation Act is the same as CITES. Article 4 of the Wildlife Conservation Act classifies wildlife into three categories, imitating the wildlife conservation lists contained in CITES: the first category is endangered species; the second category is rare and valuable species; the third category is all other conservation-deserving wildlife. All three categories are protected species regulated by the Wildlife Conservation Act.

Overview of Marine Protected Species

The reasons for the marine species being threatened with extinction is similar to the land species. Reasons include marine pollution, over-take, invasion of non-indigenous species, destruction of habitats, and food deprivation due to human fishing activities. However, the primary and the most direct reason for many marine species facing extinction is human over-take. Atlantic bluefin tuna is one example. The population of Atlantic bluefin tuna in the Atlantic Ocean has diminished by 90% since 1970, even though the IUCN had listed Atlantic bluefin tuna as critically endangered, which endangered degree ranked higher than that of the giant panda.

In Taiwan, for the past twenty years, the competent authority in charge of protecting marine species is the Fisheries Agency. For example, in 2001, the Fisheries Agency prohibited fishermen and the general public from fishing, selling, or possessing whale shark and its derivative products based on the "Measures on Whale Shark Fishing Control" in Article 44, paragraph 1, subparagraphs 1, 2, and 9, Fisheries Act.

The Fisheries Agency requires that fishermen report to the government when they catch whale sharks in order to collect information regarding the number of whale sharks and related ecological data. In 2002, when CITES listed the whale shark as a conservation species in Appendix 2, the Fisheries Agency officially issued a regulation regarding the allowed total whale shark catch, and gradually reduced the number of Total Allowable Catch each year to the extent of comprehensively forbidden to catch. The controlled measures are as below:

1. July 2002 to June 2003, the quota of Total Allowable Catch is 80 whale sharks.
2. July 2003 to December 2004, the quota of Total Allowable Catch is 120 whale sharks.
3. in the year 2005, the quota of Total Allowable Catch is 65 whale sharks.
4. in the year 2006, the quota of Total Allowable Catch is 60 whale sharks.

The Regulation prohibited the catching of Whale Sharks under 4 meters in length.

5. in 2007, the quota of Total Allowable Catch is 30 whale sharks. Spear fishing by harpoon is forbidden for catching whale sharks. The Fisheries Agency once rewarded fishermen who attached tracking beacons to whale sharks and released them if caught accidentally.

The Total Allowable Catch was reached by 27 March 2007. From that day onward, all whale shark fishing was illegal. Any transaction in whale shark meat was forbidden, starting from 27 June of that year. The Bureau of Foreign Trade announced that it was no longer permitted to import and export whale sharks, and it was forbidden to possess the whale shark from 1 November of the same year.

Since 2008, it has been prohibited to catch, sell, possess, import, and export whale sharks. Whale sharks caught by set net accidentally are to be released once the tracking beacons are attached on whale sharks for scientific research purposes.

In those days, the Fisheries Agency in Taiwan had become the competent authority of marine life conservation because overfishing by humans threatened marine species with extinction. More important is that the Wildlife Conservation Act in Taiwan is strict, and it takes a long time to officially announce species threatened with extinction to be critically endangered species. After this official announcement, the penalty for catching the species is far more severe than that of the Fisheries Act.

In 2008, according to the Wildlife Conservation Act, the Taiwanese humpback dolphin was designated a class-one endangered species on the list of wildlife protection categories in Taiwan. A draft announcement was released regarding the “Important Habitat Category and Scope of Taiwanese Humpback Dolphin”.⁴ However, because of objections by some fisheries associations and fishermen, and the superimposition of humpback dolphin habitat on lands within the nation's development projects, this announcement was postponed indefinitely.

When tracing the history of the marine species conservation movement in Taiwan, the year 2014 deserves to be marked as a significant milestone. The Taiwan Forestry Bureau for the first time put two marine fish species, humphead wrasse and the green humphead parrotfish, on the list of protected wildlife species based on Wildlife Conservation Act. Humphead wrasse, one of the largest coral reef fishes, has been inserted in Appendix 2 in CITES; the green humphead parrotfish is among the largest parrot fishes within the family Scaridae. These two species are found in Kenting, Green Island, and Orchid Island in Taiwan and beloved by scuba divers. However, they are also the target of fishing gear. The humphead wrasse is considered to be a delicacy on the dinner table. In 2014, it was estimated that the numbers of this species are less than ten in the marine areas of Taiwan where they live.

Moreover, in 2017, two other coral species endemic to Taiwan, *Polycyanthus chiashanensis* and *Pseudosiderastrea Formosa*, were added to the protected species list in Taiwan. *Polycyanthus chiashanensis* was first discovered in the Takao Hill sea area in Kaohsiung by Research Fellow Dr. Chao-Lun Chen and found to be a new species of *Polycyanthus* coral which inhabits the shallowest waters. Most *Polycyanthus* inhabit shallow waters one to three meters deep in tropical and subtropical water areas, making the newly discovered *Polycyanthus chiashanensis* unique.

In April 2018 Taiwan established the Ocean Conservation Administration of the Ocean Affairs Council. Legislation on how to separate the conservation of marine species from the Wildlife Conservation Act under the competent authority Forestry Bureau and how to establish a distinct category are fundamental.

2.4.2 Top Predator

The marine ecological system is similar to the land ecological system. They both have an ecological pyramid divided into different trophic levels. However, the marine system is more complex and difficult for contemporary science to understand. For example, many higher trophic-level fish, when at the juvenile stage, are often the food source of lower trophic-level fish. Therefore, this dissertation will examine a marine ecological pyramid with elementary five trophic levels; this has been designed by the present author.

The base of the ecological pyramid is the trophic level of primary producers which sustain the entire marine environmental system. Those primary producers include seaweeds, diatoms, phytoplankton, and tiny planktons, such as shrimps, squids, crabs, shellfish, and mollusks, among others. The second trophic level includes primary consumer small-size fish, for example, coral reef benthic creatures such as damselfish, or mackerels, which live in the

mesopelagic zone. Larger fish, such as cod, Mahi-mahi (Dolphinfish), are secondary consumers, roughly belonging to the third trophic level. Tuna, marlins, and smaller sharks are third level consumers in the fourth trophic level. Larger sharks, cetaceans, and sea turtles belong to apex predators, at the fifth trophic level. The number of apex predators is less than other species in the lower trophic levels.

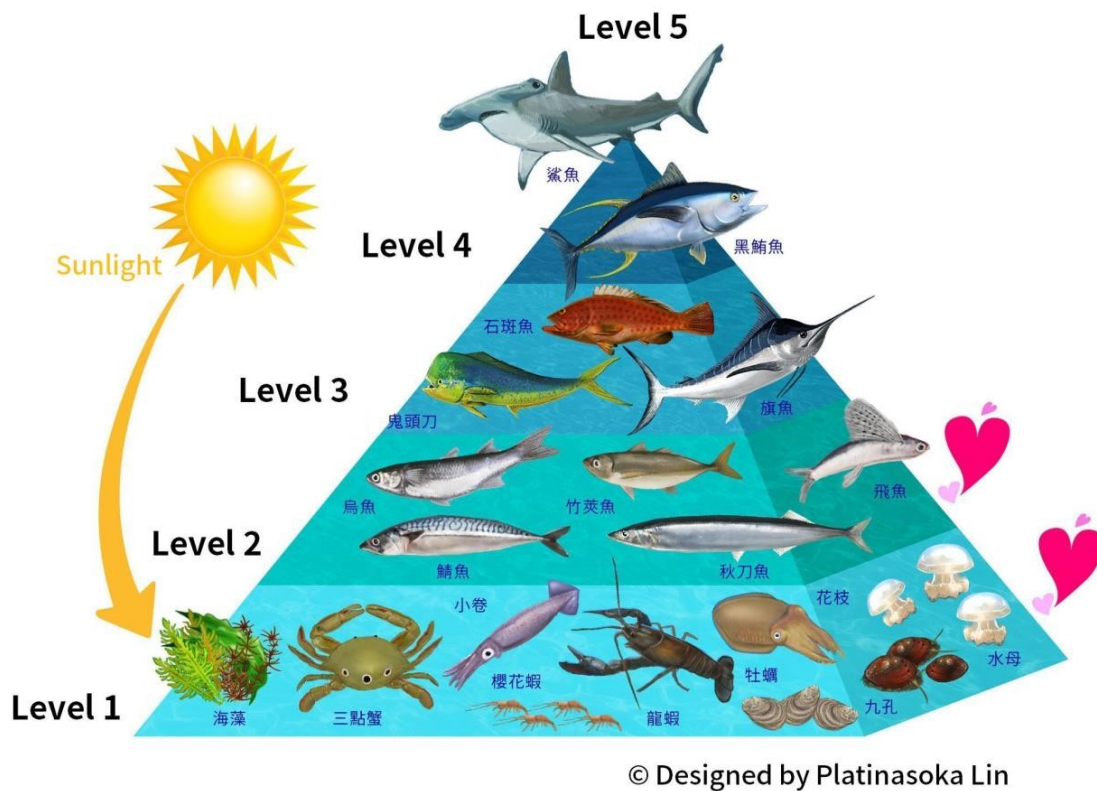


Figure 2: Marine Ecological Pyramid with Elementary Five Trophic Levels

In the past, human beings have preferred to eat larger fish, which often were the apex predators that belong to third trophic level and above. Larger fish maintain the balance of the marine ecological system. For the past thirty years, fish species of higher fishery economic values are primarily species of these higher trophic levels with smaller populations, such as cod, tuna, and sharks (especially shark fins). Compared to small fish, they mature late and

spawn fewer eggs. Once there is a drop in their stocks, it would require decades to recover. There may never be rescued, or being brought to the point of causing ecological imbalance.

Accompanying the depletion of larger fish is a change in the population structure of the marine ecological system. When these apex predators vanished from the marine ecological system, creatures of lower trophic levels begin to multiply in significant numbers. This change will ultimately cause greater unpredictability in aquatic ecology.

Purchasing fish species of lower trophic levels to substitute for the consumption of higher trophic level species is appealing to many environmental groups. For example, refusing to consume shark fin soup and instead consuming more mackerels and Pacific saury are encouraged. In Taiwan, catching apex predators such as dolphins and sea turtles is being prohibited under the Wildlife Conservation Act. Fish species of higher trophic levels are managed under the Fisheries Agency by the Fisheries Act.

Regarding apex predators, the Taiwan Fisheries Agency has developed more advanced management measures only for sharks. The fishing regulation of tuna in Taiwan follows relevant regulations of regional fisheries management organizations (RFMOs).

2.4.3 Coral Reef Fish

Fish living among or close to coral reefs are called coral reef fish. Coral reefs form complex ecosystems with tremendous biodiversity; thus, they are often called “the rainforests of the sea”. Many conditions form an environment suitable for coral reef formation, including a shallow water area that allows sunlight to penetrate, adequate concentration of seawater salinity, a warm, yearly average surface seawater temperature of 22° to 26° centigrade, and

clean water quality. Due to these stringent required conditions, most coral reefs are distributed among tropical or subtropical shallow seawater regions between 25° north latitude and 25° degrees south latitude.

Despite occupying less than 1% of the ocean floor, temperate and tropical coral reefs provide a home for as much as 25% of the world's marine species.¹⁷ Nearly 10% of all fish consumed worldwide are caught on reefs, with one square kilometer of healthy reef providing enough fish to feed three hundred people.¹⁸ These critical habitats are threatened by a range of human activities. Many of the world's reefs have been destroyed or severely damaged by water pollution, overfishing, and destructive fishing practices, disease, global climate change, and ship groundings.¹⁹

In several coral reef waters of Taiwan, overfishing in coral reefs involves using a speargun to hunt fish for food. A speargun is an underwater fishing implement designed to launch a spear at fish.²⁰

Therefore, in a seriously unbalanced coral reef ecosystem, only human beings stop hunting coral reef fish to recover the disappearing fish species, whereupon the marine ecological resources have a chance to be managed sustainably.

Status of Coral Reef Conservation in Taiwan

Of the many coral reef sea regions in Taiwan, only two sites have been categorized as marine national parks – Kenting National Park located in Pingtung, and South Penghu

¹⁷ Mulhall M (Spring 2009) Saving rainforests of the sea: An analysis of international efforts to conserve coral reefs. Duke Environmental Law and Policy Forum 19:321–351.

¹⁸ J. C. Sylvan, How to Protect a Coral Reef: The Public Trust Doctrine and the Law of the Sea, SUSTAINABLE DEV. L. & POL'Y 32, 33 (2006). At 32.

¹⁹ https://oceanservice.noaa.gov/facts/coral_species.html

²⁰ <https://en.wikipedia.org/wiki/Speargun>

Marine National Park in Penghu Islands, with the Ministry of the Interior as their competent authority. Aside from this, the Taiwan Government has taken regulatory actions concerning the frequent use of the speargun in coral reef sea regions.

Prohibition of Speargun in Taiwan

In 2004 the Tourism Bureau, Ministry of Transportation and Communications, issued "Regulations Governing Water Recreation Activities" under the "Act for the Development of Tourism". Article 17(3) stipulated that any diving while carrying a speargun and the fishing of any creatures within the sea regions are forbidden. However, some legislators believed that "fishing by speargun has to be regulated by the Fisheries Act and the Wildlife Conservation Act in 2016, in order to avoid overlapping of acts and regulations, and to meet the authorized scope and intent of the Acts"; the legislator asked the Tourism Bureau to delete subparagraph 3 from the Regulation. The Tourism Bureau agreed. There is no single law now to regulate the spearguns used by divers.

In March 2017, in order to maintain the biodiversity and the sustainability of fisheries resources of coral reef aquatic animals, the Fisheries Agency was expected to adopt "measures regulating forbidden zones for using a speargun to fish for aquatic animals". This Regulation forbids anyone to use a speargun to catch aquatic animals within twelve nautical miles from the coast. This measure not only banned the use of a speargun but also, in principle, forbade people to use the speargun while sailing on a boat.

However, the announcement triggered a debate between the positive and the negative aspects of this reform. The negative side contended that the speargun is an environmental-friendly, sustainable, low-carbon-footprint, and pristine fishing method. They believe that the speargun can replace a comprehensive prohibition of specific fishing methods if regulations

such as limiting hunting seasons and the smallest allowable size and minimum quantity of fish are enforced.

However, the organizations in favor of banning speargun fishing pointed out that the marine resources in Taiwan are being depleted. Between 2010 to 2013, a survey identifying the population concentration of benchmarking fish species living in the coral reef found that the average quantity of humphead wrasse and green humphead parrotfish per hundred square meters in some important coral reef sea regions in Taiwan had reached zero. Given this circumstance, the sea cannot afford more open fishing activities. In the meantime, regarding the argument of the speargun as a fishing method less destructive to the ecological system, the positive side believes that speargun eliminated larger, more productive coral reef fish species, such as larger female fishes, and insisted that this had caused tremendous harm to the marine ecological system. A precautionary principle should be used, and spearguns, forbidden.

However, because the draft Regulation stirred a strong backlash from speargun users in Taiwan, this measure has not been enacted.

2.5 Other Negative Fishery Practices Impacting Fish Stock Health

2.5.1 Bycatch

Bycatch refers to the circumstance that, when catching a target fish, other non-targeted fish or too small target fish are captured by the same net unintentionally. Bycatch is an unavoidable problem when fishing. Many types of fishnet ensnare arbitrarily, in effect, an indiscriminate and random selection of creatures living in the same three-dimensional space of an ecosystem.

With the advancement of technology, modernized fishing boats are equipped with highly precise fish probing instruments which enhance their fishing capability. This advance increases the bycatch. For example, with respect to the long line fishing gear that meanders for tens of kilometers, the fishing bait on the gear attracts not only tuna, but also sharks, dolphins, sea turtles, and seagulls incidentally. Trawlers cast huge fishnets, trapping all kinds of marine creatures indiscriminately, thereby generating a massive bycatch.

Aside from posing threats to biodiversity in marine ecology, bycatch is a waste of marine resources. Many non-targeted species are disposed in the sea directly. The remaining bycatch is transported back to land and sold to processing factories at a low price and made into fish meal.

Many conservation organizations appeal to the public to reduce bycatch by improving fishing methods. For example, the use of improved fishing gear reduces the bycatch of the sea turtle. Some ecolabels on canned tuna, such as “Dolphin Safe”, denote compliance with laws or policies designed to minimize dolphin fatalities while fishing for tuna destined for canning.

Taiwan Fishery Regulation of Bycatch

Case of Larval Anchovy Fishery

The bycatch of larval anchovy fishery in coastal waters is widely-known and controversial in Taiwan. Larval anchovy fisheries in Taiwan primarily focus on juvenile fish of the family *Engraulidae* and the family *Clupeidae*. However, while fishing for the targeted juvenile fish, the family *Engraulidae* in bulk, commercially juvenile fishes such as mackerel, skipjack tuna, blunt-nose lizardfish, and cutlassfish are often caught simultaneously. People

involved in inshore fishing in Taiwan discuss how to maintain a balanced marine ecology and its fishery sustainability.

According to the study, although larval anchovy fishing primarily focuses on catching *Engraulidae*, which constitute over 85% of the total catch, the average ratio of bycatch species varies significantly with temporal and spatial location. The bycatch ratio of other commercially juvenile fish is highest from June to August annually, with an average rate of over 15%. One particular case has the highest ratio of bycatch, over 46%.²¹

Therefore, the "Managing and Regulatory Principles of Larval Anchovy Fisheries Stipulated by Local Competent Authority", issued by the Taiwan Fisheries Agency in 2009, provides that the competent local authority should choose any three consecutive months in between 1 May and 15 September as a closed fishing season. The distance between 500 meters and 1,000 meters from land must be a no-take zone, the yearly Total Allowable Catch is determined, and so on.

According to a survey done by the Fisheries Agency in Spring 2013, the bycatch ratio in the northeastern sea region is 6.56%, whereas the northwestern sea region is 7.78%; southwestern, 1.41%.²² Aside from this, there is no significant change in the larval anchovy fishing quantities in recent years.

²¹ Ming-An Lee ,2004, "Bycatch of Larval Anchovy Fishery in the Coastal Waters of Taiwan," Fisheries Research Institute, Special Publication No.5: 94-103

²² Taiwan Fisheries Agency, 2013, "Research on the Changes of Resources and Management System Adjustment of Larval Anchovy Fishery in the Waters around Taiwan"
<https://www.fa.gov.tw/cht/GovReport/content.aspx?id=1659&chk=16C3ADE9-8F97-428B-97574E16626806B4¶m=>

In addition, the Taiwan Fisheries Agency not only reduced the Total Allowable Catch gradually each year, but fixed the target of acquiring in service larval anchovy fishing boats by the government as a top priority.

To sum up, regarding the elimination of bycatch, conservation goals are only achievable under multi-faceted regulation by the government, solid law enforcement, and improvement of fishing practices by scientific methods.

2.5.2 Fish Discard

Discarding fish is the practice of returning unwanted catches to the sea, dead or alive. Therefore, quantity of landings do not typically equal total catches, because fish may be discarded. Discarding could occur when fishermen catch damaged or less profitable fish, or catch undersized fish that they could not sell, or catch fish for which they did not have quotas. The degree of discarding varies by stocks and by the areas and types of fishing practice.

How to reduce fishery discard has produced different opinions among environmental organizations, academic circles and so on. For example, many addressed how to enhance the selective fishing in order to avoid the bycatch of non-targeted fish species. Some specialists propose that the concept of "Balanced Harvest". Some studies reviewing fisheries selectivity in ecosystem context conclude that highly selective fishing strongly impacts ecosystem structure, stability, resilience, and productivity. Balanced harvest is thought to be a better strategy that distributes fishing pressure across the widest possible range of trophic levels, sizes, and species in proportion to their natural productivity to counter this effect.²³

²³ Lisa Borges Luis Cocas, and Ka're Nalde Nielsen, 2016, "Contribution to the Themed Section: 'Balanced harvest and the ecosystem approach to fisheries' Food for Thought Discard ban and balanced harvest: a contradiction?" *ICES Journal of Marine Science* (2016), 73(6), 1632–1639. doi:10.1093/icesjms/fsw065

This approach includes increasing the quota of target fish or non-targeted fish species in order to avoid fishery discards because of excessive catching. Alternatively, environmental groups suggest the general public should consume fish of lower economic value. It is also suggested that a closed fishing season be imposed in some sea areas, preventing fishermen from operating during the peak period of minimum fish size, and should temporarily close fishing grounds in order to prevent the catching of juvenile fish.

Policies in Countries

Faced with the ethical problem of disposing of consumable fish, several countries address the landing obligation. They intend to end the discarding of marketable fish back into the sea, which has reduced fish stocks, damages the marine environment, and is costly for fishermen. There being no significant examples available for reference in East Asia countries, this work uses examples of legislation from Norway and European Union.

Norway

Norway prohibited discards in 1987 as part of a comprehensive package of policies to, if not eliminate the discard problem, at least to minimize it. The discard ban was established during the critical period of seven years that Arctic cod stocks were in a poor state. In 1983, Norwegian politicians, scientists, managers, and fishermen recognized that the practice of discarding vast quantities of cod wasted a valuable resource as well as being morally wrong. The ban on discarding cod and haddock had an immediate effect on the trawler fleets operating on the fishing banks. Now that policy has been extended to regulation of fishing activities and closure of areas.

European Union

A historic deal, the landing obligation, also known as the Discard Ban to reform the Common Fisheries Policy, had been agreed by the European Union Parliament on 10 December 2013. The landing obligation requires all catches of regulated commercial species on-board to be landed and counted against quota. Since October 2014, the EU Commission has adopted a series of discard plans in preparation for the implementation of the landing obligation.²⁴ The landing obligation was introduced in early 2015 for pelagic species and for certain demersal species from 1 January 2016, starting with such critical species as haddock fish. By 2019 the obligation to land all catches of quota species is to be fully implemented.

Countries in the East China Sea

There is no similar regulation in Taiwan, Japan, and China. There is much room for improvement in East Asia. Consider the Sakura shrimp, for example. The fishing method utilized to catch Sakura shrimp in Taiwan is trawlers. According to research data, the targeted Sakura shrimp caught in the Pingtung County sea area consisted of from 9.11% to 50.21% of the total fish catch from November 2011 to May 2012, with November being the lowest and February the highest. After taking into account this research data, the fishing prohibition season for Sakura shrimp in Pingtung County has been set as from June to October.

As to the Sakura shrimp fishery in Pingtung, research data showed a total of 73 fish species being caught, with the species *Benthoosema pterotum* being the largest. However, the species *Benthoosema pterotum* is primarily used as an ornamental fish, not as an edible fish, in Taiwan. Therefore, the economic value of this fish is not high. Fishing boats often discard

²⁴ https://ec.europa.eu/fisheries/cfp/fishing_rules/discards_en#Discard-plans

this fish. How to improve fishing gear and fishing methods to reduce the rate of bycatch is the fundamental solution to the problem of fishery discard. Only this can make the Sakura fish into a truly sustainable seafood.

2.5.3 Edible Catch Used as Feed

Of all the improper fishing methods mentioned in previous chapters, aquaculture seems to be an ultimate solution that can rescue the fishery industry. However, the fish feeds currently utilized in aquaculture contain fishmeal and fish oil. The raw materials used for manufacturing fishmeal and fish oil consist not only of discarded fish remnants of fish caught in the wild after they are processed, that is, fish heads, fish bones, fish fins, and intestines, but also bycatch fish of low economic value, small-sized fish, and all sorts of juvenile fish having economic value. All these fish belong to the lowest level of the marine ecological system and are usually edible by humans. If these fish are all caught, it is challenging to prevent the health of fish stocks not being affected.

Peru has the largest anchoveta fishery in the world. Although fishmeal exports are big business in neighboring Chile, about USD \$535 million annually, in Peru they are three times larger, USD \$1.6 billion a year.²⁵ Fishmeal industries brought various kinds of pollution to local environments.²⁶ Moreover, anchoveta in Peru are declining in numbers. The 2017 anchoveta season in Peru showed alarmingly low catch rates, with harvesters reaching 46% of their annual quota. When the season ended, Peru had achieved a harvest of 690,000 metric tons (MT) – a figure far below the quota of 1.49 million MT.²⁷ Peru’s anchovy catch was 2.2 million tons in 2014 - about a third the size of the annual catch in recent years. In a 2017 report, the World Bank said the anchovy fishery in Peru was previously threatened by “rampant overfishing and by recurring changes in ocean currents from climatic events like El

²⁵ <https://www.icij.org/investigations/looting-seas-iii/free-all-decimates-fish-stocks-southern-pacific/>

²⁶ A Peruvian activist takes on the fishmeal industry <https://grist.org/article/like/>

²⁷ <https://www.seafoodsource.com/features/low-anchoveta-harvest-no-problem-say-fishing-companies>

Nino”, but better fisheries management had increased its sustainability.²⁸ In Peru, fishery management improves slowly; in the East China Sea, there is a longer road to travel.

The largest consumer country of fishmeal is China. In the Greenpeace East-Asia 2017 "Research Report on China's Trash Fish Fisheries", trash fish accounted for about 49% of all trawler catch by Chinese fishermen. That equals approximately 3 million tons per year, equivalent to the entire annual catch of the Japanese fishing industry. In 2014, China's aquaculture consumed 2.51 million tons of fish meal. Of the overall 2.51 million tons fishmeal, it is estimated that at least 0.76 million tons originate from China's domestic fisheries, at least 1.04 million tons originate from outside China's waters, and the remaining 0.71 million tons are of unclear origin.²⁹

Regarding utilizing the fish catch as fish feed in aquaculture, many businessmen seek alternatives. Some governments suggest limitation of usage. In the United States, the National Organic Standards Board proposed limiting the use of fishmeal and fish oil in organically certified aquaculture products with a 12-year phase-out schedule in 2008. Moreover, a bill, H.R.2373 - National Sustainable Offshore Aquaculture Act of 2011³⁰, tried to minimize the use of fishmeal and fish oil in feed.

2.6 Proposed Certifications Standard for Sustainable Fisheries: ProFish

The aforementioned sections in this Chapter Two introduced the principles of how environmental organizations and scientific circles viewed "sustainable seafood". However, in

²⁸ <http://www.worldbank.org/en/news/feature/2017/03/06/peru-anchoveta-pescadores>

²⁹ Research report on China's trash fish fisheries, Greenpeace East-Asia 2017
https://www.greenpeace.de/sites/www.greenpeace.de/files/publications/2017_greenpeace_studie_china_jungfische_aus_beifang_als_fischfutter_in_aquakulturen_engl.pdf

³⁰ H.R.2373 - National Sustainable Offshore Aquaculture Act of 2011 <https://www.congress.gov/bill/112th-congress/house-bill/2373>

practice, especially for products from industrial and commercial circles marked with accredited insignia, there is a need for consistent standardized measurement in order to connect the missing link between the reformation of an industrial circle and the consumer market. Hence, in this section, a certification standard for sustainable fisheries is proposed by the present author: “ProFish”.

This certification standard would be utilized as a measurement to verify the behavior of sustainable fisheries academically and policy-wise. It is believed that this certification standard is appropriate for many countries in East Asia and Southeast Asia, which share a common background of environmental challenge and fishery management plight like Taiwan.

2.6.1 Introduction: ProFish Concept

Although the Taiwan Government regards itself as a marine nation, the Taiwan Government has not adopted an ecolabelling scheme for marine fisheries. There are merely some sustainable seafood guides published by Academia Sinica and local marine conservation organizations for consumers to refer in Taiwan. As for further assessment of the producer, the biological resource, and seafood that might be purchased, there is only the Responsible Fishery Index (RFI) established by Upwelling Ocean Inc.

Therefore, based on twenty years of experience in the environmental protection movement as a volunteer and a full-time campaigner, the present author decided to design a feasible program to help Taiwanese fishermen to fish more professionally with sustainable knowledge. The aim is to help local fishermen become professional sustainable fisheries managers in their own business; thus, the present author named the program “ProFish”.

ProFish primarily focuses on continually improving “effective fisheries management” in the hope of finding momentum for governmental fisheries and political units; fishermen

are aware that the environment continues to deteriorate and marine biological resources keep depleting. Not only can this genuinely help fisheries in Taiwan to grow in the next decade, but also give seafood-loving citizens in Taiwan an opportunity to take action on the dinner table to love the ocean and the seas around them.

ProFish drew upon the “Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries” reviewed and adopted by Food and Agriculture Organization of the United Nations (FAO), and the core spirit of renowned seafood ecolabels such as Marine Stewardship Council (MSC), Seafood Watch of the Monterey Bay Aquarium Foundation, Marine Eco-Label Japan, and “Sustainable, Healthy and “Umai” Nippon seafood project : SH“U”N project”. ProFish establishes four objectives of marine conservation as categories of assessment and takes into account the viable approach that works in Taiwan.

Most importantly, the percentages of ProFish are adjusted below in the first two objectives, which total 30%, and other two total 70%. Accordingly:

Objective One: Ensuring Fish Stocks Sustainable 15%

Objective Two: Protecting the Marine Environment and Ecosystem 15%

Objective Three: Keeping Fisheries Management Effective 50%

Objective Four: Taking Corporate Social Responsibility 20%

ProFish gives the first and the second objectives a relatively low ratio because they are difficult to improve in a short time, such as within five years. For example, the reduction of water pollution is complicated, and ocean science surveys are expensive. Achieving all these tasks are mission impossible for elderly illiterate fishermen.

To make it easier for fishermen to understand and to practice the policies, ProFish adopts a five-point checklist scale. With this design, anyone can take any fisheries as an example.

Table 1: ProFish Checklist: Sustainable Ecolabel Certification Standard
Designed for Taiwan Marine Fisheries

Four Objectives of Sustainable Fishery	Certification Standard: Evaluation Items (Each item on scale of 0 to 5, from worst to best.)	Percentage
1. Ensuring Fish Stocks Sustainable	1-1 Speed of fish stock replenishment 1-2 Abundance of fish stock 1-3 Degree of setting index for alert overfishing level	15%
2. Protecting Marine Environment and Ecology	2-1 Impact of fishing method and gear on marine environment 2-2 Impact of fishing on service function of marine ecology 2-3 Degree of bycatch, i.e., non-target catch	15%
3. Keeping Fisheries Management Effective	Five pairs of evaluating items. Each pair containing two items. (Each item on scale of 0 to 5, from poor to excellent execution.) 3-1 Industry self-discipline; and compulsory management by law or rules. 3-2 Conducting annual marine resource scientific survey; and annual fishery economics statistics survey. 3-3 Monitoring location of fishing boats; and degree of enforcement of illegal fishing. 3-4 Degree of input control; and degree of output control 3-5 Achievement rate of landing declarations; and accuracy of content of landing declarations	50%
4. Taking Corporate Social Responsibility	4-1 Working and living conditions on board 4-2 Fishermen's compensation package 4-3 Good hygiene practice for fishing boats and fish landing sites 4-4 Bonus questions for fishermen social responsibility activities	20%

2.6.2 Objective One: Ensuring Fish Stocks Sustainable

Fisheries Cannot Survive Without Fish

The first objective of assessing a fishery sustainable enough in the ProFish checklist is to ensure the sustainability of the fish stock. If there were no fish in the ocean, fisheries, fishermen, and seafood would not have existed. This first objective, also the first category of assessment, consists of 15% of the total score. It can be subdivided into three assessment goals: speed of fish stock replenishment, assessment of the current fishing stock abundance, and degree of setting Target Reference Points.

- 1-1. Speed of fish stock replenishment.
(on scale of 5 to 0, from fastest to slowest.)
- 1-2. Abundance of fishing stock
(on scale of 5 to 0, from most abundant to least abundant.)
- 1-3. Degree of setting index for alert overfishing level
(on scale of 5 to 0, from comprehensive to incomplete.)

As for the assessment goal of "Speed of fish stock replenishment", the speed of fish sexual maturity is fixed naturally. For example, the time needed for great white sharks to grow to sexual maturity is far longer than that of crabs and mackerels. Each coastal area has its own unique marine ecological topography, with some places being sandy land and some places growing coral reefs. The fish species living in that topography are determined by and easily subject to change and sabotage by human beings. There is little room for score improvement for this goal of assessment.

Regarding the assessment of "fishing stock abundance", this is also a complicated subject. One can find some articles on the internet casting doubts on the Marine Stewardship Council MSC and Marine Ecolabel Japan. Those authors believe that these two organizations issued ecolabels excessively without persuasive evidence of abundance of fish stocks.

From the point of view of the marine ecological scholar (which differs from that of the traditional fisheries scholars), sustainable fisheries only happen when a healthy marine ecology and a complete food chain exist. However, these three goals of assessment severely test the real power of a nation's quality of marine science. It is challenging to calculate how many fish there are in the sea.

Moreover, if we consider the Great Barrier Reef in Australia and the Taiping Island (Itu Aba Island) sea area near the South China Sea as the full five points for a healthy marine ecology with good abundance, then highly industrialized Taiwan and its islands can only receive a score below two now and in the near future. China, located at the rim of East China Sea with its highly polluted seashore, is also considered a marine ecology in poor health and scored zero in abundance of fish stocks.

Therefore, although the present author, being an environmentalist, believes that this part plays an important role, only five points can be assigned to this, judging from the practicality of fisheries management and the design of the ProFish. Otherwise, it would be tantamount to shutting the door to endeavors by the majority of fishermen.

2.6.3 Objective Two: Protecting Marine Environment and Ecosystem

In order to reduce the negative impact on the marine environment and ecological system of various fishing practices, the following may be used to verify whether a traditional fishery is environmental-friendly and to explore whether a traditional fishery has space to become a sustainable fishery. Here are three evaluative questions and their explanation:

- 2-1. Impact of fishing method and gear on marine environment
(on scale of 5 to 0, from most positive to severely damaging.)
- 2-2. Impact of fishing on service function of marine ecology
(on scale of 5 to 0, from mild to severely damaging.)

2-3. Degree of bycatch, i.e., non-target catch
(on scale of 5 to 0, from rare to a high degree bycatch.)

The objective of this conservation is among the most discussed marine conservation topics among Taiwanese and international environmental organizations. Most fishing methods will do immeasurable damage to the marine environment. Even when fisheries management is involved, marine protection remains low. For example, the banned large-scale driftnet on the high seas and trawler in the coral reef sea, objected to by most environmental organizations, can cause severe damage to coral reefs and fish living on the seabed. Trawlers can catch a large number of younger fish.

The table below refers to the Responsible Fisheries Index (RFI) set up by Upwelling Inc. to describe the friendliness of fishing methods and fish gear towards the marine environment. The present writer and the head of Upwelling Inc., Steven Shyu, are friends and have worked together on promoting sustainable fisheries for more than five years.

	對永續的衝擊 →				
	低				高
Index	1	2	3	4	5
食物階層	0-0.99	1-1.99	2-2.99	3-3.99	4-5
資源回復力	0.5年以下	1.4年以下	1.41~4.4年	4.5~14年	14.1年以上
瀕危性	低 度	適 度	飽 和	過 度	高
管理現況	永續驗證	配額管理	總量管理	投入/產出管理	無
生產方式	一支釣、 籠具、 定置網、 曳網釣、 淺坪養殖、 海洋貝類養殖	小型延繩釣、 巾著網、 焚毒網、 生態養殖	大型延繩釣、 小型刺網、 中層拖網、 室內循環水養殖、 海洋箱網養殖	大型 刺網、 大型 圍網	扒網、 集約 養殖、 多層 刺網

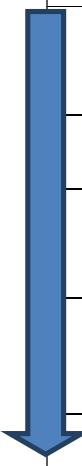
31

Figure 3: Responsible Fisheries Index (RFI) in Chinese

³¹ See <http://www.rfi.org.tw/rsi.asp>

The present writer translates the Table from Chinese into English as follows:

Table 2: Responsible Fisheries Index (RFI) in English

	Score	Fishing Method
<p style="text-align: center;"> Low Impact on Marine Environments and Ecology High </p> 	5	Angling gear, pot on trap, set net, trolling line, shallow water aquaculture, marine shellfish aquaculture
	4	Small scale long line, purse-seine, torch light net, eco-breeding
	3	Large scale long line, small scale gill net, midwater trawling, indoor circulating water aquaculture, marine net cage aquaculture
	2	Large scale gill net, large scale purse-seine net
	1	Taiwanese seine, intensive aquaculture
		Bottom trawling, multi-layer gill net

This certification standard is an example of rating the impact of fishing methods and fishing gears practicing in the sea.

With respect to fishing impact on the service functionality of the marine ecological system, it means what result this impact caused to "ecological service functionality" after fishery operations by a fishing boat. For instance, fish stocks and fish species in coral reefs are noteworthy for their biodiversity given the low quantities of each species. A larger female coral fish does more spawning than a juvenile female coral fish. Removing the larger fish in coral-reef regions will adversely affect the ecology of that sea area. This damaging effect cannot be reversed, unless there is a full-scale scientific survey conducted in that area acquiring data regarding what kinds of fish are present and the quantity of each species. Under this second objective, the ProFish ecolabel wants to preserve the marine vitality.

As to the third topic of Objective Two, some environmental organizations are dedicated to preventing bycatch of sea tortoise, seagulls, and dolphin. Aside from this, fish caught in a

large-scale bycatch which lack economic value were often thrown back into the sea directly from the fishing boat or were further manufactured into cheap food pallets after being shipped back to land. These factors led to huge squandering of marine ecological resource.

2.6.4 Objective Three: Keeping Fisheries Management Effective

It will be extremely difficult to achieve effective fisheries management when the nation is unfamiliar with “maritime affairs” concepts. Taiwan is a good example. First, it is not easy to ask all stakeholders, including potential fisheries resource users and fishermen, to attend. It is even more difficult to find consensus and reach a final conclusion after the meetings. Especially in the case of Taiwan, as far as traditional culture is concerned, anyone could venture out to sea to fish and sell any fish caught. We are unaccustomed to differentiate between commercial fishing and leisure fishing. Therefore, it is a challenge to implement “effective management” of fisheries from a legal and implementation perspective. A purpose of ProFish is to provide fishermen and masters of fishing boats with an incentive to become involved with and comply with fisheries legal regulation.

In the ProFish checklist, the third evaluation segment is the “effective management in fisheries”, which includes five pairs of evaluation question, each pair contains two descriptions similar in nature. Each sub-topic has a full score of five, further described below:

- 3-1. Industry self-discipline; and
compulsory management by law or rules
- 3-2. Conducting annual marine resource scientific survey; and
annual fishery economics statistics survey
- 3-3. Monitoring location of fishing boats; and
degree of enforcement of illegal fishing

3-4. Degree of input control; and
degree of output control

3-5. Achievement rate of landing declarations; and
accuracy of content of landing declarations

Regarding the first and the second pair, in Taiwan there is no detailed self-regulation and scientific research on the majority of fishing methods and fisheries. Therefore, it is essential to focus on specific fisheries and establish fisheries management teams first, so that a consensus for making regulations can be reached through regular meetings. Besides, scientific surveys as a reference base for policy-making, including the surveys for marine natural science, fisheries, and humanities and economics, are all important to invest.

The third, fourth, and fifth pairs belong to tracking the legislative progress and to managing fisheries activities, will be further elaborated below in Chapter Six.

2.6.5 Objective Four: Taking Corporate Social Responsibility

Some ecolabel certification standards, such as Friends of the Sea, include social accountability and worker welfare, safety, and health conditions. The present author believes that it is crucial to incorporate these into ProFish. This category of Corporate Social Responsibility accounts for 20%. It is embodied in the following four sub-topics:

4-1. Working and living conditions on board

4-2. Fishermen's compensation package

4-3. Good hygiene practice for fishing boats and fish landing sites

4-4. Bonus questions for fishermen social responsibility activities

The first and third topics are to improve the conditions on a fishing boat, including protecting fishermen and preserving the freshness of fish catch. Regarding the "fishing working condition" evaluation, a low score will be given to those employers whose employees are injured often and subject to verbal abuse; or sleep less than four hours a day; or only sleep on the ship at night for a whole year, and others.

Hygiene is inextricably related with food preservation and food safety. If an effective way to reducing the food waste via deterioration can be found, the total fish catch can be reduced to the minimum and the length of work time can be reduced. This would benefit the marine resource and the fishermen. The Taiwan Fisheries Agency can encourage fishing boats to be equipped with a "live fish tank" or an ultra-low-temperature freezer.

The second topic concerns a larger issue of the human rights of fishing laborers. The media have reported that foreign employees on Taiwanese fishing boats sometimes are treated badly. Therefore, regarding "fishermen's compensation package", points have to be deducted if the master of a fishing boat asks employees to sign an unfair labor contract, deducts from salary for unreasonable reasons, provides no health or labor insurance, pays the salary late, or gives fewer personal leaves than required by law.

Finally, the masters and captains of fishing boats are encouraged to improve the ocean environment, the fishing ports, and society voluntarily. Though the four sub-topics of the Fourth Objective have no direct link with marine conservation, it is obvious that a fundamental human right and social responsibility are linked to the sustainability of a healthy society. The checklist of items is one way we preserve our universal values. That is why this dissertation calls ProFish a sustainable ecolabel instead of merely an environmental ecolabel.

Chapter 3 Power of Green Purchasing and Ecolabelling Mechanism

In this chapter we explore the institution and mechanism of ecolabels globally to find a viable system for the ProFish program. At the outset, we need to ask: why choose this tool to promote fishery management? The various environmental challenges we human beings face are caused by modern consumption patterns following the industrial revolution. It being impossible to hold our breath while we count our money,³² the voices calling for global environmental protection are especially heard from industries and markets.

If there is a will, there is a way. With the awakened environmental consciousness, astonishing advances in technological processes, management, and products are occurring day by day to address environmental issues. Green technology refers to the environmental impacts of goods and services to be appropriately considered throughout the entire production process. The relationship between “modern convenient life” and “environmental life” has begun to turn from being opposites to a cooperative possibility of creating “sustainable modern life”. However, unless we can expand the market share of these green products, including sustainable seafood, green technology is merely an amusing novelty. People usually give priority to the possibility of corporate or government procurements.

3.1 Ecolabelling Mechanism

3.1.1 Introduction

According to the World Trade Organization (WTO), government procurement accounts for 10 to 15% of the GDP of an economy on average. This is a significant market and an

³² A popular slogan in the internet world is: “If you really think the environment is less important than the economy, try holding your breath while you count your money”.

important aspect of international trade. WTO work on government procurement seeks to promote transparency, integrity, and competition in this market.³³ Therefore, there is an important multilateral agreement: “The Agreement on Government Procurement” (GPA) under the auspices of the World Trade Organization. It was renegotiated in parallel with the 1994 Uruguay Round and entered into force on 1 January 1996. The agreement was subsequently revised on 30 March 2012. The revised GPA came into effect on 6 July 2014. It regulates the government procurement of goods and services by the public authorities of the parties to the agreement, based on the principles of openness, transparency, and non-discrimination.³⁴

How does sustainable seafood take advantage of government procurement power and achieve “openness, transparency and non-discrimination” at the same time? The introduction of an ecolabelling mechanism is believed to be the answer, as will be argued in the present work.

Of greatest importance to green producers is how to reveal the outstanding effort which businesses or a fisherman already made, or how to distinguish a green-idea product from others with the same function, such as canned tuna whose fishing practices minimize dolphin fatalities. Labelling products with a green label is usually the answer for suppliers and consumers. This is an ecolabelling mechanism.

On one hand, differing from traditional required environmental protection tools, for example, paying a penalty for a violation of the Clean Water Act or fishery regulations, "ecolabelling" is a voluntary market measure of environmental performance certification that

³³ https://www.wto.org/english/tratop_e/gproc_e/gproc_e.htm

³⁴ https://en.wikipedia.org/wiki/Agreement_on_Government_Procurement

is practiced around the world. An "ecolabel" identifies overall, proven environmental attributes of a product or service within a specific category. On the other hand, unlike the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which applies to international trade, the market appeal for an ecolabel mostly is domestic.

The International Organization for Standardization (ISO), an independent, non-governmental membership organization and the world's largest developer of voluntary International Standards, has drawn up a group of standards specifically regulating environmental labelling. The popular families of standards which respond to business needs are the series: ISO 14000 Environmental management, ISO 50001 Energy management, ISO 20121 Sustainable events, ISO 22000 Food safety management, and ISO 26000 Social responsibility.³⁵ ISO standards are reviewed every five years.³⁶

3.1.2 ISO 14020 Series

Ideally, one sustainable fish steak on our dinner plate is the result of an environmental-friendly fishing practice, an energy saving fishing boat, fishing in clean seawater without heavy metals residue in the fish, and no low-cost labor to subvert labor standards and distort the seafood market, which is a basic social responsibility.

However, the present work concentrates on the ISO 14000 series, especially on the ISO 14020 series of standards which address different approaches to environmental labels and declarations, including ecolabels (seals of approval), self-declared environmental claims, and quantified environmental information about products and services.³⁷

³⁵ See <http://www.iso.org/iso/home.html>

³⁶ See <https://www.iso.org/obp/ui/#iso:pub:PUB200002:en>

³⁷ Environmental management - The ISO 14000 family of International Standards. p. 6

According to the International Organization for Standardization, the official name for ISO 14020 labels is Environmental Labels and Declarations. The ISO 14000 standards are designed to be mutually reinforcing and able to be used independently of each other to achieve environmental goals. The entire ISO 14000 family of standards provides management tools for organizations to manage their environmental aspects and assess their environmental performance. Together, these tools can provide significant tangible economic benefits, including reducing raw material and resource use from aquaculture, reduce energy consumption, improving process efficiency, reduce waste generation or disposal costs, and utilize recoverable resources³⁸. Each item is worth considering in the context of traditional fishing.

The ISO 14020 family covers three popular labelling plans: ISO 14024 (Type I), ISO 14021 (Type II), and ISO 14025 (Type III).

Type I Ecolabel

ISO 14024 project, *Environmental labels and declarations -- Type I environmental labelling -- Principles and procedures*, was published in 1999. Type I labelling is a voluntary, multiple-criteria-based third-party program that awards a license which authorizes the use of environmental labels on products indicating overall environmental preference of a product based on life cycle considerations within a particular product category. The environmental label can be affixed to any goods or service.

Type II Ecolabel

ISO 14021 project, *Environmental labels and declarations -- Self-declared environmental claims (Type II environmental labelling)*, was published in 1999. Type II

³⁸ Ibid., p. 8.

labelling is a single-attribute label developed by a producer who sells any two or more products from the same unit process. The unit process can be an element of an organization's activities or products that can interact with the environment.

Usually the producer delivers its environmental claim to consumers through a statement, symbol, or graphic that specifies the environmental aspect of a product, a component thereof, or packaging. For example, the environmental claim may be on product packaging labels, through product literature, or advertising in digital or electronic media. The environmental claim is verified by using specific predetermined criteria and procedures with assurance of data reliability.³⁹

When there is no Type I environmental label available and applicable to a producer's environmental claim, what claim the producer made is viewed as Type II. When there are more similar Type II producers, the need for the Type I Ecolabel would be considered by the third party conducting a Type I environmental labelling program.

Type III Ecolabel

ISO 14025 project, *Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures*, was published in 2006. Type III is an environmental declaration presenting quantified environmental information on the life cycle of the product to enable comparisons between products fulfilling the same function. Such declarations are generally provided by one or more organizations.

Type III environmental declarations are primarily intended for use in business-to-business communication, but their use in business-to-consumer communication is not precluded. It is recognized that the developer of a Type III environmental declaration cannot

³⁹ See <https://www.iso.org/obp/ui/#iso:std:iso:14021:ed-1:v1:en>

precisely determine the audience. However, it is important to consider information needs in future developments.⁴⁰

Seafood guides issued by many academic agencies and ocean conservation groups are generally acknowledged to be a Type III environmental declaration.

3.1.3 FAO: Guidelines for Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries

Three guidelines relate to seafood in FAO documents: “Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries”, “Guidelines for the Ecolabelling of Fish and Fishery Products from Inland Capture Fisheries”, and “Technical Guidelines on Aquaculture Certification”.⁴¹ The first one is discussed herein.

The Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries are voluntary. They apply to ecolabelling schemes designed to certify and promote labels for products from well-managed marine capture fisheries and focus on the sustainable use of fisheries resources. The guidelines refer to principles, general considerations, terms and definitions, minimum substantive requirements and criteria, and procedural and institutional aspects of ecolabelling of fish and fishery products from marine capture fisheries.

With the emergence of more sustainable seafood schemes in the world, inconsistencies have gradually emerged in the standards. Therefore, the Committee on Fisheries (COFI) devoted efforts to identify the basic requirements. The Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries were adopted by the twenty-sixth session of the COFI, Rome, 7–11 March 2005, with amendments adopted by the twenty-

⁴⁰ See <https://www.iso.org/obp/ui/#iso:std:iso:14025:ed-1:v1:en>

⁴¹ See <http://www.fao.org/fishery/code/guidelines/en>

eighth session of COFI, Rome, 2–6 March 2009. These amendments address the recommendation from the twenty-sixth session of COFI that, in relation to minimum substantive requirements and criteria for ecolabels, FAO should review and further develop general criteria in relation to “stock under consideration” and to serious impacts of the fishery on the ecosystem.

3.1.4 Global Sustainable Seafood Initiative

After the FAO provided the guidelines above, a new organization was created to work closely with the guidelines: The Global Sustainable Seafood Initiative (GSSI). The GSSI was organized in 2013 by the German Association for International Cooperation (on behalf of the German Federal Ministry of Economic Cooperation and Development), FAO, and dozens of business groups and non-profit organizations.

GSSI is considered to be an international cooperation platform whose mission is to deliver a common, consistent and globally applicable Benchmark Tool for seafood certification schemes, adhering to FAO fishery-related guidelines. This platform was set up to bring more clarity into the marketplace with respect to the growing number of seafood certification schemes. GSSI has approved seafood certifications for MSC, Alaska management, Icelandic RFM certification fisheries, New Zealand, and other countries. A quasi-governmental-based “Marine Ecolabel Japan” expects to accept GSSI approval before the Tokyo 2020 Summer Olympics in order to supply the sustainable seafood in restaurants for athletes.

3.2 Content of Government Green Procurement

Governments, in order to run smoothly, just as a person or enterprise, need to purchase various products and services. Every government in its own country is usually the largest consumer of various items, such as computer equipment, electronic devices, vehicles, meals supplied in public schools, and so on. “Government Procurement” is a major consumer and a huge market. In 2011, the members of the Organization of Economic Co-operation and Development spent an average 13% of Gross Domestic Product on public procurement, whereas in some developing nations this can reach 20%. This adds up to trillions of dollars globally, demonstrating the scale of the power of Government Procurement.⁴²

By leveraging the power of purchasing environmentally friendly goods, services and work, governments can make an important contribution to industries of sustainable technologies and innovative solutions. Playing a key role to stimulate a critical mass of demand for more sustainable goods and services which otherwise would be difficult to get onto the market at the initial stage of development, this consumption strategy is called Government Green Procurement (GPP).

3.2.1 Definition of Environmental Preference

In legal documents the goods produced and services provided through green technology are deemed to be “environmental preferred products”.⁴³ Green Procurement is the integration of numerous environmental considerations for purchasing environmental preferred products into the procurement process, from production process to final disposal. “Green

⁴² <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=2764&ArticleID=10787&l=en>

⁴³ Cited from p.5 of <http://www.fas.org/sgp/crs/misc/R41297.pdf> See, e.g., H.R. 5136, § 833 (requiring DOD to “favor” certain products based on their environmental attributes); H.R. 5280 (requiring agencies to give “preference” to “sustainable” goods in certain preferences).

procurement” is often expressed as “to give environmental products preference”. Environmental preference can be demonstrated at any stage of the life cycle of products and is a comparison among products for the same function, which means that there is always room to improve the green technology in any product or service.

Although the term “preferred” and “preference” are widely used in reference to categories of goods or services procured because of environmental attributes, the two terms are often undefined, or defined in specific ways for specific goods or services. Legislative acts do not state the form that a “preference” should take, and agencies generally have “broad discretion” to craft an appropriate preference in their regulations or individual solicitations. And accordingly, the deference is usually given to the agency's interpretation of the degree to which a preference should be accorded.⁴⁴

3.2.2 Development of Government Green Procurement

The first Earth Day, 22 April 1970, was meant to be practical, participatory, and oriented towards environmental action. The year 1970 generally marks the birth of the modern environmental movement. Since then, together with increasing concerns about environment protection and sustainability, the magnitude of government spending on contracts has prompted questions from the public about the role of environmental considerations in government procurement.

In 1976, the United States Congress adopted the *Resource Conservation and Recovery Act* (RCRA), which requires government agencies to purchase green products with characteristics of recycled contents, low standby power, renewable energy, bio-based

⁴⁴ See in Matter of: HAP Construction, Inc. File: B-280044.2 Date: 21 September 1998, B-280044.2: United States Government Accountability Office.

contents, and so on. Section 6002 of this Act directed federal agencies to develop Affirmative Procurement programs to increase the purchase of items containing recycled material. This legislation can be regarded as the earliest embryonic framework for promoting government green procurement.

At present, many countries, including the European Union and the countries of East Asia, have viewed government green procurement as an important measure to promote sustainable development and to guide private green consumption. Some international organizations formed a special green procurement organization, among them the United Nations and the World Bank.

On 1 April 2014, the United Nations launched a scheme called the *Sustainable Public Procurement (SPP) Programme* to use global government spending worth trillions of dollars to promote sustainability.⁴⁵ This Programme assists governments redirect public spending into goods and services that bring significant environmental and social benefits.

3.3 Framework for Promoting Government Green Procurement

Although the potential of Government Green Procurement is promising, obstacles need to be addressed. There are four concerns: legal barriers, fiscal barriers, organizational barriers, and information barriers.

Legal barriers arise when the legal authority is not strong enough to protect contracting officers purchasing green against the risk of being accused of violating administrative neutrality, domestic bidding rules, or international trade regulations. Fiscal obstacles reflect the dilemma when green products are often more expensive and their acquisition may exceed

⁴⁵ See Launching the Sustainable Public Procurement Programme, 1 April 2014, 13:15-14h30, Conference Room 1 <http://www.un.org/webcast/pdfs/140401pm-owgsdg-side.pdf>

the government budget. Organizational obstacles are the absence of a clear lead agency to promote and oversee implementation.

Legal barriers can be reduced by creating enough legal authority, whereas price strategy through legislation helps with fiscal regulation. Establishing a special office to plan and supervise implementation is often a key to an organizational bottleneck, and the creation of government-based ecolabelling schemes to identify the products is usually the answer to information obstacles.

A well-designed legal framework is essential to assist agencies in overcoming barriers in dealing with the government procurement regulations and can authorize government agencies to introduce effective regulations and policies.

In the discussion below, the framework of government green procurement will be illustrated through examples of countries in the United States, Taiwan, Japan, and China. Although the United States does not border the East China Sea, it is considered here for two reasons. On one hand, the United States is the earliest country to deal with green procurement; on the other hand, the United States has a close trade relationship with China, Japan, and Taiwan.

3.3.1 Legal Authority: United States, Taiwan, Japan, China

United States of America

The United States Government's legal authority as represented by green government procurement-related laws and regulations can be classified into three categories:

- 1) Presidential Executive Orders,
- 2) Federal regulations with green procurement requirements included, and
- 3) Federal Acquisition Regulations (FAR)

1) Presidential Executive Orders

Table 3: United States Presidential Executive Orders on Legal Authority for Green Government Procurement

Issued Year	Executive Order (EO)	Main content
20 October 1993	Executive Order 12873 - Federal Acquisition, Recycling, and Waste ⁴⁶	The first "Buy Recycled" executive order required federal agencies to purchase products made from recycled content, including copy paper when they were comparable to virgin counterparts in availability, performance and price.
16 September 1998	Executive Order 13101 - Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition ⁴⁷ EO 13101 revokes EO 129873	In order to implement the "buy-recycled" policy, the order eliminated loopholes for availability and price, requiring copy and writing paper purchased to contain 30% post-consumer content when available, and mandating at least 20% post-consumer content in all purchases.
3 June 1999	Executive Order 13123 - Greening the Government through Efficient Energy Management ⁴⁸	This order calls for Federal agencies to improve the energy efficiency of their buildings, promote the use of renewable energy, and reduce greenhouse gas emissions associated with energy use in their buildings, among other energy related requirements.

⁴⁶ See <http://www.archives.gov/federal-register/executive-orders/1993-clinton.html#12873>

⁴⁷ See <http://www.archives.gov/federal-register/executive-orders/1998.html#13101>

⁴⁸ See <http://www.archives.gov/federal-register/executive-orders/1999.html#13123>

21 April 2000	Executive Order 13148 - Greening the Government Through Leadership in Environmental Management ⁴⁹	The primary goal of this EO is for each agency to strive to promote the sustainable management through the implementation of cost-effective, environmentally sound landscaping practices, and programs to reduce adverse impacts to the natural environment.
24 January 2007	Executive Order 13423 – Strengthening Federal Environmental, Energy, and Transportation Management ⁵⁰	The Order sets goals in the following areas: energy efficiency, acquisition, renewable energy, toxic chemical reduction, recycling, sustainable buildings, electronics stewardship, fleets, water conservation.
5 October 2009	Executive Order 13514 - Federal Leadership in Environmental, Energy, and Economic Performance	The order expands on the energy reduction and environmental performance requirements for Federal agencies identified in EO 13423, especially to require 95% of all new contracts to be green procurement.
25 March 2015	Executive Order 13693 - Planning for Federal Sustainability in the Next Decade ⁵¹	To maintain federal leadership in sustainability and greenhouse gas emission reductions, beginning in fiscal year 2016, in building energy conservation, water waste, vehicle efficiency, etc. *EO 13693 revokes EO 13423 and EO13514.

⁴⁹ See <http://www.archives.gov/federal-register/executive-orders/2000.html#13148>

⁵⁰ See <http://www.archives.gov/federal-register/executive-orders/2007.html#13423>

⁵¹ See <https://www.fedcenter.gov/programs/eo13693/>

2) Federal regulations with green procurement requirements included

1. *Resource Conservation and Recovery Act of 1976*

Section 6002 of the Resource Conservation and Recovery Act initially directed federal agencies to develop Affirmative Procurement programs to increase the purchase of items containing recycled material. The Act required the Environmental Protection Agency (EPA) to publish guidelines for affirmative procurement and required procuring agencies to develop relative Affirmative Procurement Programs.

2. *Clean Air Act of 1990*

Section 613 of Clean Air Act Amendments required federal agencies organizations to ensure that procurement regulations comply with the policies and requirements of Title VI of the Clean Air Act and to maximize the substitution of safe alternatives for ozone-depleting substances.

3. *Energy Policy Acts of 1992 and 2005*

Section 303 of the Energy Policy Act of 1992 generally requires that 75% of a Federal fleet covered light-duty vehicle acquisitions in United States metropolitan areas must be alternative fuel vehicles. The amendment of the Energy Policy Act in 2005 extended green procurement to include vehicle fuel. Section 701 required federal agencies to use alternative fuels in fleet dual-fuel vehicles if the fuel is available within fifteen minutes or five nautical miles, which nonetheless does not cost more than gasoline on a per-gallon basis.

4. *Farm Security and Rural Investment Act of 2002*⁵²

Section 9002 of the Farm Bill directed federal agencies to purchase United States Department of Agriculture (USDA)-designated biobased products and to report on those purchases. USDA is required to designate biobased products and provide guidance for purchasing products with biobased content in a variety of categories such as adhesives, construction materials, fibers, paper, packaging, fuels, inks, landscaping materials, composted livestock, crop residue, and so on.

3) Federal Acquisition Regulation (FAR)

1. *Federal Acquisition Regulation of 1995*

The Part 23 of Federal Acquisition Regulation, enacted on 31 May 1995, was named Environment, Energy and Water Efficiency, Renewable Energy Technologies, Occupational Safety, and Drug-free Workplace. Within the Part 23, Subpart 23.7 Contracting for Environmentally Preferable Products and Services can be viewed as the first explicit and primary legal base for federal agencies to conduct comprehensive green procurement.

⁵² <http://www.nrcs.usda.gov/about/legislative/pdf/plaw107171.pdf>

Table 4: United States Legal Base of Preferable Products and Services Contracting

Product Category	Legal Base
Recycled Content	<ol style="list-style-type: none"> 1. EO 13423, EO 13514, EO 13693 2. RCRA (42 U.S.C. § 6962(c)(1)) 3. Part 23 of FAR (48 C.F.R. § 23.04(b)(1))
Environmentally Preferable	<ol style="list-style-type: none"> 1. EO 13423, EO 13514, EO 13693 2. Part 23 of FAR (48 C.F.R. §23.703(b)(1))
Energy efficient	<ol style="list-style-type: none"> 1. EO 13423, EO 13514, EO 13693 2. Part 23 of FAR (48 C.F.R. § 23.203(a)(1)(i)-(ii))
Bio-based	<ol style="list-style-type: none"> 1. EO 13423, EO 13514, EO 13693 2. Section 9002 of the 2002 Farm Bill (7 U.S.C. §8102(a)(2)(A)(i)(II)) 3. Part 23 of FAR (48 C.F.R. §23.404(b)(1))
Alternative fuels/ Fuel efficiency	<ol style="list-style-type: none"> 1. EO 13423, EO 13514, EO 13693 2. Section 303 of The Energy Policy Act of 1992 and 2005
Non-ozone depleting	<ol style="list-style-type: none"> 1. Section 613 of the Clean Air Act

Taiwan

Taiwan is the first country in the world to promote government green procurement by adopting the policy of environmental labels and declarations and awards the legal status of Type I and Type II ecolabel through legislative progress by the Congress.

The primary legal authority for government green procurement in Taiwan is Article 96⁵³ in *the Government Procurement Act* in 1995, adopted while Taiwan was in the process

⁵³ The Government Procurement Act enacted by Taiwan Congress in 1998, and took effect in 1999:

(To be continued)

of joining the World Trade Organization and was required to enact the Agreement of Government Procurement to be an internal law. The legal authority of Taiwan is as follows:

1) *Government Procurement Act of 1999, Article 96:*

“An entity may provide in the tender documentation that preference shall be given to a product which has been permitted to use a label of environment protection approved by the government, and in addition has the same or similar functions. The said preference may include a price preference not exceeding ten percent”.

Noted by the author: “A label of environment protection approved by the government” is connected to the issue of identification of products, which is discussed below in Chapter 3.4.

2) *Regulations for Priority Procurement of Eco-Products*

Accompanying Article 96 of the Government Procurement Act and coming into force in 1999 is the *Regulation for Priority Procurement of Eco-Products (RPPEP)*, promulgated by Environmental Protection Administration of Taiwan on the same day.

The Regulation for Priority Procurement of Eco-Products not only define the legal terms of environment preference and announce the categories of ecolabelling government-based types, but also establishes a list of explicit priorities of products with various kinds of ecolabels. Agency officers are authorized to bargain with environmental vendors during the

“An entity may provide in the tender documentation that preference shall be given to a product which has been permitted to use a label of environment protection approved by the government, and in addition has the same or similar functions. The said preference may include a price preference of not exceeding ten percent. Such preference shall also be given where a product or its raw material is manufactured, used, and disposed of in such manner in line with the requirements of that conform to recycled materials, returnable products, low pollution, or energy-saving requirements.

The preceding paragraph shall apply mutatis mutandis to other products which either increase social benefits or reduce social costs, and have the same or similar functions required.

The categories and coverage of products referred to in the two preceding paragraphs and the implementing regulations thereof shall be jointly prescribed by the responsible entity, the Environmental Protection Administration of the Executive Yuan, and other competent entities.”

procurement process of opening tenders in order to maximize green purchasing under the limited fiscal budget.

3) *Resource Recycling and Reuse Act of 2002*

In 2002 the Resource Recycling and Reuse Act⁵⁴ was enacted to further the mandatory green procurement to be realized in all levels of the public sector, including public schools.

To sum up, the main legal authority to buy ecolabelling products is Article 96 of the Government Procurement Act, which illustrates what aspect of a product is urgent to purchase. Unlike Taiwan, the mode of legal authority of the United States mostly indicates concrete environmental attributes of products along with the subject-matter of the laws, Presidential Executive Orders, or governmental programs. Consequently, the regulations and programs are often repealed and amended repeatedly to keep pace with the trends of leading environmental issues and technologies.

Japan

Japan was the first country to adopt specific legislation dedicated to government green procurement. In June 1995 the Cabinet of Japan introduced the *Action Plan for Greening*

⁵⁴ Article 22 of Resource Recycling and Reuse Act enacted in 2002 :

“To promote the recycling and reuse of resources, government agencies, public schools, public enterprises and organizations, and military authorities shall preferentially procure government-recognized environmentally preferable products, renewable resources produced within the national territory, or recycled products in which at least a certain proportion of renewable resources as raw materials are used.

The central competent authority in consultation with relevant agencies shall determine the environmentally preferable products, renewable resources or regenerated products, and certain proportion of renewable resources that recycled products must contain.

The central competent authority and all industry competent authorities associated with specific projects shall themselves perform, or commission a professional organization or enterprise to perform educational and sales promotion activities for recycling technology, renewable resource, recycled product, and environmentally preferable products.”

*Government Operations*⁵⁵ and drafted green procurement principles and a performance schedule based on the *Basic Environment Law* and *Basic Environment Plan*.⁵⁶ The policy required that all governmental agencies must operate such procurement until the year 2000 and there would be a review of performance in 1997.

In 2000, the Japanese parliament enacted the *Act on Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities*, called for short the “Act on Promoting Green Purchasing”.⁵⁷ This was the first legislative act dedicated to government green procurement in the world. Accompanying by the Act was the “*Basic Policy on Promoting Green Purchasing*”, a basic policy according to Article 6 of Act on Promoting Green Purchasing. The Basic Policy was renewed in February 2015. Furthermore, in 2007 the *Law Concerning the Promotion of Contracts Considering Reduction of Emissions of Greenhouse Gases and Others by the State and Other Entities*, known by its abbreviated title as the “Green Contract Law”, was adopted.⁵⁸ Although the Green Contract Law aims to reduce greenhouse gas emissions during the production process of certain products and services, the Act supplements the Act on Promoting Green Purchasing, for example, by imposing contractual requirements to be included by government agencies and public institutions in the procurement of electricity, automobiles, energy services projects and green building design contracts.

To sum up, government green purchasing in Japan is based on two laws: *Act on Promoting Green Purchasing* and *Green Contract Law*.

⁵⁵ See https://www.env.go.jp/en/policy/economy/g2o/g2o_intro.html

⁵⁶ See https://www.env.go.jp/en/laws/policy/basic_lp.html

⁵⁷ See <https://www.env.go.jp/en/laws/policy/green/index.html>

⁵⁸ <https://www.env.go.jp/en/laws/policy/green/contract.html>

China

The first legal basis for the Government of China to buy green is the 1997 *Law of the People's Republic of China on Energy Conservation*⁵⁹ to purchase energy efficient products. Similar to Taiwan, when China sought to join the World Trade Organization, China was required to enact a government procurement law. China joined the World Trade Organization in 2001, and the *Government Procurement Law of the People's Republic of China* was enacted in 2002⁶⁰. Article 9 of the Government Procurement Law provides:

“Government procurement shall be conducted in such a manner as to facilitate achievement of the goals designed by State policies for economic and social development, including but not limited to environmental protection, assistance to underdeveloped or ethnic minority areas, and promotion of the growth of small and medium-sized enterprises”.

In 2006, an administrative order, the MOF Treasury Decree [2006] No.90 “*Opinion on the Implementing of Governmental Procurement of Environmental Labelling Products*”⁶¹ was co-issued by the Ministry of Finances and State Environmental Protection Agency. The decree facilitated the procurement of energy-efficient products and products certified as environmentally friendly. Another important decree is “*Government Procurement List on Environmental Labelling Products*”, which is constantly updated.

3.3.2 Price Strategy

Environmental-friendly products are often more expensive than ordinary products for several reasons. When the price exceeds the limited budget of a State agency, it is necessary to draw a bottom line for contracting officers to follow. In order to resolve this fiscal dilemma, regulations and strategies are created. This strategy is called “Price Strategy”.

⁵⁹ See http://www.npc.gov.cn/englishnpc/Law/2009-02/20/content_1471608.htm

⁶⁰ http://www.npc.gov.cn/englishnpc/Law/2007-12/06/content_1382108.htm

⁶¹ http://english.mep.gov.cn/News_service/news_release/200709/t20070930_109796.htm

There are two representative types: providing “Price Preference” directly, and calculating the “Best-value consideration”. “Price preference,” a term that could have various meanings depending on its context, presumes that prices exceeding within a certain percentage of the award value of the contract are not unreasonable. The range varies on different products. “Best-value consideration” can be the result of combined price, maintenance costs, performance, environmental criteria, or environmental-purely life cycle cost analysis.

Basically, the Price Preference is applied to disposable items, for example, printing paper or toilet paper, whereas Best-value consideration is applied for equipment to be used long-term,⁶² such as printers and air conditioners.

United States

Fundamentally, the vision for federal acquisition, as presented in the Federal Acquisition Regulation (FAR), is “to deliver, on a timely basis, the *best value* product or services to the customer, while maintaining the public’s trust and fulfilling public policy objectives”. The term “best value” in the FAR means that “all participants in the Federal Acquisition System are responsible for making acquisition decisions that deliver the best value product or service to the customer. Best value must be viewed from a broad perspective and is achieved by balancing the many competing interests in the System. The result is a system which works better and costs less”.

⁶² Regarding to the measure of calculating price preference, take air conditioner for an example, the vendors must figure out how much electricity their products can save through its whole use life, and then translate the amount into Taiwan dollar according to the charge fee set by government-owned Taiwan Power Company to prove that how much rate the product is worth for price preference.

However, unlike other products related to social-economic issues, such as 48 C.F.R. §25.105 (price differentials under the Buy American Act) and 15 U.S.C. § 657a(b)(3) (allowing agencies to apply a 10% Price Evaluation Adjustment to bids submitted by certified Historically Underutilized Business Zone small businesses in unrestricted competitions),⁶³ environmental products do not enjoy price preference in federal tenders. In relevant statutes, the requirement of item cost is just “at reasonable price.” Therefore, United States federal officers have considerable discretion.

Taiwan

There is an explicit regulation about price strategy in Taiwan. Article 96 of the Government Procurement Act provides:

“The said preference may include a price preference of not exceeding ten percent. Such preference shall also be given where a product or its raw material is manufactured, used, and disposed of in such manner in line with the requirements of that conform to recycled materials, returnable products, low pollution, or energy-saving requirements”.

The Articles of Measures for the Priority Procurement of Environmentally Preferable Products⁶⁴ further provide that all government agencies are to conduct preferential purchases of designated eco-products, which can enjoy up to a 10% price preference.

⁶³ <https://www.acquisition.gov/far/html/Subpart%2019.1307.html> See Subpart 19.1307 Price evaluation preference for HUBZone small business concerns.

⁶⁴ Article 11 of Measures for the Priority Procurement of Environmentally Preferable Products :

“Entity conducting priority procurement of environmentally preferable product in accordance with these Measures and applying the price preference, shall determine the range of price preference, based on procurement characteristics and budget, and specify the requirements in the tender documentation. However, the price preference percentage shall not be higher than 10 percent.

The above price preference percentage, if quantifiable, may be calculated by using the monetary saving of environmentally preferable product obtained from energy saving, increased social benefit and decreased social cost, and divided by the lowest tender of non-environmentally preferable product meeting the (To be continued)

Fortunately, current practice in Taiwan allows the vendor of an environmentally preferable product to have one opportunity to reduce the price if the quoted price is higher, but within 10% of the lowest price of the non-environmentally preferable product, and if agreed, the contract will be awarded to that vendor. When there are more than two vendors, the contracting offers shall start bargaining with the supplier of Type-I and Type-II product. The entity shall not consider whether the price of the Type III product is lower than the price of Type I and II product in advance.⁶⁵

China

There is no explicit limitation of price strategy for environmental-friendly products in China. Article 51 of the Law on Energy Saving requires the preference shall be “first” given to energy-saving products listed in the official catalogue in government procurement without specifying any measure of calculation.⁶⁶

requirements of the tender documentation. The calculated value is considered as the actual price preference percentage value.

If the actual price preference percentage exceeds the price preference stated in the tender document, then the later value shall prevail. Otherwise, the actual value shall be used.

If the price preference percentage is quantifiable and the bidder wishes to apply for price preference, the bidder shall specify the estimated monetary value in energy conservation, increased social benefit, and decreased social cost, as well as the calculation method in its tender.”

⁶⁵ Article 13 of Taiwan Measures for the Priority Procurement of Environmentally Preferable Products :

In accordance with Paragraph 1 of Article 12, if there is only one supplier of environmentally preferable product, the entity may request such supplier to reduce the price to the lowest tender and then award the contract. If there are more than two environmentally preferable product suppliers, the entity may start from the lower price bidder and ask in series each tender to reduce price. The first supplier to reduce to the lowest tender shall be awarded the contract.

When the entity asks the suppliers of environmentally preferable product to reduce price, it shall start with the supplier of Type-I and Type-II product first. If the entity is still unable to decide on the award, then it may start requesting Type III product supplier to reduce price. In Paragraph 1 & 2 of Article 12, if there are more than two environmentally preferable product suppliers that meet the requirements of price preference percentage specified in the tender documentation, the entity shall preferentially award contract to supplier of Type I and Type-II product. The entity shall not consider whether the price of the Type III product is lower than the price of Type I and II product.

⁶⁶ Article 51: When purchasing energy-using products and equipment, public institutions shall give first priority to the products and equipment listed in the catalogue of energy-saving products and equipment for government procurement.

However, just as the United States, the price strategy appeared in other fields. According to Article 13-17 of MOF Measure on the Evaluation of Government Procurement of Indigenous Innovation Products, indigenously innovated products shall be given preference at a margin of five to ten per cent in case price is the sole determining factor and otherwise four to eight percent.

3.3.3 Lead Agency

Government is a giant organization, composed of various agencies and staffs with different missions, fiscal considerations, or purchasing habits. To achieve the goal of annual procurement, the lead agency plays a crucial role. The lead agency is usually the unit in charge of promotion of government green procurement and/or the unit in charge of evaluation of the achievement of government green procurement.

In the United States, federal agencies were slow to comply with the "Buy Recycled" order EO12873 commended by President Clinton in 1993. After four years, federal agencies were still not purchasing the mandated items.⁶⁷ The problem was fixed by creating a lead agency "Steering Committee", established by EO 13101 of 14 September 1998. Compliance in federal agencies with buy-recycled laws has improved over the years. For recycled copy paper, for example, compliance is up from a mere 12% in 1994 to 98% in 2000.⁶⁸

In addition, with the purpose of responding to Section 6002 of the Resource Conservation and Recovery Act, the Environmental Protection Agency is required to designate standards of products made with recovered materials. Therefore, the EPA created

⁶⁷ See http://www.gpp.org/eo_12873.html

⁶⁸ See http://www.gpp.org/eo_13101.html

the Environmentally Preferable Purchasing Program, which started in 1993 after the signing of Executive Order 12873, and continues today under Executive Order 13653.

In Taiwan, the Environmental Protection Administration (EPA) is authorized by an *Action Plan to Implement Government Green Procurement* in July 2001 promulgated by Article 96 of Government Procurement Act. Taiwan EPA also sets up the *Government Green Procurement Performance Assessment Team* to assess the status of implementation.

In Japan, the lead agency of government green procurement is the Ministry of the Environment. Article 9 of Act on Promoting Green Purchasing authorized the Minister of the Environment to request the head of each ministry or agency to take measures which are deemed particularly necessary to promote the procurement of eco-friendly goods.

In China, the *Law of the People's Republic of China on Energy Conservation* indicates that the State Council leads, but MOF Treasury Decree *Opinion on the Implementing of Governmental Procurement of Environmental Labelling Products* assigned the Ministry of Finances and the State Environmental Protection Administration to be the lead agency.

All four countries do not impose punitive regulations if the unit failed to meet the target of government green procurement that the lead agency set up.

3.4 Participating in Government Green Procurement

As far as industries and vendors are concerned, how to participate in government procurement is the most important information.

3.4.1 Vendors

Vendors refer to suppliers, contractors, and subcontractors. The more vendors who compete, the more rapidly technology develops. However, vendors affect the quality and the process of producing directly. Therefore, it is important to regulate the vendors.

In the United States, when vendors are convicted of any offense under section 7413(c) of the Clean Air Act or section 1319(c) of the Clean Water Act, the vendors are automatically disqualified from eligibility to receive any contract, subcontract, or transaction that is prohibited by a federal department or agency under the government-wide debarment and suspension system. The debarment will last until EPA Administrator certifies the condition is corrected. However, these debarments merely apply to the vendors' operations at the facility where the violations occurred. This means that vendors with multiple facilities are not precluded from federal contracts.

In Taiwan, pursuant to the *Regulation for Application and Review for EPA Environmental Protection Product*, products cannot be certified with a Green Mark if the producer violates any environmental statutes, such as Clean Air, Water, Noise, Hazardous waste, Soil Pollution, Ocean, and so on twice within one year, and total of four. Products from an offshore factory must submit documents issued by the relevant authorities of that country where the product is manufactured to prove that there is no recorded major pollution within one previous year.

The above are good examples for seafood labelling to take into account. The record of fishermen and fishing boats should be considered in the process of government procurement.

3.4.2 Identification of Products

The identification measures for green products adopted by the major countries can be roughly classified into two types. One takes advantage of environmental label systems, mostly Type I and Type II ecolabels. The enforcement authorities set up the green mark mechanism to apply to all agencies. The other measure is to establish principles or guidelines by different agencies.

Taiwan, China, and some information technology products of the United States belonged to the former measure. For example, the Green Mark of Taiwan, Energy Star or EPEAT (Electronic Product Environmental Assessment Tool) label of the United States. The other general products of the United States and Japan use the latter approach.

Nonetheless, according to the Act on Promoting Green Purchasing, Japanese government agencies can adopt third party verification systems and the environmental information manual issued by the Green Purchasing Network as reference. All the ecolabelling schemes in the four countries are voluntary. However, considering that the ecolabelling scheme has developed a clear application process and a complete set of standards for green products, obtaining certification is always the preferred route for industries.

As for seafood, the identification of eco-seafood or sustainable seafood has not matured enough. The *Dolphin-Safe Label* originates in the United States, although the label is limited to tuna fisheries. Japan is in the early stage of developing *Marine Ecolabel Japan*. Taiwan and China have not developed their own Type I label of seafood ecolabelling scheme yet.

3.4.3 Case of Government-Based Ecolabelling: Taiwan

Taiwan, the first country to establish the legal status of the ecolabel in government green procurement, well illustrates the application of the ISO 14020 series to the identification of products. The Green Mark Program was launched in 1992 by the Taiwan Environmental Protection Administration (EPA) as a voluntary and positive ecolabelling program operated by the Environment and Development Foundation which was set up in 1997 by Industrial Technology Research Institute, a national research organization of Taiwan.⁶⁹ However, after the enactment of Article 96 of the 1999 Government Procurement Act and Article 22 of the 2002 Resource Recycling and Reuse Act, which requires all public sectors to purchase eco-products with an environmental protection label approved by the government as a priority, the Green Mark Program became an instrumental guide in implementing Government Green Procurement.

Pursuant to the “Measures for the Priority Procurement of Environmentally Preferable Products by Government Agencies”, the green products are classified into three types. Type I is issued to those products which have been ecolabelled “Taiwan Green Mark” under the category created by EPA, in which the market research must be done while specialists have been gathered to hold audits to set up relative regulations for the ecolabel category.

In Taiwan, the Type I ecolabelling program adopted the principle of “Life Cycle Consideration” (LCA) in developing product criteria, This approach differs from the early stages in 1992, when those criteria were simpler and based on one attribute.⁷⁰ The Taiwan

⁶⁹ During the period from 1992 to 1997, ITRT was administering the Taiwan Green Mark. However, issuing a Green Mark is not its legal business according to the Charter of the organization; therefore, ITRT set up EDF and transferred the work to EDF. EDF now is funded and overseen by Taiwan EPA.

⁷⁰ p.4 <http://www.wtosz.org/ecolabel/Files/The%20Green%20Mark%20Program/download/taiwan.pdf>

Green Mark Program simplified LCA techniques and used the matrix in ISO 14024 to establish qualitative judgments regarding the environmental attributes.

Because of the tough public audit system and the complicated process of issuing Type I Green Marks, only the most popular products categories get the chance to be listed in the schedule for public audit of standard setting every year. The Type II label is set up for those products that were not yet categorized as Type I label, but have been proved by the EPA to be recyclable, low pollution, and low energy consumption.

Type III is issued by other agencies or organizations such as the Ministry of Economic Affairs.⁷¹ Nonetheless, Type I and Type II products enjoy legal priority over Type III in government procurement tenders.

In addition to the Taiwan Green Mark, in order to simplify ecolabelling review, to expedite the process, to reduce the burden of vendors, and to integrate with international systems, Taiwan EPA began to sign mutual admission memoranda with the EPA of other countries. For example, Taiwan has signed an agreement with the United States EPA on the EPEAT in April 2010. From then on, computer products which have rated as Gold EPEAT in the United States can be converted directly into a Taiwan Green Mark without detailed examination if the vendor submits relevant certification to the Taiwan EPA. Those rated as Silver and Bronze can waive certain parts during the review of Taiwan Green Mark certification. The Energy Star also works in Taiwan now. Through global cooperation and mutual recognition, procurement officers can have more options on shopping categories. This is a global trend in governmental green procurement.

⁷¹ There are Energy Label and Water Conservation Label Programs operated under Ministry of Economic Affairs. Green Building Material Mark belongs to type III as well, operated by Chinese Architecture Center under Ministry of Interior Affairs

3.4.4 Organic Food in Government Procurement

Food is vital to human life. Although the traditional scope of green procurement discussed above does not cover food yet, people throughout the world are participating in movements to make school lunches organic. If each aspect of the environmental impact of organic agriculture is analyzed, one easily determines that the organic label fits the spirit of government green procurement.

First, organic agriculture is related to environmental issues. Many agricultural practices involved in non-organic production employ synthetic pesticides and chemical fertilizers which destroy the natural nutrients of the earth and pollute groundwater and streams through runoff. Overusing pesticides kills beneficial insects and often poisons the farmers themselves,⁷² not to mention creatures in the surrounding natural habitat. Angelo's article⁷³ offers a thorough discussion of the impact of industrial agriculture on the environment. Therefore, organic agriculture falls within the scope of environmental sustainability.

Moreover, various systems of organic ecolabelling comply with ISO 14024 and are able to identify qualified agricultural products for government procurement. Furthermore, in East Asia, agriculture is a vulnerable and disadvantaged industry which needs the power of government procurement to assist in developing sustainable practices.

⁷² The World Health Organization estimates that 300,000 people die from self-harm each year in the Asia-Pacific region alone. Worldwide, an estimated three million cases of pesticide poisoning occur every year.

http://www.who.int/mental_health/prevention/suicide/en/PesticidesHealth2.pdf

The author's grandfather, who was twice awarded the model farmer prize, died of liver disease caused by long-term, high-level exposure to pesticides.

⁷³ Mary Jane Angelo, Corn, Carbon and Conservation: Rethinking U.S. Agricultural Policy in a Changing Global Environment, 17 GEO. MASON L. REV. 593 (2010).

In Taiwan, twelve cities⁷⁴ adopted in 2014 a policy of supplying organic vegetables for one lunch or more a week in elementary schools and junior high schools. The first city to supply organic lunch was four elementary schools in Hsinchu County in 2011.⁷⁵ Yilan County was the first city to adopt a rule of “Location-Based Preferences” additionally, which means the rice and the vegetables supplied are all cultivated in Yilan. New Taipei City acts as the largest procurer. The purchasing volume of organic vegetables for lunch once a week amounted to 34.6 tons serving for 346,000 students in 286 public schools.⁷⁶

The enormous consumption and stable farming contract with governments has inspired more farmers to invest in organic agriculture to grow more organic food.

⁷⁴ As of 2014, the twelve cities are Taipei City, New Taipei City, Yilan County, Taoyuan City, Taichung City, Hsinchu County, Miaoli County, Kaohsiung City, Pingtung County, Nantou County, Changhua County, and Yunlin County. Cited from Legislative Yuan documents

http://lci.ly.gov.tw/LyLCEW/agenda1/02/pdf/08/06/16/LCEWA01_080616_00285.pdf

⁷⁵ Wang, Wenhao 汪文豪. 117 校園聯盟 : 32 元讓午餐變有機! [117 Campus Coalition: \$32 Makes Lunch Organic!] (Taiwan: News & Market, November 23, 2011) <https://www.newsmarket.com.tw/blog/2630/>

⁷⁶ See <https://wedid.ntpc.gov.tw/Site/PolicyDetails/736>

3.5 Ecolabels of Seafood Existing in the East Asia

3.5.1 ISO Type I: Ecolabelling Schemes of Marine Capture Fisheries

Generally, Type I labelling is a multiple-criteria-based third-party program that awards a license which authorizes the use of ecolabels on products indicating its environmental character.

Nowadays, industrial fisheries impact the marine environment and eco-system more severely, ecolabelling schemes emerge, and are regarded as a market measure to address the challenge of illegal, unreported, unregulated fishing. When a particular fish product is certified, it is presumed to be caught in compliance with environmental methods or sustainable management.

3.5.1.1 Marine Stewardship Council

The Marine Stewardship Council (MSC) is the most famous initiative in the ecolabelling of marine capture fisheries and wild-caught fish products. Established in London in 1997 as a joint project of the largest British seafood buyer Unilever and the World Wildlife Fund (WWF), MSC has operated as an independent organization since 1999.⁷⁷

The MSC global headquarters is located in London, and the MSC Regional Office of the Americas is in Washington D. C. There is a local office in Tokyo, Japan, and an office in China since 2013. According to the MSC annual report for 2013/14,⁷⁸ fisheries in thirty-four countries are engaged with the MSC, and 10.5% of wild-caught global seafood landings is MSC certified or assessed. MSC has 216 certified fisheries and 117 unique species certified and in assessment.

⁷⁷ See http://en.wikipedia.org/wiki/Marine_Stewardship_Council

⁷⁸ See <http://www.msc.org/documents/msc-brochures/annual-report-archive>

MSC set the standard for labelling through its board, supported by the Technical Advisory Board. Fishery assessment is based on a combination of species and fishing operations and is conducted by another third party who is independent from MSC. There is an independent dispute resolution process as well.

The minimum substantive requirements of MSC principles and criteria are:⁷⁹

- 1) fishing levels maintain high and ongoing productivity of fish stocks within safety margins for error and uncertainty.
- 2) depleted stocks are recovered within a specified time frame in order to provide and maintain high and ongoing productivity.
- 3) fishing does not threaten biodiversity (including genetic and species biodiversity), habitats or associated, dependent and ecologically related species. Fishing maintains functional relationships and should not lead to regime changes in ecosystem state or food webs.
- 4) fishing avoids or minimizes the capture of non-target species, adverse impacts on habitats, and mortality or injuries to threatened, endangered or protected species.
- 5) the management system has clear objectives consistent with the above requirements of fishing.
- 6) the management system is consultative to all interested parties, including fishing interests, and includes appropriate dispute resolution mechanisms.
- 7) the management system is appropriate to the context, scale and intensity of the fishery.
- 8) the management system includes a research and monitoring programme appropriate to the scale of the fishery, to provide the information necessary for management.

As of April 2015, only two fisheries in the East Asia had received an MSC ecolabel. One was the Kyoto Danish Seine Fishery, certified in 2008;⁸⁰ the other was the Chinese

⁷⁹ Keith Sainsbury, Review of Ecolabelling Schemes for Fish and Fishery Products from Capture Fisheries, p.17
Also see <http://www.msc.org/documents/get-certified>

scallop fishery at Zhangzidao, which was the first Chinese fishery to achieve MSC certification, on 22 April 2015.⁸¹

3.5.1.2 Friend of the Sea

The Friend of the Sea is a non-profit organization founded in 2006, headquartered in Italy, for the certification and promotion of sustainable seafood including fisheries and aquaculture. The Friend of the Sea started as a project of the Earth Island Institute, the organization which operates the famous Dolphin-Safe project. The Friend of the Sea has a two-person Board, an Advisory Board, and a Technical Committee. Candidate fisheries to be first assessed would be submitted to a third-party certification body to be assessed against the principles and criteria of the Friend of the Sea.

The Friend of the Sea is the only certification scheme which certifies wild and farmed seafood with the same logo. Both wild-caught fishery and aquaculture account for about 50% of certified seafood within Friend of the Sea business. The Friend of the Sea claims that their pricing model of ecolabelling, in line with the FAO, is affordable also to artisanal fisheries and small-scale fishermen, representing over 50% of the Friend of the Sea certifications.

Friend of the Sea sustainable fishery criteria are as below:⁸²

- 1) non-overexploited target stock according to FAO, Regional Fishery Bodies and National Marine Authorities;
- 2) no relevant impact on the seabed;
- 3) selective fishing method (max 8% discards);

⁸⁰ See <http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/pacific/kyoto-danish-seine-fishery-federation-snow-crab-and-flathead-flounder/kyoto-danish-seine-fishery-federation-flathead-flounder>

⁸¹ See <http://www.msc.org/newsroom/news/first-ever-chinese-fishery-achieves-msc-certification>

⁸² See <http://www.friendofthesea.org/fisheries.asp?ID=97>

- 4) no by-caught species included in the IUCN Red List of endangered species;
- 5) compliance with legal requirements (incl. TACs, no IUU, no FOC, mesh size, MPA, etc);
- 6) energy balance and yearly fuel efficiency improvement;
- 7) waste management;
- 8) social accountability.

As of April 2015, none of the fisheries in Japan, Taiwan, and China had been certified.⁸³ However, the Friend of the Sea and MSC compete for the Asian seafood market intensely.⁸⁴

3.5.1.3 Dolphin Safe

Dolphin is often by-caught in tuna fisheries as they commonly swim with schools of yellow fin tuna. The dolphins, who swim closer to the surface than tuna, may be used as an indicator of tuna presence. Dolphins and other marine mammals are frequently killed in the course of tuna fishing operations in the eastern tropical Pacific Ocean and high seas driftnet fishing in other parts of the world.⁸⁵

In 1990, the Earth Island Institute, a non-governmental organization based in Berkeley, California, defined Dolphin Safe tuna as tuna caught without setting nets on or near dolphins, and launched Dolphin-safe labels used to denote compliance with laws designed to minimize dolphin fatalities during fishing for tuna destined for canning. The Dolphin-safe label is mainly applied by tuna companies in the United States, and the relevant requirement was

⁸³ See <http://www.friendofthesea.org/fisheries.asp?ID=71>

⁸⁴ [News] FOS to top MSC in Asia seafood certification market, Wednesday, October 16 2013.
<http://www.seafoodsource.com/news/environment-sustainability/24605-fos-to-top-msc-in-asia-seafood-certification-market>

⁸⁵ The Marine Mammal Protection Act, Section 116. Dolphin Protection 16 U.S.C. 1385 (b)(1)

incorporated in the *Marine Mammal Protection Act* in the United States as *the Dolphin Protection Consumer Information Act*.⁸⁶

In 1997, the standards for Dolphin Safe tuna were expanded by Congress with the passage of the International Dolphin Conservation Program Act,⁸⁷ amending the Marine Mammal Protection Act to include the standard that no dolphins were killed or seriously injured in a net set to qualify that tuna for a Dolphin Safe label.

In 1999, via the Inter-American Tropical Tuna Commission, several nations adopted the Agreement on the International Dolphin Conservation Program (AIDCP), which set up standards for a different Dolphin Safe/Dolphin Friendly label, the standards being weaker than the United States standards, by nations that continue to chase and net dolphins to catch tuna. The AIDCP standard allows up to 5,000 dolphins be killed annually in tuna net sets, while encouraging the release of dolphins unharmed.⁸⁸ In 2013, a Campaign for Eco-Safe Tuna, representing the tuna fishing industry and government agencies of Latin America, advocated the adoption of the AIDCP label in place of the United States dolphin-safe label.⁸⁹

In a 2008 report, Greenpeace noted that relevant canned tuna with dolphin-safe labels may not be viewed as environmentally friendly because the dolphin-safe label merely indicates the by-catch contained no dolphins, but not necessarily no other species. And there is lack of an overall environmental impact assessment given to the tuna fishing method.⁹⁰

⁸⁶ Text of the Marine Mammal Protection Act (MMPA) <http://www.nmfs.noaa.gov/pr/laws/mmpa/text.htm>

⁸⁷ <https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=228&id=11672>

⁸⁸ <http://www.iattc.org/PDFFiles2/AIDCP-amended-Jul-2014.pdf>

⁸⁹ <http://www.ecosafetuna.org/about/campaign-eco-safe-tuna.html>

⁹⁰ Greenpeace, Canned Tuna's Hidden Catch, 2008.

<http://www.greenpeace.org/raw/content/usa/press-center/reports4/canned-tuna-s-hidden-catch.pdf>

In May 2012, the World Trade Organization ruled that the United States dolphin safe label focuses too narrowly on fishing methods, and too narrowly on the Eastern Tropical Pacific. The United States label does not address dolphin mortalities in other parts of the world. The United States subsequently expanded reporting and verification procedures to all oceans of the world, while maintaining the strong standards for the Dolphin Safe label, to come into compliance with the WTO decision.⁹¹

As of April 2015, the numbers of approved Dolphin-Safe Tuna processing companies and fishing companies by the Earth Island Institute were: China, 30; Taiwan, 6; and Japan, 1; individually.⁹²

3.5.1.4 Marine Ecolabel Japan

Since twenty-first century, several national fisheries ecolabels have been part of ecolabelling schemes that are government-linked. Developments have been seriously considered in Africa, Australia, Japan, and the Nordic countries. In East Asia, Japan is the first country to establish its own ecolabelling scheme for marine capture seafood. Taiwan and China are far behind.

In 2007, the Japan Fisheries Association, an incorporated association of Japanese fishing industry groups and interests, announced the development of a fisheries ecolabel: Marine Ecolabel Japan (MEL Japan), which was available for application in 2008. MEL Japan consists of an Audit Committee, an expert Advisory Body on technical issues, and a Council. The eleven-person Council was initially composed of four people from the wholesale and retail sectors, three from government agencies (Fisheries Research Agency,

⁹¹ https://www.ustr.gov/sites/default/files/DS381.US_.Sub1_.Fin_.Public.pdf and <http://www.ecosafetuna.org/about/wto-case.html>

⁹² See <http://www.earthisland.org/dolphinSafeTuna/DolphinSafeCanners.php>

Japan Fisheries Agency), two from industry associations (Japan Fisheries Association, National Federation of Fisheries Cooperatives in Japan) and two from scientific organizations.

The current requirements for assessment of the producing fishery are:⁹³

- (1) fisheries should be conducted under an effective management scheme;
- (2) the target resource should be maintained at a level that gives sustainable use; and
- (3) appropriate measures should be taken for the conservation of the ecosystem.

As of December 2014, Marine Ecolabel Japan had certified 28 fisheries.⁹⁴

In April 2017, the Tokyo 2020 Olympic Organizing Committee published the final version of its sourcing code. It set criteria for everything supplied for the games, from timber used in the Olympic village to food served in Olympic-affiliated canteens and restaurants. For Tokyo 2020, the sourcing code stipulates suppliers can obtain seafood certified as sustainable by one of four certification authorities: MSC, Aquaculture Stewardship Council (ASC), MEL Japan, and Aquaculture Ecolabeling Japan. During the Olympic games in Rio and in London, only MSC and ASC certified seafood was promoted. There are three Japanese fisheries and one aquaculture farm certified by MSC and ASC respectively, whereas twenty-eight fisheries are certified by MEL Japan and nineteen aquaculture farms by AEL Japan.

MEL Japan is revising criteria to adhere to GSSI global benchmarking and has set a three-year transition period within which all fisheries currently certified by MEL Japan have to be reassessed. This period ends after the Tokyo Olympics.⁹⁵

⁹³ Review of ecolabelling schemes for fish and fishery products from capture fisheries (FAO, 2010) p.16

⁹⁴ See <http://melj.jp/pdf/%E2%91%A5MELJapanCertifiedFisheries2014December.docx>
<http://melj.jp/fishery/index.cfm?fuseaction=FisheryList> Print

3.5.2 ISO Type II: Self-Declared Fisherman and Company

When there is no available or affordable ecolabelling scheme for a local fisherman or fishing business, what people usually can do is to declare the environmental effort they made in the productive process of seafood by themselves through the statement on their products. In Taiwan, more individual fishing families or small-scale fishing groups sell their fish on a website in order to distinguish themselves from common products often caught by large-scale industrial fishing vessels. Many emphasize that the Rod-and-reel fishing method they use can result in less bycatch because non-targeted species can be released immediately. Additionally, only one fish is caught at a time, preventing overfishing. Other seafood suppliers try to select reliable fishing boats.

In Japan, a country with long history of rich seafood culture, many old and famous Japanese restaurants and seafood wholesalers cooperate with familiar fishing groups. However, selling sustainable seafood does not particularly interest the Japanese. It is still an uphill struggle.⁹⁶

China is increasing demand for seafood, and self-declared environmental claims are not the trend there. A 2014 report surveyed by Seafood Source released the following findings:⁹⁷

“Increasingly, Chinese firms are keen to be covered by sustainability certification programs as it can boost sales to Western clients. Such certification is popular among multinational retailers, hoteliers and restaurateurs who want to burnish

⁹⁵ See Louis Harkell, 2017, May 15. “Tokyo 2020 will be a ‘backwards step’ for seafood sustainability, says expert” UCN (Undercurrent News), <https://www.undercurrentnews.com/2017/05/15/tokyo-2020-will-be-a-backwards-step-for-seafood-sustainabilitysays-expert/>

⁹⁶ See Winifred Bird. July 2012. "Will Fish-Loving Japan Embrace Sustainable Seafood?" http://e360.yale.edu/feature/will_fish-loving_japan_embrace_sustainable_seafood/2553/

⁹⁷ By Mark Godfrey, SeafoodSource contributing editor reporting from Beijing, China <http://www.seafoodsource.com/news/environment-sustainability/27268-china-buyers-lip-service-to-sustainableseafood>

their green image. Chinese seafood processors invariably pay for certification because Western clients demand it, not because they care about the sustainability of the species they process and package for export.

This is worrying, given that the real growth in seafood consumption is in mainland China, where there's very little enthusiasm for sustainability certification. Demand for sustainable seafood remains minimal; price and food safety are more important.

Disappointingly, Chinese fisheries bodies, such as the State Oceanic Administration, have not promoted their own certification programmes. Rather, brands in mainland China tend to use the imported nature of their seafood to motivate consumers at the mass-market end”.

3.5.3 ISO Type III: Sustainable Seafood Guide

A seafood guide is an information source addressing issues and expectations for sustainable fisheries and fish products and intended for the general public recommending which seafood to enjoy and which to avoid. Seafood guides are not formally third-party ecolabels and do not deal with certification or identify fisheries. They only provide a recommended list based on academic research which assesses fishing methods and capture targets throughout the overall life-cycle impact on the marine eco-system. Several guides use the IUCN Red List to identify species that should be avoided. These guides and claims are mostly confined to Type III ecolabels which are ISO 14025 defined.

The seafood guides are mainly designed by individual NGOs to give recommendations to consumers when purchasing in retail outlets and restaurants. A large number of seafood guide schemes are in operation, and actually they are a major and rapidly growing part of the public perceptions of a sustainable fishery. Details of seafood guides can be accessed on Web sites.

The minimum substantive requirements are:⁹⁸

- 1) a distinction is recognized between overfishing (i.e. fishing that will lead to the stock being depleted) and the stock being already overfished.
- 2) bycatch and discards are given prominence.
- 3) habitat impacts are given prominence, usually by some combination of intensity of impact and spatial extent of the impact. Large scale bottom trawling on hard bottoms and biogenic habitats usually score low in these schemes, together with the use of explosives and poisons.
- 4) food web considerations mostly relate to effects on dependent predators, and key prey species are often required to be considered explicitly with high scores requiring their management so as not to deplete dependent predators.

In the United States, various seafood guides exist.⁹⁹ The "Seafood Watch" issued by the Monterey Bay Aquarium is popular; whereas the WWF, together with the Seafood Choices Alliance, North Sea Foundation, and the Marine Conservation Society, developed a methodology to assess the sustainability of seafood species.

Taiwan

In Taiwan, the *Fish Database of Taiwan of the Biodiversity Research Center of Academia Sinica* was the first unit to issue a seafood guide.¹⁰⁰ Oceanus Honors Gaia, cooperating with Academia Sinica, developed simple generic principles¹⁰¹ for the public and continually converts the seafood list into such formats as menus or drawing books¹⁰² to promote public environmental education.

⁹⁸ Review of ecolabelling schemes for fish and fishery products from capture fisheries (FAO, 2010) p.22

⁹⁹ On the websites, it is easy to find the seafood guides of the Monterey Bay Aquarium, WWF, Natural Resource Defense Council, FishOnline, Food and Water Watch, Environmental Defense, and others.

¹⁰⁰ See <http://fishdb.sinica.edu.tw/chi/seafoodguide.php>

¹⁰¹ The principles are listed in the Appendix.

¹⁰² See <http://happyocean.org/index.php>

Japan

In Japan, the WWF, Greenpeace, and the Sustainable Fisheries Partnership have all published a Japanese-language guide. WWF also issues a Chinese version in Hong Kong. However, there seem to be no seafood guides generated by Japanese and Chinese local organizations.

China

Since November 2016, the first China Sustainable Aquatic Products Database, iFISH,¹⁰³ was publicly displayed at the "China Sustainable Aquatic Development Conference" held in Qingdao. The China Aquatic Products Processing & Marketing (CAPPMA) and China Blue jointly released iFISH for the first time. According to its website, iFISH is not an ecolabelling scheme, but a platform providing the latest knowledge and data concerning the sustainability of local Chinese aquatic products. And it may become Type I Ecolabelling scheme with third party verification in the future. However, iFISH insists in developing a sustainable fisheries evaluation system in the Chinese manner, especially for Chinese local fisheries. iFISH published "The Guidelines for Responsible Seafood Sourcing for China Retail Industry",¹⁰⁴ which were publicized on the United Nations Environment Programme (UNEP) in June 2017.

3.6 Conclusion

Given all the information and analysis of the current ecolabelling mechanism and government procurement, two arguments are readily made. The first is that government procurement helps establish sustainable ecolabelled fishery, but there is room for

¹⁰³ See <http://www.ifishonline.org/#/>

¹⁰⁴ See <http://en.chinabluesustainability.org/?p=744>

improvement. For example, the mandatory procurement objects do not include environmental food, including seafood, yet. The administrative order is not strong enough to carry out the sustainability goal.

The second argument is that ecolabelled seafood faces a long road to be included in the government procurement framework because of the lack of accreditation for fisheries and daily supply quantities.

In Taiwan and China, the challenges are more profound because of the lack of accurate and comprehensive recording and managing systems for collecting data on wild-caught catch and the monitoring, assessment, decision-making and implementation of management measures. Unsurprisingly, the primary difficulty of fishery scientific assessment in relation to ecolabelling is also the primary difficulty with cost and price, being a high barrier to producers and an obstacle to legal policy strategy.

Shortening the gap of cost and price between sustainable seafood and illegal, unreported and unregulated food is the key to finding the path on the legal map to sustainable seafood. Many legal and policy measures, for example, to strengthen enforcement of conservative laws and close legal loopholes, will be discussed in the following chapters.

Chapter 4 Where is the East China Sea?

The East China Sea is a marginal sea of the Pacific Ocean surrounded by China, South Korea, Japan, and Taiwan.

4.1 Scope of the East China Sea

Traditionally speaking, the East China Sea lies eastward of the Japanese islands of Kyushu and the Ryukyu Islands, and westward of the Asian continent. Lines from the mouth of the Yangtze River on China's Shanghai City to Korea's Jeju Island and Jeju Island to the south point of Kyushu are the northern boundary. As to the southern edge, there are three views. The key factor is whether the Taiwan Strait is an independent sea expanse or not.

A. East China Sea Containing Taiwan Strait

In the first point of view, Taiwan traditionally holds that the East China Sea does not contain the Taiwan Strait; the Taiwan Strait is part of the South China Sea. This is also the position expressed in the third edition of "Limits of Oceans and Seas".

The third edition of "Limits of Oceans and Seas" (1953) was published by the International Hydrographic Organization (IHO) as below.¹⁰⁵ The Ministry of the Interior of Taiwan adapted the IHO information to make its own Electronic Navigational Table.¹⁰⁶

¹⁰⁵ See https://www.iho.int/srv1/index.php?option=com_content&view=article&id=446&Itemid=402&lang=en

¹⁰⁶ See <https://www.nlsc.gov.tw/Home/MakePage/443?level=443>

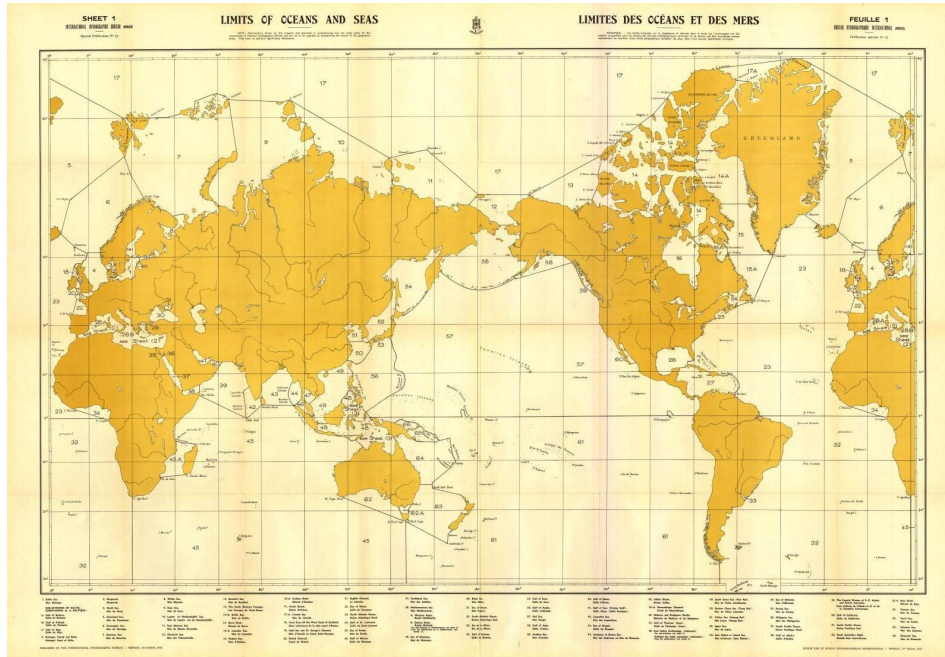


Figure 4: The third edition of "Limits of Oceans and Seas" (1953) published by the International Hydrographic Organization (IHO).

In this document, the Taiwan Strait is obviously a part of the South China Sea as the picture shows zoomed in below. Zone No. 49 is part of the South China Sea and covers the Taiwan Strait. The pink dot is the location of the Taiwan Strait.



Figure 5: Taiwan Strait located in third edition of "Limits of Oceans and Seas"

We can see this view more clearly in the figure of the South East China Sea below, the blue sea expanse is the South China Sea:



Figure 6: South China Sea in third edition of "Limits of Oceans and Seas"

B. East China Sea Containing Taiwan Strait

It is believed that China supports this view. According to the divisions of administrative jurisdiction of the East China Sea Branch of State Oceanic Administration¹⁰⁷ of China (中國國家海洋局東海分局), the southern boundary is the Dongshan Islet of Fujian Province.

Taiwan Strait is considered to be part of the East China Sea.



Figure 7: Location of the Dongshan Islet

¹⁰⁷ From March 2018, according to the "State Council Institutional Reform Plan," the State Oceanic Administration will no longer exist, and the Bureau will be replaced by the People's Republic of China Department of Natural Resources.

C. Taiwan Strait is Independent

There is another solution proposed in the draft 4th edition¹⁰⁸ of S-23. Taiwan Strait is regarded as an independent zone marked as NO 7.2 as below, which is also another common version seen in some Taiwan nongovernmental publications.

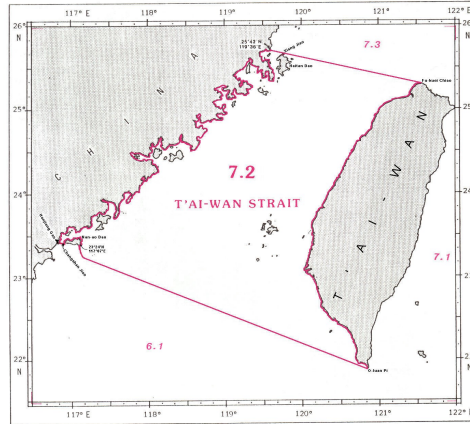


Figure 8: Taiwan Strait located in draft fourth edition of "Limits of Oceans and Seas"

D. Tropic of Cancer is the Boundary between East China Sea and South China Sea

Because the southern limit of the East China Sea is controversial, a new solution is proposed here after the present author consulted a Taiwanese marine biologist, Dr. Chao-lun Allen Chen¹⁰⁹. This position is that the southern edge of the East China Sea should be the Tropic of Cancer, the line of 23°5' N, which passes through Taiwan's Penghu Islands (澎湖群島) and China's Dongshan Isle (東山島).

¹⁰⁸ The 2002 draft 4th edition of S-23 was developed from 1998 to 2002, based on the 1986 draft. It was submitted to the IHO Member States in August 2002 for approval, but the voting process was interrupted by the IHB directing Committee in September 2002. It is a working document only. Retrieved from https://www.iho.int/mtg_docs/com_wg/S-23WG/S-23WG_Misc/Draft_2002/Draft_2002.htm

¹⁰⁹ Dr. Chaolun Allen Chen, a Research Fellow of Biodiversity Research Center, Academia Sinica of Taiwan. Retrieved from <http://www.biodiv.tw/en/people/faculty/dr-chaolun-allen-chen>

In other words, the East China Sea encompasses the north half of the Taiwan Strait; the other half of the Taiwan Strait belongs to the South China Sea. The boundary between the South China Sea and the East China Sea is the Tropic of Cancer, the line of 23°5 N.



Figure 9: Extent of the East China Sea Proposed in this Work

The most important argument supporting that the demarcation line between the East China Sea and the South China Sea should be the Tropic of Cancer is based on **the marine biophase**. The Tropic of Cancer has great significance for the land and sea climate. Fish and marine creatures in the temperate ocean and subtropical ocean are very different from one

another. Moreover, two kinds of temperate and subtropical fish can be harvested in Penghu Island waters in the same fishing net, which are located at 23.5 degrees north latitude.

Moreover, there is an uplift and banded seabed, academically called “Dongshan land bridge” (東山陸橋), also translated as “Tungshan land bridge”, beneath the Taiwan Strait waters connecting the Penghu Islands and Dongshan Island. Ten thousand years ago the Dongshan Land Bridge connected the Neolithic people of Taiwan with mainland China until melting glaciers made sea levels rise. The Dongshan Land Bridge is also considered to separate the ancient East China Sea and the ancient South China Sea and then to form two potential refuges.^{110 111}

To sum up, for the reasons discussed above, which sometimes intertwine to form an organic whole and become more persuasive when we understand more of the sea’s biological history, we may safely arrive at the conclusion that the best southern boundary of the East China Sea is the Tropic of Cancer, 23.5 degrees north latitude.

¹¹⁰ Dan Zhao, Qi Li, Lingfeng Kong, & Hong Yu. (2017, August 20). Cryptic diversity of marine gastropod *Monodonta labio* (Trochidae): did the early Pleistocene glacial isolation and sea surface temperature gradient jointly drive diversification of sister species and/or subspecies in the Northwestern Pacific? *Marine Ecology*, 30(4), e12443. Retrieved from <https://doi.org/10.1111/maec.12443>

¹¹¹ Shing-Fan Huang, (2014, June 16). Hypothesizing Origin, Migration Routes and Distribution Patterns of Gymnosperms in Taiwan. *Taiwania*, 59(2), p.139-163. Retrieved from <http://tai2.ntu.edu.tw/taiwania/abstract.php?type=abstract&id=1363>

4.2 Extent of the East China Sea Explored Herein

Considering the following factors: the 2013 Taiwan-Japan Fisheries Agreement which the northern boundary is 27 degrees north latitude; to the southward area of 27 degrees north latitude, it is currently within Taiwan's exclusive economic zone and within the substantive jurisdiction of the Taiwan's fisheries management and enforcement power; many Taiwanese fishing boats work there year round; considering the feasibility of the actual implementation of the scheme discussed in the present work, this work narrows the discussion area of the East China Sea to the space between the north of 27 degrees north latitude and the south of 23.5 degrees north latitude, the Tropic of Cancer.



Figure 10: Extent of East China Sea Explored in this Work

4.3 Fishery Resources in East China Sea

The East China Sea spans temperate and subtropical zones. Its northern and western seabed topography is a flat continental reef, which is not deep and mainly paved with sandy and sandy soft mud. The water temperature is about 10 degrees Celsius in winter. However, in the southern and eastern parts of the East China Sea, water depths range from hundreds to thousands of meters. The water temperature is affected by the Kuroshio Current, which is a warm current keeping the water at about 20 degrees Celsius. This affects the growth of fish and the catch in the East China Sea. Many fish species breed, grow, find food, and survive the winter here.

Because the East China Sea is a semi-enclosed sea, it makes fish stocks relatively independent, and fish migration is relatively small. In addition, a large number of Chinese coastal rivers bring rich nutrients, among them the Yangtze River, along with the nutrients from the Kuroshio Current, so that the economically-attractive fish species in the East China Sea are diverse. However, river pollution is increasing from cities, which flow into the East China Sea. How to preserve and manage hundreds of fish species has become the most challenging fishery management issue in the world.

According to the Japan Fisheries Agency data shown below, the Japanese long-term Fishery Resource Assessment study is based on fifty species which contained 84 fish stocks when updated in 2016. The United States has conducted studies of 473 fish stocks, whereas the European Union has undertaken studies of 186 fish stocks. But if we take the size and ratio of national land area to the exclusive economic sea area into account, Japan is salient, as the data show below.

日本の資源評価手法の米国・EUとの比較

(注) MSY (Maximum Sustainable Yield)

	日本 Japan		米国 U.S.A			EU		
評価数	84系群 (2016年)		473系群 (2~3年毎に実施、2015年は121系群)			186系群 (2014年)		
評価結果	資源状態	高位	資源状態	乱獲 (Overfished)	適正 Okay	不明 Unclear	資源状態: 適正 漁獲圧力: 適正	22
		中位		38	196	239	資源状態: 適正 漁獲圧力: 過剰	37
		低位	漁獲圧力	過剰 (Overfishing)	適正	不明	資源状態: 乱獲 漁獲圧力: 適正	19
				29	286	158	資源状態: 乱獲 漁獲圧力: 過剰	108

Data from Japan Fisheries Agency website
Marked by Platinasoka Lin

Figure 11: Comparison of fishery resource assessments in Japan, United States, and European Union

The present work focuses on the southeast area of the East China Sea. The cases of Taiwan fishery management selected in Chapter 7, including Shark, Crab, Mackerel, Neritic Squid, and Mahi-mahi, are mainly living their marine life in the southeastern East China Sea. However, except for Mackerel and Neritic Squid, there is a lack of long-term and credible scientific marine biology research on the other species.

The East China Sea is a semi-enclosed sea area encircled by China, South Korea, Japan, and Taiwan. The fisheries development processes of these four countries differ; Japan was the first to develop, followed by Taiwan and South Korea.

In the past fifteen years, China has been building large numbers of fishing boats. The number of its fishing boats has surpassed the former three countries and the lack of fishery management has severely depleted the fishery resources in the East China Sea. The serious cross-border illegal fishing of Chinese fishing boats generated clashes with the other three countries regarding maritime law enforcement.

How to jointly conserve and sustainably use the fishery resources of the East China Sea has become a crucial issue of marine policy for the four countries concerned.

4.4 EEZs Claimed in East China Sea

The East China Sea is an extended, narrow sea area among China, Japan, Korea, and Taiwan, 300 to 400 nautical miles north to south, and 140 to 280 nautical miles east to west. From the geographical configuration of the East China Sea, we can easily see a high potential for demarcation disputes because China, Japan, South Korea, and Taiwan all claim 200 nautical miles of exclusive economic zone (EEZ) waters. The claims over the EEZ are described below.

First, Japan adopted a Law on the Exclusive Economic Zone and Continental Shelf dated 14 June 1996, with entry into force as of 20 July 1996. It was the first of the four countries bordering the East China Sea to do so. Second, the Law on the South Korean Exclusive Economic Zone Law was adopted 8 August 1996 and came into effect on 10 September 1996. Third, the Law on the Exclusive Economic Zone and Continental Shelf was adopted in Taiwan on 30 December 1997, with effect from 21 January 1998. Finally, the Law on the Exclusive Economic Zone and Continental Shelf of the People's Republic of China was adopted 26 June 1998.

As the EEZs established by these four countries in the East China Sea overlap, the 1997 "*Fisheries Agreement of the People's Republic of China and Japan*", the 2001 "*Fisheries Agreement between the Government of the People's Republic of China and the*

Government of the Republic of Korea”, and the 2013 “**Taiwan-Japan Fisheries Agreement**”¹¹² have been concluded.

¹¹² As for the political factors between China and Taiwan, the actual name of the Taiwan-Japan agreement is "Fisheries Agreement between the Association of East Asia Relations and the Interchange Association (亞東關係協會與公益財團法人交流協會漁業協議)". Retrieved from <https://www.fa.gov.tw/cht/LawsAnnounceFisheries/content.aspx?id=25&chk=0eeae2ec-001b-4b84-9b8b-573bde2b772c¶m=> and https://www.mofa.gov.tw/en/News_Content.aspx?n=539A9A50A5F8AF9E&sms=37B41539382B84BA&s=E80C25D078D837BB#

PART II. LEGAL TOOLS FOR CONSERVATION OF MARINE LIVING RESOURCES AND MANAGEMENT OF FISHERIES

Chapter 5 International Legal Instruments pertaining to a Coastal State Exercising Sovereign Rights to Conserve and Manage the Marine Living Resources

5.1 Introduction

Hugo Grotius (1583–1645), a founder of the modern doctrine of international law, put theory into practice when a dispute arose between the English and the Dutch over the freedom of the seas. His involvement in the dispute led to his views published in *Mare Liberum* (1609).¹¹³ Grotius argued that the sea was free to all and that nobody had the right to deny others' access to it. Moreover, he believed that the sea was more like air than land, and was, as opposed to land, common property of all:

"The air belongs to this class of things for two reasons. First, it is not susceptible of occupation; and second, its common use is destined for all men. For the same reasons the sea is common to all because it is so limitless that it cannot become a possession of any one, and because it is adapted for the use of all, whether we consider it from the point of view of navigation or of fisheries".¹¹⁴

In the twentieth century, the freedom of the seas began to be more clearly defined. The 1958 Geneva Convention on the High Seas (Article 2) provides that the freedom of the high seas includes the freedom of navigation, the freedom of fishing, the freedom to lay submarine cables and pipelines, and the freedom to fly over the high seas.

¹¹³ See <https://plato.stanford.edu/entries/grotius/>

¹¹⁴ Hugo Grotius , p. 28

<http://oll.libertyfund.org/titles/grotius-the-freedom-of-the-seas-latin-and-english-version-magoffin-trans>

Two freedoms were added to Article 87 of the 1982 United Nations Convention on the Law of the Sea (UNCLOS): the freedom to construct artificial islands and other installations and the freedom of scientific research. However, Article 87 of UNCLOS also states that “these freedoms shall be exercised by all States with due regard for the interests of other States in their exercise of the freedom of the high seas, and also with due regard for the rights under this Convention with respect to activities in the Area”, suggesting the freedom is restricted.

In addition, UNCLOS (Article 3) allows the territorial sea to be extended to a limit not exceeding 12 nautical miles, and the Article 57 permits countries to have an exclusive economic zone, which shall not extend beyond 200 nautical miles from the baseline of the territorial sea. These two articles reduce the area for freedom of fishing on the high seas. With the rapid development of fishing technologies during the past half-century, mankind began to realize that fishery resources are finite. Therefore, the freedom of fishing on the high sea continues to be more constrained. Coastal countries and port States are playing larger roles in protecting the marine ecological environment and conserving marine biological resources. In the next section, critical legal documents affecting the management of fishery resources by the international community are selected by way of a simple introduction. The conservation concepts and measures revealed in these documents have influenced Taiwan's development of domestic fisheries management.

5.2 International Legislation

5.2.1 1982 United Nations Convention on the Law of the Sea

Introduction

United Nations Convention on the Law of the Sea (Law of the Sea Convention, or UNCLOS) sets forth a comprehensive legal framework governing uses of the ocean and is regarded as the fundamental law regulating marine affairs by international society.

Concluded in 1982, the Law of the Sea Convention came into force in 1994. Currently, there are 167 parties,¹¹⁵ including China, Japan, and South Korea. The United States has not acceded to the Law of the Sea Convention,¹¹⁶ nor has Taiwan. But Taiwan claims its territorial waters and exclusive economic zone based on the Law of the Sea Convention.

Application of UNCLOS in Taiwan

When the 1982 United Nations Convention on the Law of the Sea (UNCLOS) was signed, Taiwan, also known as the Republic of China, had already withdrawn from the United Nations in 1971. Nevertheless, Taiwan enacted the "Law on the Exclusive Economic Zone and the Continental Shelf of the Republic of China" in 1998, in which Article 2 states that “the exclusive economic zone of the Republic of China denotes the sea area contiguous to the outer limits of the territorial sea and a distance measuring outwardly 200 nautical miles from the baseline of the territorial sea”.

However, the Taiwan Government does not comprehensively accept UNCLOS and its derivative agreements. The deadline for countries to submit applications for the extension of

¹¹⁵ https://treaties.un.org/pages/ViewDetailsIII.aspx?src=TREATY&mtdsg_no=XXI-6&chapter=21&Temp=mt_dsg3&lang=en

¹¹⁶ See <https://www.state.gov/e/oes/lawofthesea/>

the continental shelf to the Commission on the Limits of the Continental Shelf of the United Nations was 12 May 2009. On the same date, the Ministry of Foreign Affairs of Taiwan issued the “Declaration of the Republic of China on the Outer Limits of Its Continental Shelf,¹¹⁷” which stated the following:

*“As this country was not invited to participate in the negotiation and signing of the UNCLOS, it was unable to become a party state to the UNCLOS. As a result, this government is not legally bound by the SPLOS/72 and SPLOS/183 decisions made by the contracting parties to the UNCLOS. Accordingly, the making of claims over the extended continental shelf by this country is not constrained by the deadline of 12 May 2009. After this date, this country shall remain entitled to make claims on the outer limits of its extended continental shelf beyond 200 nautical miles with respect to the waters of the East China Sea, Eastern Taiwan, and the South China Sea”.*¹¹⁸

Fisheries Resources Conservation and Management

One central purpose of the Law of the Sea Convention is: "with due regard for the sovereignty of all States, a legal order for the seas and oceans which will facilitate international communication, and will promote the peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources, the conservation of their living resources, and the study, protection and preservation of the marine environment".¹¹⁹

The Law of the Sea Convention has relevant principles for most aspects of marine affairs. In order to achieve effective conservation and management of fishery resources, many documents have been adopted, including the 1993 “Agreement to Promote Compliance

¹¹⁷ See Declaration of the Republic of China on the Outer Limits of Its Continental Shelf https://www.mofa.gov.tw/en/News_Content.aspx?n=1EADDCFD4C6EC567&sms=5B9044CF1188EE23&s=1DE6A7BA5C27CED3

¹¹⁸ Declaration of the Republic of China on the Outer Limits of Its Continental Shelf http://multilingual.mofa.gov.tw/web/web_UTF-8/almanac/almanac2009/html/12-4.htm

¹¹⁹ The fourth point in the PREAMBLE of the Law of the Sea http://www.un.org/depts/los/convention_agreements/texts/unclos/preamble.htm

with International Conservation and Management Measures by Fishing Vessels on the High Seas”, the 1995 “Fish Stocks Agreement”, the 1995 “Code of Conduct for Responsible Fisheries”, and the 2009 "Agreement on Port State Measures", among others. These documents and agreements are expected to achieve the sustainable utilization of marine resource through cooperation within the international community.

The parts relevant to conserving fishery resource in the Law of the Sea Convention are: "Part V - Exclusive Economic Zone" and "Part VII - High Seas". Part V, Exclusive Economic Zone (EEZ), is the vital legal base of the fisheries management measures in the East China Sea that this work considers because most Taiwanese fisheries operations in the East China Sea occur within the 200-nautical mile zone of northern Taiwan coasts. For example, the Diaoyutai Islands are located in the East China Sea, 102 nautical miles away from Keelung, which is the northernmost city of Taiwan. Most Taiwanese fishing boats operate in the East China Sea between Taiwan Island and Diaoyutai Islands.

Part V of the Law of the Sea Convention (Article 56) provides that the coastal State has "sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the waters superjacent to the seabed and of the seabed and its subsoil" in the exclusive economic zone. Furthermore, Article 61 allows the coastal State to determine the allowable catch of the living resources in its exclusive economic zone. The Taiwan Government is expected to implement this policy in the East Sea fisheries.

In addition to setting the allowable catch, Article 62 provides many options for coastal State. Though Article 62 is addressed to “nationals of other States fishing in the coastal State's exclusive economic zone to comply with the conservation measures established in the

laws and regulations of the coastal State”, the provision is valuable to coastal States themselves. For example, Article 62 indicates that “the conservation measures may relate, *inter alia*, to the following”, which is the focus of fisheries management that Taiwan has to achieve:

- (a) licensing of fishermen, fishing vessels, and equipment, including payment of fees and other forms of remuneration;*
- (b) determining the species which may be caught, and fixing catch quotas, whether in relation to particular stocks or groups of stocks or catch per vessel over a period of time or to the catch by nationals of any State during a specified period;*
- (c) regulating seasons and areas of fishing, the types, sizes and amount of gear, and the types, sizes, and number of fishing vessels that may be used;*
- (d) fixing the age and size of fish and other species that may be caught;*
- (e) specifying the information required of fishing vessels, including catch and effort statistics and vessel position reports.*

However, although the Law of the Sea Convention provides a framework for resolving conflicts over the use of ocean resources in the exclusive economic zone, it provides no further regulation on the conservation of fishery resources on the high seas. Only Article 64 gives some principled guidance. Furthermore, Article 116 provides that "all States have the right for their nationals to engage in fishing on the high seas", but overfishing would happen if there were no management. Therefore, the 1993 FAO Compliance Agreement and the 1995 UN Fish Stocks Agreement were concluded subsequently.

5.2.2 1995 Fish Stocks Agreement

In the East China Sea, by reason of the overlapping Exclusive Economic Zones of Taiwan, Japan, and China, there are straddling fish stocks, such as mackerels and Mahi-mahi which are discussed in Chapter Seven, when facing the challenge of ecosystem conservation and fishery management. In this section, we consider some materials to help address these topics in the East China Sea.

Although the UNCLOS mentioned straddling fish and highly migratory fish, they are addressed in principle rather than having any practical managerial effectiveness. In order to supplement the missing parts in UNCLOS, the United Nations Convention on Straddling Fish Stocks and Highly Migratory Fish Stocks (Fish Stocks Agreement) was signed on 4 August 1995 and came into force in 2001.

The Conference convened to draft the Fish Stocks Agreement commenced in 1993; the negotiating text contained eleven sections, listed below.¹²⁰ Most sections are of referential value for the East China Sea participants regarding possible future cooperation:

1. The nature of conservation and management measures to be established through cooperation;
2. The mechanisms for international cooperation;
3. Regional fisheries management organizations or arrangements;
4. Flag State responsibilities;
5. Compliance and enforcement of high seas fisheries and management measures;
6. Responsibilities of port States;

¹²⁰ Chairman's Negotiating Text, UN Doc. A/CONF.164/13 (30 July 1993)
http://www.un.org/ga/search/view_doc.asp?symbol=A/CONF.164/13

7. Non-parties to a sub-regional or regional agreement or arrangement;
8. Dispute settlement;
9. Compatibility and coherence between national and international conservation measures for the same stocks;
10. Special requirements of developing countries;
11. Review of the implementation of conservation and management measures, and minimum data requirements for the conservation and management of these stocks.

As for how Taiwan, China, and Japan should co-work together to achieve the goals of marine conservation, we suggest that these three nations should start with a discussion regarding specific fish stocks as a top priority, utilizing quasi-official fisheries management or marine conservation institutions to reach an initial consensus. As to whether three countries should have a consistent managerial direction and goals, Article 7(2) provides the answer:

“Conservation and management measures established for the high seas and those adopted for areas under national jurisdiction shall be compatible in order to ensure conservation and management of the straddling fish stocks and highly migratory fish stocks in their entirety. To this end, coastal States and States fishing on the high seas have a duty to cooperate for the purpose of achieving compatible measures in respect of such stocks”.

However, there are no high seas within the East China Sea. Therefore, if the results of the discussion are to be executed, a fisheries agreement among the nations should be relied upon to achieve compatible measures concerning such stocks. Another important topic is port State control mechanism. Some pelagic fishing States initially argued that the port State has no right to deny access to the port. On the other hand, some coastal States believed that all ports should be vested with that kind of authority, regardless of where the violation took place. Article 23(2) provided a conclusion:

“A port State may, inter alia, inspect documents, fishing gear and catch on board fishing vessels, when such vessels are voluntarily in its ports or at its offshore terminals”.

However, most offshore fishing boats from Taiwan, Japan, and China go back to their country of origin to issue their Landing Declarations. These regulations may not have a chance to be of use. Therefore, we will not dwell in detail on the 2009 Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported, Unregulated Fishing, Port State Measures Agreement, in force as of June 2016.

Current Status of Taiwan

Although Taiwan did not participate in this Agreement, Article 1(3) provided:

“This Agreement applies mutatis mutandis to other fishing entities whose vessels fish on the high seas”.

The term “fishing entity” is usually applied to Taiwan, reflecting political disputes between China and Taiwan. This term opens the gate for Taiwan to participate as part of the international pelagic fisheries community, that is, several Regional Fisheries Management Organizations (RFMOs). For example, since 2002, Taiwan has become a member of six RFMOs, including the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC), Western and Central Pacific Fisheries Commission (WCPFC), Inter-American Tropical Tuna Commission (IATTC), South Pacific Regional Fisheries Management Organization (SPRFMO), and North Pacific Fisheries Commission (NPFC).

However, taking the reasons below into account:

- 1) the offshore and coastal fishing boats in East Asian countries include far more than pelagic fishing vessels; and
- 2) the industrial structure of offshore and coastal fisheries are more complicated than that of pelagic fisheries,

the present author is of the view that the opportunities for organizing a successful cooperative management meeting forum of straddling fish stocks of East Asia for Taiwan, Japan, and China could only occur if there is a significant change in the political atmosphere among the East Asian countries.

5.3 International Voluntary Agreements

5.3.1 1995 FAO Code of Conduct for Responsible Fisheries (FAO Code)

Among all the international conventions, except the Law of the Sea Convention, the Code of Conduct for Responsible Fisheries might be the most helpful instrument to help Taiwan improve its domestic fishery management work, considering the plight of Taiwan's international diplomatic dilemma which is the result of the harsh political relationship between Taiwan and China.

Introduction

The International Conference on Responsible Fishing (1992) adopted the “Declaration of Cancun”, calling for the strengthening of the international legal framework for more effective conservation, management and sustainable exploitation and production of living aquatic resources. Thus, the 1995 FAO Conference adopted the FAO Code of Conduct for Responsible Fisheries.

The purpose of the FAO Code is to facilitate structural adjustment so that marine capture fisheries would develop in a comprehensive and balanced manner under the concept of "responsible fisheries". This concept encompasses the long-term sustainable utilization of

fishery resources in harmony with the environment and the use of capture and aquaculture practices that are not harmful to ecosystems, resources, or their quality.¹²¹

According to Article 2, the objectives of the Code are to:

- a. establish principles, in accordance with the relevant rules of international law, for responsible fishing and fisheries activities, taking into account all their relevant biological, technological, economic, social, environmental and commercial aspects;*
- b. establish principles and criteria for the elaboration and implementation of national policies for responsible conservation of fisheries resources and fisheries management and development;*
- c. serve as an instrument of reference to help States to establish or to improve the legal and institutional framework required for the exercise of responsible fisheries and in the formulation and implementation of appropriate measures;*
- d. provide guidance which may be used where appropriate in the formulation and implementation of international agreements and other legal instruments, both binding and voluntary;*
- e. facilitate and promote technical, financial and other cooperation in the conservation of fisheries resources and fisheries management and development;*
- f. promote the contribution of fisheries to food security and food quality, giving priority to the nutritional needs of local communities;*
- g. promote the protection of living aquatic resources and their environments and coastal areas;*
- h. promote the trade of fish and fishery products in conformity with relevant international rules and avoid the use of measures that constitute hidden barriers to such trade;*
- i. promote research on fisheries as well as on associated ecosystems and relevant environmental factors;*
- j. and provide standards of conduct for all persons involved in the fisheries sector.*

This Code itself is not binding, but rather is a global reference document and not limited to participation by United Nations members. The Code attempts to ensure that all people working in fisheries and aquaculture commit to the Code principles and goals and take practical measures to implement them.

¹²¹ See <http://www.fao.org/focus/e/fisheries/codecond.htm>

Taiwan's practice of "responsible fisheries" includes strengthening marine fishery management, collecting fishery catch information, establishing an observer system, promoting fishing vessel position monitoring, setting up fishery resource conservation areas, efforts to reduce catch (limited fishing vessel construction, fishing vessel acquisition, and rewards for not fishing) and fishery science research. Overall, there are many areas for improvement, considered below.

5.3.2 Four FAO International Plans of Action (IPOA)

Following the FAO Code, there are four International Plans of Actions (IPOA), which are voluntary instruments elaborated within the framework of the Code. They apply to all States and entities and all fishermen. In the view of the present author, these IPOAs played an essential role to induce the Taiwan Government to meet the minimum expectations of the international community, including with respect to the seabird issue.¹²²

There are four IPOAs:

1. *International Plan of Action for the Management of Fishing Capacity (IPOA-Capacity)*
2. *International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries (IPOA-Seabirds)*
3. *International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks)*
4. *International Plan of Action to Prevent, Deter, and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU)*

¹²² The present author was the vice coordinator of seabird conservation task force of the Chinese Wild Bird Federation from 2012 to 2015. From the perspective of conservation groups, IPOA-Seabirds is requesting the Taiwan Government to supervise the installation of seabird bycatch mitigation and prevention devices. Therefore, it is an important document.

The first three IPOAs were developed in 1997 because people found it necessary to have an international agreement in order to manage compliance with the FAO Code. The most suitable instrument for each text was developed in two intergovernmental meetings, open to all FAO members, held in 1998. These IPOAs were adopted by the Twenty-third Session of the FAO Committee on Fisheries in February 1999 and endorsed by the FAO Council at the session held in November 2000.¹²³

The National and Regional Plans of Action (NPOA), which are developed by States themselves, usually follow the IPOAs. In reality, the degree of plan fulfillment relies upon the degree of emphasis that each country puts on marine conservation.

The Taiwan Government has announced the NPOA-Seabird, NPOA-Shark, NPOA-IUU, and NPOA-take Capacity. The industry most affected in Taiwan is the pelagic fisheries. Comparatively speaking, whether it is IUU or Fishing Capacity, the actual policy implementation and law enforcement of these two have not been executed to the extent that is satisfactory to the conservation groups. Relatively speaking, because pelagic fishing vessels from Taiwan are prone to inspection by foreign harbors or encounter pressure from foreign officials for vessel checks on board, the Taiwan Fisheries Agency is more proactively spending time on the promotional tasks of pelagic fisheries.

Take NPOA-Seabird for instance. As one of the significant tuna longline pelagic fisheries nations in the world, Taiwan has more than 1,000 longline fishing vessels operating in the three oceans all year round. Those fishing vessels might incidentally catch albatrosses, petrels and other seabirds while fishing at high latitudes. In order to reduce seabird bycatch, the Taiwan Fisheries Agency developed the first version of NPOA-Seabirds in 2006 and

¹²³ See <http://www.fao.org/fishery/code/ipoa/en>

updated this plan in 2014. Furthermore, the Taiwan Fisheries Agency formulated relevant plans requesting fishing vessels to use at least two of the following seabird bycatch mitigation measures: bird-scaring lines, weighted branch lines, and night setting.¹²⁴

However, the sea area explored in this work is the southern half of the East China Sea, and there seems to be no urgent issue of seabird bycatch. In this work, the NPOA-take Capacity, NPOA-IUU, and NPOA-Shark are the significant means for reaching the goal of sustainable fishery in the East China Sea. Details of suggested policies relating to Fishing Capacity and IUU are discussed in Chapter Six, whereas sharks are discussed in Chapter Seven.

¹²⁴ See <https://www.fa.gov.tw/cht/includes/rd.ashx?mID=218&id=37&chk=67C32D6C-08DE-4D62-A5EE-2EB21677A424>

5.4 Existing Fisheries Agreements in East China Sea

5.4.1 Taiwan-Japan Fisheries Agreement

Median Line of Japan

Japan was the first among the four countries around East China Seas to announce an exclusive economic zone. After adopting the 1996 Act on Exclusive Economic Zone and Continental Shelf, Japan established a median line between the East China Sea and the Pacific Ocean based on the Act in order to distinguish the boundary of the exclusive economic zone (EEZ) between Japan and Taiwan. However, the Taiwan Government did not concur with the boundary. Since 2000, Japan began enforcing its law unilaterally, detaining Taiwan fishing boats that had crossed the overlapping EEZ between Japan and Taiwan.

Taiwan's Temporary Law-Enforcement Line

Under the pressure of public opinion, the Taiwan Government announced in 2004 the first part of temporary law-enforcement lines of EEZ. These were based on the principle of equitable balance, using the Diaoyutai Islands as the base point to draw the northern boundary, in order to prove its determination to protect Taiwanese fishermen.

The law-enforcement line has not been accepted by Japan, which insists on the application of the median line principle. Japan has detained any Taiwan fishing boats crossing the median line. Because the law enforcement forces of the Taiwan Coast Guard Administration are less powerful than those of Japan, the Taiwanese government could only protest.

Issue of Traditional Fishing Grounds

The East China Sea between the Diaoyutai Islands and Japan's Yaeyama Island is a Tuna migration route. Many Taiwanese tuna fishing boats travel to the sea to compete with Japanese tuna boats at the risk of being detained. The area is where most conflicts occurred between Taiwanese and Japanese fishing boats. The leading cause of conflict between Taiwan and Japan over the EEZ, in the opinion of the present writer, is rivalry over tuna fisheries rather than the sovereignty of the Diaoyutai Islands.

Because of the special international status of Taiwan and the lack of formal diplomatic ties between the Taiwanese and Japan governments, the Government of Japan has been unwilling and unable to negotiate with Taiwan over the demarcation of an exclusive economic zone, the issue of EEZ demarcation essentially being unresolvable.

Historical Turning Point

In 2012 Japan claimed the Diaoyutai Islands, triggering tension among East China Sea countries and instigating a series of declarations concerning the sovereignty of the Diaoyutai Islands by local and governmental organizations from China and Taiwan. In order to alleviate the pressure from protests regarding the sovereignty of the Diaoyutai Islands, Japan unexpectedly agreed to sign the Taiwan-Japan Fisheries Agreement.

Given the lack of formal diplomatic ties between the two countries, the fisheries agreement is signed by two non-governmental organizations, the Association of East Asian Relations of Taiwan and the Exchange Association of Japan, in Taipei City of Taiwan on 10 April 2013. Pursuant to the Agreement, the Taiwan-Japan Fishery Committee was set up, which meets annually to discuss fishing regulations. The sea area covered by the Agreement

is depicted in the chart below. The purpose is mainly to exclude the sea area with a range of 12 nautical miles around the two Diaoyutai Islands.

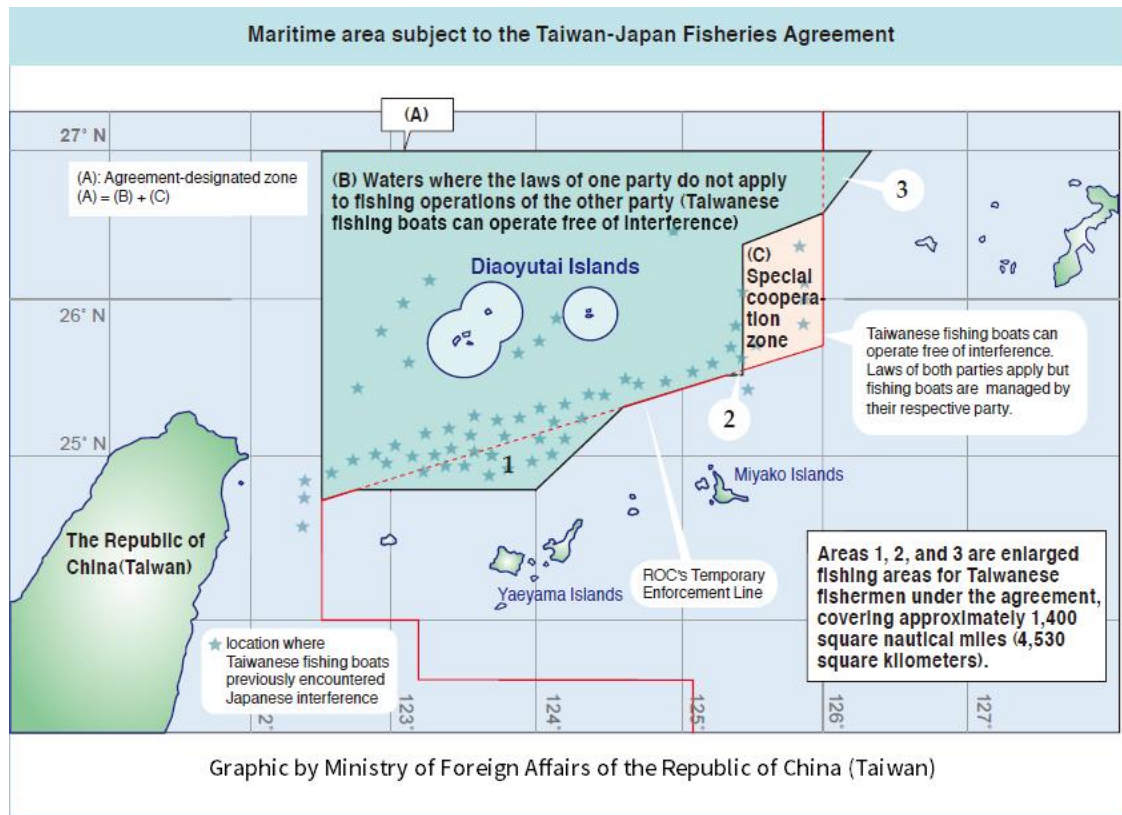


Figure 12: Maritime area subject to the Taiwan-Japan Fisheries Agreement

Cited from Ministry of Foreign Affairs of the Republic of China (Taiwan) ¹²⁵

The area of the East China Sea regulated by the Agreement is 74,000 square kilometers. Compared with the EEZ area covered by the temporary law-enforcement line of Taiwan, the fishing area for Taiwanese fishing boats has increased by 4,350 square kilometers in the 2013 fisheries agreement. In the overlapping EEZ, named “Special cooperation zone” of the Fisheries Agreement, fishing boats of both sides are allowed to fish.

¹²⁵ See [https://www.mofa.gov.tw/Upload/WebArchive/979/The%20Taiwan-Japan%20Fisheries%20Agreement%20\(illustrated%20pamphlet\).PDF](https://www.mofa.gov.tw/Upload/WebArchive/979/The%20Taiwan-Japan%20Fisheries%20Agreement%20(illustrated%20pamphlet).PDF)

After the Taiwan-Japan Fisheries Agreement came into force on 10 May 2013, the number of Taiwanese fishermen fishing on the East China Sea suppressed by the Japan coast guard has fallen from seventeen cases before the implementation of the Fisheries Agreement to fewer than five cases in 2018. These five cases all are instances of Taiwanese fishing boats illegally trespassing beyond the sea area where the Fisheries Agreement operates; thus, they all faced detention or expulsion by Japan.

5.4.2 China-Japan Fisheries Agreement

In 1949, when the People's Republic of China (PRC) was founded, China had no formal diplomatic relation with Japan. At that time, many modern boats of Japan fished in the East China Sea, which was rich in fishery resource, and Japan competed with Chinese fishing boats for the marine resource. In 1954 PRC Prime Minister Zhou Enlai recommended that the issues of fishing in the Yellow Sea and the East China Sea should be dealt with through negotiation between private fisheries associations of both sides while meeting with Japan members of the Congress who visited China. Then, in 1955, delegations of fisheries associations from China and Japan signed the "Agreement Concerning Fishery in the Yellow and East China Seas between the PRC-Japan Fishery Council of Japan and the PRC Fishery Association".¹²⁶

¹²⁶ See 「中華人民共和國中國漁業協會和日本國日中漁業協議會關於黃海、東海漁業的協定」

The Chinese content of "The Agreement Concerning Fishery in the Yellow and East China Seas between the PRC-Japan Fishery Council of Japan and the PRC Fishery Association."

<http://worldjpn.grips.ac.jp/documents/texts/JPCH/19631109.T1C.html>

However, in 1972, China established diplomatic relation with Japan. In August 1975, governmental delegations of both sides signed the “Agreement on Fisheries between the People's Republic of China and Japan” in Tokyo.¹²⁷

In November 1994, as noted above, the UNCLOS came into force. China and Japan each subsequently claimed a 200 nautical-mile EEZ. The EEZs of China and Japan overlap in the East China Sea. Therefore, the two countries re-signed the fisheries agreement, also called the “Agreement on Fisheries between the People's Republic of China and Japan”,¹²⁸ pursuant to the UNCLOS in November 1997, which came into force on 1 June 2000.

Considering the formal boundary of the exclusive economic zone between China and Japan in the East China Sea has not demarcated, the fisheries agreements are provisional arrangements based on the paragraph 3.¹²⁹ Under the Agreement, the Japan-China Joint Committee on Fisheries was created. The main provisions of the Agreement are:

1. *the fishing vessels of China and Japan can legally fish in the EEZs of both countries through fisheries access privilege.*
2. *the waters of temporary arrangements: The range is similar to a parallelogram. The eastern boundary and the western boundary respectively are 52 nautical miles from the baseline of both countries. The northern boundary is 30°40'N. The southern boundary is 27°N, which is the northern boundary of Taiwan-Japan Fisheries Agreement.*
3. *this agreement excludes waters south of 27°N and west of 125°30'E in the East China Sea.*
4. *either Contracting Party may, by giving six month's written notice to the other Contracting Party, terminate the present Treaty at the end of the initial 5-year period or at any time thereafter.*

¹²⁷ See <http://www.sdsqw.cn/bin/mse.exe?seachword=&K=a&A=22&rec=192&run=13>

¹²⁸ See https://www.mfa.gov.cn/mfa_chn//ziliao_611306/tytj_611312/tyfg_611314/t556672.shtml

¹²⁹ Paragraph 3 of Article 74 of the UNCLOS: "Pending agreement as provided for in paragraph 1, the States concerned, in a spirit of understanding and cooperation, shall make every effort to enter into provisional arrangements of a practical nature and, during this transitional period, not to jeopardize or hamper the reaching of the final agreement. Such arrangements shall be without prejudice to the final delimitation."

Chapter 6 Taiwan Legal Regime of Fisheries Management

6.1 Introduction: Taiwan Owns Fish Biodiversity

Taiwan is located in the subtropical area through which the Tropic of Cancer passes; and the island is located at the boundary between the Eurasian Plate and Philippine Sea Plate, through which several sea currents pass. The marine biodiversity is among the best in the world. A video clip report on the National Geographic Channel says:¹³⁰

“The Biodiversity Research Center of Academia Sinica in Taiwan has collected over 57,700 indigenous species during past decades, of which some are 13,000 species of marine organisms.

Compared with the self-proclaimed title of “country with the most marine species in the world”, there being 33,000 in Australia and in Japan, Taiwan is not inferior in any respect. This is because the territorial waters and the latitude and longitude coverage of territory in Australia and Japan are far greater than that of Taiwan. The territorial area of Taiwan consists of 0.025% of the whole world. After the standardized calculation, the number of marine species in Taiwan is 400 times more than other countries, and the land species are 100 times more than other countries.

Therefore, Taiwan is truly a kingdom of biodiversity. For example, the total number of fish species in Taiwan is nearly 3,000, which make up one-tenth of the world’s total number. Among them, the total numbers of Chaetodontidae family (butterflyfish) and Pomacanthidae family (banded angelfish) are the highest in the world”.

Not surprisingly, offshore fishing started early in Taiwan, around 400 years ago. Referring to the research data,¹³¹ in terms of period and fishery management features, the present work suggests that the history of offshore fishery in Taiwan can be divided into five stages. Moreover, in order to determine how best to successfully develop a sustainable

¹³⁰ See <https://www.natgeomedia.com/news/ngnews/12596>

¹³¹ Hu, S.H. (2006, December 1). The History and Culture of Taiwanese Fishery Industry. Oceanic Culture Journal, 2, p.25-48. Retrieved from <https://www.nmmst.gov.tw/other/B160-wc.pdf>

fishery, the present work will consider the legal aspects of fishery management in Taiwan and identify controversial aspects of the system that need improvement.

6.1.1 History of Taiwan Coastal Fisheries

During the Chinese Song Dynasty (960-1279 AD), many Chinese Southern Fujian fishermen often fished in the western part of Taiwan and the waters of Penghu. However, by reason of the civil war in China, the Government of the Ming and Qing dynasties imposed a "sea ban" on several occasions, restricting fishermen from fishing in the sea and inspecting fishing boats. Therefore, there were no fishery management policies in Taiwan during that period. We therefore utilize the year 1624 AD, when the Dutch first came to Taiwan, as the year when fishery management in Taiwan commenced.

1. **Fishermen Tax Era:** 1624-1877, Dutch-Ruled Period and Ming Cheng Monarch Period, focusing on fisheries tax.
2. **Era of Inaction:** 1877-1895, Qing Dynasty, mainly a sea banned era.
3. **Modernization Era:** 1895-1945, era of Japanese occupation and development of modern fisheries and scientific research.
4. **Development Era:** 1945-2017, after World War II, redeveloped fisheries of Taiwan, a period of static management.
5. **LOHAS Era:** 2018-present, Fisheries Agency has established various fisheries advisory groups, which is dynamic management.

First: Fishermen Tax Era

When the Dutch ruled Taiwan (1624-1662), they began to collect a tithe mainly on the mullet fishery in Taiwan, one-tenth of the mullet catch paid as a mandatory tax to the Dutch

East India Company in Taiwan. At that time, about 300 to 400 Chinese Junks were fishing between China and Taiwan in the East China Sea. Most boats concentrated on winter fishing for mullets. The catch of fish was estimated to be up to 1 million catties,¹³² so one-tenth of the tax was about 100,000 catties. The Dutch East India Company therefore established a system of customs declarations, licensing, landing declarations, and tax payment for fishing boats in Taiwan.

In 1662, the Ming Zheng monarch of the Ming Dynasty defeated the Dutch, ruled Taiwan, and continued to collect taxes on fisheries and other taxable objects, including aquaculture and various fishnets. Ming Zheng and the Dutch both managed fishing boats and fishing methods for the purpose of tax collection, but the tax collection methods were different. Unlike the Dutch tithes, Ming Zheng mainly collected silver and unexpectedly achieved the fishery management effect of obtaining some fishery data.

According to a Japanese scholar, Takashi Nakamura (1910-1994), who examined Dutch historical materials, in the winter of 1657 the fishermen caught a total of 318,335 mullets.¹³³ In 2017, the Taiwan Fisheries Agency counted 711,986 mullets.¹³⁴

¹³² The catty, commonly in China and Taiwan, symbol “斤”, is a traditional Chinese unit of mass used across East and Southeast Asia, notably for weighing food and other groceries in some wet markets, street markets, and shops. The catty is traditionally equivalent to around 1½ pound avoirdupois, formalized as 604.78982 grams. In some countries, the weight has been rounded to 600 grams (Taiwan, Japan, Korea and Thailand). In China, the catty has been rounded to 500 grams. Retrieved from <https://en.wikipedia.org/wiki/Catty>

¹³³ Liu, Fang-wei.(劉芳薇) (Interpretation, 2002) *Taiwan Three Character*, p.171. (Original: Wang, Shih-peng(王石鵬), 1900). Taiwan: Taiwan ancient books.

¹³⁴ 711,986 is the official statistics number from Taiwan Fisheries Agency. But many people in the fishing industry told the author that there are still many mullets catches that have not been counted. See <https://www.fa.gov.tw/cht/PublicationsAchievementCount/content.aspx?id=7&chk=fb3b063e-b13b-4ace-be b8-ba536d9112d0¶m=pn%3d1>

In addition, there were mullet fisheries conservation measures, such as "mullet flag". The East China Sea mullet travel to Taiwan every year before or after the winter solstice. The mullet fishing season is short, and the fishing ground is concentrated. The Dutch issued certificates, and the Ming Government issued mullet flags. Such a legal system could not only levy a fishing tax, but also can crack down illegal fishing without a fishery license. From the perspective of modern fisheries law, it was already under the management of "Directed Fisheries".¹³⁵

Ming Zheng limited the distribution of mullet flags to 94 per year. The mullet fishing boat must first be granted permission by the Government to fish and receive the mullet flag. The name of the fisherman is written on the flag. Each flag owner has to pay annual fee. The control of the mullet flag was the first historically documented fishery resource conservation measure in the history of Taiwanese waters.

In 1683 the Qing Dynasty defeated Ming Zheng and ruled Taiwan. The fishery policy of issuing 94 mullet flags per year continued. In 1753 (year 18 of Emperor Qianlong of the Qing Dynasty), the government exempted two fishermen who had a mullet flag but suffered natural disasters from the payment of taxes. The actual number of mullet flags taxed that year was 92. Until 1877, the Fujian Governor, Ding Ri-Chang, cancelled many fisheries taxes, including the mullet flag tax, as general tax cuts.¹³⁶

¹³⁵ According to Article 36 of the Taiwan Fisheries Law: "The term 'specific fishery' as used in this Law refers to a fishing vessel engaged in the harvesting of aquatic animals and plants designated by the competent authority.

¹³⁶ Refer to Taiwan General History.

Second: Inaction Era

Although the Qing Dynasty abolished the fishery tax, there were no other new fisheries management measures. This meant that relevant fishery data is lacking for this era.

Third: Modernization Era

In 1895, after defeating the Qing Dynasty in the First Sino-Japanese War, Japan began to govern Taiwan. Japan re-imposed the tax on the mullet fishery, but in a different way. After the fishermen caught the mullet, they were taxed by the Japanese local government according to the transaction amount when trading in the market. In addition, the Japanese established an important fishery department structure in Taiwan, including the Japanese unique "Fishermen's Association" and undertook a scientific survey of aquatic products. The Japanese also introduced industrialized fisheries technologies to Taiwan. At the outset of Japanese occupation, the fish catch in Taiwan was less than 5,000 tons. In 1912, modern power fishing boats and fishing techniques were introduced, such as steamboat trawling, whaling technology, and long line fishing. In 1921, the fish catch in Taiwan reached 23,306 tons. In 1940, the fish catch in Taiwan reached 119,520 tons, which reached the highest peak.¹³⁷ At the end of the Japanese occupation period, there were 1,499 powerboats in Taiwan, 3,988 sampans, and 5,755 fishing rafts. The fishing industry was very active.

Fourth: Development Era

In 1945, after the end of the World War II, the Kuomintang Government came to power in Taiwan. There were 697 motorized fishing boats in Taiwan, mostly small fishing boats, sampans, and fishing rafts under 20 tons. The fishery production in 1946 was only 16,860

¹³⁷ Council of Agriculture, Taiwan. (2013, June). Taiwan's Agricultural Century - Fishery, p.54. Retrieved from <https://www.fa.gov.tw/upload/168/2013020812470776611.pdf>

tons. Therefore, policies focused on restoring offshore fisheries. In 1951, the Government encouraged private shipbuilding, and gradually the offshore fishery began to recover. Fishery production increased year by year. From 1952 to 1960, the first and second phases of economic construction and design were implemented. The Government invested funds in offshore and coastal small-scale fisheries. In 1952, fishery production rose to 121,697 tons, surpassing the highest standards of the Period of Japanese Rule.¹³⁸ In 1980, the offshore and coastal fishery production of Taiwan reached about 370,906 tons.

Since then, because of the proclamation of EEZs, the fishing sea areas open to fishing boats were reduced. Overfishing also caused an ecological crisis, and fishery production began to decline. Over the past 20 years, the offshore and coastal fishery production of Taiwan remained between 200,000 and 250,000 tons.¹³⁹

In 1967, in order to protect benthic fish resources, Taiwan introduced a shipbuilding system giving preference to trawlers under 300 tons. Since 1989, in order to control the amount of fishery investment, the build-limitation on fishing vessels had been fully implemented. During this period, although the government implemented management measures for several fisheries, such as trawler management in 1999 and Japanese anchovy fisheries in 2009, there were no civil environmental groups to participate in relevant meetings. Fisheries regulations were dominated by the Government. However, at that time, conservation groups with the ocean as the sole axis in Taiwan had not yet emerged.

In December 2013, the Taiwan Fisheries Agency historically first invited marine conservation groups to participate in public hearings on the crab management draft, but this

¹³⁸ See https://atc.archives.gov.tw/treasure/html/section07/section07_26.html

¹³⁹ All of the above data are official data of the government. However, they have not been fully tested by the scales. Therefore, it can only be used as a reference for a trend change.

was uncommon. Since then many non-governmental environmental groups have held press conferences repeatedly to criticize the trawler management of Fisheries Agency, the process and content of the revision being led by the Fisheries Agency. For example, the Fisheries Law should be amended so that the competent authority in charge of executing punishment is changed from the local to the central government in order to prevent undue influence on local government from local public opinion not to impose fines for illegal fishing.¹⁴⁰

To sum up, the decision-making model of the Fisheries Agency during this period was mainly the government official seeking advice from the Fishermen's Associations and scholars. NGOs were not part of the decision-making system of the Fisheries Agency.

Fifth: LOHAS Era

LOHAS means “Lifestyles of Health and Sustainability”, which is precisely what fisheries in Taiwan need. **Health** should be the fundamental human right standard for all crewmembers and fishermen, whereas **sustainability** means how we take advantage of the ocean resource. Only when these kinds of lifestyles prevail in the world of fisheries will sustainable fisheries endure and, in the end, attract the younger generation to participate in this line of work.

On 10 January 2018, in a heated public hearing on mackerel fishery management, the present author opposed allowing fishermen to undertake fishery management by way of “spontaneous management”, suggested that the Fisheries Agency should establish a “Mackerel Fisheries Advisory Panel”, and should incorporate this advisory panel into environmental groups. The Director of the Fisheries Agency, Tianshou Chen, agreed to this

¹⁴⁰ In the author's experience, the earliest "Marine Conservation Campaigner" in Taiwan is the Wilderness Protection Association in 2009. The Wilderness Protection Association is the largest environmental group in Taiwan, and the present author took over the position of campaigner in 2011. Greenpeace began offering a marine conservation campaigner in Taiwan in 2010.

suggestion during the meeting.^{141 142} The “Mackerel Fisheries Advisory Panel” was officially established on 28 March 2018. Three members are representatives of citizen groups, and the present author is one such member.

The Fisheries Agency has used the Mackerel Fish Fisheries Advisory Panel as an example for other advisory panels. In 2018, the preparatory meetings and formal meetings of three advisory panels for gem corals, landing declarations, and squid were held. Although many fishery management measures in Taiwan need to be strengthened in order to ensure sustainable fisheries, Taiwan's coastal and offshore fisheries management has entered a new era.

In this LOHAS Era, modern fisheries management measures are essential. The following section introduces some ideal fishery management tools.

6.1.2 Trilog of Contemporary Sustainable Fisheries Management

Although Taiwan borders an ocean with high biodiversity, according to the Ocean Health Index, Taiwan ranked 121st among all 221 Exclusive Economic Zones, whereas Australia ranked at 22; South Korea, 41; Japan, 64; United States, 109; and China, 160. The Index measures the status of the ocean around the globe. An Index score for 220 countries and territories, the Antarctic region, and 15 sections of the high seas, is calculated using existing global data.¹⁴³

¹⁴¹ January 10, 2018, public hearings of Taiwan Fisheries Agency's mackerel fish management measures adjusted. See <https://youtu.be/uaGnxI3Tdk4?t=2h17m30s>

¹⁴² Press Release of the Taiwan Fisheries Agency on the conclusion of the mackerel fish fishery public hearing. See <https://www.fa.gov.tw/cht/NewsPaper/content.aspx?id=2456&chk=37fb9048-d916-4fd9-988c-0cdf8f0c2f2f>

¹⁴³ See <http://www.oceanhealthindex.org/region-scores>

In order to avoid the fate of marine ecology in Taiwan ending tragically, scientific and legal methods are needed for its management. This is the “fifth era: LOHAS Era”. Fisheries management is not a difficult task for many countries, nor is it a mission impossible. An opinion expressed by United States National Oceanic and Atmospheric Administration on the FishWatch website suggested that the fisheries management has three steps:¹⁴⁴ Science, Management, and Enforcement. Ideally, these three steps are continuous. However, in terms of the politics and national expenditure, certain difficulties cannot be overcome immediately. For example, politicians may not be willing to designate a budget for marine scientific research. We cannot cease to manage ocean affairs and law enforcement due to the lack of long-term marine scientific research data. In the present author’s view, these three steps should be regarded as three independent tools, as follows:

A. Science

Effective fishery management starts with accurate scientific information about fish and fisheries. The law requires that fishery managers use the best science available to make managerial decisions. To achieve this, fishery scientists need to undertake the following:

1. conduct fish stock assessments to estimate how many fish species are in the water.
2. conduct research on the biology of fish and ecosystems.
3. collect historical information about the fishery, including economic and social factors.
4. keep track of current harvests.

In Taiwan, no more than ten species of fish receive government funding for long-term scientific research; research on marine ecology in Taiwan is not sufficient. And the validity

¹⁴⁴ See <https://www.fishwatch.gov/sustainable-seafood/managing-us-fisheries>

of most data in the annual fishery report encountered challenges. This problem became one topic of the “Citizen Fishery Forum” held by the government in 2016. The present work tries to resolve these difficulties by introducing a “Landing Declaration” with a smart regulatory form and creative intelligent digital technology proposed in Chapter Ten.

B. Management

Fishery resources are never unlimited. If fishing power is not controlled in various ways, fish stocks will collapse long before they are able to reproduce themselves. Various forms of management are possible. Scientific information is provided to fishery managers in order to establish to set harvesting goals and operational requirements for each fishery.

Input and output controls are two narrowly defined techniques of fishery management that can lead to responsible fisheries, including limitations on the amount of fish allowed to be harvested; the number of fishing vessels which can participate in a fishery; and requirements as to where, when, and how fish can be caught. These will be discussed in Chapter Six below.

However, before exploring the methodology of input and output controls, several fundamental questions must be clarified, among them: “who” owns the fish in the sea, “who” is defined as a fisherman, and “who” is in charge of fisheries management. The three topics need to take into account the latest concepts of marine conservation and sustainable fishery in Taiwan. And that is the core reason for undertaking the present work.

C. Enforcement

Although the legal debate is important, effective enforcement is the crucial tool and the key to the success of sustainable fisheries management.

The National Oceanic and Atmospheric Administration, the United States Department of Commerce (NOAA) Fisheries Law Enforcement agents and officers use such traditional enforcement techniques as patrols, investigations, satellite tracking systems, and education and outreach.¹⁴⁵ The Taiwan Government uses similar methods, but these law enforcement agents are unable to penetrate bureaucratic barriers in Taiwan. Therefore, the present author has proposed new technological policies to assist or even replace existing manpower to conduct the Monitor, Control, and Surveillance (MCS) promoted by the FAO and set out in Chapter Ten. While MCS, in the basic FAO definitions, does not include enforcement, they are cornerstones to identify and prevent such illegal activities as fishing out of season, fishing in restricted areas, and exceeding catch limits.

Taken together, these three tools make sustainable seafood more possible to realize; and keep the marine environment healthy, fish populations thriving, and our seafood industry on track.

¹⁴⁵ *ibid.*

6.2 Who Is a Fisherman? Capital-Labor Relations in Fisheries

After the end of World War II, fisheries industries developed rapidly, and the structure of investment and operation became more complicated. Wealthy individuals sometimes owned several fishing boats, but never went fishing at sea. Many poor people owned no boat and worked with or for others to fish all the year. This section clarifies the modern role of “fisherman” to determine who is “capital” and who is “labor”. Are all fishermen and crew labor? Who are the bosses? The purpose is to find a better legal solution to resolve the low-wage issues of crew and fishermen. Also, to determine who should be responsible for illegal, unreported, and unregulated fishing.

6.2.1 Who Is “Capital” in Fisheries: Masters of Fishing Boats or Captains?

When defining who is “capital”, we begin with laws in force for a legal definition. In Taiwan, catching fish to sell is regarded as a commercial activity regulated by the “**Fisheries Act.**” Article 4 of which provides:

“For the purpose of this Act, the term “fishery operator” means the fishing right holders, the fisheries access privilege holders, or any other persons who engage in fisheries operation in accordance with the provisions of this Act.

For the purpose of this Act, the term “fishery employee” means any crew members of fishing vessels or any other persons who catch/harvest, or cultivate aquatic organisms for any fishery operator.”

In the Taiwanese legal system, the fishery operator is the person whose name is printed on the fishing license. Only when natural or juridical persons get permission from the Fisheries Agency can they legally catch and sell fish. The licensee is usually the fishery operator and also the “master of the fishing vessel”.

How to Become a Fishery Operator?

In Taiwan, if you want to be the person whose name is printed on the fishing license, there are two ways to make this dream come true. The first step is to own a registered, qualified, and licensed fishing boat, and then apply for fishing licenses for your own fishing boat. You also can rent a fishing boat to apply for fishing licenses. However, you have to submit the lease contract to the Fisheries Agency and go to the Ministry of Transportation and Communications to complete the ship's registry, which reveals by whom the ship is controlled and managed during a certain period of time.

When a fishing boat is shared by many people, the person entered on the fishery license may also be a company organization, namely a juridical person, a company representative, or a group representative. Nonetheless, there is always only one natural person or one juridical person on the fishing license.

What about the Captain?

Nowadays, many fishery operators hire captains and other crew members to work for him on the fishing boat or in ports. Are all "fishery employees" mentioned in Taiwan's Fisheries Act the "**labor**"? Is it possible that the employed captain belongs to the "**capital**"? We have to define what duties a captain performs. According to Taiwan's "**Regulations on the Management of the Crew of Fishing Vessels**" (Article 2):

"Terms and phrases used in the Regulations are as follows:

- 1. Fishing vessels: Any type of vessel registered in the Republic of China (Taiwan) for the purposes of fishery operation.*
- 2. Crew: Any working member on the fishing vessel, including crew officers and regular fishermen.*

3. *Crew officer: Any working members on the fishing vessels holding the position as captain, mate, chief engineer, chief engineering supervisor, engineering supervisor, and radio operator.*
4. *Ordinary fisherman: Regular fisherman other than crew officer.*
5. *Captain: The one who is in charge of all affairs on the fishing vessel.*
6. *Mate: A crew officer on deck in charge of navigation.*
7. *Chief Engineer: A crew officer who is in charge of the operation of the vessel's main engines, auxiliary engines, and electronic devices.*
8. *Chief Engineering Supervisor: A crew officer who is in charge of assisting and supervising operations of the engineering section of the vessel.*
9. *Engineering Supervisor: A crew officer who is in charge of work in shifts, operation and maintenance of engineering.*
10. *Radio Operator: An operator who is in charge of telecommunications.*
11. *Fisheries Observer Onboard: Qualified as a crew member on the vessel, thus assigned by the competent authority of the central government and has been given tasks of collecting data, auditing fishery performances, and biological sampling.”*

From the above, we understand that the captain is in charge of all affairs on the fishing vessel; hence it is possible that he represents the master of the fishing vessel, that is, on behalf of the employer. The captain is like a chief executive officer in the fishing vessel company.

Furthermore, the Taiwan Labor Standards Act (Article 2) stipulated:

“The terms used in the Act shall be defined as follows:

1. *Worker means a person who is hired by an employer to work for wages.*
2. *Employer means a business entity which hires workers, the responsible person of business operations, or the person who represents the business owner in handling labor matters.”*

When a captain is working on the seas far from land, he is apparently the only person who represents the business owner, i.e. fishery operator, in handling all fishing labors and other crewmember matters, including directing fishing operations.

Moreover, according to the present author's understanding from some Taiwan fishermen, there are various types of contract between master and captain. In most cases, they are a partnership and share the profit equally or at a fixed ratio. In a few cases, they are employer and employee with a regular monthly salary. No special regulation regulates or protects each type of fishing labor contract. Only the "Labor Standards Act" operates.

How Does the Taiwan Government Know Who Are the Captains?

The Taiwan Government does not require shipowners to register with government agencies. In fact, after contracts are signed between a shipowner and captain, the Fisheries Agency requires the shipowner to register the list of captains with the Fishermen's Associations to which these captains belong. Most shipowners do register their captains because these captains can only obtain a formal certificate of work experience based on the registration records. Then these captains can continue to accumulate their navigation experience. However, shipowners would not be punished for failing to register their captains.

In law enforcement practice, when the fishing boat is caught conducting illegal fishing, the tickets are given to the owner of the fishing license and the captain of that journey on that boat at the same time by the Taiwan Fisheries Agency. If the captain is as the same as the master, he usually receives two tickets. This is good legal design and law enforcement.

However, Taiwan Coast Guard Administration cannot know who the masters and captains are when discovering illegal fishing on the seas. The Coast Guard Administration has to submit the ships' name to the Fisheries Agency, and the staffs of the Fisheries Agency

would use computers to check. Therefore, in order to strengthen control over data as to which fishing boat owner or fishing company a captain belongs to, this legal loophole should be eliminated. Moreover, the Taiwanese government should make data about fishing boats fully digitized and networked.

In conclusion, there is no doubt that the master of the fishing boat and the captains are the “capital” and should assume more responsibility for sustainable fisheries and fishers’ human rights.

6.2.2 Who is “Labor” in Fisheries: Crew and Fishermen?

After ascertaining who is the “capital” in the fisheries structure, it is easy to recognize who is “labor”; that is, those who are not “capital”. According to the "Regulations on the Management of the Crew of Fishing Vessels" (Article 2), there are many types of workers on a fishing boat: crew, crew officer, and so on. Below in bold are the workers regarded as “labor” in the present work:

“Terms and phrases used in the Regulations are as follows:

- 1. Fishing vessels: Any type of vessel registered in the Republic of China (Taiwan) for the purposes of fishery operation.*
- 2. Crew: Any working member on the fishing vessel, including crew officers and regular fishermen.*
- 3. Crew officer: Any working members on the fishing vessels holding the position as captain, mate, chief engineer, chief engineering supervisor, engineering supervisor, and radio operator.*
- 4. Ordinary fisherman: Regular fisherman other than crew officer.*
- 5. Captain: The one who is in charge of all affairs on the fishing vessel.*
- 6. Mate: A crew officer on deck in charge of navigation.*
- 7. Chief Engineer: A crew officer who is in charge of the operation of the vessel's main engines, auxiliary engines, and electronic devices.*
- 8. Chief Engineering Supervisor: A crew officer who is in charge of assisting and supervising operations of the engineering section of the vessel.*

9. *Engineering Supervisor: A crew officer who is in charge of work in shifts, operation and maintenance of engineering.*
10. *Radio Operator: An operator who is in charge of telecommunications.*
11. *Fisheries Observer Onboard: Qualified as a crew member on the vessel, thus assigned by the competent authority of the central government and has been given tasks of collecting data, auditing fishery performances, and biological sampling.”*

In this section, we explore the employment of Taiwanese crews. The Taiwan Fisheries Agency requires that a minimum number of Taiwanese crews should be hired by captains for each voyage. Therefore, no matter how many foreign fishers are hired to work for Taiwan fishing boats, the topic of Taiwanese crews and fishers has to be first discussed. Foreign fishers are discussed in Section 6.3 below.

Status of Taiwan Crew

When the term “crew” is mentioned, it includes crew officers and regular fishermen as regulated in Taiwan Fisheries Act. The term “fisher” is used in the C188-Work in Fishing Convention, and “fisher” in this work mainly refers to the foreign fishing labor working on Taiwan fishing boats.

Taiwanese fishermen have been exempted from income tax since 1989 and that leads to the circumstance that the income of crews is not transparent. Many Taiwan fishery operators also do not need to register with the Ministry of Economic Affairs according to regulations. These regulations have caused Taiwan Fisheries Agency to have no control over the fishery economy.

The Business Registration Act of the Ministry of Economic Affairs (Article 5) provided:

“The following small-sized businesses shall be exempted from registration in accordance with this Act:

1. *Vendors.*
2. *Family agriculture, forestry, fishery, animal husbandry businesses.*
3. *Family handiwork businesses.*
4. *Lodging businesses.*
5. *Businesses who's amount of sales per month does not reach the minimum taxable sales.*

The small-sized businesses referred to in points 2 and 3 of the preceding paragraph shall be limited to businesses operated by himself/herself or mainly operated by himself/herself, although some employees are hired in such business.”

Therefore, the present author interviewed anonymous Taiwan fishermen to obtain an overview of the general earnings of crews. Generally speaking, the earnings of a Taiwan fishing crew mainly comprise basic salary and fishing bonus.

A. Basic Salary

The basic salary of Taiwan fishermen is sometimes called a home settlement payment. Not being affected by the fishery operations, the salary is paid every month by the fishery company or the master of fishing vessel to protect the livelihood of the crew's family. The basic salary varies according to the size of the fishing vessel and the position on the crew. In general, with the conversion of exchange rate, the average NT dollar which a new regular crew member receives is \$300 USD per month. An officer receives about \$300 to \$500 USD per month. A chief engineer receives about \$700 to \$800 USD per month. A captain earns about \$800 to \$1000 USD.¹⁴⁶

B. Fishing Bonuses

There are two ways for Taiwanese fishermen to qualify for a fishing bonus:

¹⁴⁶ See <http://w3.tpsh.tp.edu.tw/organization/shcool/intro1/workinrto/a01/007/b066/3.htm>

- 1) after deducting the common cost of a vessel's navigation on the sea, the bonus is allocated in a certain percentage to the ship's master and all the crew, depending on the revenue of selling the catch;
- 2) without deducting the common cost, the bonus is allocated in a certain percentage directly to the ship's master and all the crew.

During the voyage, the family of a Taiwanese crew member might borrow money from the shipowner or the crew's fishing company, depending on the amount stated in the employment contract when this family needs money to live. Then the fishing company or the shipowner will deduct the borrowed money from the fishing bonus of this crew. In general, the average salary of Taiwanese working in pelagic fisheries is about \$2,600 USD per month. The average salary of Taiwanese working in coastal and offshore fisheries is about \$1,200 USD per month, whereas the average salary of Taiwanese working in inshore fisheries is \$950 USD per month.¹⁴⁷

In public hearings almost all masters insist on the Labor Standards Act being suitable for factories on land, not for fishing vessels at sea. Most masters refused to pay overtime to fishers; most of the aforementioned salary does not include overtime. However, the Labor Standards Act is applicable to Taiwanese crew and foreign fishers.

¹⁴⁷ In this work the author defines these fisheries as below:

"Inshore fisheries" are fishing vessels working within 3 nautical miles from Taiwan's coastal line;

"Coastal fisheries" are fishing vessels working within 12 nautical miles from Taiwan's coastal line;

"Offshore fisheries" are fishing vessels working within Taiwan's Exclusive Economic Zone, the waters of 200 nautical miles from Taiwan's baseline;

"Pelagic fisheries" are fishing vessels working outside of Taiwan's Exclusive Economic Zone, the waters outside of 200 nautical miles

6.3 Shortage in Fishery Workers

Taiwan's coastal, offshore, and pelagic fisheries all need a larger workforce. However, the hard life on a fishing boat causes Taiwanese to avoid working as fishermen. Since around 1985, masters of Taiwan fishing boats have gone directly to Fujian Province in China to supplement the fisheries workforce. Later, fishing boats sought other foreign fishers, rather than Chinese, to supplement workforce.

Work in the fishery industry is considered to have the following three features, which are also challenges for a sustainable fishery.

1) 4D job characteristics

Working on fishing boats has 4D characteristics, which are dirty, dangerous, difficult, and distant from home. The willingness of Taiwanese young people to engage in fishing is low, and most parents are reluctant to let their children to fish as a job. Sometimes fishermen do not want children to live as hard as themselves, instead hoping their children would do other jobs. The decline in the birth rate and improving educational level in Taiwan also are contributing factors.

2) Unstable Income

Similar to agriculture, fishing is critically affected by climate and weather. Theoretically, fishermen's income comes from the sale of catches. The number of days that fishing boats go fishing on the sea is always affected by weather, wind, fishing ground, fishing season, and the quantity of living marine resource. Therefore, there has been a vigorous debate between the fishing industry and the labor community about whether the earnings of fishermen should be regulated by the Labor Standards Act. In general, fishing

boat crews do not have fixed working hours. After fishermen board the ship and go to sea, their working hours and rest hours are difficult to distinguish. The fishing industry is unable to calculate working hours and overtime pay in accordance with the method used to clock in offices on land.

Moreover, traditionally, the method of paying salaries to Taiwanese fishing crews mainly is based on the bonus distribution system. Taiwanese crew income is totally dependent on the bonus. Their earnings vary with the size of the catch and the price of fish. However, for the past twenty years, the revenues of ordinary crewmembers in family-type fishing could be greatly increased. Compared with the growing incomes in the technology industry, the average annual income of fishermen is not high. Therefore, being an important world-renowned technology country, the Taiwanese are barely willing to work in fishing.

3) Work Site is Not Fixed

In order to pursue fish at sea, Taiwanese fishing boats sometimes range over three oceans. Pelagic fishing boats return to Taiwan every two or three years. For crews who miss their family, fishing is a difficult job. Therefore, the shortage of a pelagic fishery workforce is more serious than for the coastal fisheries of Taiwan. According to the Fisheries Agency, the number of pelagic foreign crews is about 10,000. This data is not absolutely correct. Many international marine conservation groups and human rights groups often suggest that pelagic fishing in Taiwan employs a large number of foreign fishers not reported to the Taiwanese Government. Moreover, offshore fishers often escaped to land for other work.

However, without fishermen or fishers, we have no fish to eat, and certainly there will be no sustainable fishery. Accordingly, marine conservation and sustainable fishing have to face fisheries workforce issues.

6.3.1 Introduction of Foreign Workers on Taiwan Domestic Fishing Boats

In terms of governmental management, the source of the Taiwan fishing workforce is divided into domestic port bases and foreign port bases according to fishing area. By nationality, the workforce legally can be divided into Taiwanese, foreigners, and Chinese. This section discusses foreign fishers hired by fishing boats which fish in the Taiwan exclusive economic zone and offload catches at Taiwan domestic ports. The following information has been obtained by the present author's oral inquiries with the Fisheries Agency.

Foreign Fishing Workers in Taiwan EEZ

Payment

The masters of fishing boats in the Taiwan EEZ, including inshore, coastal, and offshore fisheries, employ foreign fishing crews under the Employment Service Act. These foreign fishers are mainly Indonesians. The masters have to pay 1,900 TWD, which is about \$63 USD, per month for each foreign worker as an employment security fee. In addition, the masters have to pay the labor insurance fee, health insurance fee, and brokerage fee, which in all are about \$50 to \$100 USD for each foreign worker. Most foreign workers are not given a work bonus. For years, masters of fishing boats have demanded that the Taiwan Ministry of Labor reduce the employment security fee and labor insurance fee in order to reduce the cost of hiring foreign crews.¹⁴⁸

¹⁴⁸ The Labor Council. (2012, July 27). To relax the hire of foreign fishermen or not. The Labor Council: taking into account the rights and interests of the foreign and local crews. Retrieved from <https://www.cooloud.org.tw/node/69801>

What is Employment Security Fee?

According to the Taiwan Employment Service Act (Article 42),

“For the purpose of protecting nationals’ right to work, no employment of foreign worker may jeopardize nationals’ opportunity in employment, their employment terms, economic development or social stability”.

Therefore, Article 55 of the Employment Service Act requires the following:

“When employing a foreign worker, the employer shall pay an employment security fee for the purposes of processing matters regarding promotion of employment of nationals, enhancement of labor welfare, and handling the employment and administration of foreign workers”.

The Ministry of Labor believes that the employment security fee should not be lowered, because 1,900 TWD for each hired foreigner crews is the lowest in all industries. In addition, the Ministry of Labor insists that masters of fishing boats should pay the labor insurance fee for their crews. The Ministry of Labor thinks, under the standard of the same fee, the obtained protection of only paying commercial insurance or medical insurance for foreigners fishing crews is not actually better than labor insurance.¹⁴⁹

Deductions from Foreign Workers’ Pay

Based on experience of campaigning for the human right of Taiwan fishing workers, the present author has discovered that many kinds of fee have been directly deducted from foreign workers’ salary, including a service fee for brokers, guarantee bond for the work period, boarding fee, and foreign loan fee, and others. These deductions severely exploit foreign workers and have been denounced by international human rights groups. On 13 September 2018, a United Kingdom-based non-profit organization working internationally

¹⁴⁹ Ibid.

released a video¹⁵⁰ of Taiwanese Fishing Vessel *Fusheng No. 11*, which was the first fishing vessel detained under the provisions of the International Labor Organization Work in Fishing Convention, 2007 (No. 188); this happened in Cape Town, South Africa, in May 2018.¹⁵¹ In the video, a crewmember of *Fusheng No. 11* Fishing Vessel complained that he received only \$50 USD each month as salary in the first five months.

Based on participation in meetings with the Fisheries Agency and the campaign for the Taiwan fishing workers' human rights, the present author learned that all foreign crews hired in Taiwan almost have no pre-employment training in their home countries. For example, before working for Taiwan fishing boats, many Indonesians lived inland and had never seen the ocean. The lack of experience contributes to the low salaries of foreign crews. Generally, when foreign crews come to Taiwan to work on fishing boats, the masters of these boats would arrange basic safety training for their crews in accordance with Fisheries Agency regulations. However, few masters would arrange vocational training, safety and health training, and professional training for foreign crews.

In order to deal with the low payment of foreign workers, two aspects of fishery policy should be improved. First, fishery worker brokerage firms should be strictly supervised. The Taiwan Government should promote a "Direct Employment System", and work with labor source countries to help masters of fishing boats hire crews directly. This approach would prevent fishing crews and boat masters from paying high brokerage fees.

¹⁵⁰ See <https://vimeo.com/289478169>

¹⁵¹ International Labour Organization. (2018, July 17). First fishing vessel detained under ILO Fishing Convention. Retrieved from https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_634680/lang--en/index.htm

Second, pre-employment training and on-the-job training for fishers should be strengthened, which may be the most effective method to promote improved salaries for fishers. With the cooperation of the Taiwanese and Indonesian governments, Taiwan's pelagic, coastal, and offshore fishery firms should sponsor the establishment of a maritime school to train Indonesians who are willing to work as fishing crews in Taiwan. Education and training also will help Indonesian fishing workers understand their legal rights.

6.3.2 C188 Work in Fishing Convention, 2007

Since the beginning of the twenty-first century, the human rights of fishing workers gradually have become more important internationally. In past decade, many international environmental groups and human right groups revealed shocking stories of fishermen slaves. For example, in April 2016, the Associated Press won a Pulitzer Prize for the "Seafood from Slaves" investigation – a series of stories that recorded how the fishing industry in Southeast Asia used fishers, or so-called fishermen slaves, to work with seafood sold to kitchens and restaurants in the United States and around the world.¹⁵²

¹⁵² <https://www.ap.org/press-releases/2016/ap-wins-pulitzer-prize-for-seafood-from-slaves-investigation>

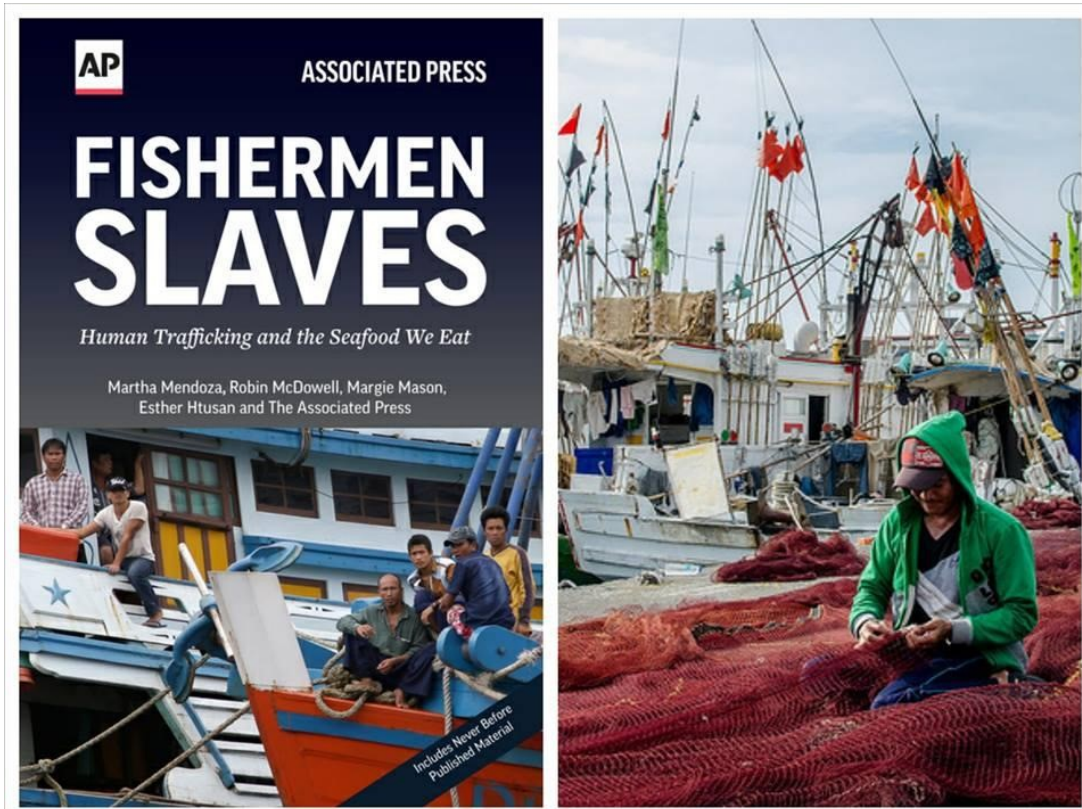


Figure 13: Cover of the Associated Press News report “Seafood from Slaves”

There are similar reports about fishers from different countries working under bad conditions and poor environment aboard fishing vessels with low salaries¹⁵³ on the high seas in pelagic fisheries. However, ships sailing or operating on the high seas are governed by the flag State in accordance with international law. After the rise of modern shipping and industrialized fishing, boats may sail or work at sea all year round and will not return to the port of registration for many years. Therefore, it is difficult for a flag state to manage its boats.

Furthermore, in past twenty years, there are more Flag of Convenience (FOC) vessels. When registering a vessel, one must choose a nationality under the flag of which that vessel

¹⁵³ See <https://ejfoundation.org/reports>

will sail. The term “flag of convenience” refers to registering a ship in a sovereign State different from that of the ship's owners.¹⁵⁴ A ship must operate under the laws of its flag State, so vessel masters often register in other nations to take advantage of less onerous regulations, lower administrative fees, or greater numbers of friendly ports. Some masters exploit loose regulation, unloading catches at ports which have no strict law enforcement.

FOC vessels result in more substandard ships, which erode the international Flag State Control system. Under such circumstances, the idea of replacing the system of “Flag State Control” with the “Port State Control” has emerged. Many Taiwanese fisheries businesses own FOC fishing vessels. The Taiwan Fisheries Agency enacted the “Act to Govern Investment in the Operation of Foreign Flag Fishing Vessels” under heavy international pressure between 2006 to 2008.

Convention (No. 188) Concerning Work in the Fishing Sector (CWF), also known as Work in Fishing Convention, 2007, is a classic example that takes advantage of Port State Control. The Work in Fishing Convention was adopted at the 96th International Labor Conference (ILC) of the International Labor Organization (ILO) in 2007. The convention comes into force twelve months after it has been ratified by ten countries, eight of which must be coastal countries.

The convention entered into force on 17 November 2016 and has been ratified by fourteen states: Angola (2016), Argentina (2011), Bosnia and Herzegovina (2010), Republic of the Congo (2014), Estonia (2016), France (2015), Lithuania (2016), Morocco (2013), Namibia (2018), Norway (2016), Senegal (2018), South Africa (2013), Thailand (2019), and United Kingdom (2019); all are coastal States.

¹⁵⁴ See https://en.wikipedia.org/wiki/Flag_of_convenience

The Preamble of the Convention¹⁵⁵ provides:

“Noting that the objective of this Convention is to ensure that fishers have decent conditions of work on board fishing vessels with regard to minimum requirements for work on board; conditions of service; accommodation and food; occupational safety and health protection; medical care and social security”.

Also, the Convention takes into account the following:

“The need to revise the following international Conventions adopted by the International Labor Conference specifically concerning the fishing sector, namely the Minimum Age (Fishermen) Convention, 1959 (No. 112), the Medical Examination (Fishermen) Convention, 1959 (No. 113), the Fishermen's Articles of Agreement Convention, 1959 (No. 114), and the Accommodation of Crews (Fishermen) Convention, 1966 (No. 126), to bring them up to date and to reach a greater number of the world's fishers, particularly those working on board smaller vessels”

The Convention applies to all fishers and fishing vessels engaged in commercial fishing operations. It supersedes the earlier Conventions relating to fishermen. Although Taiwan is not a party to the Work in Fishing Convention, Article 44 affects Taiwan fishing vessels:

“Each Member shall apply this Convention in such a way as to ensure that the fishing vessels flying the flag of any State that has not ratified this Convention do not receive more favorable treatment than fishing vessels that fly the flag of any Member that has ratified it.”

Below are brief introductions and comparisons between the Convention and related Taiwan regulations.

First Part: Manning and Hours of Rest

CWF Article 13:

“Each Member shall adopt laws, regulations or other measures requiring that masters of fishing vessels flying its flag ensure that:

- (a) their vessels are sufficiently and safely manned for the safe navigation and operation of the vessel and under the control of a competent skipper; and*

¹⁵⁵ See https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C188

(b) fishers are given regular periods of rest of sufficient length to ensure safety and health.”

CWF Article 14:

“1. In addition to the requirements set out in Article 13, the competent authority shall:

(a) for vessels of 24 metres in length and over, establish a minimum level of manning for the safe navigation of the vessel, specifying the number and the qualifications of the fishers required;

(b) for fishing vessels regardless of size remaining at sea for more than three days, after consultation and for the purpose of limiting fatigue, establish the minimum hours of rest to be provided to fishers. Minimum hours of rest shall not be less than:

(i) ten hours in any 24-hour period; and

(ii) 77 hours in any seven-day period.

3. The competent authority may permit, for limited and specified reasons, temporary exceptions to the limits established in paragraph 1(b) of this Article. However, in such circumstances, it shall require that fishers shall receive compensatory periods of rest as soon as practicable.”

Status of Taiwan

According to long-term inquiry with fishermen and the Fisheries Agency by the present author, the number of days traveling on the seas per voyage for Taiwan inshore and coastal fishing boats take less than 3 days. Therefore, these boats are not regulated by Article 14. Pelagic fishing boats take several months, even two years, to return to Taiwan. When traveling to fishing ground for work, fishers on a pelagic fishing vessel may have no rest time for several days in a row. Sometimes, the fishers might do nothing on board for several days, because their boats find no fish stock.

Therefore, whether the time not used for fishing work on board could be viewed as rest time is disputed among Taiwanese environment groups, human rights groups, and fishery

representatives. The Taiwan Fisheries Agency enacted “Regulations on the Authorization and Management of Overseas Employment of Foreign Crew Members” on 20 January 2017, Article 6 providing:

“(7) The foreign crew member shall not have less than ten hours of rest per day and less than four days off per month. In consideration of fishing operation, compensatory leave(s) may be arranged in accordance with the agreement between the employer and the employee.

“(8) The distant water fisheries operator shall respect the need of the foreign crew member for religious holidays.”

Second Part: Payment of Fishers

CWF Article 23:

“Each Member, after consultation, shall adopt laws, regulations or other measures providing that fishers who are paid a wage are ensured a monthly or other regular payment.”

CWF Article 24:

“Each Member shall require that all fishers working on board fishing vessels shall be given a means to transmit all or part of their payments received, including advances, to their families at no cost.”

Status of Taiwan

I. Foreign Fishers of Fishing Boats Based in Domestic Ports

The foreign fishing workers hired by masters of Taiwan fishing boats in accordance with Employment Service Act and the Reviewing Standards and Employment Qualifications for Foreigners Engaging in the Jobs Specified in Items 8 to 11 of Paragraph 1 to Article 46 of the Employment Service Act are all protected by the minimum basic salary required by Taiwan Labor Standards Act.

The minimum basic salary per month is 23,800 TWD, about \$790 USD since the 1 January 2020. This is the minimum wage for working 40 hours per week in accordance with normal limitation of working hours regulated by law.

II. Foreign Fishers of Fishing Boats Based in Foreign Ports

Masters of fishing boats pay foreign fishers in accordance with the “Regulations on the Authorization and Management of Overseas Employment of Foreign Crew Members”, instead of the Labor Standards Act. Article 6 provides:

“The monthly wage of the foreign crew member shall not be less than 450 US Dollars.”

Third Part of Social Security

WFC Article 34:

“Each Member shall ensure that fishers ordinarily resident in its territory, and their dependants to the extent provided in national law, are entitled to benefit from social security protection under conditions no less favourable than those applicable to other workers, including employed and self-employed persons, ordinarily resident in its territory.”

WFC Article 35:

“Each Member shall undertake to take steps, according to national circumstances, to achieve progressively comprehensive social security protection for all fishers who are ordinarily resident in its territory.”

Status of Taiwan

I. Foreign Fishers of Fishing Boats Based in Domestic Ports

The Taiwan Employment Service Act requires employers have to pay labor insurance fee and health insurance fee for foreign fishers as Taiwan workers, which meets the requirement of Article 34 and Article 35 of CWF. However, in the present author’s

experience of joining the conference of between the fisher human rights campaign and the Fisheries Agency, few employers have paid health insurance but have not paid labor insurance for foreign fishers. The employers not paying the labor insurance fee have chosen cheaper commercial insurance.

II. Foreign Fishers of Fishing Boats Based in Foreign Ports

According to the “Regulations on the Authorization and Management of Overseas Employment of Foreign Crew Members” (Article 6) in Taiwan:

“(3) The distant water fisheries operator shall insure for the foreign crew member the accident, medical and life insurance, and the insured amount of the life insurance shall not be less than one million New Taiwan Dollars.

(4) In case that any foreign crew member is injured or sick for carrying out the duties, the distant water fisheries operator shall arrange for immediate medical treatment and shall pay the medical fees and other related expenses.”

First Case of Work in Fishing Convention

After considering the core spirit of the Work in Fishing Convention, we shall discuss the first case of a fishing vessel detained under the Convention and released publicly on the official website of International Labour Organization.¹⁵⁶ It was a Taiwanese Fishing Vessel, named *Fu Sheng No.11* (福牲 11 號).

Fu Sheng No. 11 is about fifty years old, registered in Taiwan. According to the information on the International Labor Organization website, this 380-gross-ton fishing vessel was detained in Cape Town, South Africa, and then released at the end of June,

¹⁵⁶ See https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_634680/lang--en/index.htm

following complaints by the crew about working conditions. *Fu Sheng No.11* sailed back to Taiwan Kaohsiung Port on 13 September 2018.

International labour standards

First fishing vessel detained under ILO Fishing Convention

Convention to improve working conditions for fishers on commercial fishing vessels shows its teeth.

News | 17 July 2018



CAPE TOWN (ILO News) – The first detention of a fishing vessel under the provisions of the International Labour Organization’s Work in Fishing Convention, 2007 (No. 188) >, has taken place.

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Figure 14: First Case of a Fishing Vessel Detained Under the Convention and Released on the Official Website of International Labour Organization

The Convention requires that all fishers have a written agreement, signed by the fishing vessel master or the fishing vessel masters’ representative, which is comprehensible to them and which sets out the terms of their work, including such matters as methods of payment and the right to repatriation. However, after the vessel was detained, two inspectors from the South African Maritime Safety Authority (SAMSA), Thelma Paul and Pieter-Chris Blom,

found a long list of problems, including lack of documentation, poor accommodation, insufficient food for fishers, and poor safety and health conditions on board.

“Only two of the crew members had work agreements and there was not even a crew list,” explains Thelma Paul. “The lifebuoys were to be replaced because they were rotten, the anchors were not operational, and one was even missing. Health and safety conditions were generally very poor”.

Crew members complained to the inspectors about harsh working conditions, which included having to manually pull in fish that were caught and carrying heavy loads to the fish storage facility. Some crewmembers said they wanted to leave the vessel.

An international environmental group, Environmental Justice Foundation (EJF), issued their press release of investigation result¹⁵⁷ after the International Labor Organization released the news.

An EJF campaigner interviewed six Indonesian fishers on *Fu Sheng No. 11* when the fishing vessel arrived in Indonesia in August 2018. According to the EJF investigation and recorded video, fishers said that they were “lucky” if they got six hours rest a day. “We sometimes slept only 3 hours. It was like slavery. There were many cockroaches in the food and insects in the bedroom. I had a small boil on my leg, which became so swollen that my trousers did not fit, and my tendon became taut. I should not have been working, but I was forced to”, said one fisherman.

The inspectors from South Africa were particularly concerned about the vessel’s stability. It was declared unseaworthy, and all crew were evacuated following the first inspection. It was released from detention when it had been stabilized, repaired, and other issues addressed.

¹⁵⁷ See <https://ejfoundation.org/news-media/2018/abuse-and-illegal-fishing-aboard-taiwanese-vessel-let-slip-through-the-net>

However, the official response from the Taiwan Fisheries Agency denied what the International Labour Organization claimed for the first time on 24 July 2018.¹⁵⁸ The Taiwan Fisheries Agency claims that Taiwan Government needs further investigations to clarify. Based on the statements disclosed above, the present author agrees with the ILO that the human rights conditions on this fishing vessel were obviously not in compliance with regulations of the Working in Fishing Convention. And this case might not be the last case of Taiwanese boats. There is a lot of space for many Taiwanese fishing vessels masters to improve.

6.3.3 Proposal: Establishing a Co-Hiring System of Fisheries and Agriculture

In the past three decades, Taiwan fishing has not successfully attracted young people to become fishermen and captains of fishing boats. Therefore, the fishery industry has massively hired foreign fishers at low wages to maintain profits. However, this has become a heavy burden for a sustainable fishery. Marine resources around Taiwan are severely depleted and fish stocks are decreasing. On the other hand, captains of fishing boats have to fish in order to pay their fishers every month. Foreign fishers can only work on fishing vessels and cannot do many jobs as Taiwanese. This regulation is understandable because foreign workers are subject to social security and other issues.

However, hiring foreign fishers brings pressure on captains of Taiwan fishing vessels, making the creation of marine conservation areas and closed fishing seasons in Taiwan difficult. Taiwan is like a patient that relies on painkillers rather than consuming nutritious food and exercising to maintain health. The Taiwan fishing industry may not stop using

¹⁵⁸ See <https://www.fa.gov.tw/cht/NewsPaper/content.aspx?id=2497&chk=93ba0da6-4c9f-47dd-a5a8-b65894b0778a¶m=pn%3d3%26yy%3d2018%26mm%3d>

painkillers immediately, but it should not increase the dosage. In this section, we discuss how to avoid “no more increases in dosage”.

In terms of sustainable fishery policy, the Taiwan Government must control the total number of foreign fishers. On the premise that ensuring the earnings and welfare of fishers should be in compliance with the Labor Standards Act, this work proposes that the Taiwan Government should establish a Co-Hiring System for Fisheries and Agriculture to reduce the burden of masters of fishing boats. Therefore, more marine conservation areas and longer closed fishing seasons could be established.

Moreover, the Fisheries Agency policy should clarify the status of “part-time crew”. Given the decline in marine resources, it is almost impossible for a young person to feed a family as a full-time fishery worker. By avoiding the preferential premiums for labor insurance offered by Fishermen’s Associations, part-time crew need to pay the ordinary labor insurance fee. The salary for part-time crew should be regulated in the Fishing Vessel Crew Act, which refers to the “Guidelines of Hiring Part-Time Workers” of the Ministry of Labor.

The numbers of Taiwanese crews and fishermen need to grow in order to develop a sustainable fishery. Massively hiring cheap foreign workers not only raises issues of fishing slavery, but also encourages overfishing irrespective of cost, leading to a no-win situation for Taiwanese fisheries and marine ecological environment. In the next section, issues of foreign labor working on Taiwan domestic fishing boats will be addressed.

Current Condition

According to the Fisheries Agency, there are 220,000 coastal and offshore fishing boats, hiring about 10,000 foreign fishers who are based in domestic ports. Actually, about 7,000 foreigners have crew identifications. Most foreign fishers in Taiwan are from Indonesia.

Why are fisheries and agriculture chosen to share human resources together? From the standpoint of marine protection, ideally each fishing boat should have a closed fishing season of from two to five months. However, masters need to pay fishers' salaries. Some boats employ as many as ten or twenty fishers. Taking a boat hiring more than ten fishers, for example, the personnel cost of a two-month closed fishing season is \$14,000 USD if the salary of each fisher is 21,000 TWD (about \$700 USD) per month. It is not surprising that masters of fishing vessels are vehemently opposed to closed fishing seasons and protected marine areas.

However, Taiwan agriculture also lacks sufficient labor resources, but is not allowed to hire foreign workers for agriculture. Even if farmers were permitted to hire foreign workers, they would face the same problems of high cost because Taiwanese agriculture requires a massive workforce during the short two-week harvest season. In normal times the workforce has nothing to do. Therefore, the present work proposes combining the agricultural and fishing labor forces. In closed fishing seasons, masters of fishing boats would allow foreign fishers to help farmers harvest crops, and their salary would be paid by the farmers.

Proposed Policy

For meeting the regulation of "single employer" in the Employment Service Act, the proposed policy is:

the Taiwan Council of Agriculture designs and provides a selection mechanism under which Fishermen's Associations become employers to hire foreign workers. The Fishermen's Associations would dispatch foreign workers to fishing boats or farms according to the employment need of masters of fishing boats and farms. The associations would pay the salary, the employment security fees, labor insurance fee, and health insurance fee for foreign

workers. In other words, the associations dispatch foreign workers to fishing boats in normal times and dispatch foreign workers to farms in closed fishing seasons while respecting the willingness of the workers to do so.

Other matters would be dealt with in accordance with legislation. For example, occupational safety would comply with Article 51 of the Occupational Safety and Health Act:

“People engaged in work directed or supervised by the responsible people in workplaces as described in Article 2 subparagraph 1, when performing labor work at business entities’ workplaces, are equally subject to this Act as laborers employed by said enterprise”.

Therefore, when foreign workers are dispatched to fishing boats or farms, the masters of fishing boats and farms should provide safety and health equipment and measures in accordance with regulations and give needed safety and health education and training to prevent occupational injury to foreign workers. If an occupational injury occurs, the labor inspection agency would investigate the liability of Fishermen’s Associations, masters of fishing boats, or masters of farms.

Conclusion

To sum up, en route to developing a sustainable fishery, Taiwan has to deal with the lack of fishery workforce. The best way to do so is the suggestion made herein to increase the incentive for young people to engage in fishing and reduce hiring foreign fishers in Taiwan.

6.4 Who Owns the Fish in the Sea?

To whom do the fish in the sea belong? Conservationists believe that all human beings have the duty to protect the oceans and marine resources because they are public goods; however, Taiwan fishermen think otherwise. Whether the concepts of "freedom of fishing" and "public good" are in conflict with each other, it needs to be resolved by legislation.

Many Taiwanese fishermen consider that fish living in the sea belong to them. This often leads them to resist fishery management regulations which are regarded as limiting their right to fish. Many fishermen resist the ocean diving tourism industry, considering this industry to overlap and interfere with their fishing area. During the processes of coastal and marine development, fishermen often ask for large amounts of compensation for fishing benefits they cannot obtain in the future. Thus, the ownership of natural resources in the sea must be explored.

6.4.1 Ownership of Marine Resources and Ocean Creatures

Because the oceans and their resources are part of the natural environment, we turn to the Basic Environment Act of Taiwan (Article 2):

“The term "environment" in this Act means collectively the natural resources that influence human survival and development and the human impact of natural factors, including sunlight, air, water, soil, earth, minerals, forests, wildlife, scenery, recreation, social economy, culture, historical monuments, natural monuments, natural ecological systems, etc.”

This Article defines the concept of environment and natural resource, but does not mention the ocean and marine wildlife. No other article stipulates who is the owner of the natural resources mentioned in the Basic Environment Act.

An examination of other administrative laws indicates that the ownership of natural resources having economic value are stated to belong to the country in several laws of Taiwan, such as the Water Act (水利法) and Mining Act (礦業法).

In the Water Act, Article 2 provides:

“Water resources, being part of the natural resources, are owned by the state, and the state ownership is not prejudiced by the land ownership of any persons”.

In the Mining Act, Article 2 claims:

“All mineral ownership within the territory, exclusive economic marine zone and continental shelf of the Republic of China (Taiwan) are owned by state and shall not be exploited unless a mineral right thereof has been acquired pursuant to this Act”.

The Land Act (土地法) (Article 15) reaffirms this concept:

“Minerals attached to any land shall not become private property, even if private ownership of the said land has been duly acquired”.

The Forestry Act (森林法) (Article 3) provides:

*“The term ‘forests’ means the lands and its collateral trees and bamboo, collectively. According to the delineation of ownership, forests shall be distinguished as national forests, public forests, and private forests; **forests principally belong to the nation**”.*

The Forestry Act was enacted in 1932. At that time, the phrase “**forests principally belong to the nation**” was absent in Article 3 until the amended in 1984.

However, similar regulations are not found in the Wildlife Conservation Act and Fisheries Act, which means that Taiwan establishes relevant regulations from the perspective of conservation and management instead of formally adopting legislation to declare that the State is the owner of land wildlife and marine wildlife.

Wild living marine resources have uncertain mobility; their range of movement is not confined to an artificially demarcated marine area, so the ownership of living marine resources is not easy to determine. However, in logic, if wild animals do not belong to any country, it is questionable whether national regulation of catching wild animals has sufficient legal basis. In the Taiwan legal system, assuming that wild fish do not belong to the country but are in the ownership of no one, the Taiwan Civil Code (Article 802) provides that a person who catches a fish acquires ownership of the fish:

*“Whoever with the intent of being the owner of ownerless personal property **takes possession** of the same, unless otherwise provided by the statutes, he **acquires its ownership**”.*

In this legal context, the phenomenon of overfishing is not surprising. Therefore, this provision needs to be strengthened in Taiwan’s legislation protecting fishery resources and marine ecology.

Moreover, an analysis of the China’s regulations relevant to the ownership of natural resources has identified three examples for Taiwan to consider. China does not distinguish between the definition of fishery resources and marine wild animals. However, the "Law of the People’s Republic of China on the Protection of Wild Animals", enacted in 2016 and in force from 2017, provides that all wild animals, including marine wild animals, are in State ownership:

Law of the People’s Republic of China on the Protection of Wild Animals

Article 2: All activities within the territory of the People's Republic of China concerning the protection, domestication, breeding, development and utilization of species of wildlife must be conducted in conformity with this Law.

Article 3: Wildlife resources shall be owned by the State.

Article 7: The departments of forestry and fisheries administration under the State Council shall be respectively responsible for the nationwide administration of terrestrial and aquatic wildlife.

"Forestry Law of the People's Republic of China

Article 3: Forest resources, with the exception of those owned by collectives as provided for by law, are owned by the State.

Grassland Law of the People's Republic of China

Article 9: The grasslands are owned by the State, with the exception of the grasslands owned by collectives as provided for by law. With respect to the State-owned grasslands, the State Council shall exercise the right of such ownership on behalf of the State.

6.4.2 Proposal: Amendments of the Taiwan Fisheries Act

The Taiwan Fisheries Act and other laws do not clearly provide that marine living resources belong to the State. Thus, it would be desirable to change the Taiwan Fisheries Act.

First: All marine living resources shall be owned by the State

Article 1 of the Taiwan Fisheries Act provides:

"This Act is enacted to conserve and rationally utilize aquatic resources, to increase fisheries productivity, to promote sound fisheries development, to guide and assist the recreational fishery, to maintain the orderly operation of the fisheries, and to improve the livelihood of fishermen. Matters not covered by this Act shall be governed by the provisions of other acts and regulations."

And, it is proposed to amend Article 1 to read:

"This Act is enacted to conserve and rationally utilize aquatic resources, to increase fisheries productivity, to promote sound fisheries development, to guide and assist the recreational fishery, to maintain the orderly operation of the fisheries, and to improve the livelihood of fishermen. Matters not covered by this Act shall be governed by the provisions of other acts and regulations."

[Proposed Added Paragraph]

All marine living resources within the territory, exclusive economic maritime zone and continental shelf of the Republic of China (Taiwan) shall be in the

ownership of the State and fisheries resources shall not be exploited unless a fishing right thereof has been acquired pursuant to this Act”.

Second: Ownership of Catch Obtained After Completing Landing Declaration

The “Landing Declaration” system is a perfect legal tool to play the role of the “Ownership Transfer System” from the State to a juridical or natural person, such as fishery operators or fishers. Therefore, Article 6 needs amending as below:

“Any person who intends to operate a fishery in public waters or non-public waters adjacent thereto shall obtain approval given and fishing license issued by the competent authority prior to the operation.

[Proposed Added Paragraph]

Any person may acquire the ownership of his catch only after completing a landing declaration in accordance with law. A person who violates this act shall not obtain the ownership of the catch from the beginning”.

In the present work, a violation of the Fisheries Act is illegal, unreported, and unregulated fishing activities.

Third: Changing Fishing Right into Fishery Usufructuary Right

A special kind of fishing right is granted in Chapter Two of the Taiwan Fisheries Act. It is simply named: “Fishing Right Fishery”; it is of an unreasonable legal nature, a right *in rem*. This is inconsistent with the previous concept that the State owns all marine living resources.

Article 20 provides:

“The fishing right shall be considered as a right in rem. Except as this Act otherwise provides, the provisions of the rights in rem of real property in the Civil Code shall, mutatis mutandis, apply”.

In Taiwan, the Civil Code divides property rights into ownership (real right) and limited real right. Limited real rights contain the usufructuary right and collateral right. In

1929, the Nationalist Government of China viewed the fishing right in the Fisheries Act as a kind of property right, which is absurd from the perspective of the twenty-first century. In practice, this law causes fishers to think that they own the ocean, even the fish in the ocean. However, in essence, Fishermen's Associations and fishers merely use fishing grounds to fish, instead of owning fishing grounds. Fishing grounds belong to all citizens and belong to the State.

Moreover, in 2010, the chapter on property rights in the Taiwan Civil Code was fundamentally amended, and a new usufructuary right added: the "*agricultural right*", listed in the Taiwan Civil Code, as Article 850-1:

"An agricultural right is the right to cultivate, to forest, to farm, to plant bamboos and trees or to conserve on the land of another person".

The present author considers that this new right is appropriate for addressing the legal nature of fishing rights, and thus would amend Article 20 of Taiwan Fisheries Act:

"The usufructuary fishing right shall be considered as an Agricultural Right in the Civil Code. Except as this Act otherwise provides, the provisions concerning the Agricultural Rights in the Civil Code shall, mutatis mutandis, apply."

The critical concept is that the central government, that is, Fisheries Agency, is representative of the State, which legally owns the sea and the marine living resources, that is, the landowner, in the regulations on the Agricultural Rights.

Conclusion

The State is the collective will of the entire people. When marine living resources belong to the State, they also belong to the entire public. Central government, local governments, or Fishermen's Associations only own the right and duty to manage and

maintain State property. The Taiwan Fisheries Act should establish this concept and the ownership of the State, and achieve effective management of a sustainable fishery through the legal design of “using landing declaration system to transfer the ownership of specific marine creatures”.

6.5 Who Manages the Fisheries?

6.5.1 Centralization of Competent Authority: Central Government or Local Governments

According to the Article 108 of the Taiwan “Constitution”, the management of "marine fisheries", which includes legislative work and implementation, belongs to the central government. However, implementation can be entrusted to provincial and county governments. Based on the Taiwan Fisheries Act (Article 2), the competent fishery authority means “the Council of Agriculture of the Executive Yuan at the central government, municipal governments at municipalities, and county/city governments at /counties/cities”. Regarding the management of fishery resources, in general, the Central Competent Authority “Fisheries Agency” announces fisheries regulations in accordance with Article 44 of the Fisheries Act, such as closed fishing seasons or closed areas. But Article 44(3) also gives power to issue fisheries regulations to county and city governments, as below:

Article 44:

“For the purposes of resources management and fisheries structure adjustment, the competent authority may promulgate regulations on the following matters:

- (1) Restriction or prohibition of the catching, harvesting, or processing of aquatic organisms.*
- (2) Restriction or prohibition of the sale or possession of aquatic organisms or the products made there from.*
- (3) Restriction or prohibition of the use of fishing gears and fishing methods.*
- (4) Restriction or prohibition of fishing area and fishing season.*
- (5) Restriction or removal of any object obstructing the migratory routes of aquatic animals.*
- (6) Restriction or prohibition of placing or dumping of objects harmful to aquatic organisms.*
- (7) Restriction or prohibition of placing or removal of protective objects necessary for the propagation of aquatic organisms.*

(8) *Restriction or prohibition of transplantation of aquatic organisms.*

(9) *Other matters as deemed necessary.*

Any fishery operator violating any provisions of subparagraph 4 to 9 of the preceding paragraph, shall be imposed with administrative disposition by the authority that made the promulgation.

The municipal or county (city) competent authorities shall report to the central competent authority for approval prior to any promulgation pursuant to the provisions of paragraph 1”.

Article 44(3) is considered to be in violation of the Taiwan Constitution because local governments do not have legislative power, merely executive authority over fishery affairs according to the Taiwan Constitution (Article 108). Article 44 empowers county and city governments to issue fisheries regulations. Moreover, violations are punished by local governments rather than the central one. Obviously, Article 44 distributes management of the marine fisheries to local governments.

However, in fact, Taiwan local governments do not have the ability to manage the ocean. The political reality is that local government manpower for fisheries management is limited, often one civil servant is assigned who experiences pressure from tens of thousands of fishers and local elected representatives. Local representatives often pressure local government decision-making and imposition of fines. Under the pressure of lobbying, many violations of the IUU have gone unpunished. Adverse financial circumstances mean that many local governments are unable to rent fisheries management boats. Therefore, chaos occurs when local governments enact regulations which they have no ability to implement and the Coast Guard Administration is afraid to impose fines when enforcing regulations.

Conniving in illegal fishing not only prejudices the ocean, but also lowers the morale of frontline coast patrol personnel.

Thus, the solution is that the Fisheries Agency should regroup the fisheries management human resources of local governments. The Fisheries Agency should divide nineteen coastal counties into five fisheries management centers, which are under the control of central government. These fisheries management centers can coordinate fisheries enforcement and cooperation between regions. Taiwan can have a stronger fisheries management agency and more powerful fisheries managers.

6.5.2 Role of Taiwan Fishermen's Association

Only Taiwan and Japan have fishermen's associations with their own special legal status. In Taiwan, the Fishermen's Association is the most important channel for the Fisheries Agency to promote policies, manage fishing ports, and manage fishery auction markets, which is sometimes the only and exclusive channel.

Before 1895, Taiwanese fishers were mainly part-time, who only caught fish during the important fishing season or when they were unable to farm. At that time, there was no fishery association or union of fishers. In 1895, China suffered military defeat and ceded Taiwan to Japan. Under Japanese rule, the Taiwan fishery began to modernize and developed a large-scale industrial fishery. As a result, Taiwanese fishermen set up informal groups, fisheries cooperatives, and fishermen's associations. In 1944, Japan issued a "Fishery Industry Group Law", merging all fisheries cooperatives and fishermen's associations into "Taiwan Fishery Industry Associations".

In 1945 Japan surrendered and gave up Taiwan. China's National Government took over Taiwan. In 1949, in a civil war between the Chinese Nationalist Party (Kuomintang) and the Chinese Communist Party, and the Kuomintang was defeated. The entire government and officials of the Republic of China moved to Taiwan and became the so-called Taiwan

Government. The Taiwan Government readjusted fishery groups created in the era of Japanese rule, according to the “Fishermen’s Association Act”, adopted when the Chinese Nationalist Government governed the Mainland. The Fishermen’s Association Act has been amended nineteen times. Fishermen’s Associations have undergone many mergers and elections and become what they are today. The functions and organizations of Fishermen’s Associations have experienced a crucial change, and the process of change is complicated. Now Fishermen’s Associations are an important part of fisheries management in Taiwan, although there are problems to be resolved.

Taiwan has forty Fishermen’s Associations, including one national and thirty-nine local associations. Local associations are joined by local fishers as members. Membership is divided into category A, category B, and Sponsor Members. The total membership is 420,000. Although Fishermen’s Associations are supervised by the Fisheries Agency, they are financially independent. Fishermen’s Associations have political, economic and social characteristics. In a Fishermen’s Association, the most influential people are the chair of board of directors, standing supervisor, and secretary general.

In earlier times, Fishermen’s Associations in Taiwan not only helped to deal with the catch but also took care of the daily needs of fishers, including operating barbershops and kindergartens, so the fishers need have no worries when fishing at sea.

The Fishermen’s Association Act gives nineteen tasks to Fishermen’s Associations, which mainly involve cooperating with government policies, meeting the needs of fishers, and serving fishers.¹⁵⁹

¹⁵⁹ See <http://www.rocnfa.org.tw/prg20/prg2020.aspx>

Taiwan Fishermen's Associations have contributed a lot to the development of fishing in the past, but have made insufficient contributions to the development of a sustainable fishery. For example, most Fishermen's Associations do not actively promote Landing Declarations. When having conferences with the Fisheries Agency, these Fishermen's Associations resisted the management policies of a sustainable fishery. Nonetheless, Fishermen's Associations are the only channels approved by the Fisheries Agency to submit landing declarations.

Moreover, during the past three decades, the connection between Fishermen's Associations and politics has been too close to make these associations focus on fisheries management. Some important staff in Fishermen's Associations own larger fishing vessels. Some vessels engage in smuggling. Whether they can represent the opinions of most fishers is questionable.

Apart from expecting traditional Fishermen's Associations to change, the Government has to help fishermen who willingly get involved in creating a sustainable fishery to additionally establish legal groups having the same legal status as Fishermen's Associations. Only by ending the exclusive market of Fishermen's Associations, can Taiwan really move toward creating a sustainable fishery.

6.5.3 Exclusive Fishing Right Holder

One role of the official fishery manager in Taiwan is to act as the exclusive fishing right holder. According to the Fisheries Act (Article 15):

Exclusive fishing right: the right to use a specific water area to form a fishing ground for fisheries access privilege holders to operate one of the following fisheries:

- 1. catching or harvesting aquatic organisms.*

2. aquaculture.

3. catching or harvesting aquatic animals with anchored fishing gears within the waters at a depth of twenty-five meters or less.

Only Fishermen's Associations or fisheries production cooperatives can qualify as exclusive fishing right holders.

Based on the preceding paragraph, the exclusive fishing right is used in free public waters along the coast of Taiwan, and this right is granted to fisher associations or fisheries production cooperatives to develop specific waters as the fishing ground with the government's permission. These associations or cooperatives grant fishers access to the exclusive fishing right waters to fish by signing access regulations or access contracts with these fishers. This is among the important tools for fisheries management along the coast of Taiwan. The Fisheries Agency usually requires exclusive fishing right holders to conserve their fishing grounds.

In fact, since the Fisheries Act was amended in 1991, cases arising from the actual implementation of exclusive fishing rights have been uncommon during the past 28 years. From the standpoint of environmental protection campaign groups, during the past 30 years of economic development and coastal development in Taiwan, most fishers have regarded the exclusive fishing right as the basis for legal compensation of fishery losses, without really expecting the sustainable management of coastal fishery resources. Therefore, the effectiveness of cultivation and conservation of coastal fishery resources around Taiwan has been weak for a long time.

The reasons for the low effectiveness for the sustainable management of the Taiwan exclusive fishing right system include:

1. lack of funds meant that fisher associations could not afford patrol boats or increased manpower to discourage illegal fishing vessels. Therefore, fishers believe that the associations lack management ability, and the exclusive fishing right is viewed as a quasi-property right in the Civil Code which cannot be implemented.
2. there is no joint fisheries management mechanism among associations when they execute fisheries management. According to the Fishermen's Association Act and the Fisheries Act, each Fishermen's Association has its own management waters; no joint management system is established among different fisher associations. Different Fishermen's Associations have different regulations for managing straddling fish stocks; this increase management difficulties and makes the completion of joint management objectives improbable.
3. the execution of exclusive fishing rights by a fisher association relies on the association's overall function. Because the Fishermen's Associations function poorly, especially marketing the catch, which is a major concern of fishers, the ability to raise prices is inadequate. The Fishermen's Associations should provide services to increase fisher revenue and improve fisher standards of living, encourage fishermen cohesiveness in these Associations, and increase fishermen cooperation with these Associations to promote the exclusive fishing right system.

Based on the above reasons for inadequate effectiveness of the Taiwan exclusive fishing right system, the exclusive right system should be adjusted. The adjustment should aim to eliminate the weaknesses of the Taiwan exclusive fishing right system, especially to incorporate the spirit of public good in privatization management and self-discipline joint management, and enhance the willingness of Fishermen's Associations to invest in

management in order to improve the ability to implement exclusive regulations and the provision of diversified service. Moreover, strengthening the use of advocacy and education is required to enhance the identity of fishermen groups and establish investment and management confidence of Fishermen's Associations, thereby also the expectation that the exclusive fishing right system will effectively conserve coastal fishery resources.

6.6 Input Control I: Restrictions on Number of Fishing Vessels

The Island of Taiwan is surrounded by sea with an area of roughly 36,000 square kilometers. From 1895 to 1945, the period of Japanese colonization in Taiwan, the Government developed offshore and pelagic fisheries industry in order to provide the general population with less expensive sources of animal protein. Thus, the era of Taiwan fisheries began. After World War II, fisheries continued to boom. However, with the advancement of fish catching techniques and the increase in the quantities of fishing boats, the volume of fish catches continued to rise, which ultimately resulted in the gradual depletion of the offshore marine resources. The numbers of fishing boats in Taiwan reached its peak in 1987. According to the fisheries statistical annual report published by the Fisheries Agency in 2016, the total number of fuel-powered fishing boats in 1987 was 34,360, including motorized crafts and fishing rafts.

Regarding how to reduce the fish catching capacity of the whole nation, four generalized methods are proposed: control the total number of fishing boats, control the number of fisheries licenses issued, control the total tonnage of the fishing boats, and control the total horsepower of fishing boats combined. The Fisheries Agency in Taiwan has implemented the said four ways, to be discussed below

6.6.1 Control over Fishing Vessel Construction Permits and Fishery Licenses

When a fishing boat is being built, the fishing method will be taken into account. The layout and structure of design will be adjusted to accommodate its purpose of use.

In Taiwan, in order to control fishing capability, the government will ask a fishing boat owner to apply for a fishing boat construction permit and fisheries license before the boat is built. However, with the gradual depletion of the marine resources, the Fisheries Agency ceased increasing the numbers of new fishing boats after 1989, no matter whether for pelagic or offshore fishing. If fishermen wanted to build new fishing boats, they would have to get a replacement permit by acquiring discarded fishing boats. That is to say, the Taiwan Government controls both the total number of fisheries licenses and the total number of fishing boats simultaneously limiting applications for building new fishing boats.

Below we discuss “fishing boat management” in two parts: (1) fisheries licensing system and fishing boat construction system, and (2) fishing boat replacement system.

Fisheries Licensing System

If one wants to be a fisherman in Taiwan, one must decide what kind of fishing method one wants to use first. One has four choices linked to one fishing boat at the same time.

Article 6 of Fisheries Act of Taiwan provides:

*“Any person who intends to operate fishery in the public waters or non-public waters adjacent thereto shall **obtain approval given and fishing license issued by the competent authority prior to the operation**”.*

This provision means that if a fisherman catches fish and sells them, this will be regarded as a “fishery operation”, i.e. commercial fishery. Anyone who engages in catch and subsequent transaction has to receive permission from the Fisheries Agency in Taiwan first. The Taiwan Government hopes that through this management measure, the total quantity of all fishing methods, including trawl-net fishing boats, gill net fishing boats, long line fishing boats, purse seine fishing boats, can be controlled. Accordingly, the total number of fishing boats can be controlled. Although there is a review mechanism for the market entry of

fisheries licenses, there is no permanent phase-out mechanism – even though periodic renewal of the fisheries license is required. Unless the license owner had his license revoked, license can be renewed continuously. A huge gap exists between the fisheries license design in Taiwan and the annual status of fisheries resources, making it hard for the system to make adjustments and keep up with the ever-changing environment.

Next, the first paragraph of Article 8 in Fisheries Act stipulated that “the building, modification, or chartering of **any fishing vessel used by a fishery operator** for a fishery operation shall **obtain permission** from the competent authority”. The qualification for fishers to apply for fisheries licenses is based on Article 4¹⁶⁰ in the “Regulations for the Issuance of Building Permit and Fishing License of Fishing Vessel”. The first qualification that may apply for the issuance of fishing license listed in Article 4 of the regulations is that “The fishery operator has acquired a fishing vessel newly-built with the replacement qualification to engage in fisheries”. Here one can see how Article 6 and Article 8 of Fisheries Act in Taiwan intertwine to form an organic legal mechanism of fishery input control.

¹⁶⁰ Article 4, Taiwan Regulations for the Issuance of Building Permit and Fishing License of Fishing Vessel. Any fishery operator that meets any of the following requirements may apply for the issuance of fishing license: The fishery operator has acquired a fishing vessel newly built with the replacement qualification to engage in fisheries;
The fishery operator is authorized to engage in fisheries with a newly-built fish carrier over 2 thousand tons;
The fishery operator engages in fisheries with an imported fishing vessel that is permitted by the central competent authority;
The fishery operator engages in fisheries with an assumed or chartered fishing vessel;
The fishery operator is authorized to change the fishery type to be engaged in with the existing fishing vessel;
The fishery operator whose fishing vessel is authorized to specialize in fisheries training, research and patrolling;
The fishery operator who obtains the replacement qualification pursuant to these Regulations engages in fisheries with the acquisition of a fishing vessel whose fishing license has been revoked by the central competent authority, instead of building a new fishing vessel.

In short, if one wants to become a fisherman who can use a certain fishing method, one has to acquire the certified qualification of fishing boat replacement. Or, one can buy or rent the fishing boat from the owner of fisheries license with a certain kind of fishing method. The fourth qualification that may be applied to the issuance of fishing license listed in Article 4 of the Regulation is that *“A fishery operator who accepts or charters a fishing vessel from another party for the operation of fishery”*.

As mentioned above, there are four types of fishing allowed to register at the same time. According to Article 25 of the Regulations for the Issuance of Building Permit and Fishing License of Fishing Vessel:

“Registration of the main fishery on the fishing license shall be limited to one type only and registration of part-time fishery shall be limited to three types.”

Moreover, in the past decade, in order to control trawl fishery, longline fishery, squid jigging fishery, tuna purse seine fishery, mackerel purse seine fishery, and gillnet fishery, Taiwan Fisheries Agency closed the door for applying for these fishing permits.

Article 22, Fisheries Act

“Main fisheries such as trawl fishery, longline fishery, squid jigging fishery, tuna purse seine fishery, mackerel purse seine fishery and gillnet fishery shall not be registered as part-time fishery.

Where the trawl fishery, longline fishery, squid jigging fishery, tuna purse seine fishery, mackerel purse seine fishery and gillnet fishery has been approved as part-time fishery, at the time of application for issuing or renewal of the fishing license, the competent authority shall cancel such part-time fishery”.

Furthermore, Taiwan has stopped issuing fishing licenses for coral fishery, shellfish fishery, and fishing using submarine devices which are considered to be harmful to the marine ecosystem.

After one has decided which fishing method, the next step is to own or rent a fishing boat. It is possible to fish without a boat in Taiwan. One can simply find a natural coast and cast the net into the sea. But based on the current situation around Taiwan, one is likely to catch nothing but trash.

Fishing Vessel Construction System and Fishing Vessel Replacement System

The building of whole new fishing boats is forbidden in Taiwan now.

In order to protect the gradually depleting marine resources, the Fisheries Agency in Taiwan started in 1967 to implement a system of fishing boat replacement rules specifically targeted at fishing boats less than 300 tons for the purpose of controlling the total number of trawl net fishing boats. In 1989 the total number of fishing boats exceeded 30,000.¹⁶¹ Because of this substantial number, the Taiwan Government introduced a system of replacement rules targeted at all fishing boats and promulgated the “Regulations for the Issuance of Building Permit and Fishing License of Fishing Vessel”.

For the past 30 years, according to the figures provided by the Fisheries Agency in Taiwan, nearly 8,000 fishing boats have disappeared, including the fishing boats that the government bought from fishers and under the replacement rules. From 1991 to 2016, the Taiwan Government had acquired nearly 5,000 fishing boats. From 1989 to 2018, the number of fishing boats whose fisheries license was revoked is roughly 500, whereas boats not built because of expired replacement qualification is about 2,500. The total number of fishing boats in Taiwan is around 22,000 in 2019.

¹⁶¹ Hung, Kuo-yao.(洪國堯) (2011, March). Promote coastal and inshore fisheries responsibility system, strengthen conservation of marine resources. *Agricultural policy and emotion*, 225. Retrieved from <https://www.coa.gov.tw/ws.php?id=23066&print=Y>

Pursuant to “controlling the total number of fishing boats in Taiwan and total weight of fishing boats” policy, the Regulations for the Issuance of Building Permit and Fishing License of Fishing Vessel have been amended 22 times. This regulation has become the most important source of law governing input control of fishing boats. The relevant articles regulating offshore fisheries fishing boat management are as follows:

According to Fisheries Act (Article 8) and the Regulations for the Issuance of Building Permit and Fishing License of Fishing Vessel (Articles 3, 4, and 14), only when the fishing boat owner receives authorization to replace a fishing boat of the same tonnage can he/she start to build new boats.

Article 4 of the Regulations for the Issuance of Building Permit and Fishing License of Fishing Vessel provides:

“Replacement qualification” means that “the fishery operator whose fishing license is submitted and revoked after the loss of his/her fishing vessel is granted the qualification to build a new fishing vessel of the same tonnage to replace the original one and continue to engage in the same fishery type.”

Article 14 adds:

“In case that any fishery operator applies for the building of a new fishing vessel with the replacement qualification of more than one fishing vessel of the same fishery type, and the replacement tonnage is less than that of the newly-built fishing vessel, the shortfall shall be complemented, except that the shortfall is less than one tonnage.

Where the replacement tonnage is more than the tonnage of the newly-built fishing vessel by one tonnage and above, the surplus replacement tonnage shall be reserved for one year starting from the date of approval of reservation. The fishery type of the reserved surplus replacement tonnage shall be the same as that of the newly-built fishing vessel, and the reserved surplus replacement tonnage shall be used only to complement the shortfall of the replacement tonnage of other fishing vessel(s), but not to build a new fishing vessel.”

Article 15 of the Regulations for the Issuance of Building Permit and Fishing License of Fishing Vessel illustrates the concept of fishing boat control by providing that any fishery operator has to acquire the replacement qualification for one fishing boat of the same length and gross tonnage overall to build a new fishing boat.

Consider one paragraph of Article 15 as an example:

“For a fishing vessel whose length overall is 24 meters and above, the fishery operator shall acquire the replacement tonnage from at least one fishing vessel with the length overall of 24 meters and above and the gross tonnage of 100 tons and above of the same fishery type. In case of building a new fishing vessel, the gross tonnage of newly-built vessel shall be no less than 100 tons”.

Moreover, if fishing boat were destroyed or lost, and if the fisheries license has not been revoked, the original replacement qualification still holds and he can freely do any transaction as he wishes concerning the boat. However, if he does not apply for building a new fishing boat within three years, the replacement qualification will be lost.

Sampan and Fishing Rafts

The rules of fishery type, replacement, and modification of fishing boats do not apply to “sampan and fishing rafts”. Another regulation, the “Regulations for the Issuance of Building Permit and Fishing License of Sampan and Fishing Rafts”,¹⁶² was adopted by the central competent authority – Taiwan Fisheries Agency, and by the municipal competent authority – Taiwan’s local governments.

There are two reasons. First, the fishing capacity of ten 2-ton rafts without a cabin is not the equivalent of one twenty-ton fishing boat with cabin and electrical equipment. Generally, the Taiwan Fisheries Agency considers that the fishing capacity of ten 2-ton rafts

¹⁶² The title of the regulation in Chinese is “舢舨漁筏建造許可及漁業證照核發審核要點” which does not have an official English version yet.

is less than a well-equipped 20-ton boat. The other reason to distinguish sampans and fishing rafts from boats is that there are more than ten thousand sampans and fishing rafts in Taiwan. Local governments are expected to share the heavy workload of managing these small fishing boats. However, the basic spirit and principal rules are as the same as for fishing boats. One old sampan for one newly-built sampan.

Challenges to be Resolved

In order to control fishing capacity by limiting the quantity of fishing boats, the Taiwan Government has engaged in detailed planning regarding the fisheries license and fishing boat replacement system. However, there are occasions when the government cannot resist pressure from elected representatives to amend the laws. Therefore, for the past thirty years, the numbers of fishing boats in Taiwan has merely fallen from 30,000 to 22,000.

If one refers to the example of a renowned Pelagic fishery country – Norway, one learns that Taiwan has too many fishing boats. The exclusive economic zone of Norway is larger than that of Taiwan; however, the total number of fishing boats in Norway is around 6,000. The marine resources around Taiwan are severely depleted. Judging from the below average income of offshore artisanal-type fishermen, the present author inferred that offshore spaces around Taiwan could only sustain around 6,000 fishing boats. The number 6,000 did not derive from fisheries resource scientific investigation and fisheries economic investigation. Rather, this number has an underlying political meaning. The present author believes the research budget given to the Fisheries Agency is rather limited, with less than 4 billion TWD (roughly \$130 million USD) annually. This made it nearly impossible for the Taiwan Government to acquire all the data of offshore fisheries resources status by conducting fisheries scientific research. It is even more impossible to complete the census of

fisheries and reach a consensus on an acceptable annual income for a fisherman, and ultimately to accurately calculate how many fishing boats should there be in Taiwan.

Even if the Taiwan Government through research funding acquired definitive scientific data supporting a reduction in the number of fishing boats, this would have produced a strong and heated backlash from the fishermen and their elected representatives. Therefore, how many fishing boats are required for the already saturated fisheries industry in Taiwan remained difficult to answer from the perspective of marine science and economics. An ultimate goal needs to set through political decision-making. Adjustments have to be made for the next ten years. This topic is purely political. Therefore, how to reduce the numbers of fishing boats in Taiwan will be a challenging task for fisheries policy and law in the future.

Old and unused fishing boats are berthed in fishing ports for a long time. These unused boats took up nearly all the berths, meaning the general public who bought personal boats had no berths. The surplus boats and reluctant masters were a challenge for the government.

The Regulations for the Issuance of Building Permit and Fishing License of Fishing Vessel used to provide that if a fisheries license had passed the two-year expiration date without renewal, the license owner could no longer apply for a fisheries license. However, this article was amended. These dormant berthed fishing boats can be used anytime, and the owner can apply for renewal of the license. Legally speaking, this request from a fishing boat owner cannot be denied. These latent and unstable license applicants will be included as part of fishing capacity once their renewal applications have been approved.

Following the implementation date of the replacement system, the price of replacement tonnage in the market rose tremendously. Fishermen filed complaints because they could not buy or cannot afford to buy such tonnage. The soaring price of replacement tonnage resulted

in the owner making full use of every space on a newly-built fishing boat. For example, the crewmember living spaces were being replaced by fish storage compartments. Pictures of fishers sleeping on deck usually made headline news as they were considered sweatshops. Therefore, the challenge is to balance the control of total number of fishing boats and the affordable cost for fishers to refurbish their fishing boats.

Two Suggestions:

First, the replacement qualification of sampans and fishing rafts should interact with fishing boats, thus speeding up the reduction of sampans and fishing rafts. Moreover, berths in fishing ports should not be free anymore, especially for dormant and dilapidated fishing boats. The owner should be obliged to pay a berth fee monthly. This will accelerate the process of reducing dormant and dilapidated fishing boats.

Second, the Fisheries Agency and the Maritime and Port Bureau should work together to develop plans to exclude the following from the total tonnage demanded by the replacement qualification: crewmember living space, which includes living quarters, cafeteria, and lounge. This implies that the masters of newly built fishing boats could directly increase crewmember living space without buying replacement tonnage. The fishing boats have to be inspected annually, and any conversion of living space into fishing storage compartments is forbidden. For example, a purse seine net fishing boat has a replacement tonnage of 2,000, and the space for living quarters, bathrooms, cafeteria, and recreation rooms is 200 cubic meters. The master of the fishing boat might build a new boat with a tonnage of 2,200.

In conclusion, by reason of the limited total length of coastline and limited numbers of fishing ports, the government was prone to establish more fishing ports, which led to excessive marine construction. This ultimately destroyed the natural habitats along coastlines.

Therefore, gradually reducing the number of fishing boats remains a necessity. However, to conserve the marine ecology merely by controlling the quantity of the fishing boats is less effective. This could precipitate the unhealthy development of fishing boat replacement. The best fisheries managing strategy can only be achieved by accompanying the above with output control measures.

6.6.2 Control over Total Tonnage of Fishing Boats

As noted above, limited marine resources, limited coastline length, and limited number of fishing ports mean that Taiwan must continue to reduce the number of fishing boats in order to achieve the goal of sustainable fisheries. One way to reduce the number of ships is to control the tonnage of fishing boats. The Taiwan Government has no other measures to control the nationwide gross tonnage except to use the construction system mentioned above to gradually reduce the total tonnage of the entire country's fishing boats.

Taiwan also has no specific target for the number or gross tonnage of all kinds of fishing boats. However, over-controlling the total tonnage of fishing boats throughout the country is not advisable, as that would cause human rights problems by depriving the crew living space of the fishing boat.

Moreover, it is desirable that Taiwan not have too many small fishing boats, especially sampans and rafts which are under 5 tons. In the present author's experience in participating in fishery public hearings and caring for fisheries law enforcement in past years, the little boats have always strongly resisted management regulation. They have many reasons to engage in illegal fishing, are unwilling to install the Automatic Identification System (AIS) or Vessel Monitoring System (VMS), and are not willing to do landing declarations. Even the proposal that light fishing boats should be at least fifty meters from the coast was opposed by

the representatives of Fishmen's Associations. For Taiwan to promote sustainable fisheries, how to effectively manage a large number of small fishing boats is a difficult challenge.

Who Are Small Fishing Boats?

According to Ministry of Transportation and Communications in Taiwan, the Law on Ships (Article 3) defines a "small ship" as a non-power-driven ship of under fifty (50) gross tonnage, or a power-driven ship of under twenty (20) gross tonnage".

Internationally, fishing vessels are often graded by length. For example, the 1993 *Agreement to Promote Compliance With International Conservation and Management Measures By Fishing Vessels on the High Seas* provides in Article II:

"A party may exempt fishing vessels of less than 24 metres in length entitled to fly its flag from the application of this Agreement unless the Party determines that such an exemption would undermine the object and purpose of this Agreement".

The "State of World Fisheries and Aquaculture 2018", issued by the FAO states: "Size distribution of vessels and the importance of small boats":

"In 2016, about 86 percent of the motorized fishing vessels in the world were in the LOA class of less than 12 m, the vast majority of which were undecked, and those small vessels dominated in all regions. Asia had the largest absolute number of motorized vessels under 12 m, followed by Latin America and the Caribbean. Only about 2 percent of all motorized fishing vessels were 24 m and larger (roughly more than 100 gross tonnage [GT])."

Despite the global prevalence of small vessels, estimations of their numbers are likely to be less accurate, as they are often not subject to registration requirements as larger vessels are, and even when registered they may not be reported in national statistics. The lack of information and reporting is particularly acute for inland water fleets, which are often entirely omitted from national or local registries.

Information on vessels is essential for effective performance-based fisheries governance. It is therefore a serious concern that data on vessels are often most lacking for small-scale fisheries, which are typically a key source of livelihoods and nutrition for coastal communities".

Grading of Taiwan Fishing Boats

The fishery statistics annual report of the Taiwan Government began to calculate the number of fishing boats in 1967. In order to unify the management of fishing boats and fishing rafts, the Taiwan Fisheries Agency issues seven uniform serial numbers when fishing boats are approved for construction. The first three serial numerals represent the grading of the fishing boat, and there are 13 gradings. The last four numerals of the serial number are the ship number. The grading of the first three numbers of fishing boats and the total number of fishing boats in the 2016 annual fishery report are as follows.

A. Fishing rafts and sampans:

1. CTY: Non-motorized fishing rafts.
2. CTR: Motorized fishing rafts. 10,109 boats.
3. CTX: Non-motorized sampans.
4. CTS: Motorized sampans.

B. Motorized fishing boats:

1. CT0: Less than 5 tons. CTS + CT0 total 6,605 boats.
2. CT1: 5 tons or more and less than 10 tons. 791 boats.
3. CT2: 10 tons or more and less than 20 tons. 1,441 boats.
4. CT3: 20 tons or more and less than 50 tons. 1,565 boats.
5. CT4: 50 tons or more and less than 100 tons. 1,200 boats.
6. CT5: 100 tons or more and less than 200 tons. 156 boats.
7. CT6: 200 tons or more and less than 500 tons. 253 boats.
8. CT7: 500 tons or more and less than 1000 tons. 257 boats.
9. CT8: More than 1000 tons. 50 boats.

In Taiwan, fishing boats of less than 100 tons comprise the vast majority. However, Taiwan legislation does not indicate which levels are big ships and which are small boats.

Fisheries regulations also do not have comprehensive and consistent fishery restrictions on big ships or small boats.

That is to say, different fisheries management regulations contain different norms as a result of multiple parties and realistic considerations. For example, in areas prohibited for drag-net fishing, 50-ton large ships are prohibited from fishing within 12 nautical miles. However, with respect to catfish, fishing vessels of more than 100 tons are prohibited from fishing within 12 nautical miles. And fishing boats under 10 tons do not need to submit landing declarations.

Motorized Fishing Boat Grading Recommendations

Although there are 13 gradings for Taiwanese fishing boats, there is no clear definition of which fishing boats are “small”. There are no specific policy objectives in terms of management policies. Therefore, it is suggested that the government establish an additional classification management principle as a common language for media, consumer, and aquatic products. The recommended grading is as follows:

- A. **Tiny** fishing boats XS: Less than 5 tons. CTR, CTS, CT0. Currently about 16,000 boats.
- B. **Small** fishing boats S: 5 tons or more and less than 20 tons. CT1, CT2. Currently about 2,200 boats.
- C. **Medium** fishing boats M: 20 tons or more and less than 100 tons. CT3, CT4. Currently about 2,800 boats.
- D. **Large** fishing boats L: 100 tons or more and less than 500 tons. CT5, CT6. Currently about 400 boats.
- E. **Giant** fishing boats XL: More than 500 tons. CT7, CT8. Currently about 300 boats.

Fishing boats of more than five tons should be obliged to submit landing declarations and the position of the boats should be monitored.

Motorized fishing rafts (CTR) have so developed during the past half century that some boat lengths exceeding 15 m and 20 m have a fishing capability equivalent to fishing boats of 10 tons or more; these need to be reclassified as small fishing boats.

It was suggested above that Taiwan's "best total number of fishing boats" cannot be obtained through fisheries scientific or economic research given Taiwan's realistic government funding. This will be a political, not a scientific, issue. However, regardless of the number of optimal fishing boats, this work suggests that in the overall policy of limiting the number of fishing boats, we must try to make small fishing boats exit. In the exit mechanism, especially for the fishing boats which are often illegally fishing or whose fishing licenses have expired for more than three years, it is recommended to revoke the fishery license, stop the oil subsidy, and add fishing port berth fees.

In Taiwan, many small fishing boats of 5-20 tons are artisanal for individuals or small families, and foreign fishers are employed less often. Therefore, it is recommended that the government provide green subsidies to help tiny fishing boats transform into small fishing boats, or a number of tiny fishing boats become a partnership of medium fishing boats, join various fisheries monitoring and management schemes, and increase opportunities to participate in the sustainable seafood stamp program.

6.6.3 Control over Total Fishing Boats Engine Power

One way to control fishing capacity is to control the main horsepower of the motorized fishing boat. Sometimes this is a national policy goal. But is this method effective?

In addition to the horsepower of the fishing boat engine, the size of the engine is related to the speed, torque, fuel consumption, cost, and the like of the fishing boat. In general, the

greater the horsepower, the faster the speed and torque of the fishing boat, but the engine price is relatively expensive. The engine requires more space, and fuel consumption increases.

In general, fishing boats in Taiwan use low-speed engines. Compared to high speed engines, the biggest benefit is fuel economy. When fishing boats put out to sea, oil accounts for 40 to 60% of the total cost. Furthermore, low-speed engines have better load-bearing capacity when the fishing boat is fully loaded or when the operation requires a relatively large output. The low-speed engine and the high-speed engine are similar to the concept of a truck and a sports car. The fishing boat is similar to the truck, which needs higher load-bearing capacity, but slower speed.

China

On 9 December 2017 Han Xu (韓旭), deputy head of the fishing management bureau at the Ministry of Agriculture of China, said in Beijing that the Government of China intends to reduce the size of its domestic fishing fleet and crackdown on illegal fishing operations with a “zero tolerance” approach. The Ministry announced a new “China Plan” intended to stop decades of overfishing and allow the coastal environment and biodiversity to recover. One goal is to reduce the 20,000 fishing boats and 1.5 million kilowatts of fishing boat horsepower.

Taiwan

Taiwan tried to reduce fishing boat horsepower as early as 1999.

The Fisheries Act (Article 8) of Taiwan says:

“The building, modification, or chartering of any fishing vessel used by a fishery operator for the fishery operation shall obtain permission from the competent authority”.

Therefore, the Taiwan Fisheries Agency enacted in 1999 the Regulation “Maximum Horsepower Limit for Main Engines Installation on Fishing Vessels More Than 20 Tons”. whose content is below:

Table 5: Taiwan’s Maximum Horsepower Limit for Motorized Fishing Vessels

Tonnage	Main Engine Maximum Horsepower
Less than 20 tons	Set by Local Government
20 tons or more and less than 50 tons	$\text{Tons} \times 16 + 140$
50 tons or more and less than 100 tons	$\text{Tons} \times 10 + 440$
100 tons or more and less than 200 tons	$\text{Tons} \times 8.5 + 600$
200 tons or more and less than 500 tons	$\text{Tons} \times 3 + 1700$
500 tons or more and less than 1000 tons	$\text{Tons} \times 2 + 2200$
More than 1000 tons	$\text{Tons} \times 1 + 3200$

In addition to limiting the fishing capacity, the regulations restricting the horsepower of fishing boats is to limit the fishboat fuel subsidy ceiling. However, fishermen have different views, and it is often hoped that the Government will relax the horsepower restrictions of the fishing boat main engine. In general, there are two reasons:

1. The current regulation of horsepower is inadequate. Small fishing boats are not as resistant to waves as large ships. They need more horsepower to resist wind and current.
2. When horsepower is insufficient, the fishing boat often has to add a larger throttle to reach the required speed, which means greater loss of engine life. And from the point of view of energy saving, increasing the throttle is not more environmentally friendly.

Therefore, in 2017 the Fisheries Agency agreed that local governments can appropriately ease horsepower restrictions for small fishing boats, but government fishing subsidies for fishing boats cannot be increased. The Tainan Municipal Government is an example. In 2017 the Tainan Municipal Government relaxed the horsepower limit for small fishing rafts. The press release of the Tainan Municipal Government says:

“The Government has regulated restrictions of the main engine horsepower of fishing boats and rafts in order to prevent the fishing boats from engaging in illegal activities and maintaining the catch. The original standard specifies the maximum horsepower limit of 90 for fishing boats below 10 meters in length.

However, fishermen observe that when facing extreme weather change at sea, the horsepower of the main engine is insufficient to resist the wind and waves. It is prone to shipwrecks.

After re-examination, the horsepower limit of the fishing rafts with a length of 14 meters or less could be increased up to a maximum of 150 horsepower. Plus, in order to meet the needs of fishers, the horsepower limit of the fishing rafts below 10 meters is also relaxed. “

In China, some studies have claimed that the main engine horsepower of fishing vessels is low in correlation with fishing capacity. The total production of marine fishing correlates highly with the number of fishing vessels and fishery labor, whereas the correlation with total tonnage and total horsepower of fishing vessels is low.

Conclusion

The Government does not need to limit the horsepower of fishing boats. Fishing boats can be allowed more horsepower. Conservation methods should be aimed at the "full prohibition of fishing net within the coastal belt of three nautical miles", which will force fishermen to sail the boat farther seaward to fish and will increase sailing time. If the fishing boat has more horsepower, the adverse effect of added sailing time will be reduced. However, if the Government wants to relax the fishing horsepower limit, a nearshore marine protection

zone must be created and the maximum amount of oil subsidies for fishing boats limited. The Fisheries Agency should move to a policy of reducing oil subsidies for fishing boats. The Government should encourage boats built up with energy efficient engines.

6.7 Input Control II: Restrictions on Fishing Capacity

Fishery resources are limited, whereas the powers of human technology are unlimited. Consequently, if fishing capacity is not controlled, we are doomed to have nothing in the sea but plastic rubbish. That is happening in Taiwan coastal waters. Therefore, control of the total number of fishing boats, discussed above, is not sufficient. More detailed and specific controls of fishing are required for Taiwan. We turn to an inventory of the regulations of Taiwan fisheries management.

6.7.1 Restrictions on Specific Fishing Methods

Fishing methods include those for locating fish, gathering fish, and catching fish. In terms of the management of coastal and offshore fisheries, Taiwan has no restrictions on the method for locating fish. As for the method of gathering fish, there are guiding principles for light fishing issued by local government, without any comprehensive restriction. Only the method of catching fish is partially limited.

Restriction on Method of Locating Fish

Light fishing is an important example. Light fishing is the use of light to attract marine creatures having positive phototaxis at night. However, the unrestricted use of strong light creates a competition of light power between fishing boats, which wastes energy and impairs the health of humans and marine creatures. This method of gathering does not screen the type of fish. Many small fish and marine creatures without economic value are attracted by the night lights, coming close to the fishing boats. The method of gathering fish in Taiwan by light fishing severely damages coastal and offshore marine ecology.

In 2003 the Taiwan Fisheries Agency promulgated the “Normative Principle of Light Fishing Management by Local Government According to Article 44 of Fisheries Act”, which provides:

“Article 1 the fishing forbidden zone of light fishery is at least extending 3 nautical miles from the coast. The sea area from 3 to 12 nautical miles which has resource conservation facility can be included in the fishing forbidden zone.

Article 2 the maximum light power of fish lamp of each fishing boat is 180 kw.”

Restricting the power of fishing lamps limits the method of locating fish. However, this restriction is not compulsory. Ten counties and cities have promulgated this regulation, including Yilan County, Keelung City, New Taipei City, Miaoli County, Tainan City, Kaohsiung City, Pingtung County, Taitung County, Hualien County and Penghu County. The forbidden zone of light fishing they have announced extends for more than 3 nautical miles.¹⁶³

Restriction on Method of Fishing

Taiwan’s prohibition of destructive fishing methods that affect ecology only includes poison fishing, electrofishing, blast fishing, and fishing with the use of submarine devices.

Banned Method of fishing: Poison, Explosives, and Electricity

The Taiwan Fisheries Act (Article 48) provides:

“Aquatic organisms shall not be caught or harvested with the use of:

- (1) toxic substances.*
- (2) explosives or other dynamite*
- (3) electricity or other narcotics”.*

¹⁶³ See <https://www.fa.gov.tw/cht/ResourceWorldOceansDay/content.aspx?id=4&chk=43308040-aa25-4ad9-ad29ced7a817d7fe¶m=pn%3D1>

Violating this regulation engages criminal punishment rather than an ordinary administrative penalty. Any person who violates the regulation shall be subject to imprisonment for a period not exceeding five years, short-term imprisonment, or in addition thereto a fine of not exceeding one hundred and fifty thousand New Taiwan Dollars.

Fishery Using Scuba Diving Device

A scuba diving device could enable a diver to capture specific rock reef fish and large coral reef fish for a long time, seriously impairing the regeneration of marine ecology and resources. Therefore, since 1989, the Taiwan Fisheries Agency stopped issuing new fishing licenses for fishery with the use of scuba diving devices.

Limitation on Scale of Fishing Gear

In theory, limiting the size of fishing net mesh, the length of line in long-line fishing, or the number of fishhooks is a viable fisheries management approach. However, in Taiwan, there is no comprehensive management of this. Only some counties and cities have forbidden the using of driftnet in certain maritime areas.

Restricting Number of Fishing Boats in Specific Fisheries

Taiwan only restricts the number of fishing boats in mackerel fisheries and precious coral fisheries. Since 2013, the number of fishing boats in mackerel fisheries is limited to 60 groups. The number of fishing boats in precious coral fisheries is limited to 60 based on the latest regulations in 2014.

The total number of fishing boats in these two fisheries is not expected to increase. However, how to replace original members with good young fishermen who are more willing to obey relevant conservation regulations will be a new issue in the future.

The national total number of fishing boats in trawler fisheries and gillnet fisheries, or engaged in light fishing should be restricted by the Taiwan Fisheries Agency next.

6.7.2 Regulations of Closed Fishing Seasons and Closed Fishing Areas

Fishing Effort is the amount of fishing gear of a specific type used on the fishing grounds over a given unit of time, e.g. hours trawled per day, number of hooks set per day, or number of hauls of a beach seine per day.¹⁶⁴ Many measures are used to control the fishing effort in different countries. In Taiwan, the measures adopted most are the closed fishing season and partial closed fishing area.

In other countries around the East China Sea, China is famous for its comprehensive closed fishing season from May to September each year since 1995.¹⁶⁵ Japan uses the closed fishing season, closed fishing areas, and total allowable effort system (TAE).

Below are the brief introductions to Taiwan's input control measures.

Closed Fishing Season

A fishing season is closed to allow fishery resources have time to recover spatially and temporally provided that no reduction in the number of fishing boats is needed. This reduces the pressure that fishing places on resource utilization in the ocean.

Ideally, in biological science the closed fishing season should last for a whole year and for continuous years, giving marine ecology a complete opportunity to recuperate. In reality, only a few types of fishery choose a period as a closed fishing season, especially when mature fish lay their eggs, in order to protect mature and juvenile fish against human

¹⁶⁴ See the definition of Fishing Effort on the website of Coordinating Working Party on Fishery Statistics (CWP) <http://www.fao.org/cwp-on-fishery-statistics/handbook/capture-fisheries-statistics/fishing-effort/en/>

¹⁶⁵ See http://www.gov.cn/gzdt/2009-11/19/content_1468595.htm

interference. The purpose of this policy is to limit the Fishing Effort, generate more resources for the biological population the following year, and enhance the economic effectiveness of fishery production.

Mackerel

Summer is mackerel growing season. Starting from 2013, in the period from 1 to 30 June, mackerel fishing vessels located at northeast sea area in Taiwan are forbidden to fish.

Flying Fish

The flood season of flying fish is from April to July each year. The fish population that lay eggs are located in sea areas from Pengjia Islet of northern Taiwan to northeastern part of Taiwan near East China Sea. For the past twenty years, the flying fish are diminishing gradually in quantity. The Fisheries Agency in Taiwan established a closed fishing season for taking flying fish eggs and the Total Allowable Catch. The Total Allowable Catch is 300 tons. The allowable flying fish egg taking season permitted by law starts from 15 May each year and ends on 31 July at the latest. Usually, when the amount of Total Allowable Catch is reached, the fishing season ends early.

Larval Anchovy Fishery

There is a special type of fishery in Taiwan – the larval anchovy fishery. A type of anchovy is the target catch. However, when catching this anchovy, bycatch of other types of large and of small juvenile fish is common. Therefore, this fishing is considered to be a major factor in the depletion of marine biological resources. The Fisheries Agency in Taiwan fixed a period from 1 May to 15 September, which is the peak of bycatch, as a closed fishing season control the fishing effort in the larval anchovy fishery.

Closed Fishing Season Subsidy Policy

Beginning in 2002, the “spontaneous closed fishing season subsidy” policy has been implemented in Taiwan. The true purpose of this policy is to follow the international trend after Taiwan joined the WTO in 2000. After the fishing vessel fuel subsidy was reduced, the Taiwan Government promulgated a loose subsidy policy, which has social welfare features, in order to make up the loss of vested interests of fishers. For decades, the Control Yuan of Taiwan and many media believed that this measure did not help the recovery of marine resources in Taiwan. The primary reason is that the spontaneous closed fishing season of fishermen is not just convenient for the fishermen themselves and not based on fishery science. Moreover, if, in the same sea area, not all fishers had implemented a closed fishing season at the same time, plus the Taiwan Government had not imposed a Total Allowable Catch, this marine conservation policy is tantamount to being useless.

Input Control has to be implemented in coordination with Output Control simultaneously in order to achieve the goal of marine ecological conservation and sustainable fishery resources.

6.8 Output Control

Output control regulates the amount of fish being caught. It consists primarily of limitations on the size of fish, gender, Total Allowable Catch (TAC), and individual allowable catch. The laws and regulations rely heavily on marine scientific research, making the legislative process more difficult, and the implementation of the law has a higher threshold. Compared with input management, output controls make a greater contribution to marine ecological conservation.

The advantages of input control are that the administrative tasks are finished after auditing the quantities of fishing vessels and the issuance of a fisheries license; the overall cost and investment can be controlled. Although, in theory, auditing should be performed regularly in the fishing port and on the sea to verify whether the fishing vessel masters have fishery licenses, in reality such tasks are difficult due to the lack of manpower in the Fisheries Agency and Coast Guard Administration. Even if there were sufficient manpower to enforce the laws, law enforcement should also prevent fishing vessels from overfishing.

The administrative cost of output control is relatively high. Two important factors are to continuously undertake marine scientific research and obtain reliable and sufficient fish catch reports.

6.8.1 Output Control of Taiwan Fisheries

The fish species undergoing output control are few in number.

Fish Catch Limitations

In general, fish catch limitation includes species, length, and gender. In terms of species, only two cartilaginous fish in the EEZ around Taiwan are in the category of forbidden to

catch, which include whale shark (forbidden since 2008); and the giant oceanic manta ray (forbidden since 15 August 2018). Pelagic fishing vessels abide by the international regulations of Pacific Ocean, Atlantic Ocean, and Indian Ocean. In addition, the conserved species listed in the Wildlife Conservation Act, including whales, dolphins, sea turtles, humphead wrasse, and green humphead parrotfish, are prohibited. In fact, there is room for improvement, for many endangered marine species in Taiwan require fish catch limitations. Major problems originated from the fishing methods unable to screen out different types of fishers while fishing, and this ultimately caused bycatch. Examples are trawl nets and driftnets.

Regarding size and gender, only crab fishing is regulated in Taiwan. For example, each year from 16 August to 15 November female pregnant crabs may not be taken by fishing vessels. Crabs smaller than 8 centimeters are forbidden all year round. Aside from the aforementioned regulations, no other laws and regulations impose limitations for size and gender.

Total Allowable Catch

The only fisheries industries restricting total allowable catch are flying fish roe and anchovy fisheries. The annual TAC for flying fish roe is 350 tons. However, according to data from the 2016 Fisheries Statistical Yearbook issued by the Fisheries Agency, the report showed that the total catch is only 54 tons the whole year, only 72 tons in 2017, and less than 40 in 2018.¹⁶⁶ After the end of flying fish fishing season in July 2019, the initial estimate of the total catch was merely 18 tons. The previous figures mentioned are significantly lower

¹⁶⁶ Lai, Yu-wei.(賴郁薇) (2018, July 12). The catch of flying fish eggs is terrible. This year, the whole Taiwan is less than 40 tons. *United Daily News*. Retrieved from <https://udn.com/news/story/11322/3249877>

than the 350 tons limitation. Therefore, marine conservation groups have suggested that the limitation of TAC on flying fish is meaningless. According to media reports, some fishermen claimed that they could catch thousands of tons of flying fish. Attempts to find such evidence and figures in the Fisheries Statistical Yearbook from past years had failed.¹⁶⁷

Regarding the anchovy fishery, the TAC announced by the Fisheries Agency on 31 July 2018 was 1,723 tons. According to the Fisheries Statistical Yearbook, the total catch of anchovy in 2016 was 808 tons, while in 2017 being 1,201 tons. Actual total catches being far lower than the TAC happened again. However, if the conservation groups had asked the government to lower the TAC, this would have drawn severe backlash from the fisheries industry. Based on the present author's past experiences of attending fisheries meetings, many fishers and government officials would contend that the correct fish catch numbers were not declared, which rendered the figures in the Fisheries Statistical Yearbook untrustworthy.

Given that the TAC could not achieve consensus among the conservation groups, fishers, and officials of Fisheries Agency, the implementation of Individual Quota (IQ) system is unlikely. There are no examples of regulations being promulgated for this system. This is why the difficulties of output control are greater. Although Norway, New Zealand, and Canada have used the IQ system for years, the countries around the East China Sea are unfamiliar with this system.

¹⁶⁷ Chen, Ya-fen.(陳雅芬) (2011, July 8). Perspectives on flying fish eggs. *Taiwan Environmental Information Center*. Retrieved from <https://e-info.org.tw/node/68435>

6.8.2 Output Control of China Fisheries and Japan Fisheries

China

China has no regulations based on the Total Allowable Catch or Individual Quota systems. According to the January 2017 announcement published by the Ministry of Agriculture of China, a “Notification regarding further enforcement of controlling marine fisheries resources Total Allowable Catch from Ministry of Agriculture” was issued:

“After the year 2020, China Fishery Law Enforcement will further setup a control target based on the assessment of marine fisheries resources and actual fisheries production, and will establish a balance between the Total Allowable Catch in the ocean and affordability of marine fisheries resources”.

This passage suggests that output control would be a future goal of fisheries management in China. However, before 2020, the Chinese Government will need to invest more manpower to gather basic fisheries data and establish a fish catch declaration system. In fact, the notification from the Ministry of Agriculture in China showed that for the coming years fisheries management in China will be focusing on input control and such basic tasks as reducing the general fish catch. Reducing the total number of fishing vessels will be another input control goal.

Different from Taiwan and China, Japan is famous for fisheries management in their own Exclusive Economic Zone. In the next section, we briefly introduce the status of Fisheries Management and Output Control in Japan.

Japan

Official management measures and autonomous management mechanisms are the two main fisheries management systems in Japan. The data regarding these two systems are from the stock assessments conducted annually by Fisheries Research Agency of Japan. Fisheries

resource management within the Exclusive Economic Zone will also be discussed here. Foreign Exclusive Economic Zones are regulated by international law; whereas fishing on the high seas is governed by domestic law. Neither is discussed here.

Official Management Measures

Two primary laws governing fisheries in Japan are the Fishery Act and the Law Regarding the Preservation and Management of Living Marine Resources. The Fishery Act entered into force in 1949, and several amendments ensued. Fishing rights and licensing are regulated under the Fishery Act. The Total Allowable Catch system was first promulgated by the 1996 Law Regarding Preservation and Management of Living Marine Resources.

Fishery Act

Three main categories are regulated under the Fishery Act: fisheries with licensing, fisheries with fishing rights, and open access fisheries. Open access fisheries have a low impact on the fisheries output control and will not be the main focus of this section. Fisheries with fishing rights and licensing will be briefly introduced in this section.

Fisheries with Fishing Rights

Fishing rights are regulated by the 1949 Fishery Act and are categorized into large-scale set-net fishing rights, common fishing rights, and aquaculture fishing rights. Fishermen are granted exclusive access to designated coastal areas with marine resources. Some of the fishing rights include: sea urchin, small-scale set net fisheries, and abalone.

Licensing System

There are three types of licenses under this system: licensing by the Japan Ministry of Agriculture, Forestry and Fishery (MAFF); licensing by prefectural governments supervised

by the MAFF; and licensing by prefectural governments. Of the 47 prefectural governments in Japan, 39 are located along the coast. These 39 prefectural governments are in charge of issuing licenses for fishing vessels.

The MAFF issues licenses to fishing vessels whose operations cover multiple prefectural waters or to vessels whose operations significantly impact the resources. Examples of such fishing vessels are: large-scale trawlers, large-scale purse seiners, and tuna long lines.

Coordinating Organization

Area Fisheries Coordinating Committees (AFCCs) make recommendations to prefectural governments and issue directions regarding fishing and licensing under prefectural government jurisdiction (Fishery Act 1949). Wide-Area Fisheries Coordinating Committees (WFCCs) also organize the resource allocation of migratory pelagic fish stocks among the prefectural jurisdictions (Fishery Act 1949). Committee Directions are issued by three WFCCs: Pacific WFCC, Sea of Japan and Western Kyushu WFCC, and Seto Inland Sea (瀬戸内海) WFCC; these are described in the Fishery Act.

Law Regarding Preservation and Management of Living Marine Resources

The Law Regarding Preservation and Management of Living Marine Resources came into force in 1996. The TAC system was promulgated under this Law in 1997. After an amendment of this Law in 2001, a Total Allowable Effort (TAE) was introduced in 2003.

TAC systems

For a particular fish stock, a catch limit is stipulated by the Total Allowable Catch (TAC) system under Law Regarding Preservation and Management of Living Marine

Resources. Starting from 1996, eight species were categorized and regulated under the TAC system in Japan: Japanese jack mackerel (*Trachurus japonicus*), Pacific saury (*Cololabis saira*), walleye pollock, Japanese sardine (*Sardinops melanostictus*), chub mackerel, spotted chub mackerel (*Scomber australasicus*), Japanese common squid (*Todarodes pacificus*), and snow crab (*Chionoecetes opilio*). These eight species were chosen because there are enough data and these species are economically and socially important (Fisheries Agency of Japan, FAJ).

The MAFF consulted with the Fishery Policy Council each year and set TAC for individual species. The socio-economic status of the fishery and stock assessments were taken into account. Then, TAC is collectively allocated to fisheries management organizations (FMO) and prefectural governments in Japan. The FMO will ensure that the total catch falls within the allocated limit. Individual prefectural governments will implement TAC management to make sure that the total catch falls within allocation limit.

Individual quota and individual transferrable quota systems were not included under the TAC system in Japan. However, the Law Regarding Preservation and Management of Living Marine Resources allows the Fisheries Agency of Japan to allocate quota to individual fishers.

TAE systems

Total Allowable Effort (TAE) refers to the limit of fishing effort. For example, days fished by gear type regulate TAE (Law Regarding Preservation and Management of Living Marine Resources). Nine marine species were regulated under TAE system starting from 2003: flathead flounder (*Hippoglossoides dubius*), littlemouse flounder (*Pseudopleuronectes herzensteini*), ocellate puffer (*Takifugu rubripes*), roughscale sole (*Clidoderma asperimum*), Japanese sand lance (*Ammodytes personatus*), Japanese Spanish mackerel (*Scomberomorus*

niphonius), marbled flounder (*Pleuronectes yokohamae*), willowy flounder (*Tanakius kitaharai*), and spear squid (*Loligo edulis*).

The implementation of the TAE system is similar to the TAC system. Prefectural governments work with FMOs to instruct fishermen and ensure that they comply with their allocated TAE. The Fisheries Agency of Japan and prefectural governments undertake the monitoring.

6.9 Supervision of Fisheries: Monitoring, Control and Surveillance (MCS)

After decades of legal experimentation, the international fisheries management mechanism has been gradually perfected. From the 1982 UNCLOS, Agenda 21 in 1992,¹⁶⁸ the 1993 Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (Compliance Agreement), the 1995 United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks, to the 1998 Technical Guidelines in Support of the Implementation of the Code of Conduct on Responsible Fisheries, international legal fisheries management regimes gradually became popular. However, how to implement the relevant international norms has become the biggest challenge of the twenty-first century.

What concerns the international community about aquatic products most is the marine capture fishery. Although the legal norms exist and many regional fisheries management organizations (RFMOs) have been established, the supply of marine resources is becoming worse. Implementing law enforcement has become the most important challenge to RFMOs and flag States. Consequently, after formulating the regulations, the issue of "Monitoring, Control and Surveillance (MCS)" became a popular topic in fisheries management conferences and documents internationally and domestically. Taiwan's offshore and coastal fisheries management started to appreciate MCS from 2015.

¹⁶⁸ Agenda 21 is a non-binding action plan of the United Nations concerning sustainable development. It is a product of the Earth Summit held by UN Conference on Environment and Development) in Rio de Janeiro, Brazil, in 1992.

6.9.1 Content of Monitoring, Control and Surveillance

The content, elements, and measures of MCS are of intertwined and difficult to clearly separate. The definition of MCS developed by an FAO Expert Consultation in 1981 is:¹⁶⁹

- (i) **Monitoring** - the continuous requirement for the measurement of fishing effort characteristics and resource yields;
- (ii) **Control** - the regulatory conditions under which the exploitation of the resource may be conducted; and
- (iii) **Surveillance** - the degree and types of observations required to maintain compliance with the regulatory controls imposed on fishing activities.

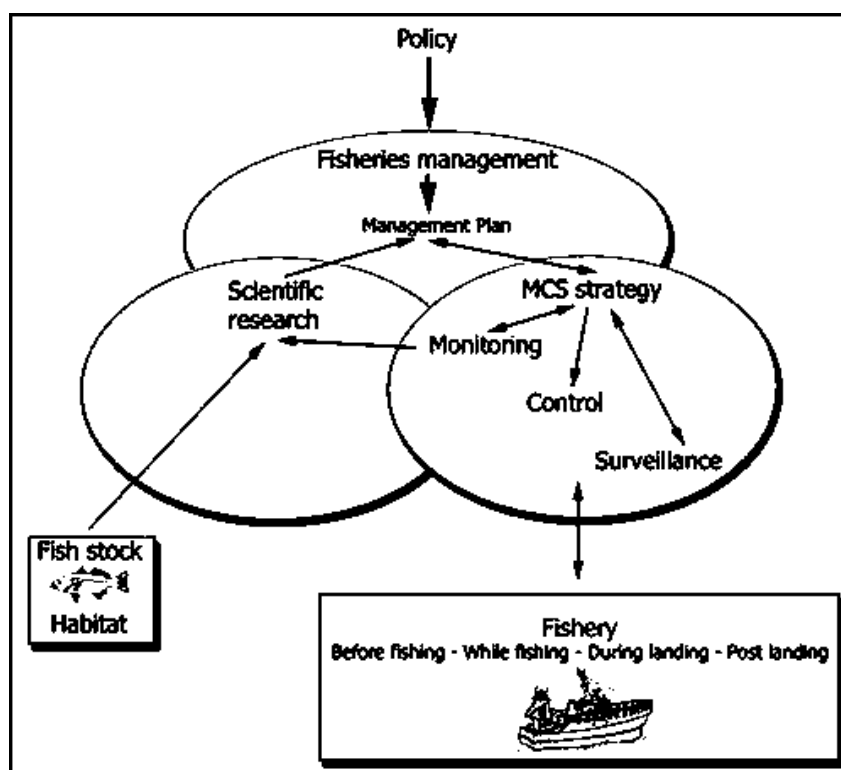


Figure 15: Illustration of Content of Monitoring, Control and Surveillance

¹⁶⁹ See <http://www.fao.org/docrep/005/y3427e/y3427e0a.htm>

The main links between MCS and fisheries management¹⁷⁰

This diagram on the FAO website illustrates the relationship among fisheries management and “Monitoring, Control and Surveillance”. Simply speaking, what the FAO experts considered in 1981 as “monitoring” gathers information on the fishery that is used to assist in assessing the fishery resource and in developing appropriate fisheries management measures, called “control”, whereas “surveillance” is a set of tools to ensure that these controls are complied with. MCS is a fisheries management process.

Measures widely used in the world are: monitoring, which consists of logbooks and the filing of landing declarations. Surveillance refers to the equipment or system used to implement law enforcement, such as patrol vessels, patrol planes, satellite imagery, Vessel Monitoring System (VMS), observers, and so on. In Taiwan, port inspectors are hired to conduct the surveillance of offshore and coastal fisheries.

Use of the term MCS is sometimes criticized as being too broad and confusing, given the concepts and functionalities in relation to the core function of compliance or law enforcement section of fisheries management authority. A book published by FAO Fisheries Department, *A Fishery Manager's Guidebook - Management Measures and Their Application* (2002), explained: “*This is essentially because the ‘enforcement’ section of the authority does not usually focus on the monitoring or control elements of MCS but rather on the surveillance and enforcement elements*”. In Taiwan, the Coast Guard Agency is such a case. The Taiwan Coast Guard Agency is in charge of surveillance and enforcement of numerous coastal and marine assignments, such as preventing illegal immigration, smuggling, marine pollution, illegal fishing, and so on.

¹⁷⁰ Retrieved from <http://www.fao.org/docrep/005/y3427e/y3427e0x.gif>

From 1981 to 2020, nearly 40 years have elapsed. The world has changed, whether in government decision-making, the development of communication technologies, or the ecological environment of the Earth.

Is MCS suitable for the world of the next 40 years? Is MCS suitable for flag State internal fishery affairs? Questions such as these should be seriously discussed. For example: *Do the duties of the coast guard include combating “unreported fishing”, which seems falls within the scope of “monitoring”? Or is this merely the concern of the Fisheries Agency?*

This involves clarifying the nature and the legal status of surveillance and unreported fishing. Furthermore, what role should the Fisheries Agency play in the “surveillance” of MCS?

6.9.2 Rethinking MCS: MS Might Be More Accurate

In the present author’s view, “MCS” is a confusing term in domestic law. Monitoring and Surveillance (MS), without “control”, deserves discussion. The so-called “control” function in internal administration is the same as “making fisheries policy”. All input and output controls are fishery policies announced and administered according to laws. The differences among control policies is merely the proportion of development or conservation. In Chapters Five and Six above input controls and output controls were discussed in detail.

Moreover, marine law enforcement is a special area and more difficult than land law enforcement. Taiwan and China have been exploring how to integrate more effective and powerful maritime enforcement in the past twenty years. But this brings a confusion of roles between the Fisheries Agency and Coast Guard Administration. The Taiwan Coast Guard is the priority police force resisting illegal activities at sea and in ports, because they have the

most of new patrol vessels and more than ten thousand personnel. The Taiwan Fisheries Agency only has two old vessels. Who should be in charge of MS?

Furthermore, it is useful to consider the scope of fishery enforcement. Is fish laundering serious and deserving of zero tolerance? If yes, why does not the traditional coast guard enforce legislation against unreported activities in Taiwan fishing ports? Taiwan officials need to explore when “MCS” gradually came into domestic law and internal administration.

In the view of the present author, control should be separated from monitoring and surveillance. In other words, monitoring and surveillance differ from control in domestic administration. The role of Fisheries Agency in making fisheries management “control” decisions cannot be replaced by other entities, for example, Coast Guard Agency or non-government organizations obtaining outsourcing contracts with the Fisheries Agency. Moreover, control cannot be replaced by robots or carried out by novel technologies, but monitoring and surveillance can.

Monitoring and surveillance should be positioned to assist in the formulation of policies, i.e. “control”. Monitoring can be regarded as a modern new requirement in the fishery industry and collect the data on the daily fish catch and track all fishing boats comprehensively: just as all fishing boats were given an ID number, passed inspections for seaworthiness, and obtained a fishing permit in the past.

By way of illustration. There are monitors almost everywhere on the roads and in every corner of Taiwan and China. The Chinese Government has built the largest monitoring system in the world.¹⁷¹ The difference between Taiwan and China is that the monitors in

¹⁷¹ Russell, J. (2017, Dec 14). China’s CCTV surveillance network took just 7 minutes to capture BBC reporter. *TechCrunch*. Retrieved from <https://techcrunch.com/2017/12/13/china-cctv-bbc-reporter/>
(To be continued)

Taiwan are set up by the governments, stores, and citizens, not primarily by governments. And access to monitoring system data in Taiwan is strictly controlled in the present author's understanding. Usually, the police and the victim need to undergo legal procedures to get a monitor video.

The above shows how the nature of surveillance measures shift to monitoring when the technology is applied extensively and interpreting the giant database becomes an impossible mission unless one day artificial intelligence (AI) identification technology keeps up with the pace. When that day comes, AI technology will return some monitoring devices to surveillance. The classification is dynamic.

In the present author's view, if AI interpretation does not exceed the scope of protecting three public interests: fighting against IUU fishing, smuggling, and human trafficking, then AI surveillance is welcome. It is crucial to keep the interpretation of monitoring data and observer surveillance within the government, either the fisheries management authority or coast guard units being appropriate. The Coast Guard should share more MS work, in keeping with the progress of the times.

Compared to monitoring, surveillance costs more and thus should be linked to spotting suspicious non-compliant behavior with some intent to ascertain the truth. Surveillance resources should target fishermen that are the greatest threat to a fishery in terms of financial loss or biological damage. In other words, surveillance should be conducted with a degree of public authority, or it is merely another format of monitoring.

The video: In Your Face: China's all-seeing state <https://www.bbc.com/news/av/world-asia-china-42248056/in-your-face-china-s-all-seeing-state>

Case of VMS

Does the Vessel Monitoring System (VMS) belong to monitoring or surveillance? In all available data, VMS is considered to be surveillance because it exists on a small percentage of fishing vessels, especially those boats fishing tuna on the high seas. However, in the present work, VMS is considered to be monitoring. The simple reason is that recording the fishing vessels tracks helps analyze the Fishing Effort and understand the status of fishing grounds. It meets the definition given by FAO that:

“Monitoring - the continuous requirement for the measurement of fishing effort characteristics and resource yields”.

The Taiwan Government once created a large diagram of the tracks of Taiwanese fishing boats over many years as proof that the southern part of the East China Sea is the “traditional fishing grounds” of Taiwan when Taiwan negotiated with Japan to claim the “Traditional Fishing Rights” over the waters of the East China Sea.¹⁷² Here, the tracking data does not have the intent to “*maintain compliance with the regulatory controls imposed on fishing activities*” as FAO definition describes.

Moreover, some new technologies perform the same function as VMS, such as the automatic identification system (AIS) now used in the famous real-time dynamic website Global Fishing Watch¹⁷³ and Voyage Data Recorder (VDR), which is more popular in Taiwanese fishing vessels. Without people to interpret the record, all the data are meaningless. Therefore, the present considers VMS, AIS, or VDR as a monitoring measure rather than surveillance.

¹⁷² This passage was what the author heard from the leader of Taiwan Fisheries Agency in a non-public meeting with environmental group representatives in March 2013.

¹⁷³ See <https://environment.google/projects/fishing-watch/>

In conclusion, with the rapid development of information technology, it might be more appropriate to shift MCS to “monitoring and surveillance”, or MS, in internal fisheries management. Control is another area rooted within the fishery authority itself.

6.9.3 Accessing MCS Performance

With the advances of technology, more measures can be performed by MCS. How to evaluate the performance of MCS measures is an important topic. FAO suggested that

“Measuring performance of the MCS system against the strategic targets should be an annual activity of the MCS organization and it should involve feed-back from involved interested parties.”¹⁷⁴

But this is not easy for Taiwan. Re-measuring MCS performance on a large-scale frequently is important only when it has the chance to change or adjust. So far, except for the satellite communication fee paid by fishermen, all other expenses of MCS are paid by the Taiwan Government annually. Even the VDR device is subsidized by the Taiwan Fisheries Agency. In other words, the Fisheries Agency bought them for Taiwanese fishermen to install on fishing vessels. There is no room for discussing whether fishermen should pay more for MCS given the condition of Taiwanese fishermen because illegal and unreported fishing is prevalent. The government has to find the financial resources while fishermen do not need to pay taxes. This is a dilemma. However, the government should not cease requiring the fisheries industry to pay because there are the interest groups benefiting from the sustainable fishery. The beneficiary pays.

¹⁷⁴ See the fifth point: ENSURING SYSTEM PERFORMANCE. Retrieved from <http://www.fao.org/docrep/005/y3427e/y3427e0a.htm>

The other dilemma is that once the equipment was bought or MCS programs were approved, the situation will not change quickly because of governmental regulations. For example, the VDR equipment has been on the Taiwanese fishing boats since 2006. It will continue to be used unless the policy changes. Some computer systems in Taiwan local governments use Windows 95. According to a 2017 news report, Windows 95 and 98 still power the Pentagon's critical systems in the United States.¹⁷⁵

However, a better monitoring technology idea, named iFish System, is suggested in Chapter Ten below and was proposed to the Taiwan Government on Earth Day 2018. With this novel technology based on AIS, the cost of the device and communication fee can be reduced. The contradiction of who should be responsible for MS work between the Fisheries Agency and Coast Guard Agency can be resolved by high technology.

More importantly, the portable features of iFish are expected to improve MS popularity in artisanal and small-scale fisheries, the combinations of large numbers of fishing boats, mixed gear, and migrant fishers which made MCS a complex task around the world. After all, if large numbers of small boats or gear are violating controls, the cumulative effect can be as significant as industrial fishing boats.

As to Control

Some people might say that “if non-compliance is high (that is, the controls are regularly being violated), it is an indication to management that the controls are unsuccessful”.¹⁷⁶ However, such thinking is probably not applicable in Chinese society

¹⁷⁵ See <https://windowsreport.com/windows-95-98-pentagon/>

¹⁷⁶ See 1.3 The role of MCS in fishery management. Retrieved from <http://www.fao.org/docrep/005/y3427e/y3427e0a.htm>

whether in Taiwan or China. More commonly, few people will comply with the “monitoring or control” regulations unless a ticket with fine is imposed. The minority fishermen who comply with the law are often laughed at by others in the local community because illegal fishing is so prevalent, and there is no obvious benefit to the minority. It is usually nothing to do with the quality of the controls, the policy decisions. In the early days, good policies were made without scientific research, for example, setting up a marine protected area, and banning bottom trawling. The precautionary principle works well in fisheries management policy making when a country has a low budget for marine scientific research, monitoring and surveillance work.

The best way to control performance is to evaluate the status of fish stock and the health of the marine ecosystem.

Finally, the most ideal situation is that every MS system be assessed annually in order to ascertain whether strategies of MS measures are implemented in the most efficient manner at low cost. The strategies should be adjusted flexibly according to the characteristics and conditions of different inshore and coastal fisheries. When an obvious improvement in compliance can be felt by Taiwanese fishery circles and the general public over time, it is an indication of a successful MS system and organization.

Chapter 7 Case Studies of Taiwan Fisheries Management in the East China Sea

In this chapter, five species of fish are taken as examples to explore relevant fishing management regulations. The sequence of the five species is in the order that the issues occurred in the present author's timeline of her marine conservation campaign history. If these five species of fish are properly managed, four of them have the potential to obtain an ecolabel within the next ten years.

7.1 Shark

Sharks, a fish with skeletons made of cartilage instead of bone, have been swimming in the oceans of the Earth for more than 400 million years. As apex predators, sharks play a vital role in maintaining the health of marine ecosystems, just as lions and tigers in terrestrial ecosystems. However, similar to the plight of tigers and lions, sharks are vulnerable to pressure from human exploitation. And due to their slow growth rate and low level of reproduction, shark populations have declined to levels where it is difficult for them to perform their roles as top predators in their ecosystem.

Approximately 500 types of sharks are scattered in the big oceans, ranging from tropical regions to frigid zones and from surface layer to deep-sea layer, and they can be found in the estuaries of rivers. In the course of evolution, they did not develop lungs or air bladders. Their teeth keep growing and can be replaced continuously. There are obvious gill clefts on both sides of their head, and they do not have gill covers and scales. Sharks have three ways to bear their young, varying by species, including oviparity, viviparity, and ovoviviparity.

Because sharks are apex predators, whether they are suitable as sustainable seafood is often debated. Especially, in Chinese culture, the elder generation consumes shark fins. Each year millions of sharks are caught globally, although shark meat itself is not attractive in the traditional market. Compared to other target species (for example, tuna), shark meat is low-value. Fishermen catch sharks for Shark Fin Soup – a Chinese delicacy in Eastern Asian cuisine since the Ming Dynasty,¹⁷⁷ usually served at such special occasions as weddings and banquets.¹⁷⁸ During the past three decades, Hong Kong, Singapore, and Taiwan have been the main shark-fin trading centers. In China, the demand for shark fin soup has boomed, and the price of shark fins has increased. Therefore, the fins are the most profitable part of a shark.

In Taiwan, shark meat is used in many cuisines. However, refusing to eat shark fins and shark meat is appealing to younger generations and many conservation groups. However, conflicts exist between this concept and fishermen and the Fisheries Agency in Taiwan. Therefore, when it comes to the list of sustainable seafood in the East China Sea, sharks are an unavoidable topic. Topics regarding shark conservation and shark fishery are complicated and are all encompassing. According to FAO data,¹⁷⁹ global shark catches have tripled since 1950, reaching an all-time high in 2000 of 888,000 tons. Since then, a downward trend can be observed with 790,000 tons in 2014, about 11% lower than catch records of the previous year. A simple explanation for the recent trends is impossible because there are general factors which may contribute to this development.

¹⁷⁷ Bird, M. (2001, February 26). Man Bites Shark. Time. Retrieved from http://www.time.com/time/world/article/0,8599,100660,00.html?iid=fb_share
Ming Dynasty was the ruling dynasty of China from 1368A.D. to 1644 A.D.

¹⁷⁸ For an example. According to news report, “Stewed Shark Fin” is supplied in former Taiwan President (1988 - 2000) Teng-Hui Lee’s 90-year-old birthday party on 2011 January 4 in Taipei City. More than three hundred political and business celebrities attended.

¹⁷⁹ See <http://www.fao.org/ipoa-sharks/background/sharks/en/>

First, shark conservation measures have been introduced in many national and regional fisheries management regimes. If all are effectively implemented, these measures should lead to a reduction of shark mortality and avoidance of unwanted shark bycatch.

Second, in many cases the reduction in shark catches is unintentional and a consequence of the overall declining abundance of sharks; this leads to reduced yields even though the Fishing Effort remains the same or increases.

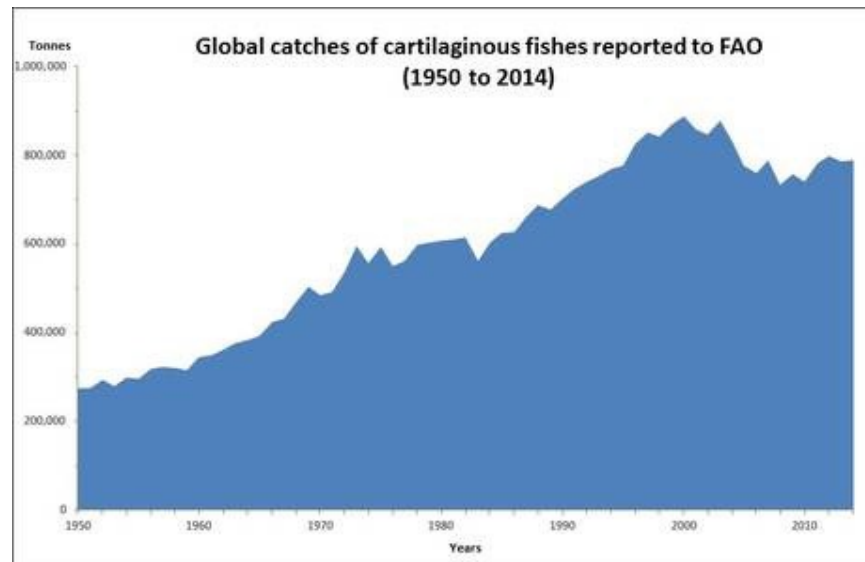


Figure 16: Global Catches of Cartilaginous Fish Reported to FAO

For an overall view of shark finning regulations from the hunting stage to terminal consumption, the shark conservation and shark fishery are divided into three stages according to the chain of fishing:

- I. Before catching:** Species Protection, Marine Protected Area, and Closed Fishing Season
- II. Catching:** Banning Bycatch, Finning, and Transferring;
- III. After catching:** Landing and Consumption.

Present efforts are broadly summarized in these three stages and recommendations made for law reform in Taiwan regarding shark conservation and shark fishery issues,

especially in the East China Sea. An important question needs to be reconsidered: “should shark fins or meat be certificated and ecolabelled as sustainable seafood under certain conditions”?

Before turning to legal measures, more illustrations of the three stages are discussed below:

I. Before catching: Species Protection, Marine Protected Area, Closed Fishing Season

The International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species listed roughly 50 types of sharks as threatened species, including ten critically endangered shark species, nine endangered species, and thirty-one vulnerable species. The figures are constantly changing,¹⁸⁰ but bad news is often the case. More sharks are being listed as threatened species. The 2002 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Conference listed two species of shark in Appendix II for the first time. As of 2010, seven kinds of shark had been entered in the Appendices. The list is becoming longer.

The ideal situation that most conservationists expect is to protect all kinds of sharks from being hunted on purpose or accidentally, and all shark habitats to be protected integrally. However, in reality, as the plight of endangered animals on land continues to worsen, it is not easy for sharks to be listed as protected species in domestic endangered species law. The regulations for on-land endangered species usually do not provide sufficient support for these highly migratory marine creatures. Therefore, aside from preserving species diversity, the concept of sanctuary, or marine protected areas, is applied to the marine ecosystem to provide habitats for numerous kinds of sharks.

¹⁸⁰ See <https://newredlist.iucnredlist.org/search?query=Sharks&searchType=species>

Palau was the first country to create a "shark sanctuary", in 2009. An area of ocean roughly the size of France was established to ban all commercial shark fishing in its EEZ. Taiwan fishing boats often caught sharks in Palau waters during the past twenty years. Therefore, Palau has strictly prohibited fishing boats from fishing for and harming any sharks in its waters since 2003. Ships in Palau's waters are not allowed to store or transport shark fins and shark carcasses.

In November 2010¹⁸¹ a shark sanctuary was created in Indonesia – a principal shark fishing ground where Taiwan shark fishing vessels operate.¹⁸²

However, there is no help for highly migratory and domain straddling sharks, especially on the high seas, unless entire high seas areas are designated as protected areas. That being the case, when large numbers of sharks are caught during a specific season, setting a no-take season is a policy approach that should be considered.

II. Catching: Banning Bycatch, Finning, and Transferring

Sharks are caught as catch target or bycatch. In the East China Sea countries and according to international law, only certain protected species of sharks may not be harvested. The shark issue is more difficult than whales. Commercial whaling was banned in 1986 under the International Whaling Commission moratorium. The shark issue also differs from sea turtle and seabird issues, which are generally recognized not to be the target catch; markets

¹⁸¹ See <http://www.practicalfishkeeping.co.uk/content.php?sid=3392>. Retrieved on January 7, 2011.

¹⁸² See <http://www.scribd.com/doc/22261666/Shark-Finching-Report-Wildaid>. In this Shark Finning Report from WildAid, it is said that, "Much of Bali's fin trade is controlled by Taiwanese interests and it is they who control shark fin prices in Bali. There is a local 'Taiwan Town' in Bali, known as 'Sesetan', where all the Taiwanese fishermen and businessmen reside. However, Bali is also home to a large number of Singaporean Triad members. Researchers were informed by a Taiwanese dealer that traders could buy fins directly from the very large companies. However, if buying on a smaller scale, they needed to buy from "representatives of the police" as did all of the Taiwanese and Japanese companies. "

for sea turtles and seabirds are not significant. However, the consumption markets of shark fins for banquets, shark meat for daily food, and shark cartilage for nutritional supplement are in demand globally. Therefore, shark fishing exists, including in the inshore, coastal, and offshore fisheries of Taiwan.

On the high seas, the shark is, together with sea turtles and seabirds, one of the three main objects of bycatch. Highly migratory sharks are often the bycatch of tuna fishing vessels. When a shark was accidentally caught, in order to ensure that the sharks do not occupy space for frozen tuna on board, the fishermen often cut off the fins and tail of one shark, and then dump the carcass back into the sea even when the shark was alive, as shown in conservation group videos on websites. The problem has become more acute given the increasing market demand for shark fins.

At the 1994 CITES Conference, the first resolution appealed to the FAO to call attention to shark conservation and management. Subsequently, at the Twenty-second Session of the FAO Committee on Fisheries (COFI) in March 1997 that FAO organized, an expert proposed that the consultation to develop Guidelines leading to a Plan of Action should be submitted at the next Session of the Committee, which will aim at improving the conservation and management of sharks. This International Plan of Action-Sharks is referred to as IPOA-Sharks.¹⁸³ The most critical specification is in Article 22:

“22. The Shark-plan should aim to:

(5) Minimize unutilized incidental catches of sharks.

(7) Minimize waste and discards from shark catches in accordance with article 7.2.2.(g)¹⁸⁴ of the Code of Conduct for Responsible Fisheries (for example, requiring the retention of sharks from which fins are removed). “

¹⁸³ See <http://www.fao.org/ipoa-sharks/en/>

¹⁸⁴ 7.2.2 Such measures should provide inter alia that:
(To be continued)

These paragraphs illustrate the issues of bycatch and finning. Fortunately, with this guidance of IPOA-Sharks, many international and regional fisheries management organizations take these two ideas as models to further regulate shark finning issues.

If there were no shark-fin market, the bycatch issue of sharks might be viewed merely as another issue such as marine mammals, seabirds, or sea turtles. Perhaps the bycatch problem may be resolved by advanced fishing gear and new technology to prevent the sharks from being hooked or netted. But based on the present author's years of campaigning experience, this challenge is not easy to resolve biologically. According to marine scholars and fishermen, magnetic devices not only affect sharks, but also target fish as well.

Shark Finning

Although it is impossible to ban shark fishing and bycatch immediately, the phenomenon of shark finning, which is cruel and wasteful, could be reduced. Furthermore, the wastage of carcasses would accelerate the degradation of the natural marine resources. Therefore, there are more regulations to regulate finning.

In the United States, the Shark Conservation Act of 2000¹⁸⁵ tried to ban shark finning. The Shark Conservation Act of 2008¹⁸⁶ was intended to amend the High Seas Driftnet Fishing Moratorium Protection Act and the Magnuson-Stevens Fishery Conservation and Management Act to introduce stringent restrictions to ban shark finning, such as eliminating

(g) pollution, waste, discards, catch by lost or abandoned gear, catch of non-target species, both fish and non-fish species, and impacts on associated or dependent species are minimized, through measures including, to the extent practicable, the development and use of selective, environmentally safe and cost-effective fishing gear and techniques.

¹⁸⁵ S. 2831: Shark Conservation Act of 2000. See <http://www.govtrack.us/congress/bill.xpd?bill=s106-2831>

¹⁸⁶ H.R. 5741: Shark Conservation Act of 2008. See <http://www.govtrack.us/congress/bill.xpd?bill=h110-5741>

the practice of slicing off a shark's fin and leaving its body to sink and die in the ocean. This law requires all commercial fishermen to land sharks with the fins naturally attached.

In 2003 the European Union (EU) adopted Regulation (EC) No. 1185/2003¹⁸⁷ to ban finning in Article 3(1):

“It shall be prohibited to remove shark fins on board vessels, and to retain on board, transship or land shark fins”.

Historically, the most common way to implement a finning ban is to limit the ratio of the fins to carcass weight. The prevailing consensus regarding a reasonable ratio of fins to carcass is five percent to ninety-five percent. The scene of too many fins with too few shark carcasses on one fishing vessel likely indicates shark finning. It is usually for the port States to decide if finning happened.

Theoretically, when the sharks are caught, the next step is usually to return to port and unload the catch. However, in reality not all shark fins are unloaded directly. In order to avoid the ban against shark finning, sometimes shark fins are transferred to a non-take transport ship to be landed in other countries as an import of foreign goods. In order to ensure the shark-fin ratio verification of shark unloading is precise, States must close the loophole of transferring shark fins and carcasses at sea. The United States Government did so in December 2010.

The 2010 Shark Conservation Act¹⁸⁸ stipulated in Section 103:

¹⁸⁷ The text of Council Regulation (EC) No 1185/2003 of 26 June 2003 on the removal of fins of sharks on board vessels. See <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32003R1185>

¹⁸⁸ H.R. 81: International Fisheries Agreement Clarification Act. Title I: Shark Conservation Act of 2010. See <http://www.govtrack.us/congress/bill.xpd?bill=h111-81>

“Amends the Magnuson-Stevens Fishery Conservation and Management Act to revise provisions prohibiting the removal of shark fins to make it a prohibited act to:

- (1) remove any shark fin (including the tail) at sea;*
- (2) have a fin aboard a fishing vessel unless the fin is naturally attached to the carcass;*
- (3) transfer a fin from one vessel to another or receive a fin unless it is naturally attached; or*
- (4) land a fin that is not naturally attached to a carcass or land a carcass without fins naturally attached.*

Revises the current rebuttable presumption provision concerning shark fins on fishing vessels to create a rebuttable presumption that, if any shark fin (including the tail) is aboard a non-take vessel without being naturally attached, the fin was transferred from a fishing vessel in violation”.

This Act closed a major loophole of transferring shark fins at sea. In other words, the United States adopted more stringent measures to ban shark-finning and transferring. However, the most reliable strategy to enforce a shark finning prohibition is to require that sharks shall be landed with their fins naturally attached to their bodies.

III. After Catching: Landing and Consumption

Landing involves the reporting of the catch of shark fins and meat to the port State or the flag State. If violated, it is regarded as “unreported” fishing.

After filing the landing declaration, the shark catch goes to market. Generally speaking, environmentalists believe that as soon as the consumption of shark fin soup and shark meat ceases, finning or catching should decrease quickly. For this reason, many states of the United States banned the possession and sale of shark fins. Hawaii was the first government in the world to prohibit the sale, possession, or distribution of sharks or shark parts in July 2010.

However, the problem of bycatch will not be solved merely through stopping consumption. The government needs to create marine protected areas with closed fishing seasons, especially during the shark growing season or bycatch peak. The establishment of a closed fishing season for sharks may be feasible, especially in inshore and coastal water areas.

7.1.1 Shark Fishery and Management of Taiwan in East China Sea

Shark fisheries have a long history in Taiwan. The Taiwan Fisheries Agency claims that “sharks are a type of fish utilized by Taiwanese fishermen and the general population in traditional economies. The annual global catch of sharks is about 800,000 tons. The annual catch of sharks in Taiwan falls in between 30,000 to 50,000 tons, with a market price of over one billion TWD (33 million USD), which comprised 7% of the total annual global catch. Taiwan ranked fifth globally. Sharks made a huge contribution towards providing animal proteins domestically, the livelihood of fishermen, and the economic growth of fishing villages.¹⁸⁹ A huge gap exists between the traditional approach of Fisheries Agency and the animal conservation and marine conservation groups. Therefore, environmental groups have concentrated on sharks since 2002. The present author started participating in matters of shark conservation as a full-time marine conservationist in 2011. After sixteen years of the shark conservation movement, Taiwan has been recognized as a leading country in East Asia regarding shark conservation. The shark conservation regulations in Taiwan are summarized below.

¹⁸⁹ Press release. (2002, May 3). Sustainable shark resources to be reasonably utilized. No need to oppose this practice. Fisheries Agency of Taiwan. Retrieved from <https://www.fa.gov.tw/cht/NewsPaper/content.aspx?id=682&chk=A1B6FFBB-6EC1-4EA6-8972-05D1387259BE¶m=>

International environmental groups have accused pelagic fishing vessels of Taiwan of shark finning. Taiwan's official responses to shark fishing are usually divided into two parts: pelagic fisheries and coastal fisheries. To quote from the press release from Fisheries Agency in Taiwan on 3 May 2002, "due to the fact that fishermen in Taiwan utilize the body of sharks very thoroughly, the offshore and coastal fishermen utilized every part of shark after they caught the sharks. Finning and discarding the carcasses only happened in other countries, which do not utilize the sharks or in some cases, the pelagic fishing vessels. So far, the Pelagic shark fisheries from all over the world generally have cases of shark finning. This is a global issue". Sixteen years have elapsed. On 12 September 2018, the Environmental Justice Foundation released video footage¹⁹⁰ showing that the Taiwanese fishing vessel *Fu Sheng No. 11* conducted shark finning illegally. However, the Fisheries Agency of Taiwan stated the following in the press conference and the press release on 4 October 2018: "*Fu Sheng No. 11* belongs to the Southern Atlantic Ocean fleet of albacore (*Thunnus alalunga*). According to the regulation, she can only berth at the designated port indicated by the Taiwan Government to do the landing declaration or transship the fish catch. During her periods of fishing operations between 7 December 2017 and 13 September 2018, she had only berthed at Cape Town of South Africa and Kaohsiung of Taiwan to submit a landing declaration. After the being inspected by the government officials from South Africa and Taiwan, no cases of forbidden types of sharks and violation of finning practice are found". This is a classic case.

¹⁹⁰ EJF Staff. (2018, September 12). Abuse and Illegal Fishing Aboard Taiwanese Vessel Let Slip Through the Net. Environmental Justice Foundation, EJF. Retrieved from <https://ejfoundation.org/news-media/2018/abuse-and-illegal-fishing-aboard-taiwanese-vessel-let-slip-through-the-net>

However, even though experiencing this kind of depressing official reaction from the government, the environmental groups made progress after years of endeavor. The management measures are listed as below:

I. Before catching: Species Protection, Marine Protected Area, and Closed Fishing Season

Since March 2008, the Taiwan Government has comprehensively banned the catch, sale, possession, import, and export of whale shark. Since August 2018, Taiwan comprehensively banned the catch of *Manta birostris* and *Manta alfredi*. This was a spontaneous introduction of the fishing ban by the Taiwan Government.

In addition, starting from 2001, there is a catch-report scheme for the whale shark, basking shark, megamouth shark, *Manta birostris*, and *Manta alfredi*. The regulations require fishermen to complete a catch sheet, including information regarding fish length, weight, sex, time of catch, and fishing gear. And they need to report to the local government when they catch cartilage fish such as sharks and mantas listed above.

Other banned shark lists differ from ocean to ocean and international fisheries organization regulation. Below is a list of banned sharks in different oceans required by different organizations:

1. East Pacific Ocean (required by IATTC): Oceanic Whitetip Shark; Mobula ray and Manta ray.
2. Central and West Pacific Ocean (required by WCPFC): Oceanic Whitetip Shark; Silky Shark.
3. Indian Ocean (required by IOTC): Oceanic Whitetip Shark; Pelagic Thresher Shark; Common Thresher Shark; Bigeye Thresher Shark.
4. Atlantic Ocean (required by ICCAT): Oceanic Whitetip Shark; Silky Shark; Pelagic Thresher Shark; Common Thresher Shark;

Bigeye Thresher Shark; Great Hammerhead Shark; Winghead Shark; Scalloped Hammerhead; Smooth Hammerhead Shark; Shortfin mako.

There is no marine protected area or closed fishing season for sharks in Taiwan.

II. Catching: Banning Bycatch, Finning, and Transferring

Since 1 July 2013, all Taiwanese fishing boats have been prohibited from finning sharks. Regulated fishing boats include the those with fresh ice or those using a freezer to preserve the fish catch. As for the Taiwanese fishing boats which submit the landing declaration in foreign ports, they are merely requested to demonstrate that the ratio of fins to carcass is five percent to ninety-five percent. These pelagic fishing vessels abide by rules of regional fisheries management organizations and port States. There is no ban against the transfer at sea enacted in Taiwan.

III. After catching: Landing, and Consumption

There is no Total Allowable Catch system for shark fisheries in Taiwan. Sharks captured in coastal waters mostly were supplied for Taiwan domestic market consumption, so these vessels land the shark catch in Taiwan ports. Pelagic fishery catches mostly land in foreign ports. These sharks were sold frozen to local markets or transferred to other countries. There are no prohibitions against the possession and sale of shark products, including shark fin soup.

7.1.2 Shark Fishing Regulations of East China Sea Littoral Countries

China

Taiwan was the first East China Sea country to implement advanced shark protection measures. China seems to be the most backward. No documents are available to show that China has specific legal measures to protect endangered shark species. China's s National

Plan of Action for Conservation and Management of Sharks cannot be found. Shark finning is still legal in China.

China experiences considerable market demand for shark fin, and there is no ban against the possession and sale of shark fins. China has a long way to progress in each stage of shark conservation and management.

Japan

Japan, just as Taiwan, ranks among the top 26 shark fishing nations on FAO website.¹⁹¹

1.	Indonesia	14.	Sri Lanka
2.	India	15.	New Zealand
3.	Spain	16.	Portugal
4. ●	Taiwan	17.	Nigeria
5.	Argentina	18.	Iran (Islamic Rep. of)
6.	Mexico	19.	United Kingdom of Great Britain and Northern Ireland
7.	The United States of America	20.	Republic of Korea
8.	Pakistan	21.	Canada
9.	Malaysia	22.	Peru
10. ●	Japan	23.	Australia
11.	France	24.	Yemen
12.	Thailand	25.	Senegal
13.	Brazil	26.	Venezuela (Bolivarian Rep. of)

Figure 17: Top 26 Shark Fishing Nations on FAO Website

Just as the Taiwan Fisheries Agency, the Government of Japan thinks similarly about shark fisheries. In its National Plan of Action for Conservation and Management of Sharks,¹⁹² the Government of Japan argues that “in recent years, some environmental protection

¹⁹¹ See <http://www.fao.org/ipoa-sharks/national-and-regional-plans-of-action/en/>

¹⁹² Japan's National Plan of Action for Conservation and Management of Sharks. See <http://www.fao.org/3/a-bt662e.pdf>

organizations obstruct sustainable and effective use of sharks. The Government of Japan counters their arguments while providing accurate information”. Therefore, it is not surprising to find media stories such as: “Japan Blocks 4 out of 5 Shark Conservation Proposals at Atlantic Tuna Meeting” on 17 November 2015.¹⁹³

However, Japan seems to be advancing the pace of progress. Some conservation and management measures for sharks appear in Japan's latest version of the National Plan of Action for Conservation and Management of Sharks, updated in March 2016. In addition to compliance with shark fishing regulations of regional fisheries management organizations, Japan proposed new instruments to be applied within its waters and landing ports. For example, **pelagic and offshore** tuna longline fishing vessels are prohibited to possess wire as branch lines and leaders or to use branch lines running directly off the longline floats or drop lines, known as shark line.

Below is Japan’s “Management Plan for Longline Fisheries Targeting Sharks”, which is shown in Japan’s National Plan of Action for Conservation and Management of Sharks; words in bold font are the important points emphasized in the present work. Japanese fisheries management style can be found. For example, the practice of total annual landing limit of sharks.

1. Background

The offshore longline fishing fleet **based in Kesenuma** is among the major offshore longline fleets in Japan. Vessel sizes vary between 119 and 150 tons. They mainly operate in the Oyashio-Kuroshio transition zone in the subtropical and temperate northwest Pacific

¹⁹³ Albert, D. (2015, November 17). Japan Blocks 4 out of 5 Shark Conservation Proposals at Atlantic Tuna Meeting. Project Aware. Retrieved from <https://www.projectaware.org/update/japan-blocks-4-out-5-shark-conservation-proposals-atlantic-tuna-meeting>

throughout the whole year. Blue Shark is a primary target species, and they generally conduct blue shark targeting operations between early summer to early autumn.

2. Management plan

In accordance with paragraph 2 of CMM2014-05 (Conservation and Management Measure for Sharks), the following shark management plan is addressed:

(1) time period of the plan: five years, starting from **1 January 2016**.

(2) Fleet conducting the plan

Offshore surface longline fishing fleets based in Kesennuma fishing port.

(3) Operational area

Subtropical and temperate Northwest Pacific

(4) License for the pelagic longline operation

License of the offshore surface longline fleet for the pelagic longline operation is issued by Minister of Agriculture, Forestry and Fisheries of Japan.

(5) **Total annual landing limit**

Blue Shark: 7,000 tons

Shortfin Mako shark: 600 tons

Total landing limits are set to their historical lowest level.

(6) Measures to conserve stocks of depleted tropical sharks

- Prohibition of the use of shark line.

- Sharks landed at the port are limited to Blue Shark, Shortfin Mako shark, Salmon shark, and Thresher sharks. All other sharks will be released in a way to maximize their survival.

(7) Other measures

- Fin of sharks will be attached at the time of landing.

- Shortfin Mako sharks smaller than 1m PCL are released in a way to maximize their survival, except for retaining as scientific sample for biological study.

(8) Report on the management plan

Implementation of the management plan will be reported to the Commission by 15 July of the next year.

What Japan does in the famous shark fishing town, Kesenuma Fishing Port, can be classified in three stages as follows:

I. Before catching: Species Protection, Marine Protected Area, and Closed Fishing Season.

All sharks other than Blue Shark, Shortfin Mako shark, Salmon Shark, and Thresher Shark are protected.

II. Catching: Banning Bycatch, Finning, and Transferring

Shark finning is prohibited. But there is no ban on transferring shark fins on the oceans enacted in Japan.

III. After catching: Transferring, Landing, and Consumption.

Fin of sharks will be attached at the time of landing, and there are Total Allowable Catch amounts applied to Blue Shark and Shortfin Mako shark.

Conclusion

Although Japan began to implement shark protection regulations later than Taiwan, Japanese measures have been more advanced in many respects than those of Taiwan. It seems that Taiwan is superior only in the range of application.

7.1.3 ProFish Score Check: Shark Fishery in Taiwan

Table 6: ProFish Score Check: Shark Fishery in Taiwan

Four Objectives of Sustainable Fishery	Certification Standard: Evaluation Items (Each item on scale of 0 to 5, from worst to best.)	Total: 22
1.Ensuring Fish Stocks Sustainability (15%)	<p>1-1 Speed of fish stock replenishment (Score: 1) Reason: Based on blue sharks, their sexual maturation is around five to six years.</p> <p>1-2 Abundance of fish stock (Score: 1) Reason: Only professors and scholars from Fisheries Research Institute and National Taiwan Ocean University have done research regarding few species of sharks. Other data is scanty.</p> <p>1-3 Degree of setting index for alert overfishing level (Score: 0) Reason: Related research is lacking, including the quantity of sharks and biological research. Therefore, it is difficult to set alert overfishing level.</p>	Sub-total: 2
2.Protecting Marine Environment and Ecology (15%)	<p>2-1 Impact of fishing method and gear on marine environment (Score: 3) Reason: Fishing vessels with large-scale long lines primarily fish shark.</p> <p>2-2 Impact of fishing on service function of marine ecology (Score: 0) Reason: Sharks are predators and belong to a higher trophic level. They have a high impact on marine ecology.</p> <p>2-3 Degree of bycatch, i.e., non-target catch (Score: 3) Reason: Large-scale long line fishing method can easily cause bycatch of non-targeted species, such as seagulls and sea turtles.</p>	Sub-total: 6

<p>3.Keeping Fisheries Management Effective (50%)</p>	<p>Five pairs of evaluating items. Each pair containing two items. (Each item on scale of 0 to 5, from poor to excellent execution.)</p> <p>3-1 Industry self-discipline; and compulsory managements by law or rules. (Score: 0;4) Reason: (1) There is no self-discipline made by fishermen; (2) Taiwan Fisheries Agency has banned shark finning on the sea.</p> <p>3-2 Conducting annual marine resource scientific survey; and annual fishery economics statistics survey. (Score: 3;0) Reason: (1) Only National Taiwan Ocean University was doing shark science survey; (2) Government has no plans to do shark fisheries economics survey.</p> <p>3-3 Monitoring location of fishing boats; and degree of enforcement of illegal fishing. (Score: 0;3) Reason: (1) Offshore shark fishing boats not forced to install VMS positioning systems; (2) Control measures are primarily port check, and few audits at sea.</p> <p>3-4 Degree of input control; and degree of output control (Score: 0;0) Reason: (1) No forbidden fishing zones and fishing seasons were established for sharks; (2) No Total Allowable Catch control for sharks to be established.</p> <p>3-5 Achievement rate of landing declarations; and accuracy of content of landing declarations (Score: 2;3) Reason: Only port checking personnel conduct audit regarding landing declaration of sharks. Based on the present author's understanding, the ratio of landing declaration of sharks is less than 50% and accuracy is unknown.</p>	<p>Sub-total: 15</p>
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<p>4.Taking Corporate Social Responsibility (20%)</p>	<p>4-1 Working and living conditions on board. (Score: 2) Reason: In order to effectively utilize space on boats, there is room for improvement of living quarters and working conditions of the employees.</p> <p>4-2 Fishermen's compensation package. (Score: 3) Reason: Most paychecks and salary for fishers are not transparent.</p> <p>4-3 Good hygiene practice for fishing boats and fish landing sites. (Score: 2) Reason: Offshore fishing boats primarily use ice to preserve freshness of sharks, and rarely use freezers to preserve them.</p> <p>4-4 Bonus questions for fishermen social responsibility activities (Score: 2) Reason: Relative activities of fishermen are not impressive.</p>	<p>Sub- total: 9</p>
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To sum up, given that the shark as the highest predator in the sea; there are too many shark species to conduct thorough academic research for each species too many fishing methods for bycatching young sharks accidentally, it is difficult for shark meat or shark fins to obtain an ecolabel certificate from ProFish.

7.2 Crab

Seafood lovers are familiar with crabs around the world. Crabs are important seafood in the East Asian cultures as well. There are more than 50 crab species in the East China Sea.¹⁹⁴

In the past, the East China Sea was rich in crab resources. The swimming crab was an important fishing target for Chinese and Taiwanese fishermen. Therefore, two crab species are considered: Blue swimming crab (遠海梭子蟹 or 花市仔 in Chinese) and Three-spot swimming crab (紅星梭子蟹 or 三點蟹 in Chinese). These crabs can hold eggs all year round. The peak breeding season extends from August to November each year. Crabs are sensitive and vulnerable to catching pressure, which leads to early maturity. After the female crab has initially held eggs, the crab will continue to grow and the carapace will continue to widen. The larger the carapace width, the more eggs the crabs hold.¹⁹⁵

According to Chinese research,¹⁹⁶ in general during the spring and summer economically-attractive crabs are mainly in the northern part of the East China Sea, such as the Yangtze River estuary fishing ground. The range is small, and the crab population is concentrated. In the south-central part of the East China Sea, the range of crab fishing ground is large, but the crab population is scattered, and economically-attractive crabs are sometimes bycaught with other fish. The south-central part of the East China Sea is the fishing ground where Taiwanese fishermen mainly catch crabs. According to the experience of Taiwanese

¹⁹⁴ See <https://read01.com/4OGAmO.html#.W4gHRtR97UI>

¹⁹⁵ Chen, Tzu-chun(陳姿君). (2010). *Assemblages of Epibenthic Crabs and Spatiotemporal Distribution of Dominant Species in Coastal Waters off Southwestern Taiwan* (台灣西南部沿海蟹類的種類組成及優勢種之時空分佈), p.78. Retrieved from <https://hdl.handle.net/11296/77hgw2>

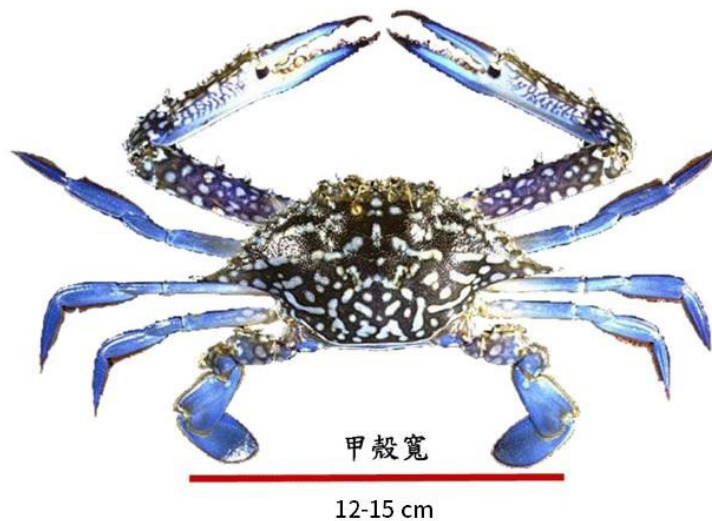
¹⁹⁶ YU, Cun-gen, Song, Hai-tang, Yao, Guang-zhan & Lu, Hua-qing. (2006, January). Composition and Distribution of Economic Crab Species in the East China Sea (東海大陸架海域經濟蟹類種類組成和數量分布). *OCEANOLOGIA ET LIMNOLOGIA SINICA*, 37(1). Retrieved from http://gdhys.cnjournals.com/hyyhz/ch/reader/create_pdf.aspx?file_no=200601009&year_id=2006&quarter_d=1&falg=1

fishermen, there are also fishing grounds where crabs gather in the south-central East China Sea. However, the Taiwan Government has not invested enough relevant marine research, so there is insufficient information on the history of fishing grounds and crabs.

China mainly uses trawl nets to catch crabs. Since 1990, Chinese fishermen have also used crab cages. The Taiwanese fishermen who catch crabs in the East China Sea mainly use crab cages. The number of some crab species in the East China Sea is tending to decrease, but there are no clear scientific figures. The following introduces two kinds of crabs:¹⁹⁷

1. *Portunus pelagicus* (Blue swimming crab)

Portunus pelagicus (Blue swimming crab)
遠海梭子蟹 (花市仔)



From: Taiwan Fisheries Agency website

Figure 18: Carapace Width of Blue Swimming Crab

Blue swimming crabs love sandy and sand-muddy depths in shallow waters between 10 to 50 m depth, including areas near reefs, mangroves, sea grass, and algae beds. Young blue

¹⁹⁷ See <https://read01.com/zh-tw/4OGAmO.html#.W4gPQNR97UI>

swimming crabs are most commonly found in intertidal shallower areas. Their age of maturity is around one year. Females are dull green in color, and males colored with blue markings, which is why they are called blue swimming crab. Maximum carapace width is 20 cm, and the usual size is around 14 cm.¹⁹⁸

The blue swimming crab is distributed in the East China Sea, South China Sea, Japan, Thailand, Australia, East Africa, and South Africa. In the East China Sea, blue swimming crabs are mainly distributed in the waters south of the Yangtze River estuary. Large blue swimming crabs are favored by the Chinese. In the 2016 Taiwan Annual Fishery Statistics, the catch of blue swimming crabs was 903 metric tons. The FAO website shows the total catch reported for this species to FAO for 1999 was 133,938 t. The countries with the largest catches were China (52,577 t) and Philippines (34,076 t). They are sold in local markets (frozen or fresh) and to the crab-flesh canning industry.¹⁹⁹

¹⁹⁸ Habitat and Biology. See <http://www.fao.org/fishery/species/2629/en>

¹⁹⁹ Interest to Fisheries. See <http://www.fao.org/fishery/species/2629/en>

2. *Portunus sanguinolentu* (Three-spot Swimming Crab)

Three-spot Swimming Crab (*Portunus sanguinolentu*)
紅星梭子蟹 (三點蟹)



From: Taiwan Fisheries Agency website

Figure 19: Carapace Width of Three-Spot Swimming Crab

The three-spot Swimming Crab loves sandy and sand-muddy depths in shallow waters between 10 to 60 meters in depth.²⁰⁰ Juveniles most commonly occur in intertidal shallower areas. Carapace width is similar to the blue swimming crabs. The three-spot swimming crab is distributed in the East China Sea, South China Sea, Japan, Hawaii, the Philippines, Australia, New Zealand, the Indian Ocean, and South Africa. Three-spot swimming crab is traditionally one of the important economically-attractive marine crab species in the East China Sea. But there is no actual catch data available, either on the FAO website or from the Taiwan Fisheries Agency.

²⁰⁰ See <http://study.nmmba.gov.tw/Modules/Biology/BioView.aspx?ItemID=586&TabID=46>

7.2.1 Crab Fishery and Management of Taiwan in East China Sea

The northeastern and southwestern parts of Taiwan are two important crab producing areas, whereas the northeastern fishing area is the East China Sea fishing area, located in Taiwan's EEZ. Due to the decreasing catch and the shrinking body length of crabs, invoking the early warning principle, the Taiwan Fisheries Agency held a crab control public hearing in December 2013. And in April 2014, the “Regulations on the Catch of Crabs Caught by Inshore and Coastal Fishing Vessels” were issued to limit the size of five species of crabs: Corab crab (*Charybdis feriatus*), Red-spotted swimming crab (*Portunus sanguinolentus*), Sand swimming crab (*Portunus pelagicus*), Hairy backed crab (*Charybdis natator*), Red frog crab (*Ranina ranina*). The Taiwan Fisheries Agency also banned the capture of pregnant female crabs from 16 August to 15 November every year.

The recommendations of the conservation group in the public hearing were included in the Regulation: "Any accidentally caught crabs, whether alive or dead, should be returned to the sea immediately and must not be brought into port or held. Considering bottom gillnet fishing in some areas, after the fishing boat raised the net, the crabs wrapped around the fishing net were not easy to deal with on the ship. The fishing boat will be allowed to put the whole pair of gillnets into the flowing water bucket or the air pumping equipment, carry them into the port together, and do the separating operation at the port. However, crabs that do not conform to the regulations should be returned to the sea within 12 hours after the fishing vessel enters the port".

一、禁止漁船捕撈下列螃蟹類：

(一) 鋪斑蟊 (*Charybdis feriatius*)：甲殼寬未滿八公分 (附圖一)。

(二) 紅星梭子蟹 (*Portunus sanguinolentus*)：甲殼寬未滿八公分 (附圖二)。

(三) 遠海梭子蟹 (*Portunus pelagicus*)：甲殼寬未滿八公分 (附圖三)。

(四) 善泳蟊 (*Charybdis natator*)：甲殼寬未滿六公分 (附圖四)。

(五) 旭蟹 (*Ranina ranina*)：甲殼長未滿六公分 (附圖五)。

二、每年8月16日至11月15日，禁止漁船捕撈將受精卵抱於體外腹側之母蟹 (俗稱開花母蟹，如附圖六)。

三、誤捕禁止捕撈之螃蟹類，不論存活或死亡，應立即放回海中，不得攜帶入港或持有。但以刺網誤捕者，限於卸貨漁港之整補區自網具上移除，置放於維生設備中，並應於漁船進港後12小時內放回海中。

四、基於學術研究目的捕撈螃蟹類，經中央主管機關核准者，不受前三點規定限制。

五、違反第一點至第三點規定之一者，依漁業法第六十五條第六款規定，處新臺幣3萬元以上15萬元以下罰鍰。



Figure 20: Advertisement of Taiwan for Crab Fishing Regulations

The story of the Taiwan Fisheries Agency managing the crab fishery is a classic fishery management tale. The present writer participated in the public hearing of the Fisheries Agency as part of an environmental group. The beginning of this story was similar to other fishery resources. People and fishermen seemed to feel that the number of wild crabs was decreasing and their body length was shrinking. But when the Fisheries Agency began to manage the crabs, they found that there was insufficient marine scientific information about the life history of these five species of crabs. The Taiwan Fisheries Agency was not sure about the average body length of their sexual maturity, so it referred to scientific data and fisheries management measures in other countries.

The most interesting part was that at first, the Taiwan Fisheries Agency did not know how many Taiwanese fishing boats were catching crabs in the East China Sea. After taking an inventory, 84 fishing boats in the Wanli Fishermen's Association of New Taipei City were using crab traps. This was an unprecedented historical process. For the first time, the Taiwan Fisheries Agency asked environmental groups to take part in the management of a popular wild seafood.

Moreover, to persuade Taiwanese fishermen to accept fisheries management, they had to drive away Chinese trawlers that crossed the Taiwan Strait midline competing for crabs. This was a difficult fisheries management challenge. At first, the Taiwan Coast Guard Administration was not sure where Taiwanese fishermen were catching crabs. Below is a map provided by the Taiwan Coast Guard to the present author privately to illustrate their effort to protect Taiwanese crab-take vessels in 2016.

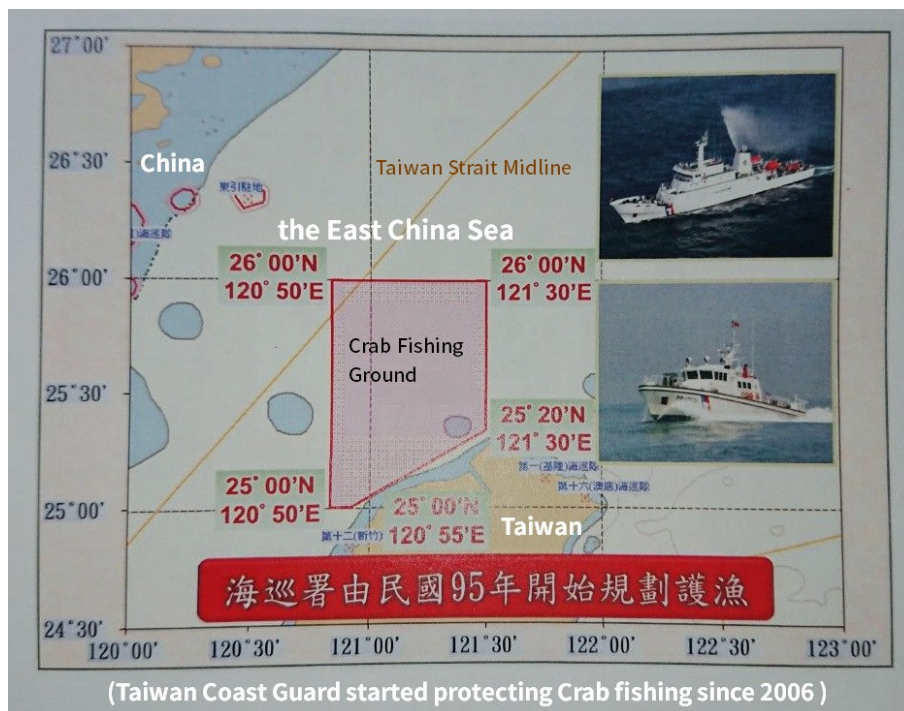


Figure 21: Crab Fishing Ground of Taiwan Fishboat in the East China Sea

Although this is a starting point for managing the crab fishery, there is much room for improvement. We need more information to form the Total Allowable Catch.

7.2.2 Crab Fishing Regulations of East China Sea Littoral Countries

Among the East China Sea littoral countries discussed herein, only Japan and Taiwan have fisheries management for specific crab species. When the Taiwan Fisheries Agency was drafting crab management measures in 2013, it once referred to Australian legislation. Therefore, we consider the crab fishing management measures of Japan and Australia.

Japan

Since 1996, Japan has used the Total Allowable Catch (TAC) system on eight species: Pacific saury (*Cololabis saira*), Japanese jack mackerel (*Trachurus japonicus*), walleye pollock, Japanese sardine (*Sardinops melanostictus*), chub mackerel, Blue mackerel (*Scomber australasicus*), Japanese common squid (*Todarodes pacificus*), and snow crab (*Chionoecetes opilio*).

Japanese TACs have been set for eight species. According to Wataru Tanoue,²⁰¹ these eight species were so designated because they were important socially and economically in the Japanese market and there was sufficient data. The TAC is set annually by the Ministry of Agriculture, Forestry and Fishery (MAFF) of Japan in consultation with the Fishery Policy Council, taking into account results of stock assessments and the socio-economic situation of fishing industries. After the Japanese MAFF sets the TAC, it is distributed to the local counties.

²⁰¹ Tanoue, W. Master of Marine Affairs. (2015). Japan's Total Allowable Catch Systems in Fishery Resource Management. University of Washington, U.S.A. Retrieved from https://digital.lib.washington.edu/researchworks/bitstream/handle/1773/34012/Tanoue_washington_02500_14735.pdf?sequence=1

The Japanese government has not adopted Individual Quota (IQ) and Individual Transfer Quota (ITQ) systems generally with the exception of southern bluefin tuna (*Thunnus maccoyii*), Atlantic bluefin tuna (*Thunnus thynnus*), and red snow crab (*Chionoecetes japonicus*). The IQ system officially regulates these three non-TAC species. In the case of red snow crab, 90% of catch amount in 2006 was allocated as catch quota to individual vessels, instead of the TAC calculated by scientists.²⁰²

Here is the 2018 TAC for Japan local counties:

http://www.jfa.maff.go.jp/j/suisin/s_tac/kanren/attach/pdf/index-57.pdf

However, there are no minimum size limit information available on the Japan Fisheries Agency website.

Australia

There are many crab fisheries or crab fishing rules in different states of Australia. Two states, South Australia and Tasmania, are taken as examples.

South Australia has the *Recreational Fishing Guide for Crab Fishing in South Australia* which depicts the regulations for blue swimming crab fishing:²⁰³

*“The Blue swimmer crab (*Portunus armatus*) is widely distributed throughout the inshore waters of South Australia, particularly in areas with extensive sandy bottom and seagrass meadows in Gulf St Vincent and Spencer Gulf.*

Size limit

A Blue Swimmer Crab is undersized if the carapace is less than 11 cm when measured from side to side at the base of the largest spines. Size limits apply in all waters of the state. Any undersized crabs must be returned to the water immediately.

²⁰² Ibid.

²⁰³ Crab Fishing in South Australia. Recreational Fishing Guide. See http://www.pir.sa.gov.au/data/assets/pdf_file/0006/92337/Crab_Fishing_Brochure.pdf

Bag limit

A combined Blue Swimmer/Sand Crab catch limit of 20 crabs per person, per day applies in South Australian waters.

Boat limit

The boat limit applies where three or more people are onboard. A combined Blue Swimmer Crab/Sand Crab daily boat limit of 60 crabs per boat applies in South Australian waters.”

The above concerns recreational crab fishing. Tasmania is considered from the standpoint of commercial crab fishing. Tasmania is an island state of Australia. It is located 240 km to the south of the Australian mainland, separated by the Bass Strait. In February 2013 the Tasmania Government enacted Fisheries Giant Crab Rules.²⁰⁴ The commercial crab fishery managements of Japan and Australia have in common the TAC system and IQ, known as the license quota in the Australia Rules.

The Fisheries Giant Crab Rules (Article 18) provide that the Minister of the Department of Primary Industries, Parks, Water and Environment of Tasmania State

*“is to allocate the portion of the **total allowable catch** allocated to the commercial giant crab fishery to the holders of fishing licences (giant crab) according to the number of giant crab quota units held and owned by those licensees in respect of those licences immediately before the commencement of the period”.*

The Minister for Primary Industries and Water set the TAC for the Tasmanian Giant Crab Fishery at 20.7 tonnes, equating to 20 kilograms per unit for the 2018/19 quota year.²⁰⁵

²⁰⁴ Fisheries (Giant Crab) Rules 2013. See <https://www.legislation.tas.gov.au/view/html/inforce/current/sr-2013-002>

²⁰⁵ Giant Crab Total Allowable Catch. See <http://dpiwwe.tas.gov.au/sea-fishing-aquaculture/commercial-fishing/giant-crab-fishery/giant-crab-total-allowable-catch>

Figure 22: Crab Total Allowable Catch on Website of Tasmania, Australia

Moreover, just as South Australia, Tasmania has Minimum Size Limits. The minimum permitted length for female giant crab is 15 cm, whereas 14 cm for male giant crab. Tasmania regulates the closed fishing season and the protection rules of female breeding stock. Article 16 of the Rules provides that

“A person must not –

- (a) take, buy, sell or be in possession of a female giant crab that has any spawn or eggs attached to it; or*
- (b) remove any spawn or eggs from a female giant crab; or*
- (c) be in possession of a female giant crab from which any spawn or eggs have been removed.”*

This regulation is more advanced than Taiwan. In Taiwan’s 2013 public hearing of crab fishery, the marine conservation groups had a fierce argument with the fishermen groups on how to regulate the protection of female breeding stock strictly and perfectly. The fishermen groups won. However, Taiwan’s crab fishery management mode is more similar to the Australian than to the Japanese.

7.2.3 ProFish Score Check: Crab Fishery in Taiwan

Table 7: ProFish Score Check: Crab Fishery in Taiwan

Four Objectives of Sustainable Fishery	Certification Standard: Evaluation Items (Each item on scale of 0 to 5, from worst to best.)	Total: 42
1.Ensuring Fish Stocks Sustainability (15%)	<p>1-1 Speed of fish stock replenishment (Score: 5) Reason: Based on the Blue swimming crab discussed herein, their age of maturity is around 1 year.</p> <p>1-2 Abundance of fish stock (Score: 1) Reason: Few related studies in Taiwan, and Fisheries Agency has not invested in research funding for a long time. Abundance of most crab populations is unknown.</p> <p>1-3 Degree of setting index for alert overfishing level (Score: 1) Reason: Related research is not much in Taiwan. The degree of setting alert overfishing level is quite limited.</p>	Sub-total: 7
2.Protecting Marine Environment and Ecology (15%)	<p>2-1 Impact of fishing method and gear on marine environment (Score: 5) Reason: Primary method of crab catching in East China Sea is crab cage traps.</p> <p>2-2 Impact of fishing on service function of marine ecology (Score: 5) Reason: Crab has strong resilience and is low-order species in food chain with little impact on marine ecology.</p> <p>2-3 Degree of bycatch, i.e., non-target catch (Score: 5) Reason: Crab cage trap rarely bycatches other fish.</p>	Sub-total: 15
3.Keeping Fisheries Management Effective (50%)	<p>Five pairs of evaluating items. Each pair containing two items. (Each item on scale of 0 to 5, from poor to excellent execution.)</p> <p>3-1 Industry Self-discipline; and compulsory managements by law or rules. (Score: 0;3) Reason: (1) There is no self-discipline made by fishermen;</p>	Sub-total: 8

	<p>(2) Taiwan Fisheries Agency has crab forbidden fishing season, minimum fishing length, and prohibition of fishing for pregnant female crabs. However, regulations are loose and there is no regular adjustment.</p> <p>3-2 Conducting annual marine resource scientific survey; and annual fishery economics statistics survey. (Score: 0;0) Reason: Taiwan has not invested in relevant natural science and fishery economic research.</p> <p>3-3 Monitoring location of fishing boats; and degree of enforcement of illegal fishing. (Score: 0;1) Reason: (1) offshore crab-catching boats are not required to install positioning systems such as VMS; (2) Law enforcement method for crab fishing is mainly port investigation, but does not seem to be focus of law enforcement by Coast Guard and Fisheries Agency.</p> <p>3-4 Degree of input control; and degree of output control (Score: 2;0) Reason: (1) Female crab has forbidden fishing season and crab body size fishing restrictions; (2) No setting of TAC.</p> <p>3-5 Achievement rate of landing declarations; and accuracy of content of landing declarations (Score: 1;1) Reason: (1) Proportion of landing declarations for crabs is low; (2) Content of declaration not checked at all.</p>	
<p>4. Taking Corporate Social Responsibility (20%)</p>	<p>4-1 Working and living conditions on board. (Score: 3) Reason: According to some news reports, it is not too bad for fishers. In order to effectively utilize space on boats, there is room for improvement of living quarters and working conditions of the employees.</p>	<p>Sub-total: 12</p>

	<p>4-2 Fishermen's compensation package. (Score: 3)</p> <p>Reason: Salary of fishermen in most crab fishing boats is not transparent.</p> <p>4-3 Good hygiene practice for fishing boats and fish landing sites. (Score: 4)</p> <p>Reason: Because crabs are prone to corruption after death, they are mostly transported in live water tanks and air-enhanced equipment to prevent crabs from dying before they are sold.</p> <p>4-4 Bonus questions for fishermen social responsibility activities (Score: 2)</p> <p>Reason: Relative activities of fishermen are not impressive.</p>	
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To sum up, crabs is another possible option to be certified an ecolabel; however, the enforcement of fisheries regulations and the rate of submitting landing declarations must to be improved greatly.

7.3 Mackerel

Mackerel (鯖魚 in Chinese) is an important food fish consumed worldwide,²⁰⁶ including in Taiwan. Mackerel is a genus of fish in the family *Scombridae* living in the open ocean and found in the Atlantic, Indian, and Pacific oceans. There are five recognized species in this genus, including *Scomber australasicus* (Blue mackerel in common English name; 花腹鯖 in Chinese, *Scomber japonicus* (**Japan mackerel**; 白腹鯖 in Chinese, *Scomber colias*, *Scomber indicus*, and *Scomber scombrus*.²⁰⁷

In the East Asia Sea, mackerels are divided into two main stocks, the Tsushima stock and the East China Sea stock. The Tsushima stock is mainly caught by Japan, Korea, and China. The East China Sea stock is mainly caught by Taiwan, Japan, and China.²⁰⁸ The East China Sea stock is discussed herein.

The East China Sea stock of mackerels migrates and spreads from south to north in the East China Sea each year during the growing season. In January they return to the south and collect in Taiwan's territorial sea annually. May to December is the growing season of mackerels.

About 50% of mackerels become sexually mature at one year old, and 70% of mackerels become sexually mature at two years old. At three years old, all mackerels reach sexual maturity. Mackerels usually start spawning in January and ending in May each year. According to the data disclosed by the Taiwan Fisheries Agency in the mackerel public

²⁰⁶ Croker, R. S. (1933). *The California mackerel fishery*, pp.9-10. Division of Fish and Game of California.

²⁰⁷ See <https://en.wikipedia.org/wiki/Scomber>

²⁰⁸ Information provided by the mackerel fishery public hearing held by Fisheries Agency of Taiwan on January 10, 2018. See <https://www.facebook.com/fisheryTW/videos/1990687911197074/>

hearing on 10 January 2018, Taiwanese scientists estimate that about 20% of parent mackerels have a chance to spawn each year. This figure is below the standard recommended by fisheries scholars. A better suggestion is that at least 25% to 50% of parent fish should have a chance to spawn rather than be caught directly before spawning in order to maintain the survival of fish stocks. And this is what fisheries management has to negotiate with fishermen and aquatic processing plants. Both hire many workers and have to pay salary monthly.

Dead mackerel spoils quickly, especially in the tropics. Taiwan is located in subtropical and tropical zones. Accordingly, mackerels should be eaten or refrigerated after landing from fishing boats on the day of capture. Therefore, aquatic processing plants play a vital role in the mackerel fishing industry.

7.3.1 Mackerel Fishery and Management of Taiwan in East China Sea

Taiwan's Fishing Ground

The northeast water area of Taiwan's EEZ is the spawning and growing ground of mackerels, and Taiwanese fishing boats catch the fish throughout the year. In each first half of the year, the spawning population of mackerel caught by fishermen concentrates in two major areas, one is in Pengjia Islet and the other is near Yilan County's inshore waters. In the second half of the year, Taiwanese fishermen's fishing grounds move northward in the sea area between Pengjia Islet and Diaoyu Islands.

Blue mackerel and Japan mackerel are the two species caught by Taiwan fishing boats in the fishing ground of the Taiwan EEZ in the East China Sea. In addition, along with

mackerels, *Trachurus japonicus* (Japanese Horse mackerel; 竹筴魚 or 真鱈 in Chinese) is often caught in the same fishing net. Therefore, Taiwan’s regulation of mackerel fishing is aimed at these three kinds of fish: Blue mackerel, Japan mackerel and Japan horse mackerel. The mackerel catches, the Taiwan Government believes, account for 40 % of coastal and offshore fisheries catch in Taiwan.

Below are details on three kinds of mackerel. Scientific knowledge and the latest data play an essential role in fishery management and policy decisions.

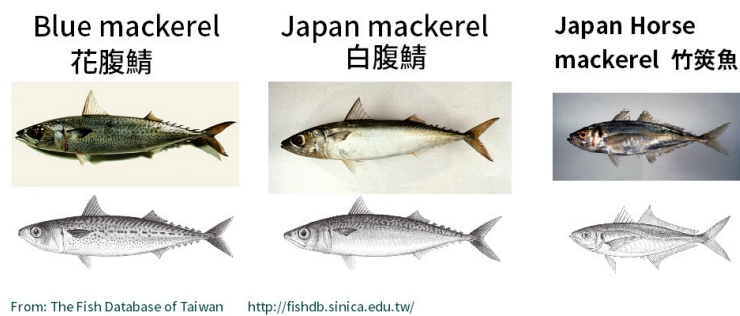


Figure 23: Blue mackerel, Japan mackerel, and Japan Horse mackerel

Blue Mackerel

The maximum length of Blue mackerel recorded in the Fish Database of Taiwan is 44 cm. The Blue mackerel in Taiwan belongs to the East China Sea stock, a warm water species, often in the southern part of the East China Sea. The northeast sea area of Taiwan is just the southernmost spawning ground of the blue mackerel in the East China Sea, especially in “Red-Fire Heart” sea area of Yilan County and Pengjia Islet sea area. Blue mackerel accounts for more than 50% of mackerel catches in Taiwan.

Blue Mackerel in Taiwan

Year	Average Length	Maximum Length	Sample Size
2001	28.8	39.3	706
2002	31.7	38.9	448
2008	24.9	38.0	1,293
2009	25.9	36.5	2,682
2010	24.0	40.1	4,112
2011	26.3	35.3	2,549
2012	24.2	37.1	2,070
2013	28.0	40.9	2,800
2014	26.8	37.3	2,046
2015	26.6	44.1	8,151
2016	25.2	46.6	7,255
2017	29.3	41.6	3,406

From: 2018-Jan-10 Taiwan Fishery Agency Public Hearing
Translated by Platinasoka Lin

ps. Data of 2017 disclosed here is only January to May.

Figure 24: Body Length Trend of Caught Blue Mackerel in Taiwan

Japan Mackerel

The maximum length of Japan mackerel recorded in the Fish Database of Taiwan is 64 cm. But the maximum length figure that the Taiwan Fisheries Agency measured is only 40.9 cm. Moreover, the current average length of sexual maturity which the Taiwan Fisheries Agency measured is less than 30 cm. and becomes shorter each year. Even though the Taiwan Fisheries Agency closed the growing season for mackerels for fishing since 1 June 2012, the fish still became smaller.

The Japan mackerel caught by Taiwan fishing boats belongs to the Tsushima stock, a cold-water species, often in the north part of the East China Sea near the continental shelf. The northeast sea area of Taiwan is the southernmost spawning ground of the Japan mackerel in the East China Sea area. But the Japan mackerel catch accounted for less than 10% of the total mackerel catch of Taiwan.

Japan Mackerel in Taiwan

Year	Average Length	Maximum Length	Sample Size
2001	24.8	31.9	76
2008	24.4	32.0	323
2009	25.8	36.0	1,593
2010	25.5	40.1	1,278
2011	25.9	35.3	1,481
2012	23.1	34.0	1,569
2013	26.6	39.7	1,383
2014	25.9	36.9	1,107
2015	28.3	40.2	1,904
2016	22.8	40.2	1,883
2017	26.8	36.2	445

From: 2018-Jan-10 Taiwan Fishery Agency Public Hearing
Translated by Platinasoka Lin
ps. Data of 2017 disclosed here is only January to May.

Figure 25: Body Length Trend of Caught Japan Mackerel in Taiwan

Japan Horse Mackerel

The maximum length of Japan Horse mackerel recorded in the Fish Database of Taiwan is 50 cm. But the maximum length figure that Taiwan Fisheries Agency measured is only 38.3 cm. The Japan Horse mackerel which Taiwan fishing boats caught belongs to the Tsushima stock, a cold-water species, often in the north part of the East China Sea, very similar to the Japan mackerel. The spawning ground of the Japan Horse mackerel is the most dispersed of the three mackerels. Japan Horse mackerel catch accounted for less than 10% in the annual total mackerel catch of Taiwan.

Japan Horse Mackerel in Taiwan

Year	Average Length	Maximum Length	Sample Size
2008	19.4	26.0	158
2009	17.5	25.6	215
2010	20.8	36.0	1,160
2011	20.9	26.7	61
2014	22.0	28.2	170
2015	20.7	38.3	2,539
2016	19.5	33.8	2,223
2017	21.4	31.9	783

From: 2018-Jan-10 Taiwan Fishery Agency Public Hearing
Translated by Platinasoka Lin

ps. Data of 2017 disclosed here is only January to May.

Figure 26: Body Length Trend of Caught Jack Japan Mackerel in Taiwan

Briefly, in terms of the entire East China Sea, the spawning ground of Blue Mackerel is relatively southward, and Japan mackerel's spawning ground is relatively northward. Therefore, the Blue mackerel Taiwan spawning grounds in Taiwan plays an important role in the entire stock health of the East China Sea. However, from the water area south of 27 degrees north latitude, the fishing period for these three kinds of mackerels are mixed together, making it difficult to distinguish their individual migrations.

The most important task that the Taiwan Fisheries Agency and the fishermen have to achieve together is to submit landing declarations in order to determine the precise correct number of mackerel catch each year.

Taiwan Mackerel Regulations

Since 2007, the Taiwan fishery industry has changed its primary fishing method for mackerels. High-efficiency scorpion nets have replaced the seine nets, and fishing efficiency has increased dramatically. However, signs of overfishing mackerel gradually emerged. The fish are getting smaller. The catch rate is getting better, but the total catch for the whole year has not improved. When mackerels became smaller and the purchase price dropped, Taiwan fishermen began to demand that the Government should intervene in fishery management in 2012.

Taiwan has never conducted comprehensive in-depth monitoring of inshore, coastal, and offshore fisheries catch before. In 2013, the Taiwan Government first promulgated fisheries management regulations to set out eight policy priorities:

1. Limit mackerel fishing vessels to 60 groups

After the publication of the Mackerel Fishery Management Regulations, the Fisheries Agency approved a total of sixty groups of single-boat purse seine, purse seine, and stench fishing boats in the mackerel fishing industry, and most importantly, since then, no more new mackerel fishing vessels have been allowed. Among the sixty groups of boats, of the 41 large fishing vessels with a total tonnage of 100 or more, 27 are from Yilan Suao.

2. Closed fishing area

The Regulations for Mackerel Fishery Management (Article 7) stipulate that mackerel fishing vessels are prohibited from fishing within six nautical miles off shore, and fishing vessels with a total tonnage of 100 or more are prohibited from fishing within 12 nautical miles of the shore.

However, at the beginning of 2018, the Yilan Suao Fishermen's Association requested the Fisheries Agency to open a square fishing ground "Red Fire Heart" at 6-12 nautical miles from Yilan County for fishing boats of over 100 tons and allow the fishing ground to be entered from January to April every year. However, according to scientific research, the red fire heart area is an important spawning ground for the mackerels, and from January to April is the spawning season of the mackerel. Therefore, a huge controversy arose.

3. Stipulated closed fishing seasons

Article 10 of the Regulations for Mackerel Fishery Management provides that fishing boats are prohibited from fishing every year during the summer mackerel growing season, 1 June to 31 July since 2013. The closed fishing season has brought some positive effect: mackerels are a little bigger. After the above-mentioned "Red Fire Heart Case", the Taiwan

Fisheries Agency announced an additional 20 days of closed fishing season in February for the mackerel spawning season since 2018 to protect the mackerel group. The closed fishing seasons are expected to benefit the sustainability of the mackerel East China Sea stock .

4. Fishing boat to install VMS

The Regulations for Mackerel Fishery Management (Articles 12 and 19) stipulate that fishing boats must carry VMS. Communication costs are borne by the fishermen. Before the fishing boat is out of port, it should be confirmed with the Coast Guard that the VMS is turned on and operating normally.

5. Landing Declaration is Obligatory

The Regulations for Mackerel Fishery Management (Article 20) stipulate that, when a mackerel fishing vessel is at sea, it shall fill out the fishing logbook and landing declaration, and submit it to their Fishermen's Association within three days after entering port. The Fishermen's Association will then transfer it to the local government, which in turn transfers it to the central Fisheries Agency.

From this process, we can see how Taiwan governmental administrative processes need to be more technology-based. Therefore, a digital fishery management system, iFish, should be established so that fishermen can directly transfer catch data to the Fisheries Agency computer data repository after inputting data in mobile devices. The Fishermen's Association should play the role of training in the use of mobile devices. The local governments and the central government are responsible for the correctness of the data.

Moreover, with the introduction of the fish catch landing declaration, fishermen should no longer need to fill out fishing logbooks.

6. Limit of twelve unloading fishing ports

The Regulations for Mackerel Fishery Management (Article 21) stipulate that only twelve fishing ports in Taiwan are allowed to unload the Mackerel catch of fishing vessels. This is because Taiwan has too many ports. Although the coastline is only about 1,500 kilometers, the country has 224 ports. If each port is equipped with the latest intelligent management equipment, the administrative costs are too high, the government has limited manpower, and inspection personnel could not be assigned to every port.

7. Limited open trading methods

Article 22 of the Regulations for Mackerel Fishery Management provides that the catch of a mackerel fishing vessel must go to a Fishermen's Association for open trade. There are four types of transactions, including auction, negotiation, fixed price, or bid. The transaction data must be sent to the government. This is to monitor the catch and other economic data in the event of a future policy adjustment.

8. Observers assigned to observe ship

Article 23 of the Regulations for Mackerel Fishery Management provides that the government may appoint observers to go out with the fishing vessel, and the vessel must accept it. Such an observer mechanism is basically borrowed from the pelagic fishery practices.

7.3.2 Mackerel Fishing Regulations of East China Sea Littoral Countries

Mackerel live freely in the East China Sea, overlapping the EEZ of several countries, including China, Japan, and Taiwan. There are no regional fisheries organizations in the East China Sea that address mackerel fishing management among these countries.

According to the Japan Fisheries Agency,²⁰⁹ Japan manages mackerel fisheries mainly using the TAC in conjunction with closed fishing seasons in some months. When the number of mackerel TACs in Japan was decided by the Ministry of Agriculture, Forestry and Fishery (MAFF), the total amount collected by the Japan Fisheries Agency for different fishing methods was then distributed to individual ship groups by local governments. In Japan, when more than 3,000 tons per day are caught, parts of Japan must temporarily suspend fishing the next day. Some local governments have stipulated fishing prohibitions temporarily and occasionally stipulated that a monthly fishing prohibition of four to six days.

In addition, from January to April each year, when entering the oviposition season, the total catch will be reduced. Especially in April, the peak of spawning, Japan reduced the amount of mackerel fishing by nearly 50%, including individual quotas and the number of fleet units involved in quotas. Japan's TAC and individual quota systems are constantly improving.

年	月	7月	8月	9月	10月	11月	12月	翌年1月	2月	3月	4月	5月	6月	個別割当 合計(トン)
		導入せず												
H20 2008	期間				10/9 ~11/8	11/10 ~12/31	1/5 ~1/31	2/1~4/1	4/2 ~5/1	5/2 ~6/1	6/2 ~			10月~6月 9ヶ月
	1ヶ統				700	1,270	600	600	600	600	600			4,970
H23 2011	期間				10/1 ~10/31	11/1 ~11/30	12/1 ~12/31	1/1 ~1/31	2/1~3/31	4/1 ~4/30	5/1~6/30			10月~6月 9ヶ月
	1ヶ統				1,200	1,200	1,500	1,200	2,000	1,500	4,500			13,100
	統数				24	29	29	27	25	24	25			26
	合計				26,540	34,209	43,950	32,337	49,800	36,225	112,163			335,224

²⁰⁹ See <http://www.jfa.maff.go.jp/j/kanri/other/pdf/2data5.pdf>, http://www.jfa.maff.go.jp/j/suisin/s_kouiki/nihonkai/pdf/n27-1.pdf and the wide area resource management policy of Japan mackerel at western Japan Sea and Kyushu western sea area (日本海西部・九州西海域マアジ(マサバ・マイワシ)広域資源管理方針に基づく) (2018, February) http://www.jfa.maff.go.jp/j/suisin/s_kouiki/nihonkai/attach/pdf/index-70.pdf

期間			9/1 ~9/30	10/1 ~10/31	11/1 ~11/30	12/1 ~12/31	1/1 ~1/31	2/1~3/31	4/1 ~4/30	5/1~6/30	9月~6月 10ヶ月			
	1ヶ統 導入せず	導入せず	2,000	2,000	2,000	1,500	1,500	2,000	1,500	5,300	17,800			
統数		20	31	32	32	28	28	26	19	27				
合計		40,800	48,415	64,525	48,600	42,300	55,497	38,850	102,181	441,168				
実績		309	10,590	14,262	13,841	33,389	13,606	8,254	9,648	3,209	3,726	1,515	8,054	120,402

期間			9/16~10/30	11/1 ~11/30	12/1 ~12/31	正月休漁 ~1/31	2/1 ~2/28	3/1 ~3/31	4/1 ~4/30	9月~6月 10ヶ月(予定)			
	1ヶ統 導入せず	導入せず	2,250	1,500	1,500	1,500	1,500	1,000	1,000		10,250		
統数		36	36	30	29	29	27	25		30			
合計		60,046	54,900	45,375	43,861	44,175	27,250	25,050		300,657			
実績		3,872	4,274	6,207	31,002	18,054	18,350	42,000	24,492	9,669	1,836		159,756

3

TAC魚種の改善と効果 Improved results after "TAC" is applied to



Figure 27: Improved Result after TAC is applied to Mackerel Fishery

China

China is not managing mackerel. Only a unified closed fishing seasons starts from 1 May to 16 August. Therefore, fishing boats that catch mackerel in the East China Sea must stay in ports and cannot go out.

7.3.3 ProFish Score Check: Mackerel Fishery in Taiwan

Table 8: ProFish Score Check: Mackerel Fishery in Taiwan

Four Objectives of Sustainable Fishery	Certification Standard: Evaluation Items (Each item on scale of 0 to 5, from worst to best.)	Total: 61
1.Ensuring Fish Stocks Sustainability (15%)	1-1 Speed of fish stock replenishment (Score: 5) Reason: Sexual maturity of mackerel is about 2 years. 1-2 Abundance of fish stock (Score: 3) Reason: The size of fish has become smaller and the catch has decreased. 1-3 Degree of setting index for alert overfishing level (Score: 4) Reason: Related research of mackerel is quite sufficient. Competent authorities can accurately grasp the average body size of mackerel parenting fish.	Sub-total: 12
2.Protecting Marine Environment and Ecology (15%)	2-1 Impact of fishing method and gear on marine environment (Score: 4) Reason: Taiwanese seine used by Taiwanese mackerel fishing vessels causes less physical damage to the marine environment. 2-2 Impact of fishing on service function of marine ecology (Score: 1) Reason: Catch amount of Taiwanese seine fishing method is extremely large; whole fish group can be fished at one time, which has considerable impact on marine ecology. 2-3 Degree of bycatch, i.e., non-target catch (Score: 3) Reason: frequency of non-target species bycatch is high, but the high-order predatory fish species bycatch is uncommon.	Sub-total: 8

<p>3.Keeping Fisheries Management Effective (50%)</p>	<p>Five pairs of evaluating items. Each pair containing two items. (Each item on scale of 0 to 5, from poor to excellent execution.)</p> <p>3-1 Industry Self-discipline; and compulsory managements by law or rules. (Score: 4;4) Reason: (1) Fisheries Agency has an advisory group on mackerel and trevally fisheries; (2) Measures for management of mackerel and trevally fisheries.</p> <p>3-2 Conducting annual marine resource scientific survey; and annual fishery economics statistics survey. (Score: 5;0) Reason: (1) Fisheries Agency has been investing in mackerel fisheries for more than a decade; (2) Government has no economic survey of mackerel fisheries.</p> <p>3-3 Monitoring location of fishing boats; and degree of enforcement of illegal fishing. (Score: 4;3) Reason: (1) Operating fishing vessel should be equipped with VMS; (2) Fishing vessels will sneak into forbidden fishing zones, and fishing control is not implemented.</p> <p>3-4 Degree of input control; and degree of output control (Score: 4;0) Reason: (1) There are mackerel banned fishing seasons and forbidden fishing zones; (2) Total catch quota has not been set.</p> <p>3-5 Achievement rate of landing declarations; and accuracy of content of landing declarations (Score: 4;3) Reason: Latest landing declaration rate is 90%. However, content of the report was not verified.</p>	<p>Sub-total: 30</p>
<p>4.Taking Corporate Social Responsibility (20%)</p>	<p>4-1 Working and living conditions on board. (Score: 3) Reason: In order to make effective use of the space on board, there is room for improvement in crew's work and living environment.</p>	<p>Sub-total: 10</p>

	<p>4-2 Fishermen's compensation package. (Score: 2)</p> <p>Reason: There is only insurance information of ship owner. Salary of fishermen in most crab fishing boats is not transparent.</p> <p>4-3 Good hygiene practice for fishing boats and fish landing sites. (Score: 3)</p> <p>Reason: East China Sea mackerel fishing boats mostly kept catch fresh with ice. In sixty groups of mackerel fishing boats, only one has freezer.</p> <p>4-4 Bonus questions for fishermen social responsibility activities (Score: 2)</p> <p>Reason: Relative activities of fishermen are not impressive.</p>	
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Overall, considering the natural trophic level, scientific research history, and its comprehensive regulations and managements, the Mackerel Fishery has the highest possibility in Taiwan to obtain the ecolabel certified by the ProFish standard.

7.4 Neritic Squid

Neritic Squid (鎖管 in Chinese, including 小管, 小卷, 透抽 and 中卷²¹⁰) is one of the commercially important species in many coastal regions of Asia, including Taiwan. Many Taiwanese love neritic squid, but squid resources have been severely depleted. According to the Fisheries Statistics Annual Report of the Taiwan Fisheries Agency, the total catch of Taiwan's Neritic Squid exceeded 20,000 metric tons in 1998, but output has declined year by year. In 2016, only 3,355 metric tons were caught. The Taiwan media reported on this issue. The Neritic Squid in Taiwan are all from the East China Sea as defined herein, including the northern Taiwanese waters and the Penghu waters.

The Neritic Squid is a cephalopod common offshore and has the characteristics of quick recovery from catches. The trophic level in the food chain is around 3. The Neritic Squid is classified as Mollusca, Cephalopoda, and Loliginidae. The Neritic Squid prefers the shallow sea environment, so is distributed in the northern and western waters of Taiwan. Due to the deep water in eastern and southeastern Taiwan, it is not suitable for Neritic Squid survival.

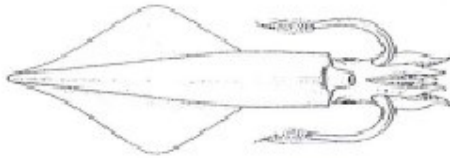
On 25 October 2018, the Taiwan Fisheries Agency convened the first Neritic Squid light fishery conference. According to the government research data published by the conference, the Neritic Squid captured by Taiwanese fishing boats are *Uroteuthis* (*Photololigo edulis*, hereinafter referred to as "Loligo edulis"), and are mainly caught in the northern Taiwanese waters. This is followed by the Chinese gun Neritic Squid (*U. (P.) chinensis*) (hereinafter referred to as "Loligo chinensis", and mainly caught in the waters of

²¹⁰ See https://www.coa.gov.tw/theme_list.php?theme=dictionary&keyword=Q&print=Y

Penghu. In Penghu, fishermen also catch Du's Neritic Squid (*U. (P.) duvauceli*). However, the Taiwan Fisheries Agency does not have sufficient research data on the Neritic Squid in the waters of the Penghu. Therefore, we shall focus on the squids *Loligo edulis* and *Loligo chinensis*.

The morphologies of these two squids *Loligo edulis* and *Loligo chinensis* are similar when they are young. They show significant differences when they grow to more than 20 cm.

Loligo edulis 劍尖槍鎖管



Loligo chinensis 中國槍鎖管

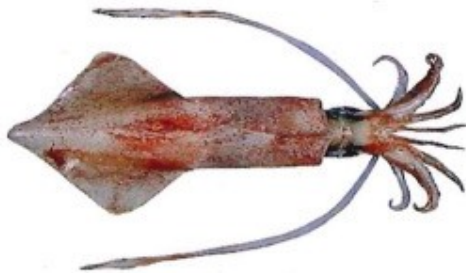


Figure 28: *Loligo edulis* and *Loligo chinensis*

The average lifespan of these two Neritic Squid is about one year because they will die after giving birth to eggs. Although the life of the Neritic Squid is short, they have an amazing high growth rate. They will grow to more than 40 cm. in just seven months.

There are two main seasons for spawning and hatching: March and April in the Spring; November and December in the Fall. The peak season for fishermen to catch the Neritic Squid is around April to November every year. In December, affected by the northeast monsoon, the waves increase and the fishermen rarely go fishing.

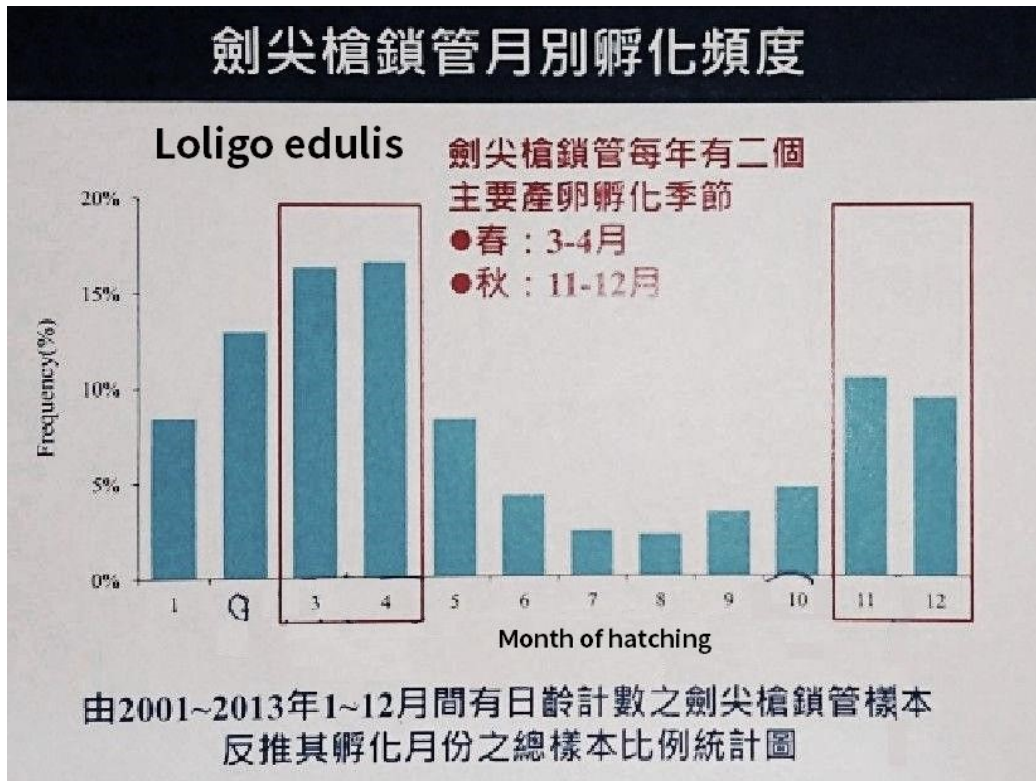


Figure 29: Hatching Seasons of *Loligo edulis*

Provided by Taiwan Fisheries Agency

7.4.1 Neritic Squid Fishery and Management of Taiwan in East China Sea

Taiwan's East China Sea Neritic Squid Fisheries and Management

In Taiwan, the main methods of fishing for Neritic Squid are light and trawl fishing. According to the meeting records of the Fisheries Agency, the top five fishing methods for fishing Neritic Squid are 63% for the light fishing, 25% for small and medium trawls, 8% for pole fishing, 0.8% for gill nets and 0.77% for Danish seine. Although some questioned the

proportion of trawling in the meeting, the trawling for Neritic Squid was mainly concentrated in the waters of Penghu. The Fisheries Agency lacked accurate survey data in the Penghu area. Therefore, this government internal data can only be used provisionally as the basis for management in 2018. At the second meeting of the Fisheries Agency, they decided to strengthen relevant scientific research and data collection over a three-year period.

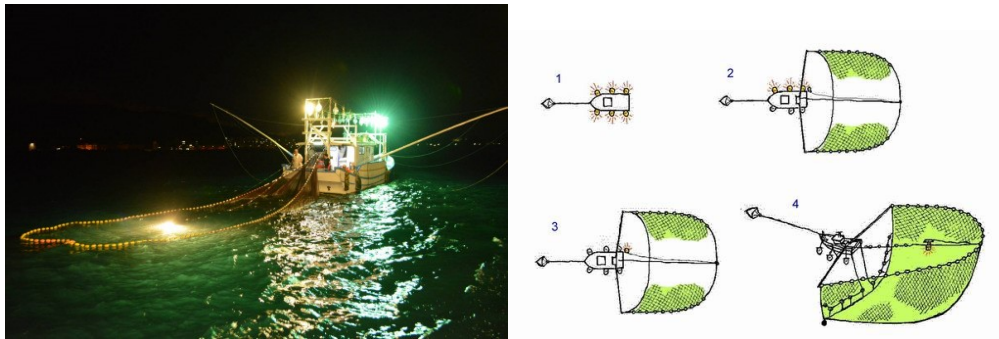


Figure 30: Taiwan fishing vessel's Torch Lighting Net

Moreover, according to the 2016 annual fishery statistics report, the top five cities' catch volumes of Neritic Squid are: New Taipei City (71%), Kaohsiung City (8%), Keelung City (8%), Yilan County (4%), Penghu County (3%). However, according to 2017 on-site inspection data, the top five catch volumes are: New Taipei City (67%), Keelung City (15%), Kaohsiung City (8%), Taichung City (4%), Penghu County (4%). The difference between the data shows that Taiwan should impose a detailed landing declaration to get correct data.

There are 1,975 light fishing boats with fishery licenses (main fishing type is 959, part-time is 1,016). After 2006, 690 fishing boats were disqualified because of transfers of title. Many fishing boats continue to illegally catch Neritic Squids. Therefore, the Taiwan Fisheries Agency decided to reopen the law to allow them to obtain a legal fishery license, provided that the fishermen were subject to the resource conservation regulations of the Neritic Squid. The management of the Neritic Squid includes a closed fishing season and part

of the closed fishing area. Fishing boats of more than 20 tons cannot fish within 3 nautical miles off the shore. Although this is not a satisfactory conservation plan, Taiwan has at least taken the first step. The Neritic Squid fishery regulations were implemented in October 2019.

7.4.2 Neritic Squid Fishing Regulations of East China Sea Littoral Countries

China

There are about 90 cephalopods in China. With changes in the marine environment, the types of cephalopod resources from north to south, Bohai, Yellow Sea, East China Sea and South China Sea increase; in turn, there are 7 species distributed in the Bohai Sea, 14 species in the Yellow Sea, 29 species in the East China Sea, and 58 species in the South China Sea.²¹¹

According to China's fishery statistical yearbook, the catch of cephalopods in 2013 was 698,909 tons. In 2014, the catch was 664,285 tons, and in 2015, it was 676,715 tons, including squid and octopus. The provinces with more than 100,000 tons are Shandong, Zhejiang, and Fujian.²¹²

◎ *Loligo chinensis* in China

Loligo chinensis is an important economic species in China with a maximum annual production of 100,000 tons. *Loligo chinensis* fishing is mainly distributed in the southern part of the East China Sea to the South China Sea, including the southern part of Fujian Province to the Taiwan Fishing Ground. The main fishing methods are trawling and lighting. According to data of Taiwan, about 20 years ago, after a Penghu fisherman sold two light net

²¹¹ *China is the world's largest fishing country for squid: not only Chinese squid and Japanese squid! See <https://read01.com/zh-tw/ogELYj.html#.W3hCWtR97UI>*

²¹² *Ibid.*

boats to Chinese fishermen in Fujian, the Chinese fishermen started building more than 500 lighte fishing boats to catch Neritic Squid.²¹³

However, as best as can be determined, the Taiwan Fisheries Agency has no information on fishing management for Neritic Squid in China.

Japan

The Japan Fisheries Agency has used the TAE system since 2001 to manage important fishery resources in the waters around Japan.²¹⁴ TAE is a Fishing Effort limit, that is, days fished by gear type, set for a particular fish stock for a year. The legal basis is 1996 Law of Japan on Preservation and Management of Living Marine Resources.²¹⁵ Since 2003, the TAE has been applied to nine species, including *Loligo edulis*.²¹⁶ ²¹⁷ However, further management information of *Loligo edulis* cannot be found.

²¹³ The author heard in the meeting of the Fisheries Agency Squid Fisheries Management Panels.

²¹⁴ Fisheries Research Institute. (2007, April 18). FRI e-paper, 12. Retrieved from <https://www.tfrin.gov.tw/epaperClient/epaper.historyView.asp?xItem=254814&ctNode=1510>

²¹⁵ Law on preservation and management of marine biological resources. Retrieved from <http://www.japaneselawtranslation.go.jp/law/detail/?id=1895&vm=04&re=01>

²¹⁶ Tanoue, W. Master of Marine Affairs. (2015). *Japan's Total Allowable Catch Systems in Fishery Resource Management*, p.17. University of Washington, U.S.A. Retrieved from https://digital.lib.washington.edu/researchworks/bitstream/handle/1773/34012/Tanoue_washington_02500_14735.pdf?sequence=1

²¹⁷ Brief Japanese data on the website of Japan Fisheries Agency. See http://www.jfa.maff.go.jp/j/suisin/s_tae/

7.4.3 ProFish Score Check: Neritic Squid Fishery in Taiwan

Table 9: ProFish Score Check: Neritic Squid Fishery in Taiwan

Four Objectives of Sustainable Fishery	Certification Standard: Evaluation Items (Each item on scale of 0 to 5, from worst to best.)	Total: 46
1.Ensuring Fish Stocks Sustainability (15%)	<p>1-1 Speed of fish stock replenishment (Score: 5) Reason: Life cycle of squid is about one year, and sexual maturity is about half a year.</p> <p>1-2 Abundance of fish stock (Score: 1) Reason: Catch from Taiwan of squid in East China Sea is decreasing in last ten years.</p> <p>1-3 Degree of setting index for alert overfishing level (Score: 2) Reason: the government has funding. Scientists have done research, but have not comprehensively gathered the data. Only few indexes can be set.</p>	Sub-total: 8
2.Protecting Marine Environment and Ecology (15%)	<p>2-1 Impact of fishing method and gear on marine environment (Score: 3) Reason: Light fishing is method for catching squid, such as torch light net and stich-held dip net.</p> <p>2-2 Impact of fishing on service function of marine ecology (Score: 5) Reason: Squid has short growing season and strong resilience and is the bottom species of the food chain.</p> <p>2-3 Degree of bycatch, i.e., non-target catch (Score: 2) Reason: It will be bycaught with phototaxis aquatic animals.</p>	Sub-total: 10
3.Keeping Fisheries Management Effective (50%)	<p>Five pairs of evaluating items. Each pair containing two items. (Each item on scale of 0 to 5, from poor to excellent execution.)</p> <p>3-1 Industry Self-discipline; and compulsory managements by law or rules. (Score: 0;3) Reason: (1) There is no self-discipline made by fishermen;</p>	Sub-total: 17

	<p>(2) Fisheries Agency has announced the regulation of squid fisheries management in October 2019.</p> <p>3-2 Conducting annual marine resource scientific survey; and annual fishery economics statistics survey. (Score: 3;0) Reason: (1) Fisheries Agency conducts a natural science survey of the squid; (2) Fisheries Agency has no relevant fisheries economic surveys.</p> <p>3-3 Monitoring location of fishing boats; and degree of enforcement of illegal fishing. (Score: 3;0) Reason: (1) Squid fishery is generally on small inshore fishing vessel with no VMS installed, but large boat has to be set with VMS or AIS; (2) Unknown.</p> <p>3-4 Degree of input control; and degree of output control (Score: 3;3) Reason: closed fishing seasons and forbidden fishing areas are available since 2020.</p> <p>3-5 Achievement rate of landing declarations; and accuracy of content of landing declarations (Score: 1;1) Reason: Landing is declared by fishing vessel itself. Proportion and content accuracy of declaration are not high, and accuracy is unknown</p>	
<p>4. Taking Corporate Social Responsibility (20%)</p>	<p>4-1 Working and living conditions on board. (Score: 3) Reason: In order to effectively utilize space on boats, there is room for improvement of living quarters and working conditions of the employees.</p> <p>4-2 Fishermen's compensation package. (Score: 3) Reason: There is only insurance information of ship owner. Salary of fishermen in most crab fishing boats is not transparent.</p> <p>4-3 Good hygiene practice for fishing boats and fish landing sites. (Score: 3)</p>	<p>Sub-total: 11</p>

	Reason: Mainly preserve the catch by ice or cooking on board. 4-4 Bonus questions for fishermen social responsibility activities (Score: 2) Reason: Relative activities of fishermen are not impressive.	
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With the Regulations of Neritic Squid Fishery Management coming into effect on 9 October 2019, the possibility of this seafood obtaining the certified ecolabel ProFish becomes higher. However, the closed fishing areas of spawning still have large scope to improve. Therefore, it may be a long road for the natural resource status of Taiwan’s Neritic Squid to achieve a sustainable level.

7.5 Mahi-mahi

Mahi-mahi (*Coryphaena hippurus*), or Dolphinfish, is highly migratory species listed in the relevant annex to the 1982 Convention on the Law of the Sea.²¹⁸ Mahi-mahi is found around the world in all tropical and subtropical oceans, and feeds on almost all forms of fish, including crustaceans and squids. Sexual maturity is reached within one year, and maximum age is reported as four years old.²¹⁹

Mahi-mahi is suitable for fish steaks because it has no hidden fish bones, so is popular among consumers all over the world, especially in North America. According to Taiwan's marine research:²²⁰ "The current research on the mitochondrial DNA sequence of Mahi-mahi shows that it does not have any endemic species group in the waters around Taiwan, and even the Mahi-mahi of the world's seas are not genetically grouped. This means that Mahi-mahi have frequent gene exchanges throughout the world. This can be evidenced by the long distances travelled by Mahi-mahi and the phenomenon of breeding in all seasons. These biological characteristics are a challenge for fishery resource management. For example, when it is discovered that the stocks of Mahi-mahi begin to decrease, it will be the disappearance of a comprehensive genic stock, and it is difficult to be protected by setting up closed fishing areas of fewer spawning grounds. Therefore, the highly migratory species of

²¹⁸ FAO. (1994). World Review of Highly Migratory Species and Straddling Stocks. FAO Fisheries Technical Paper, Retrieved from <http://www.fao.org/docrep/003/T3740E/T3740E00.HTM>
Highly migratory species covers the species listed in the relevant annex to the 1982 Convention on the Law of the Sea, such as tunas, billfish, marlins, oceanic sharks, marine turtles, pomfrets, dolphinfish and sauries.

²¹⁹ See <http://www.fishbase.org/summary/Coryphaena-hippurus.html>

²²⁰ Wu, Jui-hsien (吳瑞賢), Jiang, Wei-chuan (江偉全), Hsiao, Shen-tai (蕭聖代), Kawabe, R. & Chen, Wen-yi (陳文義). (2014). Exploring the Structure of Mahi-mahi Group in Taiwan Sea Area from Granulocyte DNA Sequence (從粒線體 DNA 序列探討臺灣海域鬼頭刀族群結構). *Journal of Taiwan Fisheries Research*. Retrieved from <https://www.tfrin.gov.tw/dl.asp?fileName=410111264371.pdf>

Mahi-mahi awaits better understanding of the migration and other activities of the stocks to find ways of achieving sustainable fisheries management.

7.5.1 Mahi-mahi Fishery and Management of Taiwan in East China Sea

Mahi-mahi can be traced in the surrounding waters of Taiwan, but the largest numbers are in the East Sea. It can be seen from the study²²¹ that, when the Kuroshio is strong from April to June every year, the Mahi-mahi will travel to the eastern waters of Taiwan with the Kuroshio Current. Because the water temperature range suitable for Mahi-mahi is 20~30°C, and 28°C is the optimum water temperature, the catch is highest in the total fishery catch from April to October, and from November to March.

The top three countries in global Mahi-mahi harvests are Peru, Taiwan, and Ecuador, indicating that the catch rate of this resource in the Pacific is higher than in other regions.²²² According to Taiwan's 2016 annual fishery report, the catch of Taiwan's Mahi-mahi is 13,423 metric tons, of which 4,289 metric tons are coastal fisheries. The main producing areas of Mahi-mahi are Taitung XinGang, Yilan Suao, Pingtung TungKang, and Hualien. Residents of the eastern coast of Taiwan regard the Mahi-mahi as an important economic fish species in the region. Taiwan has conducted a resource assessment for Mahi-mahi since 2015. The assessments show that Taiwan's Mahi-mahi resource is healthy, and therefore the Taiwan Fisheries Agency has not established management measures for the fishery.

According to the Taiwan annual report of the fishery, 3,936 metric tons of Mahi-mahi were sold to the United States in 2016. In the past, 90% of the Mahi-mahi caught in Taiwan

²²¹ Lee, Chia-lin & Shung, Sin-hwa. (1986). Survey of Fishing Ground of Dolphinfinsh in Eastern Waters of Taiwan. Bulletin of Taiwan Fisheries Research Institute, 40.

²²² Taitung County Xin Gang Fishermen's Association Action Plan for the Mahi-mahi Fisheries Improvement Project, p.6.

were sold to the United States. However, more American supermarkets began to require suppliers to provide eco-label certification in order to ensure that the catch source is legal and consistent with the measures of sustainability. Fisheries with insufficient data or poor management structures are difficult to accept, so some large supermarket chains use the Fishery Improvement Project (FIP) as a buffer. The website of the Sustainable Fisheries Partnership (SFP)²²³ shows that MacDonald's and Walmart are SFP Industry-partnerships. If the supplier has a fishery improvement plan indicating that the fishery is being managed in an ecologically sustainable manner, the store chains will agree to purchase. This has become a major challenge for Taiwan's Mahi-mahi fishery.

Taitung Xin Gang's average annual catch of Mahi-mahi is about 2,600 metric tons, making it an important location for Taiwan Mahi-mahi. According to the "Pre-assessment Report of the Fisheries Mahi-mahi Fisheries Improvement Program of the Xin Gang Fishermen's Association in Taitung County", the Xin Gang Fishermen's Association launched the Fishery Improvement Project (FIP) starting from 2015 and invited marine scholars to study the Mahi-mahi fishery from the standpoint of surface longline fishing operations, using the MSC (Marine Stewardship Council) standard, in the sea area near the port of Xin Gang Fishing Port in eastern Taiwan.

The assessment report believes that based on the best available scientific information, the resources of eastern Taiwan's Mahi-mahi should be at a stage of moderate development.

²²³ See <https://www.sustainablefish.org/About-Us/About-Us>.

According to Sustainable Fisheries Partnership (SFP) website, it is said that the Sustainable Fisheries Partnership Foundation is an independent, international NGO (US registered 501(c)(3)) promoting a new, solutions-based approach to fisheries and aquaculture improvement. SFP has a staff of around 60+ globally, with major projects in Asia, Europe, and North and South America. We do not campaign or provide eco-labels, but are dedicated to reducing the barriers to industry action to create a more sustainable world by leading and catalyzing fishery and aquaculture improvement projects globally.

However, given the absence of sustainable fisheries management, it is likely that the MSC perpetual mark certification cannot be obtained. Therefore, the Xin Gang Fishermen's Association will undertake improvements in accordance with assessment results and recommendations. In August 2015, local fishermen, fisheries, Taiwan National Ocean University, Fisheries Research Institute, Fisheries Agency, and others held a working group meeting to set up an action plan and successfully obtained login membership in the International SFP (Sustainable Fisheries Partnership) website, thereby becoming the first fish species from Taiwan to be a part of FIP recorded on the international website.

The fishermen involved in the FIP of Mahi-mahi must report the fishing logbook, recording when and where captured, how much, and so on. Professor Wang Sheng-ping, who participated in the research project, said that Taiwan has been rated "A" by the SFP for two consecutive seasons; the current sales channel works well, the price of Mahi-mahi having risen to more than 100 yuan per kilogram; the fishermen are satisfied.²²⁴

Because the FIP program requires scientific data to assess the amount of catches and ensure no overfishing, the Taiwan Fisheries Research Institute and Ocean University are conducting research on the Mahi-mahi group and cooperating with Japan to release markers. In addition to the use of satellite markers in the eastern part of Taiwan for Mahi-mahi, they are also used in Kagoshima, Japan. In 2016, a total of 4 and 6 markers were applied in Taiwan and Japan, and 3 markers were recovered.

Jiang Wei-chuan, assistant researcher of the Fisheries Research Institute, said that the ecological risk assessment of Mahi-mahi in Central and South America has shown moderate

²²⁴ Lin, Hui-chen (林慧貞). (2017, February). Mahi-mahi with identity card (有身分證的鬼頭刀). *AgriHarvest*. Retrieved from https://agriharvest.tw/theme_data.php?theme=article&sub_theme=news&id=299

risks. The Pacific Mahi-mahi do not have established data. The Mahi-mahi population of Xin Gang has not been shown to be too small and thus has not been overfished. There are study plans for the next few years, hoping to determine reasonable catch quantities for Mahi-mahi in the waters of eastern Taiwan and to achieve a more sustainable environment.²²⁵

7.5.2 Mahi-mahi Fishing Regulations of East China Sea Littoral Countries

Though the Mahi-mahi is heavily fished by recreational and commercial fishermen, its high productivity and young age at maturity have protected it against overfishing. It is believed that Mahi-mahi populations are stable and are able to support heavy fishing. Scientists consider the Mahi-mahi to be a species of least concern.²²⁶ According to the website Sustainable Fisheries Partnership (SFP), in the Pacific and Atlantic Ocean areas, there are regulations and FIPs (Fishery Improvement Project) underway in several countries. In the Pacific, five countries have FIPs for Mahi-mahi: Ecuador, Guatemala, Panama, Peru, and Taiwan. According to the rating by SFP, some FIPs are in stage 4, which means improvements in fishing practices or fishery management; some are in stage 5, which means improvements on the water.

²²⁵ Ibid.

²²⁶ SFP *Global Sustainability Overview of Pacific Ocean Fisheries that Supply Mahi-mahi*. (2013, May)

Table 10: List of Mahi-mahi Fishery Countries Joining in FIP²²⁷

Ecuador Mahi-mahi - longline	Stage 5, Progress Rating A
Guatemala Mahi-mahi	Stage 4, Progress Rating C
Panama yellowfin tuna and Mahi-mahi	Stage 4, Progress Rating A
Peru Mahi-mahi - longline (Confremar)	Stage 4, Progress Rating C
Peru Mahi-mahi - longline (WWF)	Stage 4, Progress Rating A
Taiwan Hsin-Kang (i.e. Xin Gang) Mahi-mahi – longline	Stage 4, Progress Rating B

In the Atlantic Ocean, according to the United States NOAA website,²²⁸ Atlantic Mahi-mahi is believed not to be overfished. Scientists conducted a resource assessment of Mahi-mahi in 2000 and determined that the stock was not overfished, but they have not conducted a formal stock assessment.

NOAA Fisheries and the South Atlantic Fishery Management Council (in cooperation with the Mid-Atlantic and New England Fishery Management Councils) manage the Atlantic stock of Mahi-mahi. There are conservative regulations governing Mahi-mahi from NOAA Fisheries, such as permits are required to sell Mahi-mahi, minimum size limit for Mahi-mahi caught off the coasts of Georgia, Florida, and South Carolina to protect smaller fish, and an annual catch limit (ACL). Further regulations can be checked on:

<http://safmc.net/regulations/regulations-by-species/dolphin-fish/>

²²⁷ Retrieved from <https://fisheryprogress.org/directory> and https://www.fishsource.org/stock_page/1036

²²⁸ See <https://www.fisheries.noaa.gov/species/atlantic-mahimahi>

7.5.3 ProFish Score Check: Mahi-mahi Fishery in Taiwan

Table 11: ProFish Score Check: Mahi-mahi Fishery in Taiwan

Four Objectives of Sustainable Fishery	Certification Standard: Evaluation Items (Each item on scale of 0 to 5, from worst to best.)	Total: 42
1.Ensuring Fish Stocks Sustainability (15%)	<p>1-1 Speed of fish stock replenishment (Score: 5) Reason: The Mahi-mahi grows fast and can be sexually mature in about half a year.</p> <p>1-2 Abundance of fish stock (Score: 4) Reason: According to long-term observation of domestic NGOs, the number and body length of Mahi-mahi are not declining.</p> <p>1-3 Degree of setting index for alert overfishing level (Score: 3) Reason: Although Taiwan Government has invested part of the funds to do research on Mahi-mahi, there is still very few understanding regarding the Mahi-mahi fish stock in the northwestern Pacific Ocean. Therefore, indexes that can be set are quite limited.</p>	Sub-total: 12
2.Protecting Marine Environment and Ecology (15%)	<p>2-1 Impact of fishing method and gear on marine environment (Score: 4) Reason: Fishing methods are mainly small scale longline and trolling line.</p> <p>2-2 Impact of fishing on service function of marine ecology (Score: 4) Reason: Mahi-mahi has short growing season and high resilience. It has a large appetite. Fishing of Mahi-mahi can reduce pressure on other species.</p> <p>2-3 Degree of bycatch, i.e., non-target catch (Score: 4) Reason: Mahi-mahi bycatch ratio is low.</p>	Sub-total: 12

<p>3.Keeping Fisheries Management Effective (50%)</p>	<p>Five pairs of evaluating items. Each pair containing two items. (Each item on scale of 0 to 5, from poor to excellent execution.)</p> <p>3-1 Industry Self-discipline; and compulsory managements by law or rules. (Score: 2;0) Reason: (1) There are some FIP fishermen meetings; (2) Fisheries Agency does not have Mahi-mahi management penal and relevant regulations.</p> <p>3-2 Conducting annual marine resource scientific survey; and annual fishery economics statistics survey. (Score: 2;0) Reason: (1) Taiwan's science research on Mahi-mahi has just begun; (2) Fisheries Agency has no relevant fisheries economic surveys.</p> <p>3-3 Monitoring location of fishing boats; and degree of enforcement of illegal fishing. (Score: 0;0) Reason: (1) VMS not installed on inshore and coastal fishing boats; (2) Fisheries Agency does not address relevant illegal fishing controls for Mahi-mahi fishing boats</p> <p>3-4 Degree of input control; and degree of output control (Score: 0;0) Reason: Taiwan Government has not arranged closed fishing areas, closed fishing seasons and total catch amount of Mahi-mahi.</p> <p>3-5 Achievement rate of landing declarations; and accuracy of content of landing declarations (Score: 1;1) Reason: Taiwan relies on return of the observers. Landing declaration accuracy is not high.</p>	<p>Sub-total: 6</p>
<p>4.Taking Corporate Social Responsibility (20%)</p>	<p>4-1 Working and living conditions on board. (Score: 4) Reason: In order to effectively utilize space on boats, there is room for improvement of living quarters and working conditions of the employees.</p>	<p>Sub-total: 12</p>

	<p>4-2 Fishermen's compensation package. (Score: 3) Reason: Salary of fishermen in most crab fishing boats is not transparent.</p> <p>4-3 Good hygiene practice for fishing boats and fish landing sites. (Score: 3) Reason: Inshore and coastal fishing boats mainly preserve the catch freshness by ice.</p> <p>4-4 Bonus questions for fishermen social responsibility activities (Score: 2) Reason: Relative activities of fishermen are not impressive.</p>	
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Generally speaking, Mahi-mahi might be a potential eco-labeled seafood in Taiwan. However, due to relevant regulations have not established yet, it is still a not-short road to go.

Chapter 8 Review of Landing Declaration and Sales Notes

In Chapter Seven it became clear that the “lack of accurate catch data” is the biggest obstacle to sustainable fisheries management. Therefore, we turn to determining how accurate information can be obtained with respect to inshore and coastal catches. Given that marine fisheries differ from terrestrial farmland, if the government wishes to obtain the correct catch information, it is necessary to consider the characteristics of the fishery fishing process and seek the cooperation of fishermen to use technology for data transmission. In general, there are three timing points:

1. when a boat catches fish at sea, the landing amount is declared immediately at sea right that very day. This approach requires technology and communications.
2. when the fishing boat returns to the port to unload the catch, it will immediately weigh and declare the landing.
3. when the catch goes to the processing location of the catch, such as the auction market, processing plant, or freezer, the data is declared when the catch is traded or the type or weight is counted.

Pelagic fishing has distinctive characteristics compared to inshore and coastal fisheries. Inshore fishing boats usually return to the port within five days, and coastal fishing boats sometimes go fishing for five days to two weeks, whereas pelagic fishing boats do not dock for several months. Therefore, capturing catch information from these three time points will be completely different.

Pelagic Fisheries

Despite the severe depletion of marine resources, the international demand for fishery products continues to expand. International organizations have been insisting upon fisheries management for the past 20 years, and the foundation of fishery management is correct

information, especially how many of which fish were caught. Major trading countries have gradually paid attention to imported marine products with respect to marine environmental protection and fishery management.

Moreover, combating illegal, unreported, and unregulated (IUU) fishing has become a major focus of international fisheries management. In response to international regulations, fishery resource conservation and industrial development needs, and the implementation of catch source verification and mastery of catch data, it is necessary to promote the landing declaration mechanism as a scientific basis for formulating fishery policies.

However, a pelagic fishing boat is the equivalent of a pelagic factory. It is not easy to achieve the goals mentioned above. From harvesting catches to packing aquatic products, these activities are carried out on the same fishing boat. From the time of departure to the full load of the catch, the crew on board a fishing boat are divided into the fishing group and the catch processing group. They stay on the production line all day long.

Generally speaking, the production line is located below deck and fishers do not see the sky all day long. Only during mealtime can fisherman go up to the deck for a short time, soak in the sun, and watch the sea. Every time the fishing boat goes out to sea, it will sail for about half a year before it will dock to unload the catch. Most crew time is spent on the production line. When the catch has fallen into the hatch, the catch size needs to be rapidly sorted and the packaging process begun.

Given that 90% of Taiwan's pelagic fishery catch is exported, the requirements of regional fisheries organizations, regulations on the relevant e-logbooks, and landing declarations have gradually matured, it is not surprising that pelagic fishermen have a better sense of filling in fish landing declarations.

Inshore, Coastal, and Offshore Fisheries

On the contrary, Taiwan's inshore, coastal, and offshore fisheries have stronger local socio-cultural and economic features that differ from those of the pelagic fishery. Just as most East Asian and Southeast Asian countries, Taiwan's inshore and coastal fisheries are small-scale, and the catch is mainly sold in the domestic market. Even though catches have been declining, many traders in Taiwan import cheaper foreign seafood to meet domestic demand. Hence, it is challenging to consider how to require fishermen to accept fishery management, to protect the marine environment, to improve the quality of aquatic products, and to keep up with the norms of the international market in Taiwan.

In order to explore how to obtain accurate catch data with respect to inshore and coastal fisheries, Taiwan's catch trading system, fish market overview, and the latest landing declaration system will be discussed.

8.1 Taiwan Fish Market and Fish Catch Transaction System

After different types of catch are transported to port, subsequent processes ensue. Processing includes sorting and packaging of the fish. As for fish markets, further details are given regarding the development of e-transactions and tracking systems in the fish market.

Transportation²²⁹

Fishing and transportation are tightly linked, and one cannot develop without the other. With the advanced improvement of the fishing vessels, fishing boats, and fishing rafts, they could berth at different ports and sell the catch around the port. This golden era of fishing ports helped establish fish markets near the port. Fishing boats and rafts were tools for catching and transporting fish.

Nowadays, given the larger size of boats, many masters of bigger boats berth their vessels in larger ports. Fish are stored in the freezer or refrigerator and then transported to many fish markets for further transactions. Trucks no longer use Styrofoam boxes with ice to store fish. Trucks equipped with freezers and refrigerators are now standardized in order to preserve the freshness of the fish for longer periods. Airfreight and sea freight make fresh fish more accessible to people in different countries. The techniques of individual quick freezing (IQF) and block quick freezing (BQF) can quick-freeze fish in bulk. The pelagic fishing industry has grown from single boats to an entire fleet. Some boats are primarily in charge of catching fish, whereas others transport and freeze the fish.

²²⁹ History of Taiwan Agricultural Marketing, pp.106.

Standards of Sorting the Fish

The offshore fisheries involve fish caught within the 200 nautical mile EEZ. After the fishing boats came into port, large cranes unload the fish. The fish would be transferred to the working station for further sorting based on categories and grades. Of the fish caught offshore, for example, most are mid-size or small-size fishes (within 30 centimeters). The grades are as follows:²³⁰

1. Grades for sorting mid-size or small-size offshore fish:

- (1) 80 to 100 grams (2) 100 to 120 grams (3) 120 to 150 grams
- (4) 150 to 200 grams (5) 200 to 300 grams (6) 300 to 500 grams
- (7) 500 to 800 grams (8) 800 to 1000 grams

Note: one fish per unit

2. Grades for sorting large-size offshore fish:

- (1) 1 to 3 kilograms (2) 3 to 6 kilograms (3) 6 to 8 kilograms
- (4) 8 to 10 kilograms (5) 10 to 15 kilograms

Note: one fish per unit

After the fish are sorted into baskets (each basket weighs 1 to 2 kilograms) based on their grades, they will be weighed and sold in the fish market. Subsequently, these fish will be frozen and transported to restaurants and local retailers, or even the retail store at the local sight-seeing fish port.

²³⁰ History of Taiwan Agricultural Marketing, pp.45.

Fish Packaging Techniques²³¹

In order to preserve the fresh fish and for health reasons, fish packaging techniques were developed. In the 1950s, given the lack of freezers and refrigerator equipment, fish products were dried in the sun or salted with table salt to preserve them. In its initial stage packaging took the form of wooden boxes to hold fish products which were either freshly caught, dried, or salted. As time passed and demand for quality fish products rose, new preserving techniques were developed. Freshness and packaging were viewed as key quality features of fish products.

Aside from aesthetic reasons and convenience of transportation, the most important purpose of packaging is to avoid cross-contamination. Aquatic products decay rapidly. The price of the fish varies according to freshness and quality. The preserving of the freshness has to begin when the fish were caught in order to guarantee the sanitary safety of the fish products. Three types of packaging for different categories of fish are introduced.

1. Pelagic Fish Products Packaging²³²

The distant sea fishing boat is like a factory at sea. From catching to packaging of fish products, these processes all happen on the same boat. Starting from when the boat puts out to sea until when the cargo is fully loaded, the workforce on board can be divided into two groups – fish catching unit and processing unit. The processing unit stays on the production line below deck for the whole day with intermittent breaks. Each time the fishing boat puts to sea, it will not return and unload the cargo until it has spent half a year at sea. Most crew

²³¹ History of Taiwan Agricultural Marketing, pp.60.

²³² History of Taiwan Agricultural Marketing, pp.66.

spend their time on the production line standing-by. When they receive newly caught fish, they will sort them by size and proceed with packaging as fast as possible.

2. Evolution of Mackerel Packaging²³³

In earlier times, when mackerels were caught, strings were passed through the gills of mackerels to make a string of them. These strings of mackerel, unpackaged, were sent to market to be sold. Later, as catch quantities increased, they were sent to market directly after being unloaded. After being sold, these mackerel were sent to aquaculture production factories for further sorting.

Mackerel grades, based on quality, were made into fresh fish, canned food, or bait. No matter the grade, when mackerels were sent to factories, they underwent low temperature preservation. Some products were preserved by shredded ice, using Styrofoam and glass fiber cans for transportation. Other products were put in cardboard boxes after being sorted in factories, each box of the same weight. Mackerels of the same size and grades are placed in the same box. The numbers of mackerels differed in each box because of different grades and sizes. Individual Quick Freezing or Block Quick Freezing ensued in order to maintain the freshness of the products. Other processes followed to make the mackerels into different products.

3. Average Fish Catch Packaging

Some major fishing ports in Taiwan have fish markets geared towards specific types of fish: Nanfang'ao fishing port is for mackerel; Tung Kang, pacific saury; Xin Gang, Mahi-mahi; Cianjhen, tuna, marlins, and sharks. The rest are for common fish. Mid-size or small-

²³³ History of Taiwan Agricultural Marketing, pp.68.

size fishing boats using purse seine net or long line to catch fish. These fish are then stored in pools within the cargo hold or on deck. In order to maintain the freshness of the fish, shredded ice, fresh water cabins, or simplified refrigerators are used. If the storage time is longer, the fishing boats are usually equipped with freezers with shredded ice. After the fishing boat is in port, some parts of the fish are auctioned through the fish market. The wholesaler acquires the fish at auction and then sorts them into different grades. Other parts of the fish will be sent to the market directly after they are put in the Styrofoam boxes with shredded ice. Some other parts, kept in the cooler and glass fiber cans, are sent to the processing factories for getting rid of the gills, fish scales and internal organs. They are later put in plastic bags, vacuumed, and transported in the freezers.

Establishment and Development of e-Transactions in the Fish Market

Importance of Fish Market in Marketing²³⁴

The common goals of government and industrial circles are to establish a fair, efficient, free, and transparent transaction system regarding agricultural and fishery products from the point of view of buyers and sellers and how prices were determined. The freshness of aquaculture products, non-standardized quality, and production quantity are affected by the seasons and the weather. The supply from fish producers has few categories and large quantities; the demand from the consumer side is the opposite. Therefore, there has to be an adjustable mechanism between demand and supply. The wholesale market can balance the aforesaid difference in supply and demand. Countries from all over the world establish the wholesale market by means of governmental influence, providing a place for centralized

²³⁴ History of Taiwan Agricultural Marketing, pp.126.

transactions. These include the land and the buildings for the hardware part, and business management, the software part.

Evolution of Transaction System in the Taiwan Fish Market

The fish market in Taiwan can be divided into two categories – place of fishing port fish market and place of consumption fish market. The transaction time in the place of fishing port fish market has to be coordinated with when fishing boats unload their cargo, which usually happens in the daytime. The transaction time differs from one fishing port to another. Offshore fish products are primarily for retail sale. Frozen fish products from Keelung and Kaohsiung ports are primarily sold through price negotiation.

Transactions in the early days at the place of consumption fish market adopted the auction system inherited from Japanese occupation. Fish products can be divided into three categories – fish stored in the freezer from Keelung and Kaohsiung, offshore fish stored in the freezer from other ports, and aquaculture fish products. The process usually starts at 04:00 to 05:00 hours. The auctioneer manually starts the bidding process. When bidding is finished, a receipt in triplicate form will be issued. One is for the wholesaler; the other is for putting in the fish basket; and the last one is to be handed to the accountant after the auction is finished in order to calculate the transaction fee. After the calculation is finished, the invoices will be issued to the wholesaler to pay the transaction. From the beginning of the process to registration, if done manually, is a time-consuming process. The auction and the payment paperwork will not be finished until 10:00 hours. The workers in the market usually have to work until 12:00 hours to finish their work.

Taiwan's agricultural product marketing units phased in a computerized process in 1985 to replace all paperwork. The ChiaYi fish market was chosen to computerize

transaction data, ranging from product registration, including the master of the fish products, category of fish products, and weights; the auction process, including auction price, purchasing wholesaler, and consigned quantities. All data were recorded on an electronic auction slip. During the auction process, each transaction receipt can be sent in batches to the computer center for further calculation. The wholesaler can go straight to the accounting department to make the payment without delay. This reduced the transaction time and lowered the number of manual mistakes. The experiment was successful, and this method was introduced in the fish markets in Taichung city, Taipei city, and Hsinchu city.

The fish products purchased from the auction by the wholesalers were put in the freezer and sent to nearby cities, restaurants, or evening markets for further transactions, or to the local sightseeing fishing port for retail sale.²³⁵

Evolution of Market Price System of Fishery Products²³⁶

“Production and marketing information” refers to collecting market price data in the fish market and turning these statistics into owner applicable, dynamic data, after sorting out and analyzing the data. This process gives owners a basis to refer to when making production and marketing decisions. Under the free trade market economic system, the market price is decided by market supply and demand and the superiority of product quality. In order to keep pace with the fast growing development of Internet system, since 2010 the Fisheries Agency in Taiwan had uploaded the following onto the website: daily transaction data in real time; fish product wholesale market transaction quantity, price, and place of fishing port market information.

²³⁵ History of Taiwan Agricultural Marketing, pp.133.

²³⁶ History of Taiwan Agricultural Marketing, pp.154.

8.2 Landing Declaration and Sales Notes Institution: Taiwan and Other Countries

The fisheries activity data collection for monitoring and control of fishing activity is required by more regional fisheries management organizations and countries nowadays. The common requirement for captains is to submit logbooks and provide landing declarations and sales notes to the authorities after arrival in the port. Fishing statistics are collected, processed, and calculated by fisheries administrations.

Compared to logbook and sales notes, the mandatory “Landing Declaration” is a rather new management measure for many countries during past five years and regarded as a crucial part of fishing statistics. According to Article 22 of the European Union Council Regulation (EC) No 1224/2009, "Establishing a Community control system for ensuring compliance with the rules of the common fisheries policy”, landing means the initial unloading of any quantity of fisheries products from on board a fishing vessel to land.

A landing declaration usually contains information on the catch weight and species. However, landings do not typically equal total catches, as fish may be discarded. The figures presented in the monthly statistics should not be interpreted as total removals from the sea; the figures are usually the reported live weight of fish landings. In Taiwan, discarding occurs where fishermen unintentionally catch fish, or catch damaged or less profitable fish, or catch undersize fish (for example, less than 8-cm. crabs or pregnant crabs) in violation of the regulations. In many cases only the weight of fish landed is provided because it is impractical to record the weight of fish at the time of capture due to working conditions. The landed weight may differ significantly from the weight of the fish taken from the sea, in large part due to the initial processing of the catch on board the vessel, such as gutting and filleting.

We consider some examples to understand the obligatory landing declaration system and to explore what Taiwan can learn.

Landing Declaration in Taiwan

Under the pressure from the European Union during the past five years, the Taiwan Government has significantly intensified fishery management with respect to the pelagic fishing industry. Coastal fishery management also attracts concerns of the European Union. In order to get correct catch statistics as a reference point for the government to develop marine resources management, the Fisheries Agency of Taiwan issued the “Regulation on Filing of Landing Declaration” in March 2015. This Regulation requires Taiwan fishing boats with a total tonnage of more than ten in the offshore and coastal area to submit a landing declaration to the Fisheries Agency when landing fish at 24 important fishing ports in Taiwan. In April 2018, the Regulation was amended and renamed: “Regulation on Filing of Landing Declarations of Coastal and Offshore Fisheries”. The 2018 Regulation requires all fishing boats with a total tonnage of more than ten in the fishing port to submit landing declaration.

The provisions of the Regulation for Submission and Management of Landing Declarations of Coastal and Pelagic Fisheries are as follows:

Article 1: This regulation is enacted based on Subparagraph 9, Paragraph 1, Article 44 of Fisheries Act.

Article 2: While a fishing vessel that has a total tonnage of more than ten in the coastal and offshore area enters the domestic fishing harbors, its captain should submit landing declaration.

Article 3: When a fishing vessel enters into a harbor, its captain must fill out landing declaration in accordance with the format prescribed by the central competent authority, and deliver the declaration to the Fishermen’s Association where the harbor is located within three working days.

Article 4: Local Fishermen's Associations shall send landing declarations received in the month to the local governments for preliminary examination before the 5th day of the next month. The local government shall submit the declarations to the Fisheries Agency for review before the 20th day of the next month.

Article 5: The central and local competent authorities shall send personnel to the harbor to check condition of unloading fish by fishing boats, weighing, and filling out landing declaration.

Article 6: If the captain of a fishing vessel does not process landing declaration according to regulations, catch certificate should not be issued to the vessel.

Article 7: The captain who does not declare landing declaration or does not file true information on landing declaration should be fined according to the Fisheries Act.

Implementation Results of Taiwan

In the past, Taiwan's inshore, coastal, offshore, and pelagic fishing boats did not need to report the amount of catch to the Government. Therefore, the national implementation rate was only 13% in the initial three years of the regulation. According to the information obtained by the present author while participating in the meeting of Fisheries Agency "Landing Declaration Advisory Panels", there were 3,200 fishing boats that should have filled out a landing declaration in 2017.²³⁷

The implementation of the landing declaration in 2017 is based on the proportion of voyages as below:

Mackerel fishery, 75%; flying fish egg fishery, 99%.

Sakura shrimp fishery, 62%; longline fishery, 50%. Other kinds of fisheries, 20%.

²³⁷ Wu, Shu-chun (吳淑君). (2017, December 11). The black hole of the catch is about to ruin Taiwan's fisheries. *United Daily News*. Retrieved from <https://money.udn.com/money/story/5648/2867652>

However, the catch of mackerel accounts for nearly 50% of total catch in coastal and offshore waters. Roughly estimated, the declared catch accounts for 60% of the total coastal and offshore catches.

From January to June 2018, the results of the declaration had slightly improved. For example, the mackerel fishery was 86%, trolling line fishery was 54%, and the other fishery was around 20%.

We turn to the problems faced by the Taiwan Government from 2015 to 2018 regarding the introduction of the landing declaration:

1. Not Using Information Technology

Taiwan relies on a paper declaration. Fishermen write species and weight manually. Many fishing ports lack scales, which made fishermen reluctant to complete a declaration and submit inaccurate landing information. Local Fishermen's Associations also lack personnel to assist. Moreover, fishing boats often enter ports and unload fish at night or during weekends, and Fishermen's Associations do not have the manpower and funding and constantly request subsidies from the Fisheries Agency. Some Fishermen's Associations charge fishermen.

Local governments hope the Fisheries Agency will subsidize the completion and checking of landing declarations in fishing ports. Finally, landing declarations are filed by approximately ten thousand ships per month, the Fisheries Agency does not have the manpower to carefully check and type paper data into a computer system.

2. Management Mindset Needs Adjustment

The radical adjustment of the government official management mindset is crucial in order to tackle the use of excessive manpower for inspections under the landing declaration

system. The task of government staff is to perform random port inspections rather than inspecting every fishing boat. When the catch is separately moved out of ports, any inspection afterward is meaningless. For the past three years, the Fisheries Agency has not punished any fisherman who failed to submit a landing declaration. This is why Taiwan has been warned by the European Union for its poor execution of fisheries law enforcement.

The Taiwanese government has never adopted management measures other than issuing tickets and imposing fines, such as, for example, reduction of welfare in order to sanction unruly fishermen. The issuance of tickets as the only method is not fair to law-abiding fishermen.

3. Lack of Connection to Market Transactions

Landing declaration data is only stored in government computers, bringing no added value, such as market transaction information. The incentive for fishermen to spend time on completing the declaration is small. Taiwan regulations do not require that buyers understand the source of the catch when purchasing seafood first entering port, nor do buyers and consumers have any legal basis to supervise illegal fishing.

Solution Proposed

The response of the Fisheries Agency was to change the format of landing declaration. Since July 2018, the Fisheries Agency has simplified the format of the declaration and provided versions for the characteristics of the catches of various local fishing ports, enabling fishermen to complete the landing declaration more quickly and easily. Under the pressure of conservation groups, the Fisheries Agency has designed a cloud declaration system for cell phones and tablets to replace paper.

The Fisheries Agency has setup new scales capable of automatically uploading data at the Badouzi Fishing Port of Keelung and at the Suao Fishing Port of Yilan. Smart weighbridges are expected to be tested at the Suao Fishing Port, the Xin Gang Fishing Port of Taitung, and the Tung Kang Fishing Port of Pingtung at the end of 2018. If the testing is successful, more smart weighbridges will be introduced at various fishing ports.

Sales Notes in Taiwan

In 1981, Taiwan enacted the Agricultural Products Market Transaction Act. Agricultural products containing fish products are based on Article 3 in this Act. In Article 21, the Act stipulates the following:

“Agricultural product’s first wholesale transaction shall happen in the local transaction agricultural product wholesale market. However, the following are exceptions:

- 1. farmer’s organization co-operating marketing supplies to importer or processor directly.*
- 2. the farmer who sell her/his agricultural products by retail.***
- 3. the local place does not have agricultural product wholesale market established yet.*
- 4. the farmer who is designated or approved by the project of county/city competent authority supplies to importer or processor directly”.*

Pursuant to the legal provisions, all catches must enter wholesale markets, unless they directly go to retail. However, a proportion of the catch, difficult to estimate, does not actually entered the auction markets in accordance with the regulations. In 1987, implementing the Agricultural Products Market Transaction Act, the government issued

“Directions for Banning Agricultural Product Transactions outside the Market in the Taiwan Region”.²³⁸ Article 2 defines the “transaction outside the market”:

“Violating that the first wholesale transaction of agricultural products should be executed in the local wholesale market, operating wholesale market business of agricultural products without permission, or other affairs breaching the Agricultural Products Market Transaction Act”.

Some police stations set up a “group for banning transactions outside the market”. However, when police tried to crack down on transactions outside auction markets, the fishermen and buyers argued that their activities were purely retail. Because the Council of Agriculture never defined “retail” in any related law, police stopped cracking down out of fear that there are no laws to refer to. This is typical of law enforcement in Taiwan: illegal activities are everywhere, but no one gets tickets. People are not concerned about whether laws should be amended.

Therefore, the credibility of the Annual Fisheries Statistic Report of Taiwan Fisheries Agency has been questioned by all parties. Furthermore, Article 5 of the Business Registration Act in Taiwan opened another big data black hole of fish catch transactions. Article 5 stipulates:

*“The following **small-sized businesses shall be exempted from registration in accordance with this Act:***

1. *Vendors.*
2. ***Family** agriculture, forestry, **fishery**, animal husbandry **businesses.***
3. *Family handiwork businesses.*
4. *Lodging businesses.*

²³⁸ Council of Agriculture, Taiwan. (2004, December 15). Key points for the elimination of over-the-counter trading of agricultural products in Taiwan. Retrieved from <https://law.coa.gov.tw/glsnewsout/LawContentHistory.aspx?id=FL031093>

5. *Businesses whose amount of sales per month does not reach the minimum taxable sales.*

The small-sized businesses referred to in item 2 and Item 3 of the preceding paragraph shall be limited to businesses operated by himself/herself or mainly operated by himself/herself although some employees are hired in such business.”

Not surprisingly, most Taiwanese coastal and inshore fishermen are so-called artisanal fishery businesses, and therefore they do not need to provide sale notes to the government. This dilemma contributes to the plight of fisheries management difficulties in Taiwan.

Moreover, Article 24 of the Agricultural Products Market Transaction Act stipulates:

*“For agricultural product’s first wholesale transaction, the agricultural product **wholesale market representing farmers or farmer organizations to issue sales documentation** shall be exempt from stamp duties and business taxes”.*

However, responsibility for the accuracy of data recorded in the sales documentations is not indicated. Nor is there a requirement for the buyers, the wholesale market, or the seller fishermen to submit sales notes or transaction information either to the Fisheries Agency or to the National Taxation Bureau in Taiwan. There is also no further requirement or regulations to stipulate what kind of information about fish catch sales shall be recorded on the sales documentation.

Given the legal regime of landing declarations and sale notes, it is not surprising that Taiwanese government does not have enough data to formulate good fisheries management policies. How do other countries govern their fisheries to collect these essential data?

Japan

No relevant information could be found on the website of the Japan Fisheries Agency. It is unclear whether coastal and offshore fishing boats of Japan need to declare their catch.

China

There is no relevant information on the website of the Bureau of Fisheries of China. China does not have regulations requiring fishermen to submit landing declarations.

Because major countries around the East China Sea do not have sufficient regulations governing landing declarations for reference, we consider the regulations of the European Union, United Kingdom, and Norway.

European Union

The European Union (EU) enacted Council Regulation (EC) No 1224/2009,²³⁹ “Establishing a Community Control System for Ensuring Compliance with the Rules of the Common Fisheries Policy” on 20 November 2009, which requires all each Member State to collect the fisheries activity data. This regulation impacts countries outside of EU through the “EU Carding Decisions”. For example, South Korea, the Philippines, and Taiwan were all given yellow cards by the European Commission as a caution. According to the official press release, the European Commission indicated that

“As the world's largest importer of fisheries products, the EU has adopted a firm stance against illegal fishing worldwide. No access of fisheries products is allowed to the EU market, unless they are certified as legally fished”.

EU Landing Declaration Requirements

In order to achieve sustainable fisheries management, the European Union took an important step when the Council Regulation (EU) No. 1224/2009 was enacted in November 2009. The important details for the transmission or submission of fishing logbooks, prior

²³⁹ The Content of the Council Regulation (EC) No 1224/2009. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009R1224&qid=1441808259209&from=EN>

notifications, transshipment declarations, landing declarations, sales notes, take-over declarations, and transport documents are referred to in Articles 14, 17, 20, 23, 62, 66 and 68.

Article 23 provided:

“the master of a Community fishing vessel of 10 metres’ length overall or more, or his representative, shall complete a landing declaration, indicating specifically all quantities of each species landed”.

Furthermore, the landing declaration shall contain the following information:

- (a) the external identification number and the name of the fishing vessel;*
- (b) the FAO alpha-3 code of each species and the relevant geographical area in which the catches were taken;*
- (c) the quantities of each species in kilograms in product weight, broken down by type of product presentation or, where appropriate, the number of individuals;*
- (d) the port of landing.*

The most valuable rule for Taiwan to adopt is Article 24:

*“The master of a Community **fishing vessel of 12 metres’** length overall or more, or his representative, **shall record by electronic means** the information referred to in Article 23, and **shall send it by electronic means** to the competent authority of the flag Member State within 24 hours after completion of the landing operation”.*

The master is responsible for the accuracy of the data recorded in the landing declaration. The master of a Community fishing vessel or his representative shall submit the landing declaration as soon as possible, and no later than 48 hours after completion of the landing:

- (a) to their flag Member State;*
- (b) if the landing has taken place in a port of another Member State, to the competent authorities of the port Member State concerned.*

Compared to the European Union, Taiwan requires fishing boats of 10 tons and above to submit data. According to the internal database of the Fisheries Agency in Taiwan, a fishing vessel of 10 meters in length equals about a fishing vessel of 8 to 15 tons; a fishing vessel of 12 meters in length equals a fishing vessel of 15 to 20 tons. The strict requirement of Taiwan is similar to that of the EU. But Taiwan requires masters to submit the landing declaration no later than 72 hours after landing, and only paper format is available. In this respect, the EU regulation is stricter and more advanced.

Sales Notes Requirements in EU

Council regulation (EU) No. 1224/2009 requires another important submission, sales notes, which Taiwan totally lacks. Article 62 stipulates:

*“Registered buyers, registered auctions or other bodies or persons authorised by Member States with an annual financial turnover in first sales of fisheries products of **less than EUR 200,000** which are responsible for the first marketing of fisheries products landed in a Member State, shall submit, **if possible electronically, within 48 hours after the first sale**, a sales note to the competent authorities of the Member State in whose territory the first sale takes place. **The accuracy of the sales note shall be the responsibility of these buyers, auctions, bodies or persons**”.*

And Article 63 stipulates:

*“Registered buyers, registered auctions or other bodies or persons authorized by Member States with an annual financial turnover in first sales of fisheries products of EUR 200,000 or more **shall record by electronic means** the information referred to in Article 64(1), and **shall send it by electronic means within 24 hours** after completion of the first sale to the competent authorities of the Member State in whose territory the first sale takes place”.*

The sales notes shall contain the following:

- (a) the external **identification number and the name of the fishing vessel** that has landed the product concerned;*
- (b) the **port and date** of landing;*

- (c) *the name of the fishing vessel's operator or master and, if different, **the name of the seller***;
- (d) ***the name of the buyer** and its VAT number, its **tax identification number**, or other unique identifier*;
- (e) *the FAO alpha-3 code of **each species** and the relevant **geographical area in which the catches were taken***;
- (f) *the quantities of **each species in kilograms in product weight**, broken down by type of product presentation or, where appropriate, the number of individuals*;
- (g) *for all products subject to marketing standards, as appropriate, the **individual size or weight, grade, presentation and freshness***;
- (h) *where appropriate, the **destination of products** withdrawn from the market (carry-over, use for animal feed, for production of meal for animal feed, for bait or for non-food purposes)*;
- (i) *the **place and the date of the sale***;
- (j) *where possible, the reference **number and date of invoice** and, where appropriate, the **sales contract***;
- (k) *where applicable, reference to the take-over declaration referred to in Article 66 or the transport document referred to in Article 68*;
- (l) *the **price***.

United Kingdom

The EU was not the first to introduce the landing declaration and sales note. Compared to the EU, the United Kingdom started earlier. From 1 July 2012, United Kingdom fisheries administrations have been enforcing a strict expectation that all United Kingdom fishing

vessels of 15 meters and above in length should be reporting logbook and landing declaration data electronically.²⁴⁰

From 1 January 2009, United Kingdom buyers and sellers with an annual turnover of first sale fish exceeding 400,000 EUR have been required to submit sales notes electronically. This threshold was reduced to 200,000 EUR from 1 January 2011.

A United Kingdom electronic reporting system (ERS) hub has been setup to collect, process, and store the data. Paper sales notes must be submitted within 48 hours after the sale has taken place. If you or your business has an annual turnover of more than 200,000 EUR in first-sale fish, you must provide the information electronically. If the buyer's business has an annual turnover exceeding 200,000 EUR in first-sale fish, they must submit an electronic sales note within 24 hours of completion of the sale.²⁴¹

In short, all information and documents needed to fulfill an EU captain's tasks, which are the fishing logbook, landing declarations, catch certificates, the transshipment declaration, sales notes and other relevant documents. Most must be submitted within 48 hours electronically.

Norway

The Kingdom of Norway is not a member of the European Union (EU); however, Norway is famous for good fisheries management. The long Norwegian coastline is home to rich fishing grounds, making Norway the biggest fishing nation in Europe and ranking within the top ten in the world measured by volume and export value.

²⁴⁰ UK Government Guidance: Fishing data collection, coverage, processing and revisions. (2014, July 16). See <https://www.gov.uk/guidance/fishing-activity-and-landings-data-collection-and-processing>

²⁴¹ UK Government Guidance: Sales notes – Completion and submission. (2018, September 6 updated). See <https://www.gov.uk/government/publications/buyers-and-sellers-of-first-sale-fish-and-submission-of-salesnotes/sales-notes-completion-and-submission#what-are-electronic-logbooks>

Since 2000, all Norwegian fishing vessels over 24 meters in length are required to have satellite-tracking devices. The Joint Russian-Norwegian Fisheries Commission stipulates that an exchange of satellite data and the introduction of a system for license refusal should be installed in response to serious quota overruns.²⁴²

Logbooks and sales notes are also used to monitor catch and fishing activity. All vessels are subject to logbook provisions, whereas smaller vessels only require simplified versions. Sales notes are contracts between the fishermen and buyers which indicate the percentage of quota reached.²⁴³

Fish Catch Processing and Marketing in Norway

Under the Act of 14 December 1951 on the marketing of raw fish (Raw Fish Act),²⁴⁴ all first-hand sales of fish and shellfish, with the exception of farmed fish, are conducted through the fisherman's sales organizations. There is a levy on all first-hand sales to cover the administrative costs of the sales organizations.

The Raw Fish Act of Norway stipulates that fish caught by fishermen should be sold through Fishermen's Sales Organization. The original intention of this Act is to protect the income of fishermen, but objectively make the Fishermen Sales Organization the most convenient organization to control the turnover of fish immediately after catch.

Based on this advantage of the Fishermen's Sales Organization, the Norwegian government delegated the responsibility of the fishermen to the use of quotas to the

²⁴² OECD. (2009, July 10). *Review of Fisheries in OECD Countries 2008: Policies and Summary Statistics*, pp.271. OECD Publishing, Paris. Retrieved from https://doi.org/10.1787/rev_fish_pol-2008-en

²⁴³ Information on Fisheries Management in The Kingdom of Norway on the website of FAO. See <http://www.fao.org/fi/oldsite/FCP/en/NOR/body.htm>

²⁴⁴ Act No. 3 of 1951 relative to the marketing of raw fish. See <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC013984>

Fishermen's Sales Organization. Sections 2 and 5 of the Act allow these sales organizations to impose restrictions on the catch of certain species in specified areas if management and conservation of fish stock require so. However, some measures may be taken only with the approval of the Department of Fisheries. This Act may also apply to the importation of living or fresh fish, including fish landed by a foreign vessel.

This Act was amended by Act No. 37 of 2008 relating to the Management and Conservation of Living Marine Resources (Marine Living Resources Act). This Act contains provisions with respect to the management and conservation of marine living resources in the marine waters of Norway and related genetic material. The Act also provides marine bioprospecting and rules related to marine fishing and the allocation of fishing quotas.²⁴⁵

Section 39 of the Marine Living Resources Act requires landing notes and sales notes and prior notification of landing:

“The owner or user of a harvesting or transport vessel and the person that receives the catch shall complete a landing note with information on the catch. This applies regardless of whether the catch is transferred to a land-based facility, to another vessel or to storage in the sea.

The owner or user of a harvesting or transport vessel and the first-hand purchaser of the catch shall complete a sales note with information on the catch”.

Norway thus requires the landing declaration and sales notes, as well as the European Union.

²⁴⁵ Act No. 37 of 2008 relating to the management and conservation of living marine resources (Marine Living Resources Act). See <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC082017>

8.3 Proposal: Taiwan Needs Sales Notes Institution

Landing Declaration

The preceding section has noted that Taiwan's regulation is similar to the EU's and Norway's in terms of landing declaration. The Taiwan regulation on the landing declaration needs adjustments to require that the landing declaration should be submitted solely through the electronic method. Only in this way can the proportion of those filing the landing declaration be increased.

In addition, Taiwan should require fishermen to provide a Landing Declaration when the catch is first sold in the consumer fish market, in order to strengthen the motivation of fishermen to complete the landing declaration.

Sales Notes

In Taiwan, some suggest the Landing Declaration should be replaced with Sales Notes. However, after researching regulations of the EU and Norway, both kinds of declaration are suggested to coexist separately because each declaration performs a different role. In the Landing Declaration, the master of the fishing vessel takes responsibility, and in Sales Notes, buyers assume responsibility. This legal design makes people care about the industry, not relying on fishermen to take all responsibility. Accordingly, a country should implement both the Landing Declaration and Sales Notes to control fishery data.

In Taiwan, no regulation compulsorily requires wholesale buyers or fishermen to submit sales notes. The law should be adjusted as follows:

First, to amend the Article 21 of Agricultural Products Market Transaction Act by adding the fifth exception.

Article 21:

An agricultural product's first wholesale transaction shall happen in the local transaction agricultural product wholesale market. However, the following are exceptions:

- 1. farmer's organization co-operating marketing supplies to importer or processor directly.*
- 2. The farmer who sells her/his agricultural products by retail less than 50 kilograms.*
- 3. the local place does not have agricultural product wholesale market established yet.*
- 4. the farmer who is designated or approved by the project of county/city competent authority supplies to importer or processor directly.*

[Proposed Added Paragraph]

- 5. the farmer who sells her/his agricultural products to business-registered wholesalers and retailers directly.*

Article 24

For agricultural product's first wholesale transaction, the agricultural product wholesale market represents farmers or farmer's organizations to issue sales documentation shall be exempted from stamp duties and business taxes.

[Proposed Added Paragraph] Within two days after the completion of transaction, the agricultural wholesale market should submit correct sale information through electronic means to the competent authority.

[Proposed Added Paragraph] Within three days after the completion of transaction, buyers of agricultural product should submit correct sales notes by an electronic means to the competent authority.

Article 37

The one which meets any of the following situations shall be subjected to a fine of more than NT\$3,000, but less than NT\$18,000; also cancel the permit if applicable:

- 1. violating the provisions specified in Article 18 Item 2 herein.*
- 2. violating the provisions specified in Article 21 herein.*
- 3. allow others to use her/his shipper's permit or demander's permit.*

[Proposed Added Paragraph]

4. Violating the provisions specified in Article 24.

The above is a suggested amendment to the law. With regard to sales notes concerning catching, a policy recommendation is proposed. First, all fishing auction markets in Taiwan should be fully computerized and automatically send trading information to the Fisheries Agency's central database daily.

Second, the auction code used in the fish market and Fishermen's Association should be unified with the fish species code of the Fisheries Agency's annual catch report to increase the credibility of the annual report.

Third, the sales notes of catch should include the fishing boat's name, master's name, catch area, and the detail information about size and price of aquatic product transaction.

Chapter 9 Fisheries Subsidies: Impact on Sustainable Fisheries Management

Generally speaking, a fisheries subsidy is a government action that confers an economic advantage on fishermen or a fishery industry in order to lower their costs or increase their revenues.

A fisheries subsidies study requires many types of information. Some may be easy to find, for example, information on fisheries management regimes, or contained in legislation. However, certain support schemes, for example, an investment grant scheme for fishing vessel construction, may not be widely known and therefore difficult to investigate.

The definition of fisheries subsidies on the FAO website is:

“Looking up the term “subsidy” in a dictionary tells us that a subsidy is “a direct or indirect payment, economic concession, or privilege granted by a government to private firms, households, or other governmental units in order to promote a public objective” (FAO Fisheries Glossary and Encyclopaedia Britannica 2001)”.²⁴⁶

Internationally, the marine environmental damage caused by fisheries subsidies has gained attention since the 1990s. Many international organizations began to note the impact of fisheries subsidies on the sustainability of marine resources. A report *“Marine fisheries and the law of the sea: a decade of change”*,²⁴⁷ published in 1992, revealed the severe decline in major commercial fish stocks in the world; it is believed that the existence of subsidies is among the main factors responsible for overfishing and overcapacity.²⁴⁸

²⁴⁶ FAO. (2002, December). Report of the Expert Consultation on Identifying, Assessing and Reporting on Subsidies in the Fishing Industry, p.27-34. Retrieved from <http://www.fao.org/docrep/005/y4446e/y4446e0k.htm>

²⁴⁷ FAO. (1992). *Marine fisheries and the law of the sea: a decade of change*. ROME: FAO, p.58.

²⁴⁸ FAO. (2005). *The State of World Fisheries and Aquaculture 2004*, ROME: FAO, p.86

Overcapacity means the fishing capacity is bigger than the target capacity expected in a fishing ground. Generally, the maximum sustainable yield (MSY) is the ideal target capacity. If the fishing capacity always exceeds the target fishing capacity, the fishery resources will be unable to maintain eco-balance. The problem of overfishing will arise.

Despite this, some countries that have new fisheries subsidy policies which encourage fishing vessels to compete for fishing on the high seas. Consider China, for example. In the past five years, given the depletion of fishery resources in the East China Sea, China vigorously encouraged Chinese inshore fishermen to develop offshore fishing on the deep seas. Relevant slogans can be seen on the official fisheries management websites of the coastal provinces of China. Many rumors about those generous fishery-subsidy policies provided by the Chinese Government are rampant in Taiwanese fisheries circles. But binding international legal norms to control overfishing and overcapacity do not exist. Moreover, determining how many fishery subsidies a country provides is a difficult challenge. Therefore, improving the "transparency of fisheries subsidy information" of WTO member countries is an important feature of WTO fisheries subsidy negotiations.

Fortunately, a crucial definition of the term "subsidy" was included in the WTO Agreement on Subsidies and Countervailing Measures. The definition contains three basic elements: (i) a financial contribution (ii) by a government or any public body within the territory of a Member (iii) which confers a benefit. All three elements must be satisfied in order for a subsidy to exist.²⁴⁹

²⁴⁹ See https://www.wto.org/english/tratop_e/scm_e/subs_e.htm

9.1 Overview of WTO Negotiations on Fisheries Subsidies

In November 2011, the WTO announced that Doha Development Agenda and included fisheries subsidies in the topic regarding subsidies and countervailing duties. These topics were discussed in the negotiating group on rules. The WTO officially addressed the conflict between fisheries trading rules and marine resources conservation.

However, fisheries subsidies is a complex topic involving the political and economic interests of major fisheries nations and the management of technology. During the 2002 session of the Doha Development Agenda and the discussion of “new rules for fisheries subsidies”, the WTO had difficulty in taking measures. Each member State proposed different solutions based on its own circumstances and economic status. Most countries proposed solutions that put their own interests as top priority, which slowed down progress. As of the 2017 Eleventh Ministerial Conference of WTO, no solid consensus had been reached or agendas settled.

The negotiation of fisheries subsidies can be divided into two phases:

1. Ideal phase of comprehensive ban: from 2002 to 2015.

During the initial phase of negotiating fisheries subsidies, each participating country submitted negotiation documents. During the process of negotiation, the important topics were divided into three categories according to the standpoint supported by the country of interest: friends of fish, the Core Five, and the emerging fisheries countries. For example, the topics under discussion were as follows:

“Should a comprehensive ban of fisheries subsidies be deemed a principle?”

“Should one ban the fisheries subsidies that would result in overfishing or lead to excessive fish-catching capability?”

“Should developing countries enjoy preferential treatment, such as Special and Differential Treatment (S&DT)?”

The members of the friends of fish consists of the United States, New Zealand, Australia, Iceland, Peru, and others. These countries pay more attention to marine conservation topics. They advocate a comprehensive ban on subsidies, with a few exceptions. They advocate a comprehensive ban on all IUU subsidies and subsidies that lead to overfishing and excessive fish-catching capabilities. They oppose the expansive use of S&DT.

The Core Five are made up of Japan, Taiwan, South Korea, Canada, and the European Union. These five countries have a powerful fisheries industry in international waters. In principle, they prefer that fisheries subsidies be permitted and fisheries management be enforced, rather than comprehensive ban. They believe that fisheries subsidies are not a direct cause of overfishing and resource depletion, but suggest that the effects of subsidies be examined individually. However, if fisheries subsidies were to be banned, the expansive use of S&DT should be banned simultaneously.

The emerging fisheries countries are in the initial phase of fisheries development. China, Brazil, India, and Mexico fall into this category. They believe that fisheries subsidies assist the economic development of developing countries and can improve the livelihood of fishermen. They consider that S&DT are suitable for developing countries.

In November 2007 the Chairman of the negotiation topic fisheries subsidies regulations, Mr. Guillermo Valles Galmes, proposed an “Agreement on Antidumping” (AD) and a draft amendment regarding the “Agreement on Subsidies and Countervailing Measures” (ASCM) (TN/RL/W/213); he used the proposal submitted by friends of the Fishermen’s Association as a blueprint, suggesting that Annex VIII should be added to the ASCM. A comprehensive ban

on fisheries subsidies should be imposed, subject to a few exceptions to regulate fisheries subsidies.

The less developed countries would not be affected by the ban on subsidies. Other developing countries would enjoy certain exemptions from a fisheries subsidy ban, depending on how their fisheries business is managed, consumption patterns, the length of fishing boats, fishing operation areas, and fish species.

The subsidies ban would include newly-built or modernized fishing boats, operational costs of fishing boats, infrastructure of fishing ports, support that fisheries personnel gained, support for prices of fisheries products, fishing access fee subsidies, and IUU, and others.

The general exceptions include improving the safety of fishing boats, elevating the environment-friendly fish catching techniques, the overheads of non-take personnel, and plans for reducing the numbers of fishing boats, and others.

However, this idea triggered disagreements amongst WTO members. The viewpoints regarding the W/213 document are varied, and include whether the subsidies ban is too ambitious, whether there should be an increase in S&DT for developing countries, and the content and the suitable scope of the Fisheries Management System (FMS). During the process of negotiation, the Core Five and the friends of fish opposed each other, rendering no solid results for this meeting.

After Chairman Galmes stepped down from this position in May 2010, Mr. Dennis Francis took over the position of negotiation chairman in July 2010. In February 2011, Francis divided the fisheries subsidies into six core categories: The Fisheries of International Waters, Income Support, Artisanal/Small Scale Fisheries, Fuel Subsidies, Reciprocal and Shared Access to EEZs, and Fisheries Management.

However, the opinions of each country still differed. For example, member states differ with regard to the definition of “fisheries management” system. The Friends of Fish Association stressed that the fisheries management system should include the following four major factors: the assessment of fisheries resources based on scientific foundations, limitation on fish catch based on the aforementioned assessment results, limited quota on fish catch, and effective execution measures.

Some developing countries believe that, although an effective fisheries management system can prevent the depletion of fishery resources, WTO should encourage and assist the developing countries to execute related measures, rather than using the existence of a “fisheries management system” as the basis for deciding to subsidize.

Fortunately, the effort – a descriptive exercise to simplify discussions through consultation with some fifteen countries – resulted in agreement that there should be six basic requirements for fisheries management and that the rest could be illustrations or options.

The six core requirements included the implementation of effective legislation and institutions, the ability to accurately assess the volume of catches, the ability to accurately assess the number of active fishing vessels, ensuring that appropriate monitoring controls are in place, the ability to effectively enforce legislation, and input and output controls, such as quotas or limiting days at sea. Examples of optional requirements included the installation of global positioning systems on vessels and the presence of third-party observers aboard vessels.²⁵⁰

²⁵⁰ ICTSD reporting. (2011, February 21). Fisheries Negotiations Surge Ahead as Easter Deadline Looms. International Centre for Trade and Sustainable Development. Retrieved from <http://www.ictsd.org/bridges-news/biores/news/fisheries-negotiations-surge-ahead-as-easter-deadline-looms>

Regarding the related discussion of fisheries management, it lasted until the 10th Ministerial Conference (MC10) of WTO in 2015. But the negotiation did not have a definitive result.

2. Practical phase of partial ban: from 2015 onwards

During the multilateral negotiations, it was observed that, following 2015, the discussion regarding fisheries subsidies was primarily focused on “the way of promoting fisheries subsidies negotiation” and “fisheries subsidies regulation”. In December 2017, at the 11th Ministerial Conference (MC11) held in Buenos Aires, it was observed that nearly all countries claimed that subsidies for IUU fisheries should be banned.

As for the ban on the capacity-enhancing subsidies, there existed disagreements within each country. Regarding the definition and scale of subsistence, and small-scale and artisanal fisheries, opinions among member States remained relatively diversified.

From 2015 to 2017, regarding the proposals of fisheries subsidies regulations from the member States in WTO, most suggested banning fisheries subsidies. For example: the ban on IUU fisheries subsidies, the ban on the subsidies for excessive production as a result of overfishing, the ban on the subsidies for international waters or the waters of third countries, transparency mechanisms, and S&DT. As for fisheries management system, these were not as ambitious as before, when “the ban on all fisheries subsidies in principle” was still the mainstream view.

Regarding the topics of S&DT, there is a huge gap between the viewpoints of developed and developing countries. The proposals of such developed countries as Australia, Canada, and Japan do not disclose supporting or opposing the subsidies for S&DT. However, the United States clearly expressed its opposition to S&DT.

Moreover, the negotiations seemed to have moved towards a plurilateral agreement, which implies that WTO members would be given the possibility to agree new rules on a voluntary basis. This contrasts with the multilateral WTO agreement, where all WTO members are parties to the agreement.²⁵¹ The Agreement on Government Procurement is typical plurilateral agreement. The negotiation of plurilateral agreement stressed that it is not dependent on other agreements. Thus, even if Taiwan had made concessions on fisheries subsidies, it still could not get preferential treatment regarding the negotiation of agricultural topics.

All the above topics were under debate in MC11. In the end, there were no definitive results. In a news report from Reuters, “WTO meeting ends in discord, ministers urge smaller-scale trade talks”,²⁵² the following were mentioned:

The World Trade Organization failed to reach any new agreements on Wednesday, ending a three-day ministerial conference in discord in the face of stinging United States criticism of the group and vetoes from other countries.

“We have not achieved any multilateral outcomes,” European Union Trade Commissioner Cecilia Malmstrom told a news conference. “The sad reality is that we did not even agree to stop subsidizing illegal fishing”.

She said the meeting laid bare one of the WTO’s biggest deficiencies - that all agreements must have the unanimous consent of all 164 member countries. She said the United States was partly to blame but that other countries also blocked progress.

²⁵¹ See https://en.wikipedia.org/wiki/Plurilateral_agreement

²⁵² Cohen, L & Lawder, D. (2017, December 13). WTO meeting ends in discord, ministers urge smaller-scale trade talks. Reuters. Retrieved from <https://www.reuters.com/article/us-trade-wto/wto-meeting-ends-in-discord-ministers-urge-smaller-scale-trade-talks-idUSKBN1E71J>

The following is the 11th Ministerial Conference report published on 18 December 2017.



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**Ministerial Conference
Eleventh Session
Buenos Aires, 10-13 December 2017**

FISHERIES SUBSIDIES

MINISTERIAL DECISION OF 13 DECEMBER 2017

The Ministerial Conference

Decides as follows:

1. Building on the progress made since the 10th Ministerial Conference as reflected in documents TN/RL/W/274/Rev.2, RD/TN/RL/29/Rev.3, Members agree to continue to engage constructively in the fisheries subsidies negotiations, with a view to adopting, by the Ministerial Conference in 2019, an agreement on comprehensive and effective disciplines that prohibit certain forms of fisheries subsidies that contribute to overcapacity and overfishing, and eliminate subsidies that contribute to IUU-fishing recognizing that appropriate and effective special and differential treatment for developing country Members and least developed country Members should be an integral part of these negotiations.
2. Members re-commit to implementation of existing notification obligations under Article 25.3 of the Agreement on Subsidies and Countervailing Measures thus strengthening transparency with respect to fisheries subsidies.

Figure 31: WTO Ministerial Conference Eleven Session of Fisheries Subsidies Ministerial Decision of 2017

In summary, there is a long way to go for WTO negotiations regarding fisheries subsidies. Fishermen in Taiwan could temporarily put aside their anxiety about the possibility of losing 14% fishing fuel subsidies, and keep on living their lives as before.

9.2 Current Fishery Subsidies in Taiwan

Of all the categories of fishery subsidies, fishing fuels occupy the largest percentage. Given the lack of domestic oil production in Taiwan and expensive oil prices, fuel for fishing boats comprised of a high percentage of fishing boat operation costs. From the time when the fisheries industry was in its initial development after World War II to the present, when marine resources are depleting quickly, fisheries fuel subsidies were an important category. For the annual governmental budget from the Fisheries Agency for the past ten years, 2 billion TWD were budgeted for fishery fuel subsidies. The exact figure of the subsidies varied with the rise and fall of oil prices. This category of fishery subsidy often comprised more than half of the total annual budget of the Fisheries Agency. For example, in 2014, the annual budget of Fisheries Agency was 4.7 billion TWD, and the fisheries fuel subsidy alone was 2,517,700,000 TWD.

History of Fisheries Subsidies in Taiwan

From 1956, the Joint Commission on Rural Reconstruction began to subsidize the Fishermen's Association to build warehouses for fisheries goods, some of which included gasoline storage tanks, in order to meet the demand for fishery fuels. That same year the Taiwan Government adopted the "Rules Governing Gasoline and Diesel Fuel in Taiwan". This policy actually made the Chinese Petroleum Corporation (CPC) the monopolist vendor in the petroleum industry. In 1958, measures regarding the preferential price of fuel for fishery equipment were introduced. It worked as follows: the CPC sold cheaper gasoline to fishermen for fishing boat fuels, whereas the CPC itself covered the deficit created by the price difference. This period also encompassed two global oil crises in 1973 and 1979.

It was understood in an anonymous interview conducted by the present author that CPC was becoming more unwilling to cover the deficit induced by the incentives. Therefore, in 1991, the Taiwan Government amended the Fisheries Act and made Article 59 the legal basis for the government to establish a preferential price of fuel for fisheries equipment:

Article 59, Fisheries Act

“Fuel for equipment used in fisheries shall be exempted from commodity tax. The Executive Yuan shall decide the standard of preferential price of the fuel for equipment used in fisheries”.

The Government also promulgated the “Standard of Preferential Price of Fuel for Equipment Used in Fisheries” in 1991. After a few amendments, the Government provided 28% of the fuel subsidy for equipment used in fisheries. On 1 January 2002, Taiwan officially joined the WTO as the 144th member. Although the Taiwan Government can fight for the right to earn the profits it deserves and expand its global horizons, it also has to abide by the economic and trade regulations of the WTO, including observing the “Agreement on Subsidies and Countervailing Measures” and reducing fishery subsidies.

As a result, starting from 15 August 2002, the Fisheries Agency in Taiwan reduced fuel subsidies for fisheries equipment from 28% to 14%. In order to compensate for the reduction in fuel subsidies, which had generated protests by fishermen, the Fisheries Agency promulgated the “Directions for Voluntary Closed Fishing Season Subsidies” based on loose conditions in 2002. This subsidy is social welfare in nature. Each fishing boat which has accumulated fishing operations at sea for over 90 days and had stayed in a domestic port for more than 120 days annually, is qualified to receive the remuneration annually.

For the past five years, the Fisheries Agency in Taiwan was influenced and pressured by marine conservation groups and had begun to add penalties of “stopping receiving fishing

boat fuel subsidies for a few months” for violations by offshore and pelagic fishing boats. In other words, the Taiwanese government reduced fuel subsidies as an administrative means for cracking down IUU fishing.

In April 2018, a legislator from Penghu County in Taiwan thought that these marine conservation regulation trends were reducing the income of fishermen. It was proposed to amend the Fisheries Law in the Legislative Yuan by elevating the “standard of preferential fuel price for fisheries equipment” from the level of regulation to the level of law. The legislator hoped that the fuel subsidies for fishing boats would be raised to above 20%, and be written into the Fisheries Law. It also was hoped to significantly raise the amount of voluntary closed fishing season remuneration. This proposal not only triggered opposition from marine conservation groups, but also faced challenges from the media.²⁵³

Standpoint of Taiwan in WTO

As far as the WTO fisheries subsidies negotiation standpoint of Taiwanese government is concerned, it was agreed that the IUU fisheries subsidies were forbidden. However, regarding the subsidies involved in overfishing, the government is taking a conservative position.

According to an anonymous interview and Chinese official information found on the Internet, in the view of Taiwanese fisheries management authorities, fisheries subsidies are not the direct cause of overfishing. Instead, measures for the conservation and maintenance of fisheries resources have to be based on proper fisheries management. The Taiwanese Government considers that some measures contribute to marine conservation. For example, closed fishing season subsidies and measures to reduce the acquisition of fishing boats by the

²⁵³ See <https://www.newsmarket.com.tw/blog/109121/>

government. Therefore, during the negotiation process between the Taiwanese government and the Core 5 of WTO, it has been agreed that fisheries subsidies which involved overfishing are forbidden. However, as to whether “marine resources have been overfished”, the Taiwanese Government thought that this must be acknowledged by the State or by Regional Fisheries Management Organizations.

However, without doubt, from 2002 when Taiwan joined the WTO to the present, the Fisheries Agency has regarded “fisheries subsidies” as an important topic. Therefore, on 9 May 2018, when responding to an inquiry in the Legislative Yuan, the Fisheries Agency did not agree to raise fisheries fuel subsidies. They were more willing to increase the budget for voluntary closed fishing season subsidies and mandatory closed fishing season subsidies.

The present author has suggested an amendment regarding fisheries subsidies in the Fisheries Act. The proposal has been proposed to the legislator and entered the negotiation phase in the Legislative Yuan in April 2018.

9.3 Proposal: Amendments to Taiwan Fisheries Act on Subsidies

If half of the annual budget of the Fisheries Agency continue to be used to subsidize the fuel for fishing boats, it would have expedited the depletion of the marine ecology. However, two divided opinions exist regarding how to amend fisheries subsidy policies. One approach was proposed by environmental groups, who believed the fuel subsidies to fishing boats should be replaced by marine conservation subsidies. An example is the subsidy for “mandatory closed fishing season”. The other suggested amendment was to increase fuel subsidies for fishing boats, advocated by some legislators in Taiwan. They have many fishermen voters in their constituencies. The legislators thought, given that: the quantities of fish in the ocean is decreasing, the pressure from environmental groups is increasing, the price of gasoline is rising – then, the Government should give fishermen more subsidies to survive in the difficult era. Aside from this, some legislators proposed that the subsidies for “volunteered closed fishing season” should be higher.

The proposals from legislators arise from concerns of re-election in their constituencies rather than for sustainable fisheries and marine resource conservation. The budget from the government is unlikely to increase significantly. An increase in fishing boat fuel subsidies and volunteered fishing moratorium subsidies will mean that all other budgets needed to support sustainable fisheries policies will probably decrease. Furthermore, there are many pseudo-fishermen in Taiwan. They do not make a living by fishing; they simply buy fishing boats and dock them at the fishing port, receiving fishing moratorium subsidies from the government. This loophole in the Fisheries Law has yet to be dealt with.

The present author suggests the Government should follow the international trend. While gradually decreasing the subsidies of fishboats fuel, the Government may use the

budget savings to subsidize the mandatory closed fishing season and the fees for adjusting the fisheries structure, and so on. The Government simultaneously pursues long-term marine ecology and the fisheries business at hand.

The average expenditure for subsidizing fishing boat fuel in Taiwan is approximately 2 billion TWD annually. This figure fluctuates according to international oil prices. The suggestion is that the annual expenditure for marine conservation should be 2 billion TWD, roughly the same as the fuel subsidies. It should be stipulated in the Fisheries Act that a total of 4 billion TWD for both fuel subsidies and marine conservation subsidies should be the legal budget expenditure. Otherwise, there is a high chance that the Executive Yuan of Taiwan will bounce the check.

Article 59 of the Fisheries Act provides that “fuel for equipment used in fisheries shall be exempted from commodity tax. The Executive Yuan shall decide the standard of preferential price of the fuel for equipment used in fisheries”. It is suggested the Article should be amended to read:

Article 59:

“Fuel for equipment used in fisheries shall be exempted from commodity tax. The Executive Yuan shall decide the standard of preferential price of the fuel for equipment used in fisheries.”

In order to foster the development of sustainable fisheries, the central competent authority should administer upgrading the fisheries industry, together with green policies such as resource conservation and conservation management.

The budget provision for the matters set forth in previous two Paragraphs shall be no less than 28 % of the total annual sum of the fisheries fuel price in the previous year calculated by the average oil price, or shall use 4 billion TWD as the budgeted lower limit. The higher amount will be chosen as budget provision.

The annual budget balance of the green policy as set forth in Paragraph 2 should be budgeted to the Fisheries Development Fund aforementioned in Article 56”.

In addition, in April 2018, a legislator in the Legislative Yuan in Taiwan proposed that Article 59-1 should be added. In Taiwan, a single fishing boat can receive more than 9,600 TWD in subsidies if this fishing boat sailed for more than 90 days and had a fishing moratorium of exceeding 120 days annually. This is considered by the Control Yuan of Taiwan to be unhelpful to marine conservation and to be a policy that needs review. The legislators thought this subsidy to be too low and that using only administrative ordinances is not enough. They considered amending the Fisheries Law by raising the subsidies to 50,000 TWD for a single fishing boat, with higher subsidies reflecting the weight of the boat.

This draft amendment would result in a lower marine conservation budget and render the forced fishing moratorium more difficult to promote in the future. Legally speaking, the policies of the closed fishing season and closed fishing zone mean the Government does not subsidize both fishermen and fishing boats. The closed fishing season and closed fishing zone are based on scientific research, asking fishermen to cease fishing in a specific sea area during the seasons when the fish hatch eggs and mature. And the voluntary closed fishing seasons allows fishermen to choose their own preferred time.

Once fishermen have a higher subsidy from the voluntary fishing moratorium, they will oppose more strongly the forced fishing moratorium, which is without subsidies. Therefore, the solution lies in adding the forced fishing moratorium and making the forced fishing moratorium subsidies higher than the voluntary fishing moratorium.

Theoretically, the voluntary fishing moratorium should be abolished. However, it is difficult to terminate this policy, which is tantamount to bribery.

Accordingly, the following amendment is proposed:

Article 59-1

“In order to encourage fishermen to adopt a voluntary closed fishing season and rewarding fishermen for complying with the mandatory closed fishing season stipulated by the central competent authority according to Article 37 and Article 44, the central competent authority should annually budget a subsidy reward for fishing boats which adopt the voluntary closed fishing season and followed mandatory closed fishing season.

Regarding the volunteered closed fishing season as set forth in the former Paragraph, the subsidy reward is 10,000 TWD for a single fishing boat that adopted an annual volunteered closed fishing season. Aside from this, an additional subsidy reward will be given based on the weight of the fishing boat. With an additional ton added to the boat, an extra 1,500 TWD will be granted. The subsidy reward limit for a single fishing boat is 200,000 TWD.

Regarding the mandatory closed fishing season as set forth in Paragraph 1, for a fishing boat that docked in a domestic port for one month consecutively and with an accumulated amount of over two months, the subsidy reward for the moratorium of that boat should be three times the standard of the voluntary closed fishing season.

The regulations for the application, required documents, procedures, expiration date, criteria of closed fishing season subsidy reward, ways of rewarding, conditions for revocation, and other matters to be complied with for subsidy reward of voluntary closed fishing season as set forth in Paragraph 1 shall be prescribed by the central competent authority”.

PART III. Beyond Tradition: Policies and Laws Recommended

The sea waters of Taiwan have reached a difficult bottleneck, especially in terms of the coastal and offshore fishery. The marine ecology of the waters around Taiwan has been deteriorating, just as in the East China Sea. The conflicts and dialogues between the marine conservation movement and the fishing industry have continued. The fishery would not exist if there were no fish in the sea, and there would be no marine diving tourism industry. However, finding an effective way to change is difficult. In fact, the traditional fisheries scientific management concepts abroad, such as the various fishery management methods introduced in Part II, cannot be effectively applied to the fisheries in Taiwan; this is not because traditional methods are inadequate, but because innovative methods are needed to support the traditional ones.

Taiwan requires state-of-the-art technology to control and manage the constantly changing conditions of fishing vessels. Reducing the scale of over-developed fisheries is not enough to help the ocean recover. Taiwan needs systematic delineation of marine protection areas (MPAs). However, Taiwan is not like the United States and European countries, which can finance the delineation of MPAs. Experience reminds us that overwhelming pressure from powerful political protests by local residents and fishermen would make scientific advice useless no matter how good the advice is. Moreover, bringing the power of consumer support for marine conservation is necessary to promote fishery management. Therefore, Taiwan needs to establish the sustainable seafood ecolabel as quickly as possible.

Finally, in the next decade, the Taiwan Government has to establish a Ministry of Marine Affairs and elevate the Fisheries Agency from a third-level agency to the second-level agency in order to become an actual sustainable fishery country.

Chapter 10 To Build an AI Fishery Management System: iFish

10.1 Introduction: AI Technology Meets Fishery Monitoring and Surveillance

Taiwan's Predicament

Two factors make fisheries management more difficult year by year. The first is the historical factor: there are too many fishing boats and fishing ports in Taiwan. Taiwan has an area of about 36,000 square kilometers. The area of Taiwan's EEZ is about 430,000 square kilometers, with more than 22,000 fishing boats. The coastline of Taiwan is 1,566 kilometers long with 224 fishing ports open for fishing boats to land their fish catch, except for certain controlled species. Compared to the situation in Norway, this is unreasonable.

Norway's EEZ is 2,100,000 square kilometers with about 6,500 fishing boats. The coastline of Norway is 56,000 kilometers long with only about 800 fishing ports available for landing. In Norway, there is one fishing port every 70 kilometers on average. In Taiwan, there is one fishing port per 7 kilometers and less. The more fishing ports, the higher the total managing cost of fishing ports for which government has to pay. For example, the government has to hire more inspectors to monitor in each port.

However, Taiwan is experiencing a declining birth rate. Furthermore, Taiwan's military conscription has stopped completely since 2018. Conscription is an important human resource in Taiwan's Coast Guard. Therefore, technology is the only road to the future.

Advantage of Artificial Intelligence

Artificial intelligence (AI), sometimes called machine intelligence, is intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans and other animals. Information engineering technology produces faster "AI Deep Learning".

High-profile examples of AI include playing games (such as Chess), search engines (such as Google search), online assistants (such as Siri), image recognition in photographs, speech recognition, object recognition, spam filtering, prediction of judicial decisions,²⁵⁴ and targeting online advertisements.²⁵⁵ The above-mentioned features of AI has decreased the need for human labor in fishery management and improve managerial effectiveness. It is the antidote to the expanding fisheries management workload in Taiwan for the Fisheries Agency and Coast Guard Administration.

The sections below propose and illustrate a creative idea named “AI Fishery Management System (iFish)”. Parts of the idea have been proposed to the Taiwan Fisheries Agency and Coast Guard Administration since 2012 and also proposed in the meeting of Task Force for Maritime Affairs, Executive Yuan of Taiwan, by the present author in 2017. In principle, they were adopted in 2017; the next steps are the government budget and assignment of people to carry it out.

The concept of iFish will be helpful for Taiwan and all other countries in the world.

10.2 Proposal: iFish System with iFish Card

Origin

The present author conceived of the idea of taking advantage of information technology to manage fisheries in 2011. Because each time the present author asked the Taiwanese government to do something to combat illegal fishing, the answers always included complaints regarding the lack of manpower. After experiencing these frustrations, the idea of

²⁵⁴ N. Aletras; D. Tsarapatsanis; D. Preotiuc-Pietro; V. Lampos (2016). "Predicting judicial decisions of the European Court of Human Rights: a Natural Language Processing perspective". PeerJ Computer Science. Archived from the original on 29 October 2016. <https://peerj.com/articles/cs-93/>

²⁵⁵ See https://en.wikipedia.org/wiki/Artificial_intelligence

creating an iFish System with an iFish Card for every fisherman matured in the present author's mind. And the iFish project became more specific and concrete through private discussions with Taiwan Coast Guard and Fisheries Agency officials. In order to make this iFish dream come true, the present author campaigned to amend the fishery regulations: The Trawl Fisheries Management Regulations. The objective is to simplify the legal constituent elements of illegal actions to make AI enforcement more feasible. The work of amending the laws will carry on with the development of information technology.

Content

The Taiwan Government needs to design an A.I. Fishery Management (iFish) IT system with an iFish smart card (iFish Card), containing AIS or other similar chips with GPS positioning functions. The iFish Card combines fishing boat track monitoring, crew information, and landing declaration accounts on the same chip card similar in size to a credit card.

The Government needs to set up an electronic gateway, Wi-Fi network equipment and AIS receiving station at fishing ports. When a fishing boat leaves port, the GPS system can send signals to notify the departure of the fishing boat and can also sense the iFish Card of each crew member to calculate the total number of people on board. In addition, computers automatically send the crew's information to the Fisheries Agency's cloud database. Crew information includes emergency contact information in the event of a shipwreck. The employment information of foreign fishers is best stored in the cloud system. The information about how many valid or expired fishery licenses each fishing boat has should also be fixed in the cloud system. When a fishing boat enters and exits a port, information of

the boat can be directly displayed on the computer screen of the Coast Guard Administration security checkpoint at the port.

The content above falls within the scope of Internet and information engineering. The core essence of AI is Deep Learning. With massive accumulated data of fishing boat tracks, fishing licenses, fishing grounds location, and no-take areas, effectively using the Deep Learning program can enable the computer to predict suspicious fishing activities and also automatically send warnings to captains on fishing boats, apart from reporting to the management staff of Fisheries Agency.

Taiwan History of Security Check Job at Fishing Ports

In Taiwan, during the era of martial law, when entering or leaving fishing ports, fishing boats need to be inspected and registered. On 15 July 1987, martial law was lifted and the job of security checks was transferred to the police. In January 2000, the Coast Guard Administration was created under the Executive Yuan, and the Administration Maritime Patrol Directorate General, which was originally part of the Ministry of Defense Coastal Patrol Command, took over the job of security checks. After the setup of the Ocean Affairs Council on 28 April 2018, security checks are implemented by inspection offices of the Coast Guard Administration different local branches.²⁵⁶

Inspection when entering and leaving the port is often criticized by the public as a way of disturbing the people. Therefore, since July 2012, the Coast Guard Administration started

²⁵⁶ See Wikipedia: The Coast Guard of Administration of Ocean Affairs Council
<https://zh.wikipedia.org/wiki/%E6%B5%B7%E6%B4%8B%E5%A7%94%E5%93%A1%E6%9C%83%E6%B5%B7%E5%B7%A1%E7%BD%B2>

implementing the policy of “express custom clearance”.²⁵⁷ To strengthen the safety of “express custom clearance”, the Coast Guard Administration announced the "Direction for Safe Preparation of Express Custom Clearance of Fishing Boats and Yachts" in 2014. The Direction’s basic principles are distinguishing good affairs from bad ones, cracking down illegal ones, protecting legal ones, and allowing fishing boats to enter and leave ports directly without inspection by coast patrol personnel.²⁵⁸

The security inspection by the Coast Guard Administration includes boats or other maritime transport vessels, types of fishing vessels, fishing gear, the record of fishing boat illegal activities, employed crewmen, the record of entering and leaving ports, and monitoring other potential illegal risks.⁶ The daily inspection mostly helps fishing boats register the number of times these boats have entered and left a port. This provides evidence for fishermen to apply to the Fisheries Agency for fishing vessel fuel subsidies. Some ports do not have safety inspection offices, and there may not be plans to set up one in the future. For the moment, fishermen have to call the designated safety inspection office of a nearby fishing port for processing the report and registration.

In the future, if these routine jobs can be done by a sensing iFish Card with an electronic gate to automatically record the number of times of entering and leaving a port, much coastal patrol manpower could be saved. Fishermen could view their entry and exit record through the Internet on their smart phones, rather than asking personnel of inspection offices. The Coast Guard Administration could focus human resources on places which AI

²⁵⁷ General Explanation of the Amendment of "Direction for Strengthening Safety Preparation of Express Custom Clearance of Fishing Boats and Yachts" of the Maritime Patrol Directorate General.

²⁵⁸ 2017, July 19, "Direction for Strengthening Safety Preparation of Express Custom Clearance of Fishing Boats and Yachts" of the Maritime Patrol Directorate General.

cannot monitor, such as observing whether fishing boats carry illegal immigrants or contraband.

Moreover, the Fisheries Agency will no longer need to devote manpower to monitoring computers. Fisheries management manpower could be saved by picking out fishing boats that require special attention through iFish's Deep Learning and the information stored in cloud database.

Digitization of Landing Declaration

The proportion of Taiwanese captains completing landing declarations is low, generally around 20% of all voyages. Information technology could increase the willingness of fishermen to submit landing declarations and reduce error rate of manual filling.

The Government has to utilize technology, setup smart scales that could automatically upload information to the cloud database of the Fisheries Agency, and widely install this scale in all ports and fishing wholesale markets. The small computer on a smart scale could sense iFish Card and read the ID information of fishermen. Therefore, when submitting their landing declaration, fishermen do not need to repeatedly write down basic information, such as the names of fishermen and their boats. In addition, a smart scale would directly upload catch type and weight to the cloud database of the Fisheries Agency via Wi-Fi or 4G networks. At any time, the captain of a fishing boat could check every landing declaration and print it out for the use of transaction.

In addition, ideally, a smart scale needs camera to scan and identify species of catch with the help of biometric software. Fishermen merely need to manually confirm or modify the data on the screen of a smart scale. The Fisheries Agency's first experimental version of smart scale has been tested at the Badouzi Fishing Port of Keelung since June 2018. There

will be many challenges in the future, especially how to install smart scales near remote and unprotected fishing ports without being blown away by typhoon or destroyed by sea winds. However, at least the iFish project has been gradually implemented, and the project is an important instrument for promoting sustainable seafood.

10.3 Conclusion

In fact, creating the iFish system and iFish Card is not difficult in terms of information technology. Creative ideas can be constantly generated with actual needs. What is truly difficult is humanity. First, the Taiwanese government must pay attention to marine fishery management and plan enough budget for at least ten years to comprehensively technologize fishery management throughout Taiwan. Second, most difficult is the willingness of Taiwanese fishermen to adopt the new technology.

Based on the present author's experience of participating in many fishery public hearings, Taiwanese fishermen strongly resist any policy of fishery management, including the installation of VMS or AIS. Fishermen hope that the installation would be paid for by the government. Even if these were installed by fishermen, they would shut down the VMS or AIS devices for various reasons. Therefore, promoting these technology management measures under political pressure requires joint efforts from different parts of society, including strong political determination and negotiation ability from the Government.

Chapter 11 To Establish A Marine Protected Area Network

In this era of severe depletion of marine fisheries resources, many Taiwanese Government officials understand that it is vital to restore marine ecology and marine fisheries resources as soon as possible. There are many opinions, strategies, and controversies on how to restore marine fisheries resources, including the establishment of marine protected areas, the release of juvenile fish, casting artificial reefs into the sea, and so on. Among them, the most uncontroversial is the establishment of marine protected areas. However, setting up a marine protected area is politically a mission impossible.

The website of the International Union for Conservation of Nature (IUCN), says that “One of the most effective means for protecting marine and coastal biodiversity is through the establishment and proper management of Marine Protected Areas (MPAs)”.²⁵⁹ However, the creation of marine protected areas often encounters violent protests by local fishermen and stakeholders, with nothing achieved. Therefore, this chapter sets out recommendations for a marine protected area plan with a higher success rate in Taiwan – starting with tiny, nanometer-sized marine protected areas. This proposal is suitable for countries which encounter a similar configuration.

11.1 Introduction: Marine Protected Area (MPA)

Defining Marine Protected Area?

A Marine Protected Area (MPA) is a protected area of seas, oceans, estuaries, or large lakes. They exist in a variety of legal forms and are established and managed by countries

²⁵⁹ IUCN. (2010, February 1). Marine Protected Areas – Why have them? Retrieved from <https://www.iucn.org/content/marine-protected-areas-%E2%80%93-why-have-them>

and all levels of local government in the world. There are marine sanctuaries, fisheries resource conservation areas, estuarine research reserves, ocean parks, marine wildlife refuges, and so on. Restrictions and penalties in these sites differ. However, all MPAs are supposed to be established to protect marine ecosystems, sustain fisheries production, or preserve cultural resources such as shipwrecks and archaeological sites.

There are often confusion and debates regarding the meaning of "marine protected area". Some insist that MPAs are areas closed to all human activities; some believe that all fisheries activities should be banned, usually called a "No-Take Zone" in MPAs, whereas others understand MPAs to be special areas set aside for recreation or commercial use, such as minor fisheries management areas.

MPAs are usually located in territorial waters and EEZs. Few MPAs are on the high seas. The law of the sea regulates these limits. The IUCN definition of a Marine Protected Area is:

"Any area of intertidal or sub-tidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environments".²⁶⁰

There is no definition of a Marine Protected Area in the Convention on Biological Diversity. However, a broader definition is contained in the "Convention on Biological Diversity COP 7 Decision VII/5: Marine and coastal biological diversity in 2004". The Ad Hoc Technical Expert Group adopted the following definition of "marine and coastal protected area", which incorporates all IUCN categories of protected areas:

"Marine and coastal protected area means any defined area within or adjacent to the marine environment, together with its overlying waters and associated flora,

²⁶⁰ Ibid.

fauna and historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and/or coastal biodiversity enjoys a higher level of protection than its surroundings".

"Any defined area within or adjacent to the marine environment, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and/or coastal biodiversity enjoys a higher level of protection than its surroundings".²⁶¹

Typical MPAs restrict fishing and oil/gas mining, and some restrict tourism and construction. Other restrictions limit the use of ultrasonic devices such as sonar, which may confuse the guidance system of cetaceans. Ship transportation may be restricted as a preventive measure to avoid direct disturbance to individual species. However, restrictions of fishing are always a core issue when establishing an MPA.

A no-take zone is essential to enable fish stocks to recover, especially when other parts of an MPA allow multiple uses of resources. No-take zones can cover an entire MPA or just specific portions. For example, the world's largest MPA within the territorial waters and EEZ of a single country is the Papahānaumokuākea Marine National Monument, originally established in 2006 by President George W. Bush and quadrupled its size from the original 139,797 square miles to 440,000 square miles (1,510,000 square kilometers) out to the 200-nautical-mile limit of the EEZ in August 2016 by President Obama, using his executive authority under the United States Antiquities Act (section 320301, Title 54, United States Code).²⁶² The no-take zone prohibits all commercial fishing.

²⁶¹ See <https://www.cbd.int/decision/cop/?id=7742>

²⁶² Office of the Press Secretary, the White House. (2016, August 26). Presidential Proclamation -- Papahānaumokuākea Marine National Monument Expansion. Retrieved from <https://www.whitehouse.gov/the-press-office/2016/08/26/presidential-proclamation-papahānaumokuākea-marine-national-monument>

Better Strategy to Establish MPAs: Marine Protected Area Network

Although it is wonderful to have an MPA which is three times the size of California, not every country creates one each year. However, another recommended strategy is available to achieve similar marine protection effects – to establish a “Marine Protected Area Network”.

The IUCN defines an MPA network as:

"An MPA network can be defined as a collection of individual MPAs or reserves operating cooperatively and synergistically, at various spatial scales, and with a range of protection levels that are designed to meet objectives that a single reserve cannot achieve".²⁶³

Based on the present author’s environmental campaign experience in Taiwan and the MPA network theory, proposals are made in Chapter 11.3 to form an “MPA Network of No-Take Zones Within One Nautical mile and Net-Free Within Three Nautical miles”.

International efforts

Antarctic Treaty System: World Largest MPA in Ross Sea

On 7 April 1982, the Convention on the Conservation of Antarctic Marine Living Resources (CAMLR Convention) came into force after discussions began in 1975 between parties to the then-current Antarctic Treaty to limit large-scale exploitation of krill by commercial fisheries. It also established a commission of the original signatories and acceding parties called the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) to improve the protection, scientific study, and rational use of those marine resources.

²⁶³ IUCN World Commission on Protected Area (IUCN-WCPA). (2008). Establishing Marine Protected Area Networks – Making It Happen, p.11. Retrieved from https://cmsdata.iucn.org/downloads/mpanetworksmakingithappen_en.pdf

On 27 October 2016 CCAMLR approved the creation of the world’s largest Marine Protected Area, which is larger than the Papahānaumokuākea Marine National Monument and the first MPA in international waters in Antarctica’s Ross Sea. Based on a proposal co-sponsored by the United States and New Zealand, the Ross Sea MPA will safeguard 1.55 million square kilometers (598,000 square miles) – an area nearly twice the size of the state of Texas – as one of the last unspoiled ocean wilderness areas on the planet.

It is a historically significant achievement that all member countries, including Russia and China, agreed to a joint USA/New Zealand proposal to establish a new giant MPA coming into force in December 2017. Seventy-two percent of this MPA is a “no-take” zone; the agreement will be in force for 35 years, until 2052, forbidding all fishing, whereas other sections will permit harvesting of fish and krill for scientific research.²⁶⁴

Convention on Biological Diversity (CBD): Aichi Biodiversity Targets

The Convention on Biological Diversity (CBD), known as the Biodiversity Convention, is a multilateral treaty opened for signature at the Earth Summit in Rio de Janeiro on 5 June 1992; it entered into force on 29 December 1993. At the 2010 10th Conference of Parties (COP) to the Convention on Biological Diversity in October in Nagoya, Aichi Prefecture, Japan, COP 10 Decision X/2 “Strategic Plan for Biodiversity 2011-2020”, including twenty Aichi Biodiversity Targets, was adopted. This Plan provides an overarching framework on biodiversity, not only for the biodiversity-related conventions, but for the entire United

²⁶⁴ See <https://www.ccamlr.org/en/news/2016/ccamlr-create-worlds-largest-marine-protected-area> and <https://www.state.gov/e/oes/ocns/opa/ross/index.htm>

Nations system and all other partners engaged in biodiversity management and policy development.²⁶⁵

Under the Strategic Goal C: “To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity”, Target 11²⁶⁶ says:

“By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes”.

The Secretariat of the CBD published “Global Biodiversity Outlook 4, A mid-term assessment of progress towards the implementation of the Strategic Plan for Biodiversity 2011-2020” when in COP 12 in 2014. Most progress is slow; some extrapolations suggest the Aichi targets will not be met by 2020, and some situations get worse.²⁶⁷ For example, Target 10 says:

“By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning”.

However, in *Global Biodiversity Outlook 4*, the assessment was that “Pressures such as land-based pollution, uncontrolled tourism still increasing, although new marine protected areas may ease overfishing in some reef regions”.

Better news is heard with respect to Target 11: “Marine protected areas are accelerating but extrapolations suggest we are not on track to meet the target. With existing commitments,

²⁶⁵ See <https://www.cbd.int/decision/cop/?id=12268> and <https://www.cbd.int/sp/>

²⁶⁶ See <https://www.cbd.int/sp/targets/>

²⁶⁷ Convention on Biological Diversity. (2014). *Global Biodiversity Outlook 4*, p.18-22. Retrieved from <https://www.cbd.int/gbo/gbo4/publication/gbo4-en-hr.pdf>

the target would be met for territorial waters but not for exclusive economic zones or high seas”.

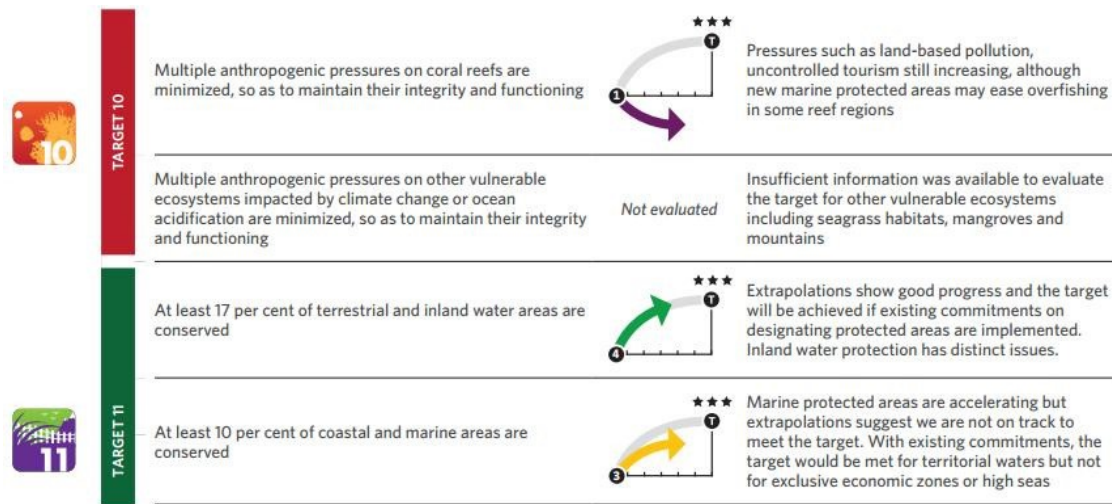


Figure 32: Targets 10 and 11 of Aichi Biodiversity Targets

11.2 Review of Marine Protected Areas Status in Taiwan

Quantities of Marine Protected Areas in Taiwan

Taiwan is an island State surrounded by sea. In theory, the Taiwan Government and its people should have been cherishing the ocean and its resources. However, in reality, judging from the established quantity and area of the “No-Take Zone”, this is not the case. So far, the Fisheries Act is concerned, although the Taiwan Government has established many MAPs, the locations of a comprehensive ban on catching marine organisms are few. The area of inland waters and territorial waters from Taiwan Island and its offshore islands is 48,359 square kilometers. The No-take Zone consists of 17.61 square kilometers, which is tantamount to 0.036% of ocean area and is far less than 1%.

What is worse is that if one delves deeply into MAPs, including discussions with local citizens who live around the No-take Zone, in order to understand the government decision to crack down on illegal fishing and the issuance of tickets, one will discover that there is scope for improvement in Taiwan. For example. Although it is forbidden to fish in the national parks in Taiwan, people who violated the law would not be fined for a long time.

As for the number of laws regarding MAPs, the Taiwan Government moves at its own pace, following international regulations. Taiwan does not want to fall behind, even though Taiwan faces diplomatic dilemmas because of China’s hostility, which makes Taiwan unable to join the United Nations or become a party to many conventions. They are listed as follows:

Table 12: List of No-take Zones of Marine Protected Areas in Taiwan

	Name of the No-take Zone in Marine Protected Areas in Taiwan	Area (Square km)
1	Keelung city – Wanghaisiang Chaojing bay resource conservation zone	0.15
2	Changhua County – Shengang mud shrimp propagation and conservation zone	0.36
3	Changhua County –Shengang mud shrimp second propagation and conservation zone	0.20
4	Changhua County – Wangung mud shrimp propagation and conservation zone	0.41
5	Pingtung County –Liuqiu Island fisheries resource conservation area and intertidal zone of conservation and demonstration.	3.67
6	Taitung County – Green Island fisheries resource conservation area, Chaikou subarea and ShihLang sub area.	5.77
7	Taitung County – Fushan Fisheries Resource conservation zone	0.28
8	Pingtung County – National Museum of Marine Biology and Aquarium Resource Cultivation Zone	6.77
		17.61 in total

The following table lists international conventions which have been integrated into the domestic law of Taiwan and compares International Conventions and Taiwan domestic legalization. These international legal documents provided the Taiwan Government with legal references for establishing MAPs. Aside from this, there are domestic laws which provide important references for establishing MAPs.

Table 13: Comparison of International Conventions and Taiwan Domestic Legalization

International Convention	Taiwan Domestic Law
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	Wildlife Conservation Act
Convention on Biological Diversity (CBD)	No corresponding domestic law. In 1994, the Executive Yuan established a task force of policy guidance regarding global changes and designated the Council of Agriculture to be in charge of the conservation tasks regarding “Biological Diversity”. On 22 August 2001, the Executive Yuan passed “Biodiversity Promotion Plan in the 2747 th meeting resolution.
International Convention for the Prevention of Pollution from Ships (MARPOL)	Marine Pollution Control Act
United Nations Convention on the Law of the Sea (UNCLOS)	1. Law on Territorial Sea and the Contiguous Zone of the Republic of China 2. Law on Exclusive Economic Zone and Continental Shelf of the Republic of China
Convention Concerning the Protection of the World Cultural and Natural Heritage	Article 6, National Park Law
Convention on the Protection of Underwater Cultural	Underwater Cultural Heritage Conservation Law

After the above international conventions were domestically legalized in Taiwan, the table below is the classified law which the Taiwan Government can utilize to plan and establish MAPs:

Table 14: Laws utilized by Taiwan Government to establish MAPs

	Name of Law	Article No.	Name and terminology for MAP used in Article
1	Fisheries Act	§44	No proper noun delineates the “marine protected areas”. In administrative practicality “fishing forbidden zone” is mostly used to dub the “No-take zone” within MAPs. It is suggested that “fishing limited zone” be added to the Fisheries Act in order to differentiate “limitation” and “forbidding” in the description of “the limitation or forbidding of the fishing area and fishing season”.
		§45	Aquatic organisms propagation and conservation zone
2	Wildlife Conservation Act	§8	National Principal Authority announces “Major Wildlife Habitats”
		§10	According to the area “Major Wildlife Habitats” announced by National Principal Authority, local authority may establish Wildlife Refuges for Major Wildlife Habitats.
3	National Park Law	§12	<ol style="list-style-type: none"> 1. Existing use area 2. Recreation area 3. Cultural/historic area 4. Scenic area 5. Ecological protected area
4	Act for the Development of Tourism	§10	Designated Scenic Spots
		§19	Ecological and Cultural Environment Reserves
5	Cultural Heritage Preservation Act	§78	Natural reserves, Geological parks

Of the laws mentioned above, the Fisheries Act is used most often. The provisions that were used to establish the marine conservation area and conserve the marine environment are primarily Articles 44, 45, and 48, as follows:

A. Article 44 in Fisheries Law:

For the purposes of resources management and fisheries structure adjustment, the competent authority may promulgate regulations on the following matters:

- (1) Restriction or prohibition of the catching, harvesting, or processing of aquatic organisms.*
- (2) Restriction or prohibition of the sale or possession of aquatic organisms or the products made therefrom.*

Note from author: for penal provisions of subparagraph (1) and (2), Article 60 of the Fisheries Law provides that they “*shall be subject to imprisonment for a period of not exceeding five years, short-term imprisonment, or in addition thereto a fine of not exceeding one hundred and fifty thousand New Taiwan Dollars*”.

- (1) Restriction or prohibition of the use of fishing gears and fishing methods.*

Note from author: for penal provisions of subparagraph (3), it is stipulated in Article 61 of the Fisheries Law that they “*shall be subject to imprisonment not exceeding six months, short-term imprisonment, or in lieu thereof or in addition thereto a criminal fine of not exceeding thirty thousand New Taiwan Dollars*”.

- (2) Restriction or prohibition of fishing area and fishing season.*
- (3) Restriction or removal of any object obstructing the migratory routes of aquatic animals.*
- (4) Restriction or prohibition of placing or dumping of objects harmful to aquatic organisms.*
- (5) Restriction or prohibition of placing or removal of protective objects necessary for the propagation of aquatic organisms.*
- (6) Restriction or prohibition of transplantation of aquatic organisms.*
- (7) Other matters as deemed necessary.*

Note from author: for penal provisions of subparagraph (4) to (9) of Article 44, paragraph 1, it is stipulated in Article 65 of the Fisheries Law that they “*shall be liable to a fine of between thirty thousand and one hundred and fifty thousand New Taiwan Dollars*”.

Any fisheries operator violating any provisions of subparagraph 4 to 9 of the preceding paragraph, shall be imposed with administrative disposition by the authority that made the promulgation.

The municipal or county (city) competent authorities shall report to the central competent authority for approval prior to any promulgation pursuant to the provisions of paragraph 1.

B. Article 45 of Fisheries Act:

“For the purposes of conserving aquatic resources, the competent authority may designate and establish on aquatic organisms propagation and conservation zone”.

Note from author: there are no penal provisions in Article 45 of Fisheries Law, which means that anyone who violates the law by catching fish in the “aquatic organisms propagation and conservation zone” will not be prosecuted. Therefore, if the local government uses this Article to establish MPAs, there will be no legal protection for the conservation zone. As a result, it is suggested that if this Article is to be used, Article 44 of Fisheries Law shall be used also as complementary law, or Article 44 of the Fisheries Law should be used instead to establish MAPs.

C. Article 48 of Fisheries Law:

“Aquatic organisms shall not be caught or harvested by the use of:

- (1) toxic substances.*
- (2) explosives or other dynamites*
- (3) electricity or other narcotics”.*

Note from author: for penal provisions of Article 44, it is stipulated in subparagraph 1 of Article 60 of the Fisheries Law that they “shall be subject to imprisonment for a period of not exceeding five years, short-term imprisonment, or in addition thereto a fine of not exceeding one hundred and fifty thousand New Taiwan Dollars”.

Punishing Concurrence of Articles

Some laws and regulations in Taiwan contain provisions to conserve marine ecology and establish MPAs. However, when illegal fishing has occurred, it has often become a conundrum for administrative departments to decide which Article to use. When it comes to “administrative penalty”, the logic of the administrative units in Taiwan makes them think that whoever makes the decision takes full responsibility of maintaining MPAs. A classic case occurred in South Penghu Marine National Park in November 2017. Wang’an Township of Penghu County has four major islands, which are Dongjiyu, Xijiyu, Dongyupingyu, and Xiyupingyu. They are collectively called the “Southern Four islands”.²⁶⁸ This used to be a sea area with abundant marine resources. The fisheries resources gradually depleted, just as most sea areas around Taiwan. In 2010, the Marine National Park Headquarters of the Construction and Planning Agency, Ministry of the Interior established the “South Penghu Marine National Park”. On 8 June 2014, which was World Oceans Day, it was officially announced that this marine national park would aim to “conserve marine ecology” as their goal. This was Taiwan’s second marine type national park, and also the ninth national park in Taiwan.

Before this marine national park was officially established, a “bottom gill net no-take zone” was established in 2013, using the Fisheries Law; the zone was located around the islands of Dongyupingyu, and Xiyupingyu that happened to be a small part of the subsequent “South Penghu Marine National Park”. This is an MPA in the broad sense, which has a mini

²⁶⁸ See

<https://www.marine.gov.tw/%E9%97%9C%E6%96%BC%E6%88%91%E5%80%91/%E7%B6%93%E7%87%9F%E7%AE%A1%E7%90%86/%E6%BE%8E%E6%B9%96%E5%8D%97%E6%96%B9%E5%9B%9B%E5%B3%B6%E5%9C%8B%E5%AE%B6%E5%85%AC%E5%9C%92/1412-%E8%A8%88%E7%95%AB%E4%BD%BF%E7%94%A8%E5%88%E5%8D%80%E5%9C%96>

no-take zone with an area of 0.7094 square kilometers.²⁶⁹ The original intent of the Agriculture and Fisheries Bureau of Penghu County was to encourage fishermen to gradually adapt to the comprehensive fishing ban in the National Park Law. However, this law was not enforced thoroughly. Cases of illegal fishing occurred from time to time.

In October 2014, “South Penghu Marine National Park” officially started operating. There was a task force of marine conservation police, which only had three people then. The leader of the police task force was the renowned Mr. Hsiao Tsai-Chuan, part of marine conservation circles in Taiwan, and dubbed “Cape Police Sergeant” by the media. After Sergeant Hsiao took over his position, he started to enforce the law rigorously, day and night, following the Fisheries Act within the mini MPA established by the Agriculture and Fisheries Bureau of Penghu County. By cracking down on fishermen who violated the law, he had both gained support from conservationists and opposition from fishermen. The tickets issued according to the National Park Law were not processed by the Marine National Park Headquarters of the Ministry of the Interior.

From 2016, Sergeant Hsiao began to feel that this conservation zone is too small to protect the marine environment. He felt that the scale of law enforcement might be larger. That is to say, the scale of issuing the tickets could be greater. Therefore, he suggested to the Marine National Park Headquarters that the “No-take zone” of issuing the tickets should also cover the East and West Corridor. After all, it was originally stipulated that fishing in the entire marine national park is forbidden. The East and West Corridors were part of a “Scenic Area” under the national park plan. According to the National Park Law, even fishing rods

²⁶⁹ On 20 February 2013, based on the No. 10200050962 document of agriculture and fisheries, Penghu County government announced the limitations of fishing forbidden area around the sea area of Dongjiyu, Xijiyu, Dongyupingyu, and Xiyupingyu. This announcement became effective on 1 August 2013.

were prohibited. However, the competent authority of the marine national park rejected the suggestion from Sergeant Hsiao.

As a result, a group of marine conservationists from Penghu County made an appeal to the central government and asked that the East and West Corridors be publicly declared as “No-take zones”. The central government held a public hearing in Penghu on 3 November 2017. A fierce debate broke out between the supporters of marine conservation and the fishermen from the opposition side. No results or outcomes were achieved during the meeting.

In the meantime, within the central government a debate broke out between the governmental departments regarding enforcement of the law: the Marine National Park Headquarters under the Ministry of the Interior and the Council of Agriculture that manages fisheries. The debate was about which articles and which law should be used to crack down on illegal fishing in the National Parks. The debate was whether to use the National Park Law or the Fisheries Act to expand the “No-take Zone”.

Marine conservationists in favor of the Fisheries Act proclaimed, “the provisional penalty of Fisheries Act is more severe”. The maximum fine for illegal fishing is three thousand New Taiwan Dollars, whereas the minimum fine for this is at least above thirty thousand New Taiwan Dollars. Obviously, lawbreakers may be deterred more by the Fisheries Act.

The National Park Headquarters of the Ministry of the Interior also favored this action. First, they believe it would be more difficult to amend the National Park Law and make the provisional penalty more severe. Therefore, one might as well choose to use the existing provisional penalty in the Fisheries Act, which is easier. Second, it is their opinion that when both the National Park Law and Fisheries Act were violated by illegal fishing, one should

choose the provisional penalty from the Fisheries Act because the last is more severe, according to Articles 24 and 26 of the “Administrative Penalty Act”.

Administrative Penalty Act

Article 24:

“If one and single act constitutes the breach of several different duties under administrative law and is punishable by a fine, it shall be punished with the highest amount of fine prescribed by law; provided, however, that the amount imposed shall be no less than the lowest amount among all minimum fines specified with respect to breach of such duties”.

Article 26:

“If one and single act constitutes simultaneously a criminal offense or offenses as well as a breach of duty under administrative law, it shall be punishable under the criminal law”.

Within the sea area of the marine national park, fishing with the use of electricity happened from time to time. The penalty of Fisheries Act is more severe than that of the National Park Law. Therefore, the managers of national parks thought that the Agriculture and Fisheries Bureau of Penghu County should expand the forbidden fishing zone and issue tickets to violators.

However, the Fisheries Agency and the present author hold different legal opinions regarding this matter. In the present author’s view, applying the principles of Punishing Concurrence of Articles, following the National Park Law, the National Park Headquarters of the Ministry of the Interior should take the full responsibility for the promotion, planning, and execution of law enforcement (ticket issuing included) of the forbidden fishing zone within the East and West Corridors. The reasons are as follows:

1. Regarding the Legal Procedure

When illegal fishing involves the criminal law, the courts should determine which law is more appropriate rather than letting administrative authority judge. For example, the criminal penalty of violating the electro-take ban in the Fisheries Act is more severe than that of National Park Law. The National Park Headquarters should hand in all evidence of perpetrators violating which laws and regulations to the judicial authority to investigate, instead of allowing the administrative authorities to choose Articles from Fisheries Act and then hand over to the judicial authority.

2. Regarding the Substantive Laws

A. New Laws Take Precedence Over Old Laws

According to Article 17 of the Central Regulation Standard Act,

“Where the regulation stipulated one object to apply or shall apply mutatis mutandis for other regulation, such other regulation shall govern even such other regulation has been amended”.

This article, in legal theory, refers to the principle of the “law latest in time governs”. This means that when referring to the same case, if two laws or regulations of the same level stipulating different things, the law or regulation latest in time should govern. That is to say, the most recent regulation should be chosen and applied to the case.

In the case of “Southern Four Islands”, the establishment date of the national park was later than the establishment date of the fishing prohibited zone by the Fisheries Act. Therefore, in the present author’s view, the National Park Law should govern illegal fishing in this case.

B. Special Laws Have Precedence Over General Laws

According to Article 16 of the Central Regulation Standard Act,

“While a regulation stipulated otherwise for the same object from other regulations, the regulation shall govern, notwithstanding other regulations have been amended and the regulation remained as it was”.

According to the opinion of the second meeting of the Administrative Penalty Act advisory group of Ministry of Justice on 4 August 2005, it was pointed out that “when one action violated more than two laws or regulations, and a relationship of special laws and general laws also existed between the laws or regulations, special laws should govern and be used”. The “constituent elements of crimes determined by special regulations must cover the constituent elements of crimes determined by general regulations”.

In addition, on 25 October 2013, the Ministry of Justice pointed out in the No. 10203511720 of the advisory opinion on the regulation that when encountering the problem of concurrent articles, the priority of dealing with them follows the principle of *lex specialis*, “special laws take precedence over general laws”. Regarding the priority of which laws apply to the case, the aforementioned principle overrides the principle of “choosing the article which has a more severe provisional penalty to penalize the offender”.

The present author is of the view that regarding the Southern Four Islands, the possibility of using this legal principle is relevant. That is to say, the National Park Law is a special law, whereas the Fisheries Act is a general law.

According to second meeting minutes of the Administrative Penalty Act advisory group of Ministry of Justice on 4 August 2005, the following was discussed:

How does one judge the relationship between a “special law” and “general law”? What is the standard of judgment? Is the comparison Law by Law, Act by Act, or is it judged as an individual case, with the scope of its goals, parties being judged?

During the meeting, several legal experts thought that it should be judged as an individual case rather than making the comparison by Laws or Acts.

The present author believes the standards should be making judgments as an individual case. If a comparison is made between the Fisheries Act and National Park Law, there may not exist a relationship of special law and general law. However, as far as the case of “conserving the marine ecology of the East and West Corridors” is concerned, one should regard the National Park Law as a special law. This is because that, according to the Fisheries Act, after the forbidden fishing zone is established, the competent authority has no legal obligation to propose a management plan and scheduled comprehensive inspection. The forbidden fishing zone only prohibits the use of the bottom gill net.

Aside from forbidding all kinds of fishing in the established MPAs based on the National Park Law, other actions are banned, such as polluting the water or littering. Moreover, after the initial announcement of the creation of national parks, management plans have to be inspected every five years and contingency measures provided. For example, such measures as: the establishment of the managerial center of the conservation zone and the marine conservation police force. Namely, in the overall design of the law, the purpose of the National Park Law is to conserve the ecology and provide better protective measures than the Fisheries Act.

The table below summarizes the concurrence of articles between the Fisheries Act and the National Park Law:

Table 15: Concurrence of Articles of the Fisheries Act and the National Park Law

Patterns of violating the law		Concurrence of Articles	
Illegal fishing within the fishing forbidden zone	Articles	Article 44 Subparagraph 1 in Fisheries Act	Article 13 Paragraph 2 in National Park Law
	Provisional penalty	Article 65: “shall be liable to a fine of between thirty thousand and one hundred and fifty thousand New Taiwan Dollars.”	Article 25: Anyone violates the law “shall be punished with a fine of not more than 5,000 TWD, or if the circumstances of the offense are so intense as to cause serious damage to the environment, he or she shall be punished with imprisonment of not more than one year, or with a fine of not more than 5,000 TWD.”
Using destructive methods to catch fish	Articles	Article 48 in Fisheries Act, Fish-catching by using toxic substances, electricity, or explosives.	There is not a law stipulated in the National Park Law regarding the case of using toxic substances, electricity, or explosives. Article 19 of Wildlife Conservation Act is often referred to: Hunting shall not be undertaken by the following methods: 1. Use of dynamite or explosives; 2. Use of poisons; 3. Use of electricity.
	Provisional penalty	Article 60 Paragraph 1 One “shall be subject to imprisonment for a period of not exceeding five years, short-term imprisonment, or in addition thereto a fine of not exceeding one hundred and fifty thousand New Taiwan Dollars.”	Article 41 Paragraph 3 The offenses “shall be punished with imprisonment for not less than six months and not more than five years, and/or a fine of not less than NT\$200,000 and not more than NT\$1,000,000.”

Therefore, focusing on the goal of “conserving certain sea areas”, the National Park Law can be viewed as a special law, and the Fisheries Act as a general law. If one is to limit fishing and penalize the illegal fishing, the National Park Law governs over the Fisheries Act.

Conclusion

The laws used to establish MPAs are sufficient. Problems lie in whether citizens are law-abiding and the determination of the government to promote the MPAs and law enforcement. The Taiwan Government should introduce the following legal improvements while planning the establishment of MPAs in the future:

1. the National Park Act should be amended to make the provisional penalty more severe. The Ministry of the Interior should increase its involvement in marine conservation.
2. in order to keep the competing shirking of duties within governmental authorities from happening repeatedly, in the future, the use of different laws to double establish MPAs in the same sea area in Taiwan should be avoided.
3. as for the sea area of “No-take Zones” not yet been established, it is suggested that the Fisheries Act be used as the priority law. The Fisheries Agency should be elevated to the “Ministry of Oceans and Fisheries” in the governmental organization of Taiwan. This will give the central competent authority in charge of Fisheries more power for law enforcement. Further details are discussed in Chapter 13.

11.3 Proposal: Creating an MPA Network

No-Take Zone within One Nautical Mile and Net-Free Zone within Three Nautical Miles

There are not enough MPAs of No-take Zone in Taiwan currently. The Fisheries Agency of the Council of Agriculture, and Ocean Affairs Council newly established, and Marine National Park Headquarters of the Ministry of the Interior all have no comprehensive plans regarding how to establish a Marine Protection Area for the upcoming ten years. In the present author's view, this lack of planning means an inability to protect the marine ecology in Taiwan and to build a sustainable fisheries industry and marine tourism.

In order to effectively restore the marine ecological functions of the offshore sea around Taiwan, maintain and protect fisheries resources; it is critical to imbue a new vitality into the fisheries-related economy. This can be achieved by establishing plans to build an MPA network, restoring the ecology of coral reefs, promoting the marine leisure industry and scuba diving tourism. All these actions can diversify the marine related industry and permit the personnel involved with marine and fisheries industry have more job opportunities in different seasons. A proposal is elaborated below regarding plans to establish an MPA called: "No-take zone within one nautical mile and Net-free zone within three nautical miles".

The area of Taiwan territorial waters is about 60,000 square kilometers.²⁷⁰ The Taiwan Government should undertake to achieve the following three parts within ten years:

²⁷⁰ Sea area referential data: Internal water A + territorial waters B + restricted waters D = 59229

Brief Overview

Part One: Establishing Micro MPAs

1. To establish a total of 60 “No-take zones within one nautical mile”, with a total area of 60 square kilometers of comprehensive forbidden fishing;
2. Within each forbidden fishing zone, that is, no-take zone, a marine patrol unit will be established. A total of 60 units will be deployed.

Part Two: Connecting Micro MPAs to be a Network

Taking advantage of the three marine corridors as the basic structure of an MPA network, all sorts of marine ecology will be covered. There are three important marine current around Taiwan: China Coastal Current, South China Sea Current, and Kuroshio Current. The three ocean currents can be three marine corridors.

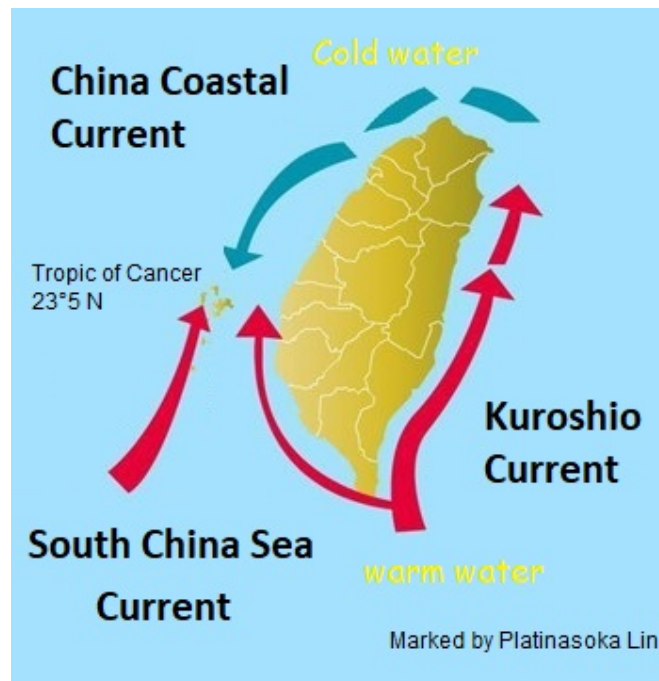


Figure 33: Three Ocean Currents around Taiwan

For each marine corridor, at least seven MPAs are expected to be established. All of them are assumed to be a “No-take zone within one nautical mile and Net-free zone within three nautical miles”.

Part Three: In coordination with an MPA, sustainable seafood can be developed

The Taiwan Government is to guide 1,000 boats that operate in fishing grounds outside a “no-take zone within one nautical mile” and invite fishermen to enroll in fisheries improvement plans for sustainable seafood ecolabels, to enable them to obtain ecolabels, and to promote those fish catches to be sold in domestic retail channels. The plan would expect all fishermen enrolled in to achieve an annual income of one million TWD.



Figure 34: Marine Protection Area of “No-take zone within one nautical mile and Net-free zone within three nautical miles” and related fishing grounds.

Detailed Explanation

Micro MPA

Compared with large-scale MPAs with an area up to 100,000 square kilometers from advanced nations, a protective strategy in politically difficult society or local areas is proposed of a “no-take zone within one nautical mile”. Thus, within three nautical miles from shore, the Taiwan Government should prioritize marine ecological areas and choose small areas such as river estuaries and coral reef areas. The Government should encourage local populations and fishermen to achieve a consensus on marine conservation. After that, the central government could publicly announce MPAs and subsidize the costs of local patrol units.

MPA Network

Many marine organisms float during the egg and larvae stages. They drift with the sea currents and disperse. Thus, it is suggested that the Taiwan Government form an MPA along the migratory path of marine organisms to form a marine corridor.

Different marine habitats need to be an MPA in order to protect all kinds of marine organisms. When these organisms drift to different habitats, the MPAs provide them sanctuary and allow them to propagate and grow. By establishing a series of MPAs within marine corridors, the possibility of the prevention of extinction of the species is enhanced. When the population of a single species in the MPA is reduced or threatened by natural or human disasters, there is a chance that the population can be supplemented from an adjacent MPA in the network. This will save the species from extinction, and its population can be restored gradually. Moreover, marine organisms will experience many different marine ecological systems or habitats during their life cycles.

Therefore, a best marine corridor should encompass all kinds of marine ecological systems and habitats. If conditions are limited, coral reefs shall be the top priority because coral reefs are the most suitable marine habitats for scuba diving tourism and ecological tourism. The mangrove, kelp beds, lagoons, algae reefs are habitats with clear water quality and have potential for developing tourism. Sedimentation seashore areas at the western coast of Taiwan Island, which contains the largest MPA, is not suitable for scuba diving tourism, but has many unique marine organisms. They all need legislative protection pursuant to the precautionary principle before these habitats are severely damaged.

From the perspective of marine geologists in Taiwan, the Island of Taiwan is mainly influenced by three sea currents: the cold China Coastal Current moving southward along the shores of China; the warm South China Sea Current moving northward from the South China Sea; and the warm Kuroshio Current moving from the equator of the Pacific Ocean northward. These three currents and marine geological features formed an invisible boundary from the northeast towards the southwest, dividing the types and distribution of marine organisms into tropical and subtropical geographical areas. The northern fish species obviously differ from those in the southern parts.

The present author suggests the three marine corridors as below:

1. Northern Corridor: China Coastal Current alongside China – the Northern Three Islands, Yehliu, and Jibei islands north of the Penghu islands.
2. Southern Corridor: South China sea current – Itu Aba Island among the Spratly Islands of the South China Sea, Pratas Islands, Southern Four Islands of Penghu, and Chimei Island. Tributary of Kuroshio current – Liuqiu Island, Kenting, Southwestern parts of Taiwan island, and others.

3. Kuroshio Current Corridor: Kuroshio current – Kenting, Orchid Island, Green Island, Hualien, and Kueishan Island, and others.

How does the Taiwan Government reach 60 MPAs where “no-take zones within one nautical mile”, with a total area of 60 square kilometers of comprehensive forbidden fishing zone? The following should be considered:

1. proactively expanding the current comprehensive forbidden fishing zones and artificial reefs forbidden fishing zones.
2. upgrade the 28 fisheries resource protection areas currently under the Fisheries Agency.
3. local important sea areas where residents have made efforts for a while:
 - (1)the East and West Corridors of Southern Four Islands of Penghu, which are 12 square kilometers;
 - (2)the sea areas along the seashore of old Liuqiu fishing port stretching for one kilometer, and 300 meters seaward;
 - (3)sea area of Chimei port.
4. upgrade the gill net forbidden zones into comprehensive no-fishing zones;
5. estuaries of rivers, coral reefs, rock areas, and Northern Three Islands, and others.

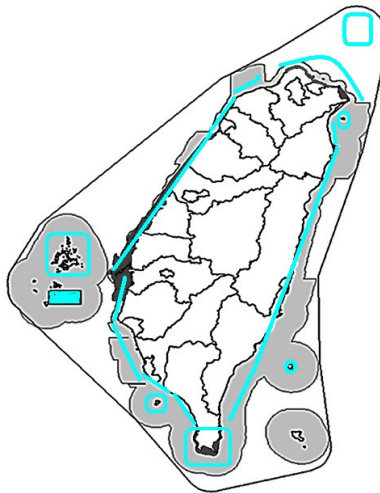


Figure 35: Schematic Diagram of Marine Protection Area Network of Taiwan

Joining Ecolabel Scheme

Regarding the detailed development of sustainable seafood, one can refer above to Chapter 2, Chapter 3, and Chapter 12. In the present Chapter 11, the situation will be considered when a sea area is being chosen for an MPA and an effort is needed to persuade fishermen to support MPAs by convincing them that protecting the marine environment can bring them better incomes. In order to achieve a win-win situation, the government should give special guidance of conferring a “sustainable seafood eco-label” to fishermen affected by the establishment of an MPA.

Therefore, a series of suggestions are proposed that are based on the goal of progressively introducing the ecolabel in ProFish.

Phase 1: Scheduled Planning

In coordination with the ten-year period for establishing a no-take zone, the following three phases can be identified: planning, promotion, and marketing.

Phase 1: four years

Fishermen:

1. the iFish System suggested in Chapter 10 needs to be installed on fishing boats;
2. fishing boats over ten tons need to execute landing declarations and a high percentage of 100% needs to be reached;
3. properly patrol the MPAs.

Government:

1. the government asks that all paper work be substituted with cloud technology, and gradually let non-governmental organizations, aside from the Fishermen’s Association, implement the tasks of weighing and collecting the landing declaration;

2. establish and promote fish catch transactions in conjunction with the uniform invoice to establish a Sale Notes system for the landing declaration;
3. establish a quasi-governmental-based “sustainable seafood ecolabel” scheme;
4. invest in scientific marine research;
5. work with retail channels to promote seafood from the outside area of MPAs that meet the progressive stage standards for the sustainable seafood ecolabel.

Phase 2: three years

Fishermen:

1. aside from elevating the ratio of the fishing boat landing declaration to be 100%, all fishing boat landing declarations need be enforced with respect to their accuracy;
2. properly execute the obligation of patrolling the MPA.

Government:

1. strengthening the accuracy of landing declarations by doing spot checks;
2. continue to give guidance to more fishing boats that wish to participate in the “sustainable seafood ecolabel” project of MPAs;
3. promote the idea of sustainable seafood to consumers;
4. planning the next step of fisheries management policy regarding the improvement of MPAs should be based on marine scientific research;
5. obtain market transaction prices and real output value of products.

Phase 3: three years

Fishermen:

1. adding fishing vessels of less than 10 tons to filing landing declarations;
2. properly patrol MPAs.

Government:

1. continue to execute landing declarations and gradually reduce the rights to do landing declarations in ports which have too low a landing declaration ratio;
2. investigate economic figures of managing marine ecology costs, the increased and decreased value of aqua products, and increase and decrease of fishermen income, and so on;
3. enforcing the auditing and certification of the sustainable seafood ecolabel products;
4. actively promoting seafood ecolabel products in various domestic chain supermarkets, organic food stores, and restaurants, and others.

Question: what is the referential basis of setting the goal of annual income of a fisherman to reach one million TWD (roughly 33,000 USD)?

Answer: Because there are few verified fish catch transactions available, the tax payment for fishermen is nearly non-existent. Therefore, the Taiwan Government has no accurate figures of fisheries economics. The present author interviewed the captain and obtained oral accounts of their long-term observation of fishermen, a conclusion of the annual income target to be set at one million TWD was determined.

There are two referential anecdotes for the target income estimated:

Referential Story One: Southern Four Islands of Penghu

A family of five local people located in the Southern Four Islands of Penghu makes a living by long line fishing. Before the establishment of the Southern Four Islands Marine National Park of Penghu, the annual income of this family was three million TWD, which means that a person earns 600,000 TWD annually, 50,000 TWD if converted to monthly income. After Captain Hsiao Tsai-Chuan took over the job of National Park Patrol Unit, he

cracked down on such illegal fishing activities as bottom gill nets and fishing with the use of electricity. The numbers of fish increased. As of now, that family earns an annual income of six million TWD, and each person has an income of 1.2 million TWD.

Referential Story Two: Liuqiu in Pingtung

In February 2013, a “net-free zone within three nautical miles” was introduced in Liuqiu. After half a year, fishermen started to notice that the fish catch increased.

Between mid-October to March of the next year is the major fishing season of Liuqiu. According to the managing director of Liuqiu Fishermen’s Association, the fish catch of red bulleyes (*Priacanthus macracanthus*) in that year increased considerably. Not only did the long line fish catch of *Atrobuca nibe*, rosy seabass (*Doederleinia berycoides*), and red seabream (*Dentex tumifrons*) increase, but also the angling gear fish catch of largehead hairtail (*Trichiurus lepturus*) did so as well.

According to Liuqiu Fishermen’s Association personnel, some fishermen in Hsiao Liuqiu earned one to two million TWD by selling their catch. There was a time when an income of 300,000 to 400,000 TWD would be called a lot. Fish are sold in Hsiao Liuqiu primarily through fishermen selling directly to restaurants, and to middlemen from Taiwan Island who came to Hsiao Liuqiu to purchase red bulleyes and resell them to restaurants in Taiwan. Because these fish were not sold in the fishing market, there were no objective figures for auditing.

In 2016, fishermen using long line fishing on bamboo rafts noticed that the quantities of *Atrobuca nibe* had increased significantly. The fish school roughly appeared at 1.5 to 3 nautical miles off the coast.

Four Key Principles in Establishing MPAs.

According to the present author's campaign experience, four key principles need to be highlighted in order to establish MPAs in Taiwan society successfully:

Principle One: Announced by Central Government

Seawater and marine organisms are dynamic and straddle different zones. In order to avoid differences in planning and announcements among local governments and avoid pressure from local influential people, an MPA should be planned by the central government and no-fishing zones established in accordance with Article 44 of Fisheries Act.

This approach should bring fisheries management in Taiwan back to where it belongs under Article 108 of the Constitution of the Republic of China (Taiwan): “the Central Government shall have the power of legislation and administration, but the Central Government may delegate the power of administration to the provincial and hsien governments”. The provincial local governments should only have the power of administration regarding fisheries tasks. Taiwan Island is not a big place, and the fish around the island straddle different zones. If local governments keep acting on their own without synchronizing with central government, the recovery of marine ecology will be difficult.

Principle Two: Comprehensive Ban on Fishing

Aside from creating MPAs within one nautical mile, all other fishing activities should be banned comprehensively the whole year in order to fully achieve the effects of the MPA, except for limited allowable harvesting of seaweed. Especially in Taiwan, based on past experience with fisheries management public hearings, disputes among all types of fishermen and fishing gear players never ceased. Everyone thought that the others were the main culprit

in depleting marine ecological resources, and this made it more difficult to promote marine fisheries management policies. Therefore, in order to successfully establish the MPAs, the fairest approach is to introduce a comprehensive fishing ban. This could be the common denominator that each group can accept.

Within coastal areas of one to three nautical miles seaward, judging from fisheries conditions on Taiwan, it is suggested that a comprehensive ban on fishing nets should be introduced, including single layer gill nets. If a consensus is reached between the sea area users and managers, with the actual execution of landing declarations, the following are permitted:

1. limited amount of angling gear fishing, trolling line fisheries, and small-scale long line fishing;
2. limitation on seasons and time, fishing methods regulated, limitation on Total Allowable Catch. Lists of species match the aforementioned three criteria: seedlings, mullet, mackerels, crab catching by pot on trap, shrimp catching by Taiwanese seine.

Principle Three: Small Scale Area of MPAs

There are nineteen counties and cities in Taiwan directly adjacent to the sea. If some of the Pratas Islands under the jurisdiction of Kaohsiung City are taken into account, there will be twenty marine area units. It is suggested that during the initial phase, the establishment of MPAs should adopt a method of simplified area calculation.

The smallest MPA unit area is 0.5 square kilometers, calculated by multiplying one kilometer of coastline and a breadth of 500 meters stretching seaward. Only on condition that the minimal area is satisfied will the government give the patrol unit support. The maximum area of the MPA is unlimited. The no-take zone can be expanded numerous times, and each expansion be regarded as a new unit.

Compared with many gigantic MPAs, an MPA of 0.5 square kilometers is like a nanometer-sized protection area. Even though this is so, the condition is nonetheless harsh for the Taiwan Government.

Area of MPA – Referential Case 1

In May 2016, the government of Keelung city, according to the Fisheries Act, established “Wanghaisiang Chaojing Bay Resource Conservation Zone” – a no-take zone of 0.15 square kilometers. During the process of establishing the MPA, the government received considerable pressure from fishermen. In winter 2016, the government faced requests from fishermen for fishing rights. Many marine conservation groups and the NGO that the present author is working with supported the opposition view of granting fishermen the right to fish. In the end, the government of Keelung city maintained the comprehensive fishing ban.

Area of MPA – Referential Case 2

A few years ago, the fishermen and local population of Liuqiu Island in Pingtung County decided to introduce a comprehensive no-take zone of 0.3 square kilometers along a 1-kilometer long coast and a 300-meter wide sandy sea area stretching seaward, located 100 meters away near the old Liuqiu fishing port. Later, the government of Pingtung County faced opposition because it intended to expand the original 1-kilometer no-take zone to several kilometers without consulting various groups. This differed from the proposal the locals originally envisioned. In the end, the original proposal of 0.3 square kilometer was postponed and has not yet been established.

Area of MPA – Referential Case 3

According to the National Park Law, it is forbidden to fish within the national parks. However, this law was never implemented fully by the Taiwan Government. For many years, the East and West Corridor, located in Southern Four Islands Marine National Park of Penghu, has been anticipated; known for its marine species bank, it could be a comprehensive no-take zone. The area is 12 square kilometers. However, the government encountered strong protest from fishermen at the public hearing concerning the establishment of the East and West Corridor Marine Protection Area, held in Penghu County on 3 November 2011. The government finally decided that the process would continue only after the mayoral elections of Taiwan were finished at the end of 2018.

The above three examples illustrate the conflicts in Taiwan between fishermen and the idea of establishing an MPA. The Government should adopt the Fisheries Act and start within key marine areas to establish mini-sized MPAs. This would bring new opportunities of change for the ocean.

Principle Four: Effective Patrol

Any MPAs work only when the patrol units works. There are some good models: Dongsha Atoll National Park, South Penghu Marine National Park, Houbihu Marine Resource Protection Demonstration Zone of Kenting National Park, Liuqiu Three Nautical Mile Zone of Pingtung, Fushan No-take Zone of Taitung, Wanghaisiang Chaojing bay resource conservation zone of Keelung City, and Wangung mud shrimp propagation and conservation zone of Changhua County, and others. For MPAs without dedicated patrol units, IUU fishing often happens.

Therefore, every MPA within this plan needs to have a marine patrol unit. The fishing boats participating in the seafood ecolabel plan should be part of patrol units, taking responsibility of maintaining the marine environment. The tasks of patrol include:

1. widely install “No-take Zone” signs on land and draw this to the attention of fishermen and the general population;
2. fix buoys at the outer boundary of MPAs;
3. regularly clean up the seashore, ports, and discarded fishing nets on the seabed;
4. set up a patrol schedule, reports, and crack down on illegal fishing;
5. set up a supervising schedule to help fishermen when they are in the fishing port to undertake weighing and the landing declaration;
6. assist marine ecological scientific research at MPAs;
7. provide students with short-term intern opportunities on board fishing boats.

According to the plans above, each marine patrol unit should receive subsidies of roughly 500,000 TWD to 1,200,000 TWD from the central government annually. The subsidies could be utilized by the patrol units freely for the following: the hiring of patrol unit personnel, the renting of patrol boats, subsidies for patrol unit fuel, gas tanks for cleaning up fishing nets on the seabed, and subsidies for cleaning up fishing ports.

The government should arrange an annual assessment of each patrol unit. Patrol units with larger no-take zones, faster planning for the establishment of MPAs, and units which have greater efficiency might obtain extra subsidies for: patrol tasks, marine scientific research of that particular sea area, ecological sightseeing consultation, and production and marketing of fishing rods, and the like. If there is a shortage of subsidies, the extra funds will come from local government and Fishermen’s Associations.

11.4 Example Proposed: Establishing Itu Aba Island MPA

Suggested Example for Designing MPAs Network by using Itu Aba Island in the South China Sea as an example

Among the three marine corridors mentioned above, the southern corridor, that is, South China Sea Current, has a significant impact on the oceans and fisheries in the southwestern part of Taiwan, and the southern corridor starts at Itu Aba Island in the South China Sea.

Itu Aba Island is the largest island within the Spratly Islands. It is occupied by the Taiwan Coast Guard. Itu Aba Island is rich in ecology, and its "Tizard Banks" are among the important reefs in the South China Sea coral reef ecosystem. According to a research report, the average number of deep sea corals in the South China Sea is about 5 ± 1 species and the number of groups is 99 ± 56 , whereas the "Pratas Islands Shed Areas" has 31 species and 502 groups. There are 24 species and 288 groups at "Eldad Reef Areas", located at the right end of the Tizard Banks; there is no real national occupation. The area between these two places in the South China Sea has the highest coral species diversity. They are hotspots for marine biodiversity in the South China Sea.

Scientific research has determined that creatures of the South China Sea will drift northward with the current, from the Itu Aba Island in the Spratly Islands, through the Philippines, Vietnam, to the Pratas Islands, and continue northward to the Taiwan main island, Liuqiu and Penghu Islands. Therefore, the Itu Aba Island sea area is the largest genetic resources reservoir of Taiwan's offshore fisheries. A well-protected marine ecology of the Spratly Islands will bring abundant fisheries resources to Taiwan and many countries. Therefore, an MPA with a No-take Zone should be established at Itu Aba Island. However,

the situation in the South China Sea is complex. At present, there are six countries in the South China Sea claiming sovereignty, including Taiwan, China, Vietnam, Philippines, Malaysia, and Brunei. Therefore, establishing an MPA at Itu Aba Island requires all aspects to be considered.

In Taiwan, on 3 March 2007, according to the Fisheries Law, Kaohsiung City Government announced that Itu Aba Island is an “important habitat of sea turtles” with the issue K-City No. 0960008087. Within the spawning habitat of sea turtles, from the beach to the outside of the forest land area, and from intertidal zone to beneath the subtidal line within 12 nautical miles, no one shall catch sea turtles within 12 nautical miles of Itu Aba Island or destroy the habitat of sea turtles.

However, it is not enough to only protect the turtles. A No-take zone is needed to protect the precious coral reef environment, so as to ensure a rich variety of marine life which can continue to migrate with the South China Sea Current from the southern corridor to the southwestern part of Taiwan; for example, the sea areas of Kenting in southern Taiwan and Penghu in western Taiwan.

Therefore, an Itu Aba Island MPA arrangement should be created and based on the basic principles mentioned above: "central government in charge, no-take, small size, and effective patrol".

Checklist for South China Sea Itu Aba Island MPA

1. Central government in charge

It is recommended that, in accordance with the Fisheries Act (Article 44.1(1) and (4)), the Fisheries Agency at the central level should be the competent authority, rather than local government such as “Kaohsiung City Government” for the sea turtle protected area.

The Kaohsiung City Government has no patrol boats to sail to Itu Aba Island. Moreover, there is not sufficient funding for Kaohsiung City Government to maintain MPAs.

2. No-take Zone

According to the Taiwan Coast Guard, there are few Taiwanese fishing boats in the sea area of Itu Aba Island. Most fishing boats are from China and Vietnam. This is another reason that, within the protected area, there should be a comprehensive fishing ban.

For detailed restrictions, the recommendations are as follows:

- A. according to the Fisheries Act (Article 44.1(4)), within the Itu Aba Island MPA, it is prohibited to catch any aquatic animals and plants or destroy the habitat in any way;
- B. according to the Fisheries Act (Article 44.1(1)), within the Itu Aba Island MPA, it is forbidden to catch the species as follows: (a) all corals, coral reef fish, and coral reefs, (b) giant clams, (c) top shells, (d) sea urchins, (e) trumpet tritons, (f) sea cucumbers, (g) cartilage fish.

These coral reef creatures should be protected by the Fisheries Act (Article 44.1(1)) because the penalties for violation are more severe. Any person who violates this Article is subject to imprisonment for a term not exceeding three years, or in addition a fine not exceeding 150,000 NTD. With the power of the criminal law, the prosecutor can protect the

ocean. However, if Article 44.1(4) of the Fisheries Act is used, there would merely be a fine of between 30,000 and 150,000 NTD.

3. Small size

Considering that the Sandy Cay, 7.1 nautical miles eastward of Itu Aba Island, is occupied by Vietnam, it is recommended to use the Itu Aba Island National Monument as the center of the circle and 6 nautical miles as the radius to draw the circular sea boundary of the no-take zone, although the territorial waters of Taiwan are twelve nautical miles in breadth.

4. Effective Patrol

Taiwan's coastguard patrol team is stationed on the Itu Aba Island. This should be an opportunity for the Itu Aba Island MPA to be effective.

Chapter 12 To Establish a Quasi-Governmental-Based Ecolabelling Scheme for Sustainable Seafood

12.1 Introduction: Why Not Apply the MSC Directly?

In chapter two, “ProFish” was the suggested certification standard of sustainable fisheries used to evaluate whether a fishery practice was sustainable. In this chapter, we analyze this further.

Often the question is raised: why not suggest fishermen apply directly for the eco-label abroad? The renowned MSC is one of them. However, the harsh truth is that the status quo of fisheries in Taiwan is not good. Marine ecological research is absent or sparse. Not a single fishing business in Taiwan can pass MSC certification.

In 2011, the Fisheries Agency in Taiwan spent money to seek an MSC certificate for pacific saury fishery in Taiwan without success. There was no organization managing pacific saury resources. In 2015, the Xin Gang Fishermen’s Association in Taitung County entrusted the Overseas Fisheries Development Council of the Republic of China to undertake a pre-evaluation of the Mahi-mahi (Dolphinfish) fishery using “surface layer long line” fishing method near the Xin Gang fishing port based on the MSC certification standard. The evaluation task force concluded that the Mahi-mahi fishery of Xin Gang in Taiwan may not have reached the sustainable fishery standard of the MSC, so the possibility of getting the certificate was zero.

According to the report, the major problem of the Mahi-mahi fishery in Taitung was the undefined management measure for the quantities of fish caught. This means that when the resource is at risk of diminishing, there are no regulations to reduce the Total Allowable

Catch. The second problem was the lack of detailed bycatch information by species and the failure to understand the ecological system, among others. Therefore, an “improvement plan” was needed to help this fishery meet the requirements for a sustainable fishery.

The Sergestid shrimps in Tung-Kang, Taiwan, are considered to be an exceptionally positive example of best fishery management. But if the Sergestid shrimp fishery were to apply for an MSC eco-label certificate, would it satisfy the certificate standard? This question was addressed in one graduate thesis. That work concluded that the Sergestid shrimp fishery in Tung-Kang faced the embarrassment of being unable to satisfy the requirements of the certificate. One factor was the problem of bycatch. There are no plans to resolve the problems of high by-catch ratio and lack of ecosystem research. The fishery is unlikely to meet the MSC standard at present.

A graduate research thesis evaluated a possible application for the MSC ecolabel regarding the larval anchovy fishery, considered to be well-managed by the Fisheries Agency in Taiwan; the result was a score of “resource condition” below 60. However, in order to receive the MSC eco-label, each of the indices evaluated has to achieve a score of exceeding 60, and the average score of each indicator has to exceed 80. Therefore, the larval anchovy fishery could not get the MSC eco-label. Bycatch is one of the biggest problems of the larval anchovy fishery. As a result, there is scope for improving the evaluation regarding the fisheries management and resource utilization.

Furthermore, regarding the question of why not directly give guidance to the fishermen and help them apply for the MSC eco-label, one challenge is the expensive certification fee. This, for most older fishermen, is not affordable. There is no publicly viewable quotation table on the website of the MSC. Searching for cases on the Internet showed that MSC fees

varied, depending on the scale of the party being evaluated. The base line certificate charge starts from 2.5 million Taiwanese Dollars (82,000 USD). Aside from this basic charge, there are annual fees and eco-label usage fees, among others.

Japan, which has many small-scale locally-based fishermen, faces the same problem. Japan developed its own certification program, MEL Japan, which charges a fee that is one-tenth of the MSC certificate charge.

This situation was noted in the aforementioned thesis on Taiwan's Tong-Kang Sergestid shrimp fishery. The conclusion pointed out that cost and responsibility will become a difficult issue. The benefits of the MSC eco-label cannot attract industries strong enough to overcome various challenges. Therefore, that it was suggested that the Taiwan Government should take responsibility to make consumers aware of products with an eco-label.

This present work comes to a similar conclusion; however, it is suggested that the focus of Taiwan Government responsibility should be constructing a quasi-governmental-based ecolabelling scheme for domestic fisheries and seafood products, and investing more in marine ecosystem research, which definitely is the highest cost that the fishermen and the industries cannot afford individually. A quasi-governmental-based scheme allows the accreditation standards and certification standard to adjust dynamically and sometimes preserve an independent identity mindset.

12.2 Establishing a Quasi-Governmental Accreditation Organization

In Taiwan, the Government established various foundations based on different reasons and objectives. Take pelagic fisheries for example: there is the “Overseas Fisheries Development Council of the Republic of China”; in the field of aquaculture, there is the “Taiwan Aquaculture Development Foundation”. However, as far as offshore fisheries are concerned, there is no single related foundation, nor is there a foundation that is devoted solely to marine conservation. Therefore, given the limited manpower in Taiwan and in order to conduct promotional work for sustainable seafood, there is a need for the Taiwan Government to establish a foundation. It should be called the “Ocean Conservation and Fisheries Sustainability Foundation”.

Below a proposed foundation charter addresses five important points:

First: Name of the Foundation

The name of the foundation shall be the “Taiwan Ocean Conservation and Fisheries Sustainability Foundation”, according to civil law and Guidelines for Reviewing Permits and Supervision of Agricultural Juridical Persons of Council of Agriculture, Executive Yuan.

Second: Spirit and Purpose of the Foundation

The foundation will match the policies of the Government, conserve the marine ecological system, protect the marine environment in Taiwan, implement the Code of Conduct for Responsible Fisheries adopted by the Food and Agriculture Organization of the United Nations in 1995, and use marine resources reasonably. The objective of establishing this foundation is to foster the sustainability of fisheries resource use.

Third: Business Scope of the Foundation

This foundation will implement the tasks as below, based on related regulations or assignment given by the government:

1. promote the conservation and reclamation of marine biodiversity in Taiwan.
2. elevate the quality of the resource management of the offshore fishery's sustainable development; of reasonable use; and of increasing resource.
3. handling the tasks of giving technicality guidance to fisheries techniques, fisheries management, or of being commissioned to evaluate the impact of developing the sea area.
4. collecting and analyzing correct data of the offshore total catch, and help assess the offshore marine ecology, the status of fisheries resources, and the most suitable quantity of allowable catch, and promote the establishment of fish catch traceability mechanisms.
5. assist in surveillance and monitoring management of offshore fishing boats.
6. promote marine environmental protection and guide the establishment of marine protection patrol units.
7. assist the tasks of investigating, planning, establishing, running, and managing of the fishing ports.
8. assist the tasks of investigating fisheries statistics, fishery (households and villages) economics and primary fishing household income, and all other fishery related statistics.
9. handle the promotional education of marine environmental protection, marine ecological conservation, and the regeneration of fishing villages.
10. assist the guarantee, improvement, and elevation of the rights, welfare, and safety of the crew of fishing boats.
11. promote and establish the system of sustainable seafood eco-label.

12. handle education and training in order to promote the perception and concept of responsible fisheries.
13. promote cooperation between Taiwan and Mainland China regarding the conservation and management of fisheries resources, and assist the government to handle the tasks of cross strait fisheries and service communication.
14. handle the tasks of evaluating the manufacturing environment of marine products and sanitary management.
15. other related tasks that match the objective of establishing this foundation, such as charitable marine conservation events, and offshore fisheries tasks.

Fourth: Board of Directors

The board of directors of this foundation shall consist of from 11 to 13 directors. The board of directors shall elect a chairman from among the directors. The chairman is in charge of organizing the tasks and shall represent the foundation.

1. One Deputy Minister from the Council of Agriculture, Executive Yuan
2. Two members from the Ocean Affairs Council
3. One member from the Construction and Planning Agency, Ministry of the Interior
4. Deputy Minister from Fisheries Agency, Council of Agriculture, Executive Yuan, who is in charge of supervising offshore fisheries.
5. Two members designated by the Fisheries Agency, Council of Agriculture, Executive Yuan
6. One member from the National Fishermen's Association, R.O.C.
7. One to three members who are persons or scholars in charge of marine conservation and sustainable fisheries related tasks.
8. Two members from fisheries organizations.

Fifth: Duties of Chief Executive Officer

This foundation shall have one chief executive officer to manage the tasks of the board of directors. The chief executive officer shall be nominated by the chairman of the board of directors, and the appointment requires the approval of the board of directors.

The responsibilities of chief executive officer are:

1. execute the resolutions of the board of the directors.
2. employment and contract termination of the staff.
3. command and supervise the tasks that belong to related staff.
4. train, do performance appraisals, and reward the related staffs.
5. propose tasks that need consideration by the board of directors.
6. other tasks that should be executed within his/her authority.

If the foundation can be established on the basis of the above provisions, the possibility of developing a quasi-governmental-based ecolabeling scheme of the sustainable seafood will be high. In fact, the present author, as the representative of the ocean division of NGOs environmental conference in Taiwan, had visited president Tsai Ing-wen in the presidential office on the World Earth Day, 22 April 2016 and 2017, consecutively, to propose an appeal to establish an “Ocean Conservation Foundation”. And this appeal had been approved by president Tsai. It is being prepared by Council of Agriculture and Fisheries Agency.²⁷¹

²⁷¹ The present author is involved in the process of drafting the foundation charters, and proposed the above opinions. The foundation has formally been established in the end of 2018, and officially in operation in January 2019. The present author was nominated and approved to be the chief executive officer by the board of directors in September 2018.

12.3 Procedures for Establishing Sustainable Seafood Ecolabel in Taiwan

In Paragraph 37 of the FAO “Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries”, it is said that there are various options for the governance of an eco-labeling scheme. The initiative for a scheme could be taken by a government, an intergovernmental organization, a non-governmental organization, or a private industry association. There are various options for the geographical range of a scheme. It could be regional, national, or international in scope.

Taiwan should choose the central government to initiate the sustainable eco-labeling seafood scheme. According to the FAO “Guidelines for The Eco-labeling of Fish and Fishery Products from Marine Capture Fisheries”, the procedural guidelines are presented in three parts:²⁷²

- (1) Guidelines for the Setting of Standards of Sustainable Fisheries,
- (2) Guidelines for Accreditation, and
- (3) Guidelines for Certification.

Each part is further subdivided into four sections: Purpose, Normative references, Functions and structure; and Requirements.

The Requirements are the minimum that a body, a person, or an arrangement should meet to be recognized as competent and reliable in its domain. The Principles listed earlier in these guidelines apply equally to procedural and institutional aspects of marine fisheries eco-labeling schemes.

²⁷² Paragraph 36 in the document <http://www.fao.org/docrep/012/i1119t/i1119t.pdf>

With respect to actual administrative practice, the Taiwan Ocean Conservation and Fisheries Sustainability Foundation (TOFF) should take charge of the establishment work. Although the organic certification standards have been enacted by the Government according to Agricultural Production and Certification Act²⁷³ (Article 4):

“The central competent authority may implement a voluntary premium agricultural product certification system for the production, processing, packaging and distribution of certain domestic agricultural products and their processed products.

“The items, application requirements and procedures, certification criteria, labeling, shelf life and relevant regulations of administration for the certain agricultural products and their processed products as mentioned in the preceding paragraph shall be prescribed by the central competent authority”.

We suggest that the Sustainable Fisheries Eco-label scheme should be developed by a quasi-governmental-based foundation first. Regarding the expectation of the FAO “Sustainable Fishery and Fish Products from Marine Capture Fisheries Certification Management Regulation”²⁷⁴, a quasi-governmental-based foundation has larger space of freedom than the governmental officers to invite different parties, for example: non-governmental, large-scale or small-scale enterprises, and consumer-related associations, to join in the scheme activities

It is suggested that the Taiwan Ocean Conservation and Fisheries Sustainability Foundation should establish a “Sustainable Fisheries Standard Commission”, which is based on the framework of the ProFish scoring checklist devised herein, in order to establish a feasible certification standard for Taiwan fisheries and fishermen.

²⁷³ <https://law.moj.gov.tw/Eng/LawClass/LawAll.aspx?PCode=M0060072>

²⁷⁴ Paragraph 54: “Standard-setting arrangements or organizations should ensure balanced participation by independent technical experts and by representatives of interested parties in the standard development, revision and approval process. Development of standards of sustainable fisheries should, wherever possible, include representatives of fisheries management authorities, the fishing industry, fish workers organizations, the scientific community, environmental interest groups, fish processors, traders and retailers as well as consumer associations.”

The members of the “Sustainable Fisheries Standard Commission” will be convened and coordinated by the Fisheries Agency, composed of scholars from academic units, representatives from the industry, environmental groups, and retail franchises. The purpose is to establish an achievable standard of sustainable fishing practicing.

After the initial work of “Setting of Standards of Sustainable Fisheries” has been completed, the TOFF can undertake a trial certification for mackerel fishing boats to gain the feedback of fishermen and obtain the practical experience and information to establish the accreditation standards and certification guidelines. With these efforts, another organization in charge of certification work might be established and be accredited by TOFF within ten years.

In addition, when the Taiwan Accreditation Foundation is ready to form a marine fishery catalog to accredit TOFF, the objective for TOFF to accredit another organization mentioned above would be practical. And the “Guidelines for Accreditation” in the suggested guideline by FAO, would be truly completed.

Meanwhile, the relevant marine competent authorities (i.e. Council of Agriculture, Fisheries Agency, Ministry of Science and Technology, and Coast Guard Administration, Ocean Affairs Council, and others) can together put effort into helping fishery businesses which have the potential to reach the “sustainable” standard of an eco-label. These endeavors include planning the annual budget for marine scientific research; investigating the maritime ecology and resource status; establishing the fisheries management task force; improving the public announcement of closed fishing seasons; subsidizing fishermen to install AIS on their fishing boats; developing the iFish Card, smart Fisheries management integration system, all

are recommended in this work; implementing landing declarations; and enforcing the crackdown against illegal fishing, etc.

More importantly, the “audit of production and marketing” of the sustainable ecolabel has to be set up simultaneously, and the long-term reputation and value of the eco-label have to be established.

There is scope for the improvement of environmentally-friendly fresh seafood in Taiwan’s domestic market. The above conclusion was drawn from the observation that there are few purchasing options in Taiwan’s supermarket for environmentally-friendly fresh seafood from local sources.

Chapter 13 To Establish a Ministry of Oceans and Fisheries in Taiwan

13.1 Introduction: Central Competent Authorities of Marine Affairs in Taiwan

Since the dawn of twenty-first century, global marine affairs have become highly diversified, and marine conservation has become more important. When it comes to issues regarding marine pollution or marine conservation, multiple government agencies are often involved. When issues arise, there is commonly a lack of horizontal communication among government agencies. In addition, the low administrative efficiency inherent in the sectionalism of different departments, and the lack of comprehensive planning, lead to marine conservation outcomes less favorable than conservation groups had expected.

Each issue discussed in this work ultimately requires the realization of government regulations and policy practice in order to fulfill the vision of "sustainable seafood" as part of the culture of Taiwan. To expect private conservation groups and fishermen to reform the fishing culture or change fishing patterns is unrealistic. Therefore, competent marine affairs authorities in Taiwan play a pivotal role.

There has never been a single competent authority responsible for marine affairs within the central government. Even though the Taiwan Government established an Ocean Affairs Council on 27 April 2018, this agency, in essence, is a platform for coordination and communication without any authority to govern marine affairs. The real power to regulate marine affairs is scattered across various parts of the governmental system. For example, the Fisheries Agency of Council of Agriculture is in charge of fisheries management; the Maritime and Port Bureau of Ministry of Transportation and Communications regulates maritime traffic; the Coast Guard Administration governs maritime security; the National

Park Management Office under the Construction and Planning Agency of Ministry of Interior manages various Marine National Parks. Many competent authorities are in charge of marine affairs, and each does its job based on its own administrative regulations. However, with more pressure coming from conservation groups, the Ocean Conservation Administration has been established under the Ocean Affairs Council. Affairs regarding marine pollution were transferred from the Environmental Protection Administration to the Ocean Conservation Administration.

Marine Law Enforcement Agency

In fact, in addition to the creation of the Ocean Affairs Council in 2018, the previous organizational reshuffle regarding marine affairs by the Taiwan Government was the integration of marine law enforcement agencies in 2000. In that year the Taiwan Government merged the Coast Guard Command of the Ministry of Defense, the Marine Police Bureau of the National Police Administration under the Ministry of Interior, and the Taiwan Directorate General of Customs under the Ministry of Finance into the "Coast Guard Administration of the Executive Yuan". The customs ships under the original three agencies were combined together under the new administration. This was the first time that Taiwan integrated marine affairs.

Although the missions of the Coast Guard Administration mainly focused on cracking down against smuggling, marine crime, and other security maintenance affairs, the Administration can execute functions of other competent marine agencies through administrative commissions. For example, the Environmental Protection Administration can entrust the Coast Guard Administration with combating marine pollution, and the EPA can purchase marine pollution prevention equipment for the Coast Guard Administration to use.

Therefore, the Coast Guard Administration becomes the frontline for tackling marine pollution instances.

Another example is that the Fisheries Agency of the Council of Agriculture entrusts the Coast Guard Administration to crack down on violations of fishery regulations. Via the cooperation of the Fisheries Agency and Coast Guard Administration to regularly audit the operation of the fishing vessels, the effectiveness of enforcement against illegal activities can be increased.

However, according to the experience of past eighteen years, the internal culture of the Coast Guard Administration is confined to cracking down on smuggling and security maintenance. The affairs entrusted from other departments often cannot be effectively executed by reason of the cognitive gap between the competent authorities and the Coast Guard Administration. Violations perceived by the Coast Guard Administration have often not been punished or cannot be punished by the original competent authority because the evidence obtained by the coast guard was considered incomplete. This adversely impacted morale within the Coast Guard Administration. Cases regarding violations of fishery regulations often ended up this way.

In 2002, while Chen Shui-bian of the Democratic Progressive Party (DPP) served as President of Taiwan, the Executive Yuan of Taiwan proposed that a "Ministry of Ocean Affairs" be established. The draft of the revised "Organizational Act of the Executive Yuan" was sent to the Legislative Yuan for first reading. The opposition party, Kuomintang (KMT), which controlled half the seats in the Legislative Yuan, boycotted the draft, and the draft was not passed. However, in 2008, when President Ma Ying-Jeou of the KMT was running in the presidential election, he surprisingly proposed the establishment of a "Ministry of Ocean" if

he were elected. After Mr. Ma Ying-Jeou won the election and took the presidential office, the Executive Yuan under his governance proposed the “Ocean Affairs Council,” which was criticized by private marine groups and scholars. However, the Organization Act of the Ocean Affairs Council was adopted by the Legislative Yuan in June 2015.

In 2016, party alternation occurred in Taiwan after the presidential election, and Tsai Ing Wen of the Democratic Progressive Party won the election. Marine conservation groups continue to appeal to the government to set up the Ministry of Ocean, including the Ministry of Marine Fisheries. With the help of legislators, the “Organizational Act of the Ministry of Oceans and Fisheries” was proposed in the Legislative Yuan. The act gained support from over half of the legislators from different parties and passed the first reading.

However, in 2017, after negotiating with the Executive Yuan, the Presidential Office thought that the legislative progress of the Legislative Yuan was doubtful and decided to establish the Ocean Affairs Council first, according to the Organization Act of the Ocean Affairs Council, which was passed in 2015.

Establishment of Ocean Affairs Council

On 27 April 2018, the Ocean Affairs Council was established by the Taiwan Government. Not only does it incorporate the Coast Guard Administration under its jurisdiction, but also sets up two new institutions: Ocean Conservation Administration and National Academy for Ocean Research. The roles and responsibilities of the Coast Guard Administration remain the same. The Ocean Conservation Administration is in charge of marine ecological conservation, prevention of marine pollution, and marine resource management. The National Academy for Ocean Research is responsible for Taiwan's marine policy planning, marine resource survey, and marine scientific research.

However, fisheries affairs are still under the governance of the Fisheries Agency; the Maritime and Port Bureau regulates maritime traffic; and the Ministry of Interior manages Marine National Parks. Inasmuch as the competent authorities of marine affairs were not incorporated under the Ocean Affairs Council, the Ocean Affairs Council became a mere rubber stamp. The Taiwan Government is still adjusting internally. There is a long way to go for Taiwan if it were to become a powerful marine State under its current marine affairs system.

13.2 Central Competent Authority on Marine Affairs of Other Countries

Marine affairs have become important in international relations. In order to safeguard national sovereignty, protect maritime interests, and conserve fisheries resources in EEZs, many countries have developed competent authorities of marine affairs based on their political systems, economic development, cultural traditions, and the like.

Marine affairs can be divided into policy and law enforcement. Marine policies mainly focus on fisheries, maritime transport, and marine tourism. Because of different histories and national resources, the competent authorities in charge of regulating the industry differ from country to country. The same applies to maritime law enforcement. The maritime law enforcement agencies around the world have a variety of organizational and execution tasks. This section mainly focuses on the introduction of fisheries management and law enforcement units in countries surrounding the East China Sea.

Japan

Japan carried out a large-scale administrative reform, downsizing in January 2001. Before this organizational reformation, Japan's central government had many units involved in marine affairs. The Ministry of Transport regulated maritime transport, whereas the Ministry of Agriculture, Forestry and Fisheries was in charge of fisheries.

In addition, the Ministry of Economy, Trade and Industry, Science and Technology Agency, Environmental Agency, and other departments had authority over marine affairs. After the organizational reformation of the Japanese government, departments related to the marine affairs were reorganized and merged. Marine affairs are mainly regulated by the cabinet office; Ministry of Land, Infrastructure, Transport and Tourism; Ministry of

Education, Culture, Sports, Science and Technology; Ministry of Agriculture, Forestry and Fisheries; Ministry of Economy, Trade and Industry; Ministry of the Environment; Ministry of Foreign Affairs; and Ministry of Defense.²⁷⁵

After the adjustment of the Japanese administrative reorganizations in 2001, the newly established Ministry of Land, Infrastructure, Transport and Tourism (MILT) took over most of the authority in marine affairs. The Ministry was established by merging the National Land Agency, the Ministry of Transport, the Ministry of Construction, and the Hokkaido Development Agency. Seventy percent of Japan's coastline is under the jurisdiction of the MILT. The responsibilities of the MILT include marine surveying, meteorological observation, maritime transport, ships, harbors, marine use, marine pollution prevention, maritime traffic safety, coastal management, sewerage, land planning, urban planning, and marine and coastal zone management.

Fisheries, however, are regulated by the Ministry of Agriculture, Forestry and Fisheries. The Ministry mainly takes responsibility for the management and industrial guidance of fisheries and aquatic resources. Originally, there were seven fisheries research institutes under Ministry of Agriculture, Forestry and Fisheries: the Research Institutes of Hokkaido District, of Tohoku District, of Central District, of Seto Inland District, of Seikai District, of the Sea of Japan Sea, and of the Far Seas. They were later merged into the "Fisheries Research Agency" on 1 April 2001.

²⁷⁵ Sung, Yen-hui (宋燕輝) & Peng, Jin-peng (彭錦鵬). (2012). Business Planning and Development of Ocean Affairs Council. Retrieved from [https://www.ea.sinica.edu.tw/file/File/\[%E7%A0%94%E7%A9%B6%E5%A0%B1%E5%91%8A\]%20%E6%B5%B7%E6%B4%8B%E5%A7%94%E5%93%A1%E6%9C%83%E6%A5%AD%E5%8B%99%E8%A6%8F%E5%8A%83%E8%88%87%E7%99%BC%E5%B1%95%20\(2012\).pdf](https://www.ea.sinica.edu.tw/file/File/[%E7%A0%94%E7%A9%B6%E5%A0%B1%E5%91%8A]%20%E6%B5%B7%E6%B4%8B%E5%A7%94%E5%93%A1%E6%9C%83%E6%A5%AD%E5%8B%99%E8%A6%8F%E5%8A%83%E8%88%87%E7%99%BC%E5%B1%95%20(2012).pdf)

Since 2007, the promotion of the sustainable seafood ecolabel “Mel Japan” of the Japanese Marine Stewardship Council, led by the Government of Japan and fisheries associations, is the responsibility of the Fisheries Agency of the Ministry of Agriculture, Forestry and Fisheries.

In terms of international marine affairs, the Economics Affairs Bureau under Ministry of Foreign Affairs has two divisions: Marine Division and Fisheries Division. These divisions are responsible for governmental foreign affairs related to the oceans and fisheries.

The Japan Coast Guard is under the Ministry of Defense, which has the Japan Maritime Self-Defense Force to take the responsibility for law enforcement. Japan’s maritime law enforcement originated from the “Imperial Navy” before World War II, which later faced defeat in World War II and then experienced several reforms. The Japan Coast Guard primarily is in charge of “guard and rescue missions” and “route identification”. Guarding and rescue missions include smuggling investigations, cracking down on illegal fishing, rescue at sea, marine pollution treatment, and maintenance of marine recreation security, among others. Route identification covers lighthouse management, navigation facility management, and meteorological data management, and so forth. The Japan Coast Guard is responsible for Japan’s internal waters, territorial waters, adjacent areas and EEZ, all of which have an area of approximately 4.8 million square kilometers. The patrol boat units of the Japan Coast Guard, of the Fisheries Agency, and of local water police were jointly known as "the three competent authorities of marine security", which safeguard Japanese maritime security and execute fisheries law enforcement.

China

With economic advance in China, in order to effectively utilize marine resources and to protect marine rights and interests, the Chinese government established five main marine law enforcement administrative units: the State Oceanic Administration under the China Marine Surveillance Bureau of the Ministry of Land and Resources; Bureau of Fisheries under the Ministry of Agriculture; China Maritime Safety Administration under the Ministry of Transport; Coast Guard under the Border Patrol Department of the Ministry of Public Security; and the General Customs Administration. These five units are responsible for marine law enforcement tasks and were dubbed colloquially as the “Marine Governing Force of Five Dragons”. However, by reason of decentralized power, lack of a clear division of labor, and inability to cooperate, the “Five Dragons” are not competent to tackle major maritime events.

Therefore, in terms of marine law enforcement, China had a crucial organizational reformation in 2013. Except for the China Maritime Safety Administration, the other four units merged into the State Oceanic Administration of Ministry of Land and Resources, and the merged organization is dubbed the China Coast Guard.

The Coast Guard was given police power to maintain maritime rights in China's inland waters, territorial sea, contiguous zones, EEZ, continental shelf, and other sea areas. In addition, sea area utilization management, marine environmental protection, supervision and management of marine fisheries activities, marine scientific research, cracking down on maritime crimes, and investigations of smuggling are the responsibility of the Coast Guard.

On 17 March 2018, China made another organizational change.²⁷⁶ China established the Ministry of Natural Resources, which absorbed the work of the State Oceanic Administration, Ministry of Land and Resources, State Oceanic Administration, and State Bureau of Surveying and Mapping. However, the name of the State Oceanic Administration was retained on the official website until September 2018, without further explanation of the affiliation between the State Oceanic Administration and the Ministry of Natural Resources.

Taiwan had established the Ocean Affairs Council in April 2018 and is still trying to determine the attribution of administrative responsibility for marine affairs. China, just as Taiwan, is trying to ascertain the right position of its State Oceanic Administration within its administrative organization.

Although China's fisheries management authority has undergone slight adjustments regarding the name of its institutions in 2008 and 2014, the latest Chinese name is “漁業漁政管理局 (Bureau of Fisheries and Fisheries Administration Management)”. Before and after the adjustments of name, they are all under the Ministry of Agriculture and Rural Affairs. Although the Bureau of Fisheries has changed its name twice, the English name on the official website still is Bureau of Fisheries without any adjustments.

²⁷⁶ The first meeting of the 13th National People's Congress passed the "Decision on the institutional reform plan of the State Council". The plan pointed out: "Combine the responsibility of the Ministry of Land and Resources, ... (omitted), and the responsibility of the National Oceanic Administration into the establishment of the Ministry of Natural Resources as the department of the State Council. The Ministry of Natural Resources retains the name of National Oceanic Administration. It does not retain the structure of Ministry of Land and Resources, the National Oceanic Administration, and the National Surveying and Mapping Geographic Information Bureau." Retrieved from http://www.npc.gov.cn/npc/xinwen/2018-03/18/content_2050371.htm

South Korea

Since 2006, South Korea's central competent authority regarding marine affairs has experienced several reshuffles. The relevant history can be read on the official website of the South Korean government.²⁷⁷ Most importantly, the Ministry of Oceans and Fisheries was established on 23 March 2013.

The Korea Coast Guard is another political story. For the past fifty years, Korea has gone through many complicated re-organizations. The Coast Guard Authority was formed and a Maritime Police Unit was established as part of the National Police Agency in 1953. On 18 May 2014, President Park Geun-hye announced the dissolution of South Korea's coastguard due to its failure to respond to the rescue mission during the Seoul ferry disaster. On 7 November 2014, the National Assembly declared that the South Korean Coast Guard be disbanded and announced that the related duties Coast Guard were to be transferred to the South Korea National Police Agency. A broader safety agency was later established.²⁷⁸

However, the South Korean Coast Guard was re-established on 26 July 2017. After newly-elected South Korean President Moon Jae-in took over the presidential office in May 2017, the Korea Coast Guard was launched as an independent external organization of the Ministry of Oceans and Fisheries in July of the same year. The former three-year-old safety agency was then abolished.

²⁷⁷See the history of Ministry of Oceans and Fisheries, Republic of Korea.

Retrieved from <http://www.mof.go.kr/eng/content/view.do?menuKey=491&contentKey=28>

²⁷⁸BBC News. (2014, November 7). South Korea lawmakers vote to disband coast guard.

Retrieved from <https://www.bbc.com/news/world-asia-29947381>

The Korea Coast Guard is famous for tough enforcement against Chinese fishing boats illegally crossing the fisheries agreement line²⁷⁹ between Korea and China. CNN reported on 21 December 2017 with regard to disputes between South Korea and China that the South Korean coast guard was trying to solve the situation: “South Korean coast guard fires 250 rounds at Chinese fishing ships”.²⁸⁰

²⁷⁹ China and South Korea are parties to the United Nations Convention on the Law of the Sea and claim an exclusive economic zone (EEZ) up to 200 nautical miles from their coastlines. This creates overlapping claims in the EEZs between the Korean Peninsula and China. The two countries signed a bilateral fishing agreement in 2001

²⁸⁰ Griffiths, J. & Kwon, J. (2017, December 21). South Korean coast guard fires 250 rounds at Chinese fishing ships. CNN. Retrieved from <https://edition.cnn.com/2017/12/20/asia/south-korea-china-intl/index.html>

13.3 Draft Ministry of Oceans and Fisheries Organization Act

The Island of Taiwan has, if the EEZ of 200 nautical miles is taken into account, a total area of roughly 430,000 square kilometers, which is more than ten times the land area of Taiwan Island. The developmental momentum brought by the sea to Taiwan is gaining in importance and potential. However, in the twenty-first century, marine affairs are diversified and all-encompassing. The degree of integration and reinforcement of maritime affairs decision-making, management, and execution plays an important role in the long-term development of the country's marine industry. Thus, in order to conserve Taiwan's marine ecological environment; effectively utilize and sustainably manage marine bio-resources; foster maritime transportation, recreation and sightseeing and maritime technology; increase the general population's awareness of marine conservation, marine affairs should be put under ministry-level administration in the central government.

Moreover, fishing is one of the oldest human activities that has a profound impact on the use of marine resources. Taiwan does not rely heavily on animal agriculture. The yield rate of offshore fishing has to be high in order to provide the proper supply of animal protein and food self-sufficiency. The central government has to reinforce the management of marine affairs and actively seek co-development. With globally increasing demands on the marine bio-resource management in each country, the central government should actively participate in international marine conservation organizations in order to maintain Taiwan's rights of marine resources. In this section, the draft is proposed of the Ministry of the Oceans and Fisheries Organization Act.

Explanation Draft Ministry of Oceans and Fisheries Organization Act

The Organizational Act of the Executive Yuan was announced on 3 February 2010, after amendment, and was promulgated on 1 January 2012. Article 4(4) stipulated that the Executive Yuan established the Ocean Affairs Council. However, ocean affairs involve many departments and units. The organizational function of Ocean Affairs Council is simply not sufficient to effectively manage so many matters and requests. In order to effectively plan, manage, and execute the ocean affairs in the Taiwan Government, marine affairs should exist in the form of ministry. The gist of the draft of the Ministry of Oceans and Fisheries Organization Act is as follows.

Proposed Draft Ministry of the Oceans and Fisheries Organization Act

The purpose of each article having been explained in the previous paragraph, the content of each Article will be explained in detail below:

Article 1

To integrate planning, coordination and implementation of marine-related policy, as well as to conduct affairs related to marine conservation, marine fisheries, waters and coast guarding, water sport and leisure activities tourism and marine research, the Executive Yuan establishes the Ministry of Oceans and Fisheries (hereinafter: Ministry).

Noted by author:

Article 1 elaborates the purpose of establishing the Ministry of Oceans and Fisheries.

Article 2

The Ministry shall be in charge of the following matters:

1. overall planning, deliberation, coordination, and implementation of general marine policy and the basic decrees;
2. overall planning, coordination, and promotion of the development of marine industry;
3. overall planning, deliberation, coordination, and implementation of marine fisheries and fishing ports;
4. overall planning, deliberation, coordination, and promotion of marine environmental protection, resource management, sustainable development, biodiversity conservation, and pollution prevention and control;
5. formulation, planning, and supervision of maritime regulations, maritime transport, the development of free trade zone and international logistics, and the construction and management of commercial port and yacht harbor;
6. supervision of maritime transport enterprises, management services of Taiwan International Ports Corporation, Ltd., and management service of free trade zone and commercial port;
7. overall planning, deliberation, coordination, and implementation of security of waters and coastal areas’
8. overall planning, coordination, and implementation of water sport and leisure activities tourism, culture, and education;
9. overall planning, deliberation, coordination, and implementation of marine scientific research and technological development;
10. overall planning, deliberation, coordination, and implementation of marine human resources development;
11. overall planning, deliberation, coordination, and implementation for harmonizing its relevant domestic laws with the international maritime conventions, and of international cooperation;
12. planning and supervision of matters related to weather;
13. supervision, coordination, and promotion of the Ministry marine research, fisheries research and manpower development institutions;
14. other matters related to maritime affairs.

Noted by author:

The authorities and functions of the ministry are explained in this article. “Marine Fisheries” refers to “marine fisheries” in Article 108(1)(6) of the Constitution of the Republic of China: “In the following matters, the Central Government shall have the power of legislation and administration: marine fisheries”. This “marine fisheries” differs from the “fisheries” referred in “Provincial agriculture, forestry, water conservancy, fisheries, animal

husbandry and public works” (Article 109); and the “Hsien agriculture and forestry, water conservancy, fisheries, animal husbandry and public works” (Article 110). The “fisheries” in Article 109 and Article 110 do not have “marine fisheries” characteristics and refer to “freshwater fisheries”.

Article 3

The Ministry shall have one Minister by political appointment; two Political Deputy Ministers, politically-appointed equivalent to Senior Grade 14; and one Administrative Deputy Minister, ranked as Senior Grade 14.

The appointment of deputy ministers mentioned in the preceding Paragraph shall consider the proportionality between policy expertise such as marine ecological conservation and sustainable management of fisheries resources.

Noted by author:

Article 3 stipulates the job title, official position, and number of ministry heads and deputy heads. In order to fulfill the purpose and original intention of establishing the Ministry of the Oceans and Fisheries and meet the expectations of the general public regarding a sustainable marine environment, marine ecology conservation, and the development of responsible fisheries, the deputy minister should seek and hire experts in the fields of marine conservation and sustainable fisheries management.

Article 4

This Ministry shall have one Chief Secretary ranked as Senior Grade 12.

Noted by author:

This article stipulates the job title and official position of the Chief of Staff of this Ministry.

Article 5

The subordinate agencies of the Ministry and their tasks are:

1. Ocean Conservation Agency: Planning and implementation of policies and management related to marine conservation and water sport and leisure activities tourism;
2. Fisheries Agency: Planning and implementation of policies and management related to fisheries;
3. Coast Guard Administration: Planning and implementation of matters related to waters and coastal security;
4. Maritime Port Agency: Planning and implementation of policies and management related to shipping affairs, vessel, seafarer, port policy, and safety of navigation;
5. Central Weather Bureau: Implementation of nation's weather matters.

Noted by author:

Article 5 enumerates the names of subordinate agencies established according to Ministry functions. The five administrations under the Ministry will be explained in detail:

In order to make the fisheries endure, the foremost task is to conserve marine ecology and ensure fishery sustainability. The related tasks of the Coast Guard Administration, such as protecting fishermen and inspecting of fishing vessels can be executed.

The achievements of marine conservation work are inseparable from the tourism resources of water sport and leisure activities. The Ocean Conservation Agency should be in charge of promoting the water sport and leisure activities tourism industry.

The management of shipping ports, navigational services, and fisheries and marine leisure activities are inseparable and should be incorporated into the Ministry of Oceans and Fisheries for coordination of the use of sea area and the development of related industries.

The vessel inspection tasks have returned to central government from local government, which had increased the workload of the Maritime Port Bureau. In the future, in order to coordinate with the development of the marine leisure tourism industry, the workload of

investing in and managing the yacht harbor can be expected to grow. In addition, the number of “departments” within the Ministry is limited, and the focus within the Ministry should be for emerging marine affairs that lack a subordinate agency to deal with them. Therefore, the related policy planning functions should be given to the Maritime Port Bureau. Meanwhile, the Maritime Port Bureau should be upgraded to the Maritime Port Agency in order to take over more responsibility.

Weather matters, being closely related to marine affairs, should be incorporated into the Ministry of Oceans and Fisheries to strengthen the integration of ocean and atmosphere affairs and scientific research and to establish a complete database.

Article 6

Based on operational needs, the Ministry may assign personnel to work overseas after gaining approval from the Executive Yuan in accordance with Organization Act of Diplomatic Missions of the Republic of China.

Noted by author:

Articles 6 deals with the assignment of personnel overseas. If operational needs arise, the Ministry may deploy its personnel overseas for handling related matters.

Article 7

The ranks, grades, and number of positions of the Ministry staff shall be governed by a separate organization chart.

Professional marine personnel in such areas as marine reservation, sustainable fisheries management, and maritime and port management shall each be staffed by no less than one fourth of positions listed in the organization chart mentioned in the preceding Paragraph.

No more than one-fourth of the positions listed in the organization chart mentioned in the first paragraph may be staffed with police and military personnel with equivalent ranks and the customs officers who were transferred to the predecessor of the Council due to transference of business in 2000. No military personnel will be staffed after four years from the entry of this Act into force.

Noted by author:

Article 7 defines the ranks and grades of positions and the number of personnel headcounts of the Ministry.

In order to establish a strong maritime State, the Ministry should substantially engage talents in various fields such as marine conservation, responsible fisheries management, port management, and water sports and leisure activities tourism.

Article 8

At the inception of the Ministry, the appointment, management, rights, and responsibilities of personnel who have been transferred from other entities shall comply with relevant laws and regulations of their personnel systems.

Noted by author:

The appointment, management, rights, and responsibilities of personnel of the Ministry of the Oceans and Fisheries and its subordinate agencies shall comply with relevant laws and regulations of their personnel systems.

Article 9

The date that this Act enters into force shall be determined by the Executive Yuan.

Noted by author: This article defines the date that this Act enters into force.

13.4 Draft Fisheries Agency Organization Act

The previous section set out the draft Ministry of Oceans and Fisheries Organization Act. As far as the governmental organization status in Taiwan is concerned, a complete reformation is difficult. If the proposed Ministry of Oceans and Fisheries cannot be upgraded to ministry level and remained under the Agricultural Department, the Fisheries Agency Organization Act should replace the Ministry of Oceans and Fisheries Organization Act. In this section, draft of Fisheries Agency Organization Act will be explained.

Article 1

To execute policies related to fisheries, the Ministry of Agriculture establishes the Fisheries Agency (hereinafter: Agency).

Noted by author:

This article defines the purpose and affiliation of the establishment of the Fisheries Agency.

Article 2

The Agency is in charge of the following matters:

1. overall planning, deliberating, researching, implementing, and supervising of fisheries policy, fisheries industry development, and decrees;
2. overall curing, conserving, restoring, investigating, estimating, and scientifically researching of marine-fisheries resources; in addition, planning, coordinating, implementing, and supervising of management and inspection of fisheries resources;
3. overall planning, coordinating, implementing, and supervising of management policy of fishing boats and crewmen;
4. overall planning, coordinating, and promoting of international fisheries affairs and foreign fisheries matters;
5. overall planning, coordinating, implementing, and supervising of fish farming management and development;
6. overall planning, coordinating, promoting, managing, and supervising of assistance for fishermen's associations, fisheries groups, and employees;

7. overall planning, coordinating, promoting, and supervising of marketing and processing of aquatic products, security of aquatic products, welfare of fishermen, promotion of fish village culture, and recreational fisheries;
8. overall planning, coordinating, law enforcing, supervising for fishing ports and fisheries facilities;
9. overall supervising, coordinating, and promoting of affiliated fisheries broadcast organizations;
10. other matters related to fisheries.

Noted by author:

Article 2 deals with the authority and duty of the Agency. At the stage when the Ministry of Oceans and Fisheries has not yet been established, in order to implement the uniformity between power and responsibility, to achieve administrative efficiency, and to avoid disorder and conflicts of policy making among the Fisheries Agency, Ocean Affairs Council, and Ocean Conservation Agency, it is imperative to define responsibility and authority of decision-making of fisheries industry and ocean affairs under the scope of this Organization Act.

The fisheries resources around Taiwan have been seriously depleted and offshore areas barely have enough fish to catch. One reason cited by the European Union is that the ability of enforcing fisheries rules is disproportionate to the number of fishing boats. In fact, since the promulgation of related fisheries laws, there is no specific manpower dedicated to enforce the law. This, in turn, has made it difficult to implement fisheries rules. People who care about ocean have seriously criticized this lack of execution.

The Ocean Affairs Council Organization Act, Coast Guard Administration Organization Act, and Ocean Conservation Agency Organization Act – all in force – do not have definitive provisions to regulate which fisheries law enforcement unit should be in charge within the EEZ. The main function of the Coast Guard Administration defined by its

Organization Act is combat smuggling and to safeguard the security of the coast. Therefore, the gap relating to enforcing fisheries rules needs to be filled by the Fisheries Agency Organization Act.

There are fully-fledged examples to guide the Taiwanese government. Japan, as a powerful ocean State, not only established the Japan Coast Guard to protect its coastline, but also benefited from enforcement activity of the Fisheries Agency. By coordinating the two administrations, Government of Japan is able to protect its law-abiding fishermen and ensure the sustainability of fisheries development. This experience is worth taking into account by the Taiwanese government.

Article 3

The Agency shall have one Director-general, equivalent to or ranked as Senior Grade 13; two Deputy Director-generals, ranked as Senior Grade 12.

Noted by author:

Article 3 defines the title, position, and number of the Agency's head and deputy head. The reasons why the appointment qualification of the Agency's head should be a dual-track system are: of all the international marine affairs, three are of the utmost importance: fisheries management, shipping development, and marine environmental protection. The appointment of the fisheries head should adopt a dual-track political and administrative system. The purpose is to symbolize that Taiwan is an ocean State.

The appointment of the head of Ocean Conservation Agency has already adopted the dual-track system. Fisheries activity has more influence on the marine ecosystem, and the Fisheries Agency needs to be imbued with conservation ideals and practical reformation, that

can be in charge of realizing the visions and take responsibility to act as a bridge of communication among different fields and industries.

Fisheries is among the most important marine industries in Taiwan. However, deep-water fisheries, offshore fisheries, and cultivating fisheries are facing miscellaneous challenges domestically and from abroad. The industry itself is in need of being elevated and upgraded. The head of the Agency not only needs to be equipped a mentality of ecological conservation, but also concepts of sustainable use of resources. Aside from pursuing food safety, environmental protection, and the improved quality of food supply, increasing the competitiveness of Taiwan's aqua products in the global markets is a top priority.

Therefore, it is imperative that the dual-track system should be implemented to create the flexibility of appointing manpower that political administration can utilize. When the country is in need, this dual-track system can attract more diverse talent to kick off reformation and industry upgrades.

Article 4

The Agency shall have one Chief Secretary, ranked as Senior Grade 11.

Noted by author: Article 4 mainly defines the title and position of the Agency chief of staff.

Article 5

As needed, the Agency could establish subordinate agencies.

Noted by author: Article 5 explains the situation for establishing subordinate agencies.

Article 6

Based on operational needs, the Agency may assign personnel to work overseas after gaining approval from the Executive Yuan in accordance with Organization Act of Diplomatic Missions of the Republic of China.

Noted by author:

In order to fulfill a request to assign personnel to an international port to supervise the landing declaration for fish products and ensure that the sustainable management of offshore fisheries can be planned in long-term perspective, the number of Agency expatriate personnel is separately organized and assigned.

Article 7

For strengthening the management of offshore fisheries resources and supervising local government management and implementation matters related to fisheries and fishing ports, the Agency establishes fisheries inspection corps, which could set up local fisheries inspection brigades according to ecological environment characteristics and management needs of different areas.

Noted by author:

In keeping up with the international trends; implementing the Fisheries Act and Fishing Port Act; auditing IUU fisheries activities; safeguarding the law-abiding fishermen; and protecting fisheries resources, the Agency establishes and commands inspection corps and local inspection brigades to execute these tasks.

Article 8

The ranks, grades, and number of positions of Agency staff shall be governed by a specific organization chart.

Noted by author: The Agency staff will be governed by a separate organizational chart.

Article 9

The date that this Act enters into force shall be determined by the order of Executive Yuan.

Noted by author: The date of enforcement of the Act.

Chapter 14 Conclusion

The environmental ecolabels for seafood on the market cannot meet the special needs of Taiwan's fisheries. Therefore, the present author designed in Chapter 2 a ProFish scoring table (ProFish Program) and chose three objectives and twenty evaluation items to determine whether a fishery meets the requirements of environmental and sustainable goals. Fishermen can use this checklist as a basis for improving fisheries management.

Regarding the implementation of the ProFish Program, the environmental labelling systems of many countries around the world have been considered and reference made to the FAO Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries. The conclusion is that Taiwan should adopt a quasi-governmental-based ecolabelling system to promoting the seafood ecolabelling scheme. Therefore, the Marine Eco-Label Japan system may be a helpful example for Taiwan.

In the Chapter Four, in order to focus on the fisheries over which the Taiwan Government may exercise her sovereign rights to monitor, control, and to surveil all Taiwanese fishing boat activities, the discussion is confined to the East China Sea south of 27 degrees north latitude of the northern boundary of the Taiwan-Japan Fisheries Agreement. The sea area is also among the Taiwan various fishing grounds over which fisheries management may be first practiced.

In Chapter Five, given Taiwan's special political difficulties in international society, such as Taiwan not being a member of the United Nations and or a party to almost all international conventions, in some respects the 1995 FAO Code of Conduct for Responsible Fisheries and the FAO International Plan of Action is a tool more helpful in upgrading

fisheries management in Taiwan. The Taiwan-Japan fishery agreement helps solve the problem of overlapping EEZs in the East China Sea.

Chapter Six holds that the Taiwan Fisheries Law must be reformed on issues of the ownership of marine resources and the fishery labor force in order to achieve an ultimate sustainable fisheries view. Moreover, the Taiwan Government must strengthen the centralization of fisheries management authorities and should not release the law-making powers of fisheries regulations to local governments because the commonality of marine ecology differs from the land concept. On the legal basis of centralized management, it is necessary to strengthen the input and output management of fishing powers and fishing capacity in order to meet the standards required by ProFish.

In the seventh chapter, examples of fisheries in the East China Sea are examined. Shark meat is difficult to reconcile with environmental standards like ProFish. But with the help of further management and scientific research, crabs, mackerels, neritic squids, and Mahi-mahi all have the potential and opportunity to be certified. However, when the fisheries management of each species is considered, “the lack of accurate catch data” is the biggest obstacle to achieving sustainable fisheries. Therefore, in the Chapter Eight, consideration is given to how Taiwan can obtain correct information on the catch yield in coastal and offshore fisheries. One possibility is to introduce the sales declaration legal system in Taiwan for the purpose of simultaneously appreciating the economic value of fishing. In this way, Taiwan can truly achieve sustainable fisheries. After all, oversupply leads to a decrease in fish price, which harms the ocean and the fishermen.

However, all fisheries management requires government budgetary input. A good budget can help fisheries and marine ecology recover well. Inadequate government

investments, especially direct subsidies to fishing boat fuel expense, may result in overfishing. However, subsidies for mandatory closed fishing seasons are necessary within the range of green subsidies. Other subsidies leading to IUU fishing should be gradually abolished.

After reviewing the issues above, a conclusion is drawn that in addition to solving the current problems one by one legally, it is essential to consider a new long-term method to address the plights or dilemmas, especially taking advantage of the popular technology of Artificial Intelligence to manage fisheries. Therefore, the present author designed a set of proposals: to create a digital smart fishery management system “iFish Project”, using current science and technology as an effective tool to combine management systems for fish, fishing boats, and crews.

A network of MPAs is outlined. Itu Aba Island (Taiping Island) should become an MPA because it is an important source of marine living resources in the East China Sea.

Because government agencies can be inflexible and have inherent limitations, the Taiwan Government should capitalize and establish a marine conservation fund. The foundation can work on sustainable seafood promotion to improve fishing methods and to promote MPAs.

Finally, in order to achieve the above ideals and goals, reference is made to many countries in the world; the Taiwan Government needs to establish a Ministry of Oceans and Fisheries in place of the Ocean Council temporarily operating now. The Taiwan Government must improve the quality of governing and increase the budget and manpower resources of the Fisheries Agency to establish sustainable fisheries management as the first major axis of ocean affairs, A newly-established Ministry of Oceans and Fisheries then needs to act upon the recommendations contained in each chapter of this work.

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