Coping with Overcapacity/Overfishing: Experience of Japan

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Preventing the incidence of over-exploitation is a central element of fisheries management. Therefore, fisheries managers should be able to comprehend the degree of exploitation in a fishery resource and if managers fail to take appropriate actions to avoid over-exploitation of the resource, they do not fulfill the goal of a very important mission, which is making sustainable utilization of fishery resources come true. Although fisheries managers are working with fishers and other relevant stakeholders who are making money from the fishery resources, in reality it is not an easy task to undertake fisheries management by limiting the fishing capacity at an appropriate level and avoiding and/or addressing the problem of overcapacity which undermines the longer term sustainability of the fishery resources. Then, how should fisheries managers work on such a challenging task? The International Plan of Action for the Management of Fishing Capacity adopted by the FAO Committee on Fisheries in 1999, urges FAO Member Countries to apply a three-phase implementation scheme while tackling with management of fishing capacity in their respective countries (FAO, 2008). These phases are: (1) assessment and diagnosis; (2) adoption of preliminary management measures; and (3) system of periodic reviews and adjustments. This article is therefore aimed at making a commentary for readers to comprehend the efforts of Japan in managing fishing capacity and in avoiding the occurrence of overfishing, which the Southeast Asian countries could refer to in managing their respective fisheries and preventing overcapacity as well as overfishing. Firstly, the institutional system of Japan's fish stock assessment are explained, and then, the Pacific Bluefin Tuna (PBFT) is referred to as a typical case of Japan's endeavor in eliminating overfishing.

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Framework for Assessment of Fishery Resources in Waters Surrounding Japan

The Fisheries Research Agency (FRA) of Japan carries out every year, an assessment of stocks of main fishery resources in the waters surrounding Japan. In 2013, FRA conducted the assessment of 84 stocks of 52 species. However, assessment of the so-called "International Stocks" such as the highly migratory species, *e.g.* tuna and tuna-like species, and anadromous species, *e.g.* salmons are covered by other frameworks of stock assessment being implemented in Japan in close coordination with relevant international bodies. The chronological changes in the results of the assessment showed that the proportion of low-level stocks had been decreasing while the medium-level stocks had been increasing as shown in **Fig. 1**.

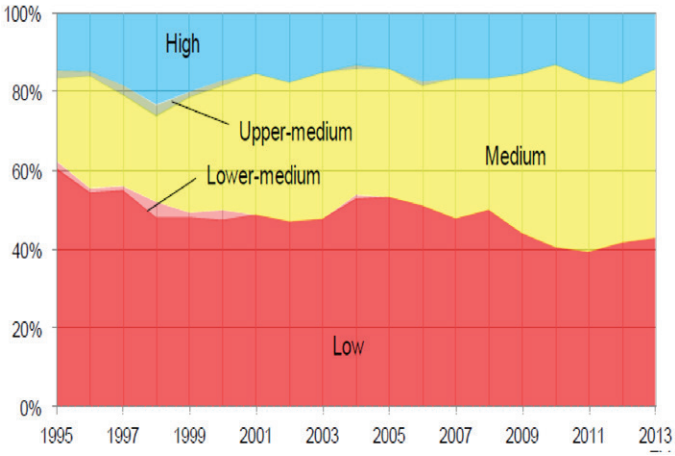

Fig. 1. Changes in the results of marine fishery resources assessment in Japan (FAJ, 2014b)

Based on the results of the stock assessments, the Fisheries Agency of Japan (FAJ) explained that the fishery resources in waters surrounding Japan is generally stable (FAJ, 2014a). In addition to the efforts of FRA to carry out stock assessment at the national scale, the Fishery Experimental Stations and Research Centers in 39 coastal prefectures all over Japan are also committed to conduct stock assessment on their own. The target species of the Prefectural Stock Assessments are typically the sedentary but local commercially-important resources (**Fig. 2**), *e.g.* bivalves, sea cucumber, and flatfish.

Strengths of the Fishery Resources Assessment in Japan

Considering that in Japan, most of fishers' catch are sold through fishers' organizations, *e.g.* Fisheries Cooperative Associations, collection of data at landing sites is relatively easy. This leads to reliable national fisheries statistics of Japan which is compiled by the Statistics Department of the Ministry of Agriculture, Forestry and Fisheries. Moreover, well-established research institutes and their networks including the FRA, Prefectural Experimental Stations and universities are always at hand to collaborate in the stock assessment activities, by providing the necessary resources needed for stock assessment, *e.g.* human resources and infrastructures (**Fig. 3**).

Fig. 2. Examples of target species for the Prefectural Stock Assessments in Japan: bivalves (*left*), sea cucumber (*center*), and flatfish (*right*)

Fig. 3. (*left*) Staff of Fisheries Research Centers collect catch data at a landing site *(Source: Kumamoto Prefecture)*; and (*right*) Fishery Research vessel dispatched for stock sampling surveys *(Source: Fisheries Research Agency of Japan)*

However, still many challenges confront the stock assessment activities in Japan. These include difficulties in securing sufficient budgetary allocations and maintaining the experienced staff, considering that the financial situation in Japan both in central and local governments had been getting worse during the recent years. In order to mitigate such hardships, activities that aim to raise the awareness of tax payers and policy makers on the importance of fisheries research have been strengthened.

How Japan is coping with Overcapacity/ Overfishing? A case of the Pacific bluefin tuna

The Pacific bluefin tuna (*Thunnus orientalis*) is a commercially valuable species. In fact, the average wholesale price of bluefin tuna (Pacific and Atlantic bluefin tuna) sold at Tsukiji Fish Market (**Fig. 4**) in 2015 was 3,792 Japanese Yen per kg (about 31.60 USD/kg). In view of its high quality meat, bluefin tuna is mainly consumed and eaten raw, *i.e.* sushi and sashimi. It is assumed that Japanese fishing vessels accounts for about 70% of world's Pacific bluefin tuna (PBFT) catch. Since PBFT migrate the whole temperate waters of the Pacific Ocean, it is also caught by fishing vessels of other countries, *e.g.* Mexico, Korea, and majority of the foreign catch are brought into Japanese market to be used as sushi and sashimi ingredients. This implies that Japan has a big responsibility for the sustainable utilization of PBFT stocks not only as a major fishing but also as a big market country (FAJ, 2013).

As the scientific body responsible for international stock assessment of PBFT, the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean (ISC) indicated that the PBFT biomass level for 2012 is nearing the historically low levels and there is a need to reduce catch of juveniles by 50% in order to restore the stock to historically medium level. Following the recommendation of ISC, the Western and Central Pacific Tuna Fisheries Commission (WCPFC) adopted a management measure of reducing the catch of juvenile PBFT (less than 30 kg) by 50% starting in 2015. This measure applies to tuna fisheries in all the WCPFC convention area including Japan's EEZ. Thus, Japan is responsible for the success of this management measure as a major fishing country as well as a major market country, the country of "sashimi eaters." As a major fishing/market country of PBFT, Japan through the FAJ has been determined to implement this drastic management measure and tackle the 50% reduction of juvenile PBFT (less than 30 kg) in Japanese fisheries. The strategy adopted by FAJ is to involve all fishers who catch PBFT, in this drastic PBFT management measure without any exception.

Fig. 4. First auction of 2015 for bluefin tuna at Tsukiji Fish Market, Tokyo

Guided by the firm belief that PBFT resource could be restored if it would implement appropriate management measures, as in the successful case of the Atlantic Bluefin Tuna restoration introduced and implemented by the International Commission for the Conservation of Atlantic Tunas (ICCAT), FAJ put into effect a regulation imposing that all relevant fisheries must abide by the said catch reduction measure. Moreover, FAJ enforced that there should be no "free riders" to such regulation, *i.e.* fishers who are free from the catch reduction scheme, thereby benefiting from other fishers' catch reduction effort. It should be recalled that more than 90% of PBFT catch in Japan are juveniles (less than 3 years old). PBFT are caught by trawling

Box 1. Legislative and Institutional Systems regarding Fishing Capacity Management of Japan

1. Fishery Right System in Coastal and Inland Water Fishing Grounds

(Based on Fisheries Law, Prefectural Governors grants, Fishery Rights to qualified applicants)

- The Prefectural Governor designates coastal and inland fishing grounds which are suitable for establishing Fishery Rights. Then, the Governor will grant Fishery Rights to qualified applicants. There are 3 types of Fishery Rights.

Fishery Rights	Type of Fisheries/Aquaculture	Qualified/legal person	Duration
Common Fishery Rights	Fishery for Sedentary Aquatic Species, Small Scale Fixed Net, Inland Water Fisheries, etc	Fisheries Cooperative Associations (FCAs)	10 years
Demarcated Fishery Rights	Any Aquaculture Operation in public waters	FCAs or Private Aquaculture Business (person/legal person)	10 years or 5 years
Fixed Net Fishery Rights	Large Scale Set Net Fisheries (depth of the catching net exceeds 27 m, etc.)	Private Fishery Business (person/legal person)	5 years

- Persons/Legal Persons who are granted Fishing Rights are responsible for maximizing fishery production in the designated area through realization of well-coordinated fishing activities
- For this purpose, Fisheries Cooperative Associations (FCAs) who are granted fishing rights will establish autonomous regulations titled "Fishery Right Exercise Rule"
- Fishery Right Exercise Rule determines conditions of fishing operation in the designated area, such as: seasonal closure of fisheries; closure of fishing ground; number of fishers eligible for designated fishery, thereby sustaining well-organized fishing operations by each FCA member (fisher), as well as preventing overfishing in the area of Fishery Right

2. Fishery License System

2.1 License of Designated Fisheries, etc.

(Based on Fisheries Law, Minister of Agriculture, Forestry and Fisheries issues licenses for operation of Designated Fisheries)

- As for large scale offshore and distant water fisheries, it is necessary to implement rigid control measures of fishing capacity (*i.e.* number of fishing vessels, size and engine power of fishing vessels, etc) in order to secure sustainable utilization of target resources
- These large scale fisheries typically operate in waters off the coast of multiple Prefectures or even in International Waters, and thus are suitable for nation-wide uniformed regulation by the responsible Minister
- 13 types of fisheries are designated by Government Ordinance (based on Fisheries Law), so these fisheries are called "Designated Fisheries". The Minister issues licenses for operation of Designated Fisheries. Examples of Designated Fisheries: Trawl fishery (Vessel Size ≥15 tons), Purse Seine Fishery (≥40 tons), Skipjack Baitboat Fishery (≥10 tons), Tuna Longline Fishery (≥10 tons), Squid Jigging Fishery (≥30 tons), Salmon Drift Net Fishery (≥30 tons)
- Persons/Legal Persons who want to operate Designated Fishery have to receive licenses issued by the Minister
- The Minister determines maximum number of fishing vessels or maximum total gross-tonnage of fishing vessels for each fishery, and licenses are issued within such limitations
- The Minister imposes restrictions/conditions on the license, such as: size of fishing vessels; prohibited area; and prohibited season, thereby securing sustainable fishing operations
- There is one more category of fisheries under the Minister's direct control, which is called "Specific Fisheries with Minister's License" (5 fisheries including Snow Crab Trap Fishery and Deep Sea Gill Net Fishery in the Pacific)
- These fisheries are deemed not necessary to impose such rigid management measures as on Designated Fishery, but need to limit number of engaging fishing vessels, and the Minister issues licenses for operation of these fisheries

2.2 Fisheries licensed by Prefectural Governors

(Based on "Fisheries Coordination Regulation" established by Prefectural Governors according to related articles of "Fisheries Act " and "Act on Protection of Fisheries Resources", Prefectural Governors issue fishing licenses)

- As for fisheries outside of the scope of Minister's control, Prefectural Governors can impose necessary regulations for well-organized fishing operations and for conservation and management of fishery resources off the coast of the Prefectures
- Prefectural Governors itemize fisheries which require Governor's license. Fishers granted such fishing licenses have to operate in accordance with "Fisheries Coordination Regulation*" as well as conditions/restrictions imposed on the license

3. Fisheries Notification System

(Minister of Agriculture, Forestry and Fisheries requires notification from the fishers for engaging in specific fisheries, based on Ministerial Ordinance (established according to "Fisheries Law" and "Law on Protection of Fisheries Resources"))

- As for fisheries which do not need licenses and which are out of scope of Fishery Rights, any fishers of Japanese Nationality (including legal person) can freely operate fishing activities
- As for fisheries Minister considers it necessary to monitor states of fishing operations, the Minister requires notification from fishers for engaging in such fisheries as well as mandatory report of fishing activities

4. TAC System

(Based on "Act on Preservation and Control of Living Marine Resources", Minister of Agriculture, Forestry and Fisheries and Prefectural Governor take charge of TAC management)

- The Minister determines Total Allowable Catch (TAC) for7 kinds of fish every year
- The 7 kinds are: Saury; Walleye Pollock; Sardine; Mackerel (Chub Mackerel and Spotted Mackerel); Jack Mackerel; Japanese Common Squid; and Snow Crab
- These kinds of fish is designated as TAC controlled fishes mainly because of (1) importance for national economy, and (2) availability of sufficient scientific information to determine TAC

Box 1. Legislative and Institutional Systems regarding Fishing Capacity Management of Japan (Cont'd)

4. TAC System (Cont'd)

- TACs are established annually based on Allowable Biological Catch (ABC), as well as in consideration of status of fishery business management
- Allocation of TAC is divided into the following 2 categories: (1) Fisheries under control of the Minister such as (a) Designated Fisheries and (b) Specific Fisheries with Minister's License), the amount of TAC allocation of which is determined fishery by fishery; and (2) Fishery under control of Prefectural Governors such as (a) Fisheries under Fisheries Right and (b) Fisheries licensed by Governors, the amount of TAC allocation of which is determined prefecture by prefecture
- Fishers who catch TAC species are responsible for reporting amount catch though Fisheries Cooperative Associations (FCAs) and other fisher's organizations.
- The Minister and Prefectural Governors are responsible for monitoring accumulated catch for TAC species and take necessary measures including order of ceasing fishing operations.

5. TAE System

(Based on "Act on Preservation and Control of Living Marine Resources", Minister of Agriculture, Forestry and Fisheries takes charge of TAE management)

- In order to support "Resources Recovery Plan"(Action Plan for cooperation of every stakeholders (fishers, managers, scientists, distributors etc.) with the aim of urgent actions toward restoration of depleted fishery resources), the Minister determines Total Allowable Effort (TAE) of target species by designated fishery in the designated area
- Typically, TAE is in the form of "Number of Fishing Vessels multiplied by Fishing days"
- The Minister notifies establishment of TAE to relevant Prefectural Governors every year, thereby supporting Prefectural Governor's control of fishing efforts towards target species

6. Control Systems of Fishing Vessels

6.1 Permission for Construction of Fishing Vessels

(Based on "Fishing Vessel Act", Ministry of Agriculture, Forestry and Fisheries or Prefectural Governors grant permission for Fishing Vessel Construction.

- In order to ensure well-ordered fishing operations, permission of the Minister or relevant Prefectural Governor is required for construction of any fishing vessels equipped with engine and whose length is 10 m and more
- As for construction of fishing vessels which needs Minister's license for their fishing operation, permission of the Minister are required
- As for construction of fishing vessels which needs Prefectural Governor's license for their fishing operation, permission of the Prefectural Governors are required
- As for construction of fishing vessels which does not need any license for its fishing operation: Minister grants permission for construction of vessels 20 gross tons and more; and Prefectural Governor grants permission for construction of vessels less than 20 gross tons

6.2 Registration of Fishing Vessels

(Based on "Fishing Vessel Act", Prefectural Governors takes charge of fishing vessels registration)

- All fishing vessels equipped with engine and whose size are 1 gross ton and more have to be registered in the "Fishing Vessels Registration List", and receive a "Fishing Vessel Registration Card"
- Prefectural Governors are responsible for compiling Fishing Vessels Registration List as well as issuing Vessels Registration Card for vessels which have base of operation within the area of the prefecture
- To confirm that actual status of a fishing vessel is in line with the contents of Vessel Registration Card, the vessel owners have to undergo a vessel inspection every 5 years

7. Other Regulations Related to Fishing Capacity Management

7.1 Restriction of Fishing Gears/Fishing Methods used by non-fisher people

(Based on "Fisheries Coordination Regulations", Prefectural Governors takes charge of this regulation)

- "Fisheries Coordination Regulations*" of all 47 prefectures in Japan stipulates "Restriction of Fishing Gears/Fishing Methods used by non-fisher people"
- By this regulation, fishing gears/methods allowed for "ordinary people" (non-fishers) are itemized in the regulation. Typically, Pole Fishing, Handline Fishing, Casting Net, Small Scoop Net, Fish Lance, Shellfish Tearing Devices, etc, are itemized in the regulation
- Through this regulation, eligible people to use effective fishing gears/methods is limited to fishers, which has effects to prevent excessive utilization of fisheries resources in coastal and inland fishing grounds

7.2 Regulation on activities of Foreign Fishing Vessels in Japanese Port

(Based on "Act on Regulation of Fishing Operation by Foreign Nationals", Minister of Agriculture, Forestry and Fisheries takes charge of this regulation)

- Foreign Fishing Vessels are not allowed to carry their catch (fish) directly from the fishing ground into Japanese Port. If they want to carry fish and enter into Japanese Port, the fish have to be accompanied by "certifications of foreign country's authorities" which certify that the fish had been shipped from foreign ports
- This regulation prohibits utilization of Japanese Port as "fishing bases" of foreign fishing vessels, thereby preventing excessive fishing pressures by foreign fishing vessels in waters surrounding Japan.

8. Enforcement of Regulations related to fishery

- Fisheries Enforcement Officers are appointed both from FAJ and all Prefectural Offices. Enforcement officer of FAJ serve as "National Fisheries Enforcement Officers", whereas Enforcement officers of Prefectural Government serve as "Prefectural Fisheries Enforcement Officers"
- To attain "compelling power" which is of vital importance for effective enforcement of regulations, Fishery Enforcement Officers are in close cooperation with relevant Law-Enforcement Organizations, including Coast Guard and Prefectural Police

Fig. 5. Growth of Pacific Bluefin Tuna
Adult fish (*left*), fish with 60 cm fork length (*middle*), and (*right*) fish with 20 cm fork length (Source: Fisheries Research Agency of Japan)

line fishery catching less than one (1) year old juveniles for sashimi-tuna and aquaculture seed stock; purse seine fishery catching 1-3 year old juveniles for sashimi-tuna; handline fishery catching adults more than 4 years old for highest quality sashimi-tuna; and other fisheries mainly the set net fishery.

Implementation of PBFT Catch Reduction Measure

In implementing the drastic catch reduction measure for PBFT, FAJ convened a number of consultations with fishers to make them understand the rationale of the said measure and to obtain their support to reduce the catch of PBFT juveniles. FAJ also intends to be transparent in the implementation of the measure which should be fair to all fishers. Following intensive discussions with fishers, FAJ decided to introduce the nation-wide measure to reduce catch of juvenile PBFT (less than 30 kg) by half (from 8,015 to 4,007 metric tons of MT) starting in January 2015 (the average annual catch of Japan in 2002-2004 was 8,015 MT). The total reduced catch of 4,007 MT was divided and allocated to each fishery taking into consideration their respective previous catch records. Therefore, the allocation for purse seine fishery is 2,000 MT and 2,007 MT for the other coastal fisheries, *i.e.* trawling line, set net, and others. However, it should be considered that these data are based on information available as of February 2015.

In implementing the said catch reduction measure, FAJ introduced a Monitoring System for juvenile PBFT catch. The allocation of 2,000 MT to purse seine fishery is monitored and controlled by the Purse Seine Fishers' Organization covering each fishing area. Considering that monitoring the allocation to coastal fisheries could be complicated, FAJ authorized the Fisheries Cooperative Associations to monitor and report the catch of PBFT from coastal fisheries to FAJ. Under the newly-established reporting/monitoring system, the 39 prefectures in Japan (all prefectures facing the sea) are divided into 6 blocks, and parts of total amount (2,000 MT) are allocated to each block. FAJ compiles the reported catch amount block by block, and feedback the information on catch amount to each prefecture. Each prefecture would then relay the updated catch amount to the fishers through the Fisheries Cooperative Associations. In cases where the catch amount of each block comes close to the allocation, FAJ will issue an alert to warn the concerned block of such a situation. Each prefecture will then notify the fishers about the warning through the Fisheries Cooperative Associations, and control the fishing operation in that particular prefecture. FAJ publicizes the alert/warning to the general public by uploading it to the FAJ website or issuing announcements in press releases, with the aim of obtaining cooperation from various stakeholders, *e.g.* processers, wholesalers, retailers, consumers (FAJ, 2014c).

Challenges in Dealing with Issues of Overcapacity/Overfishing

The importance of forming an understanding and cooperative relationships with fishers is a key to the success of implementing any fisheries management measures. This is especially important taking into account the situation surrounding fisheries business management which is becoming more severe, *i.e.* higher operation costs, lower fish price. Building trust with fishers through frank and intensive exchange of views is crucial in the successful implementation of fishing capacity management measures. As for legal instruments for controlling fishing capacity, Japan has comprehensive legislative and institutional systems for fishing capacity management (**Box 1**). Although such system is surely a big advantage of Japan, what is important in introducing any fisheries management measures, is for fisheries managers to be always fair, prudent and transparent.

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