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STRUCTURAL AND COHESION POLICIES

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FISHERIES IN JAPAN

NOTE

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POLICY DEPARTMENT B: STRUCTURAL AND COHESION POLICIES

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AUTHOR

Irina POPESCU, Toshihiko OGUSHI
Policy Department B: Structural and Cohesion Policies
European Parliament
E-mail: poldep-cohesion@europarl.europa.eu

EDITORIAL ASSISTANCE

Virginija KELMELYTE

LINGUISTIC VERSIONS

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ABOUT THE EDITOR

To contact the Policy Department or to subscribe to its monthly newsletter please write to:
poldep-cohesion@europarl.europa.eu

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Abstract

Japan is one of the world's most important consumers of fishery products. Fisheries traditionally play a considerable role in its food supply and form a key element of the regional economies in coastal areas. Japan has developed its own set of values and habits in terms of fisheries practices, along with an elaborate fisheries management system. This note provides an overview of fisheries activities in Japan and reviews some specific aspects of this highly complex sector.

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LIST OF ABBREVIATIONS

ABC	Allowable Biological Catch
AFCC	Area Fishery Coordinating Committee
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CDS	Catch Documentation Scheme
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EEZ	Exclusive Economic Zone
FCA	Fishery Cooperative Association
FMO	Fishery Management Organization
FRA	Fisheries Research Agency
GDP	Gross Domestic Product
HACCP	Hazard Analysis and Critical Control Points
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICR	Institute of Cetacean Research
ICRW	International Convention for the Regulation of Whaling
IOTC	Indian Ocean Tuna Commission
IQ	Individual Quota
ISC	Interim Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean
ITQ	Individually Transferable Quota
IUU	Illegal, unreported and unregulated (fishing)
IWC	International Whaling Commission
JARPA	Japanese Whale Research Program under Special Permit in the Antarctic

JARPN	Japanese Whale Research Program under Special Permit in the North Pacific
MAFF	Ministry of Agriculture, Forestry and Fisheries of Japan
OPRT	Organization for the Promotion of Responsible Tuna Fisheries
RFMO	Regional Fisheries Management Organization
TAC	Total Allowable Catch
TAE	Total Allowable Effort
TUMSAT	Tokyo University of Marine Science and Technology
TURF	Territorial Use Rights in Fisheries
VMS	Vessel Monitoring System
WCPFC	Western and Central Pacific Fisheries Commission
WTO	World Trade Organization

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EXECUTIVE SUMMARY

Japan plays a leading role in global fisheries, both as one of the world's top producers and as a major importer of fishery products. Surrounded by some of the most productive fishing grounds on earth, teeming with a wide variety of resources, Japan has long been a most important fish consumer and has developed an exquisite fish-rich food culture.

The high diversity of Japan's seafood resources is reflected in the great complexity of its multiple-layer **fisheries management** system. The Fisheries Agency, affiliated to the Ministry of Agriculture, Forestry and Fisheries of Japan (MAFF), is the national government body in charge of Japan's fisheries management. Coastal fisheries are co-managed by national and prefectural authorities along with organizations of local fishers called Fishery Cooperative Associations (FCA), based on a system of fishing rights. In offshore and distant waters, a fisheries licencing system is applied, with national and prefectural governments sharing the responsibilities depending on the type of fishery. This input control is further reinforced by a Total Allowable Effort (TAE) system. Japan also introduced Total Allowable Catches (TAC) as output control. Various technical measures complement this system. The efforts to combat IUU fishing are based on strengthened monitoring of fisheries activities and on strict importation procedures.

Japan's total **fishery production** has been on decrease over the past decades. The production fell to 5.32 million tonnes and 1.47 trillion yen in 2010, declining by more than half from the peak values of the early 1980s. The decline was mainly due to decreasing activity in distant waters after the establishment of the EEZ regime, and to the fall in the sardine resource level. **Marine catches** constitute most of the production (ca. 76% of the total volume). Their composition is extremely varied, with no single species in dominant position. Mackerel, anchovy, skipjack, saury and scallop are among the main catches in volume, whereas tuna species are the most valuable fisheries (14% of the total value of the marine catches). **Marine aquaculture** provides a significant part of the total production (ca. 21%). The main products are *nori* (laver), scallops and oysters, as well as higher value yellowtail. The scale of **inland water fisheries and aquaculture** is relatively limited, but they produce some valuable species, such as eels which account for 66% of the total value of inland aquaculture, and *ayu* (sweetfish) - 39% of the value of inland fisheries. New developments in aquaculture include artificially hatched bluefin tuna and Japanese eel.

Table 1: Key data

Area	377 801 km^2
Population (2010)	128 million
Capital	Tokyo
Flag	
Seas	Sea of Japan, Sea of Okhotsk, north-western Pacific Ocean, Philippine Sea, East China Sea
Length of continental coastline	29 751 km
Exclusive Economic Zone	4.47 million km²

Source: Diverse

Several specific fisheries have a particular significance in Japan.

- The highly-prized **bluefin tuna** is such a case. Japan consumes 80 to 90% of the global production of Atlantic and Pacific bluefin tuna. The total supply amounted to 40 700 tonnes in 2011, of which 62% came from Japan's production. The remaining 38% was imported, mainly from Mexico, Malta, Croatia, Spain and Turkey. While the majority of the Pacific bluefin is provided by Japanese catches and aquaculture, most of the Atlantic bluefin is imported.
- Japan is also the world's most important consumer of **eel**, accounting for nearly 70% of the global figure. The catches of wild adult Japanese eel have declined by more than 90% since the late 1960s, to 229 tonnes in 2011. Similarly, the catches of glass eel have decreased to 10 tonnes in 2011. Japan's eel production is dependent on aquaculture, which provides 99% of the domestic production. More than half of the eel consumed in Japan comes from imports. Virtually all processed eel products are imported from China, while live eel is mainly from China and Taiwan.
- There has been considerable debate over Japan's **whaling** policy. In 1988 Japan accepted the moratorium to suspend commercial whaling adopted at the International Whaling Commission (IWC), but launched a scientific whaling program, aiming to collect whale stock data to support resuming of commercial whaling. During the programme Japan has caught an average of ca. 400 whales per year in the Antarctic, and ca. 150 whales in the Pacific, in particular minke whales. The programme has become a very controversial international issue, involving various legal, scientific, political, economic, ethical and cultural arguments.

Japan implemented various schemes in order to reduce its **fishing fleet**, which resulted in a net decrease in the number of vessels and in the gross tonnage. However, the total engine power conversely increased, as well as the mean engine power. Small scale vessels dominate Japan's fisheries, as the fishing fleet over 10 tons accounts for only 4% of the total number of vessels. Major parts of the catches are taken by the trawling segment (21%), purse seines (ca. 10%), and by different types of set nets (ca. 13%).

Almost 90% of Japan's fisheries production is used for domestic consumption. After a period of recovery in the early 2000s, Japan's **exports** of fishery products have shrunk since 2008 due to the economic crisis. In addition, the March 2011 earthquake and tsunami and the Fukushima nuclear accident have contributed to the decrease of the exports and to higher imports. In 2011, Japan's fishery exports amounted to 424 000 tonnes and 174 billion yen (a contraction of 25% and 11% respectively compared to the previous year). High volumes of mackerel and skipjack were exported (24% and 11% of the total respectively), but the most valuable products were pearls (11% of the total export value), sea cucumber (7%) and scallop (6%). The most important market was Hong Kong, followed by the U.S., China, Thailand and Korea. Export to the EU was very limited: 4 billion yen, i.e. around 2.3% of the total export value. The top three products exported to the EU were pearls (30.7% of the total value), aquarium fish (22.5%) and scallop (20.5%).

The Japanese market of fishery products has become increasingly dependent on **imports**. Japan is now the world's third biggest importer of fishery products after the EU and the USA. In 2011, fishery products imported to Japan amounted to 2.7 million tonnes and 1455 billion yen. China is Japan's most important source of fishery products, and provided 18% of the total value of the imports. Chile (9%) as well as Thailand, USA and Russia (8% each) are also important partners. The main species imported to Japan were shrimps (which represented 13% of the total value of the imports, with processed shrimp adding a further 4%), tuna and swordfish (13%), and salmon (11%). Japan is also a big importer of fish

meal (11% of the volume of the imports). Shrimps, for which the Japanese production is relatively limited, are imported mainly from Thailand and Vietnam. The main sources for tuna are China, South Korea, Indonesia and Thailand, whereas salmon is mostly imported from Chile. The eel, which is an important product on the Japanese market, mainly comes from China. Mauritania and Morocco are Japan's main sources for octopus.

Although fisheries provide an essential part of Japan's food supply, the economic weight of the sector is relatively small: only 0.2% of the national GDP in 2009. However, the fishing industry contributes more to the entire economy through its secondary effects on other sectors such as food and services industries. In 2008, the total number of **employees** in the fisheries sector was 435 067, which accounted for 0.68% of the total working population in Japan. 221 908 people were engaged in fishing activities, dominated by male workers. The distribution and processing sectors employed 213 159 workers and are characterised by over-representation of female workers. The number of fishermen has been in decline and this trend is likely to continue, given that the fishermen aged 65 or above account for more than one third of the total figure, and the average numbers of newly recruited workers are limited.

The 11 March 2011 **earthquake and tsunami** wreaked havoc on the Japanese fisheries. The sector suffered huge damage in a wide area along the Pacific coast: around 28 612 fishing vessels and 319 fishing port facilities were destroyed, and the value of the damages was estimated at 1,263 trillion yen. In particular, the prefectures Iwate, Miyagi and Fukushima were heavily affected, with their damages reaching 91% of the national total. The affected areas had played a significant role in supplying fish products and in supporting fishing industry in other regions (ca. 53% of Japan's total fishery production and 38% of the marine aquaculture production in 2010). The tsunami caused the accident at the **Fukushima** Daiichi Nuclear Power Plant, which resulted in discharge of massive amounts of radioactive material into the ocean and the atmosphere, and has provoked public concerns over radioactive contamination of sea food in and outside Japan. To address these safety concerns, the Japanese government established a "Basic Policy for Inspections on Radioactive Materials in Fishery Products" and strengthened the monitoring efforts. The maximum permissible level for contamination with Cesium was lowered to 100 Bq/kg for food including fishery products (down from 500 Bq/kg, which was already in line with the EU standard). No fishing activities are allowed in the Fukushima area except trial fishing for limited species, and some fishing activities in neighbouring prefectures are suspended. Reconstruction efforts are coordinated through a Basic Plan which launched a series of fisheries-related supplementary budgets of 1.03 trillion yen.

At the centre of **marine research** in Japan is the Fisheries Research Agency (FRA), which conducts a wide range of research and development activities in fisheries, from basic research to practical applications. The FRA provides stock assessments and promotes new developments in aquaculture, among other duties. Academic research in marine sciences and fisheries is highly developed, and many universities and high schools are active in this field.

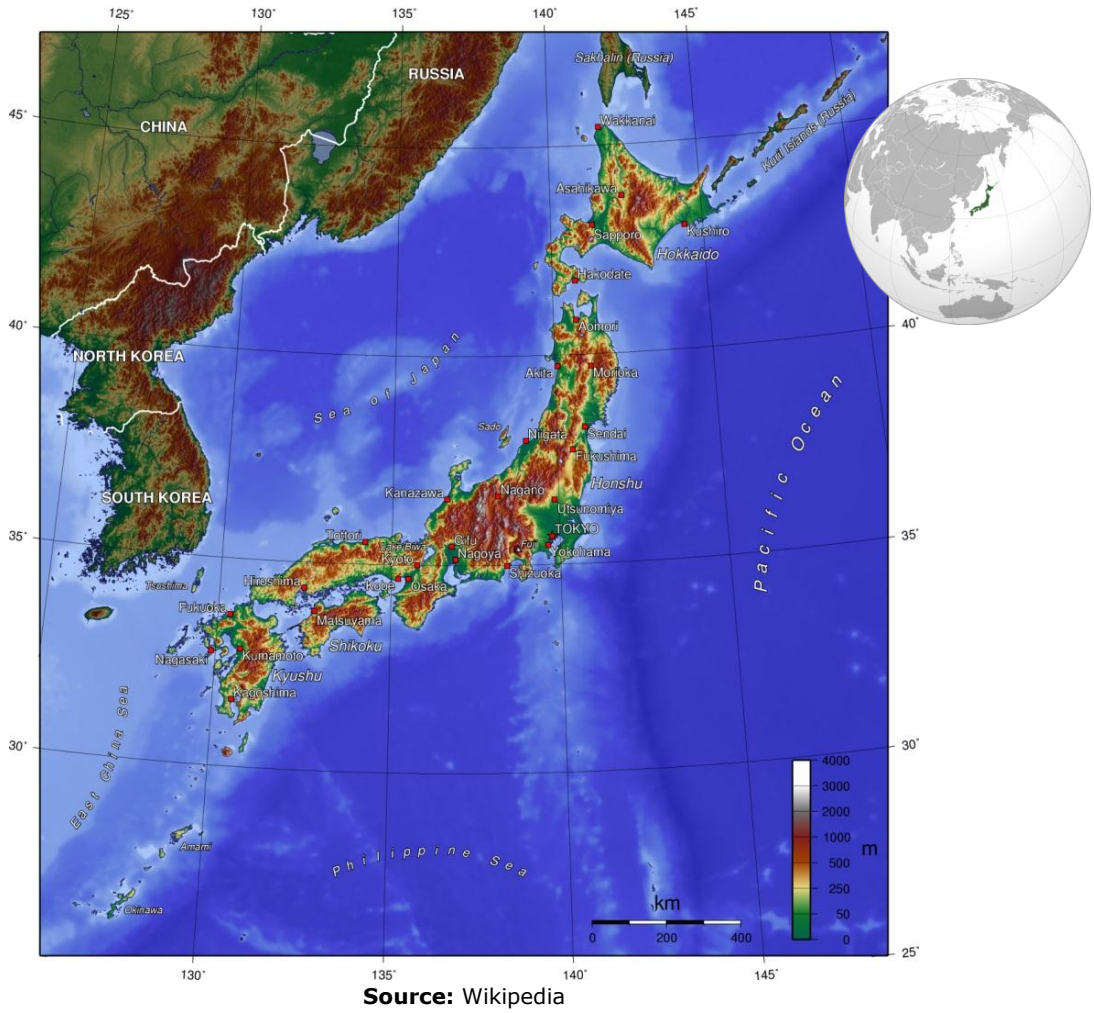
1. INTRODUCTION

Japan is an island country located along the East Asian mainland, in front of Russia, North Korea, South Korea, China and Taiwan. It is surrounded by the Sea of Japan (to the west), the Sea of Okhotsk (to the north), the north-western Pacific Ocean (to the east), the East China Sea and the Philippine Sea (to the south; Figure 1). Japan has a total land area of 378 000 km² and more than 6000 islands. Four main islands constitute ca. 97% of Japan's land area (from north to south): Hokkaido, Honshu, Shikoku and Kyushu. In addition, there are numerous smaller islands. Most of them form the Ryukyu Islands (south-west from Kyushu to Taiwan), the largest of which is Okinawa, and the Izu and Bonin (Ogasawara) Islands (south of Tokyo). The body of water separating Honshu, Shikoku and Kyushu is known as the Seto Inland Sea.

Japan is a predominantly temperate humid country with four distinct seasons, but the climate varies greatly from cool temperate in the north to subtropical in the south. Japan is mostly mountainous, with the highest peak of Mt Fuji reaching 3776 m. As more than 70% of the land is covered by mountains and forest, the habitable zones are mainly located in coastal areas and have high population densities.

Japan's total population is 128 million (2010), out of which 13 million people live in the Tokyo Metropolis (not including outer areas of Tokyo). With a population density of 343 inhabitants/km^2 (2010), Japan is one of the most densely populated countries in the world.

Figure 1: Location and topography of Japan

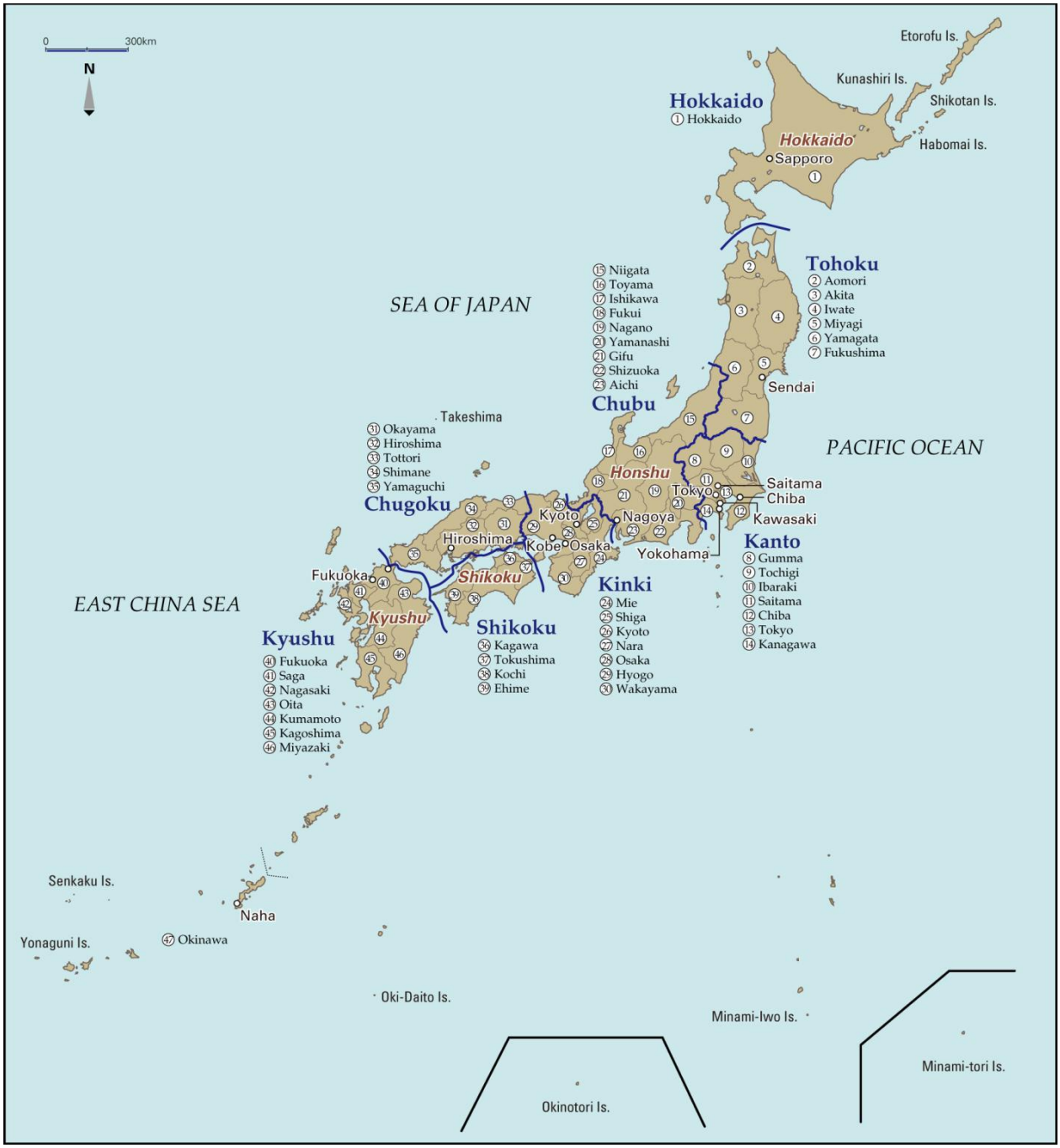


Source: Wikipedia

Japan is a constitutional monarchy and parliamentary democracy, in which the Emperor is head of state. The current emperor Akihito acceded to the throne in 1989. The highest legislative body is Japan's Parliament (*Kokkai*), divided into the upper house (242 seats) and the lower house (480 seats). Parliamentary elections take place every four years for the lower house, and every three years for half of the upper house members.

As regards administrative structures, Japan is currently divided into 8 regions and 47 prefectures (Figure 2). Each prefecture consists of cities and districts (further subdivided into towns and villages). The prefectures, cities and districts have representatives in the local assembly and a directly elected governor or mayor.

Figure 2: Japan's regions and prefectures



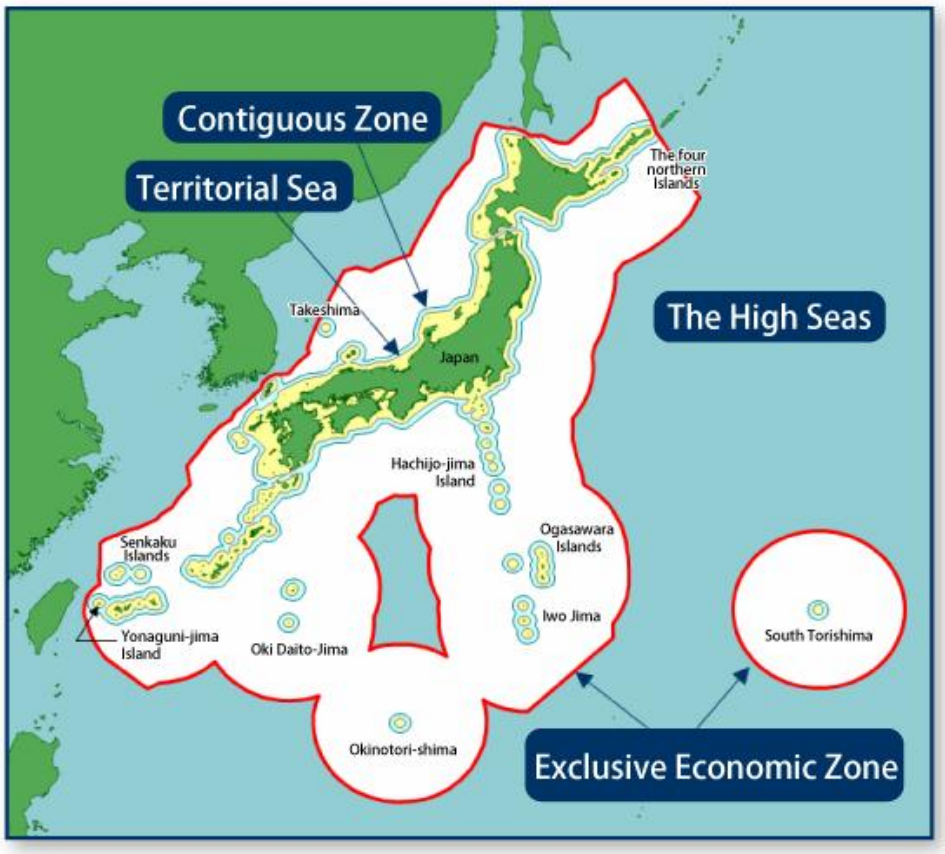
Source: Web Japan http://web-japan.org/

Japan is situated in a volcanic zone on the Pacific Ring of Fire. Frequent low intensity earth tremors and occasional volcanic activity are felt throughout the islands. Destructive earthquakes, often resulting in tsunamis, occur several times a century. The most recent major quake was the 2011 Tohoku event with a magnitude of 9.0, the highest ever recorded in Japan, known as "the Great East Japan Earthquake".

The Japanese coastline is 29 751 km long. The continental shelf around the archipelago is 20 to 30 km wide, with the shelfbreak at an average depth of 140 meters. Continental shelves are broader in the Sea of Japan along the coast of south-western Honshu to Kyushu, and around northern Hokkaido (Figure 1). East of Honshu the seafloor morphology is marked by the 9000 m deep Japan Trench, created by the subduction of the oceanic Pacific plate beneath the continental Okhotsk plate.

Japan's 12-nm territorial waters and 200-nm Exclusive Economic Zone (EEZ) cover an area of 4.47 million km², which is the sixth largest in the world and covers 12 times the area of Japan's land[1] (Figure 3). As regards territorial claims, Japan is involved in three island disputes with its neighbouring countries Korea, China/Taiwan, and Russia[2].

Figure 3: Japan's jurisdictional waters



Source: Asia Biomass Office (after Japan Coast Guard)

[1] This figure includes the EEZ around Okinotorishima in the Philippine Sea. China and South Korea claim that Okinotorishima are not islands but rocks, and should have no EEZ.

[2] The Senkaku Islands, located in the East China Sea, are administrated by Japan but claimed by both China and Taiwan under the name of Daioyu Islands. Japan is also in dispute with South Korea over the Liancourt Rocks in the Sea of Japan, called Takeshima in Japanese and Dokdo in Korean (Korea holds effective control over these islets). The South Kuril Islands, located north-east of Hokkaido, are under Russian administration but claimed by Japan.

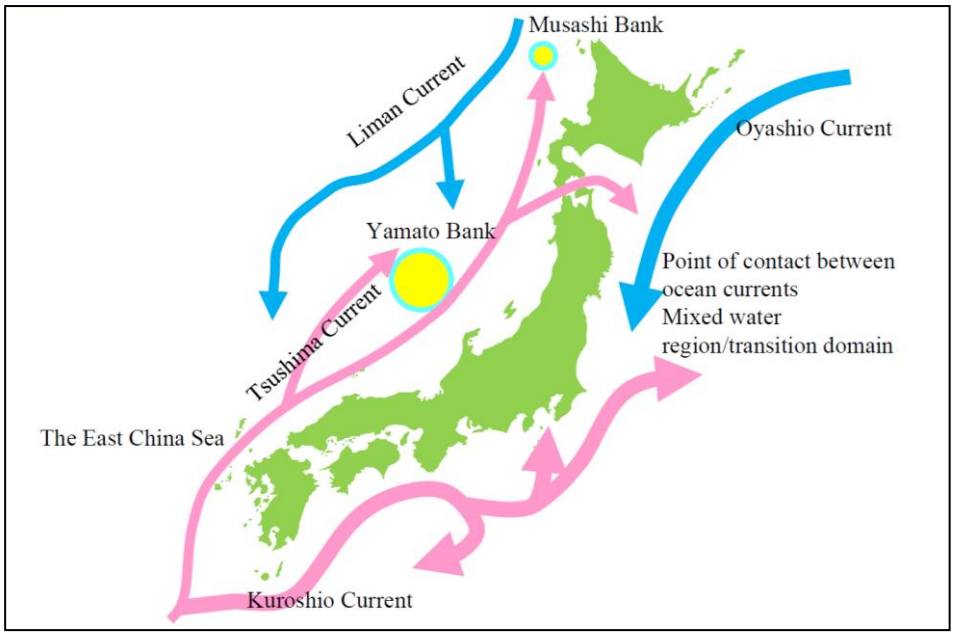
Japan is surrounded by some of the world's richest fishing grounds: the Northern Pacific, which includes Japan's EEZ, accounts for almost 23% of the global fish production. Several factors promote a wide variety of marine resources in waters around Japan (Fisheries Agency 2011a):

- The cold nutrient-rich current Oyashio flowing south collides with the warm current Kuroshio flowing north off the eastern coast of Japan, which creates a high productivity ecosystem (Figure 4).
- A suitable habitat for bottom fish is provided by the relatively broad continental shelves along the coasts of Hokkaido, the Tohoku region (north-eastern Honshu) and the San'in region (south-western Honshu), down to a depth of ca. 200 m. Also, by the terrace-shaped shallow areas of the Yamato Bank and the Musashi Bank in the Sea of Japan (Figure 4).
- The East China Sea and many inner bays around Japan (such as Funka Bay in southern Hokkaido, Ise Bay in southern Honshu, Ariake Sea and Yatsushiro Sea, both in western Kyushu) provide good conditions for abundant fishery resources due to high amounts of nutrients supplied from land areas.

The diversity of fish and shellfish in Japan is such that more than 3300 fish species are found in its waters. No single species constitutes dominant catches, and 80% of Japan's total catch volume is shared among 24 species (Figure 5). For a comparison, in Norway and in Iceland 5 and 6 species respectively account for 80% of the total catch volume (Fisheries Agency 2012b). Most of Japan's fisheries production comes from its EEZ (offshore and coastal waters).

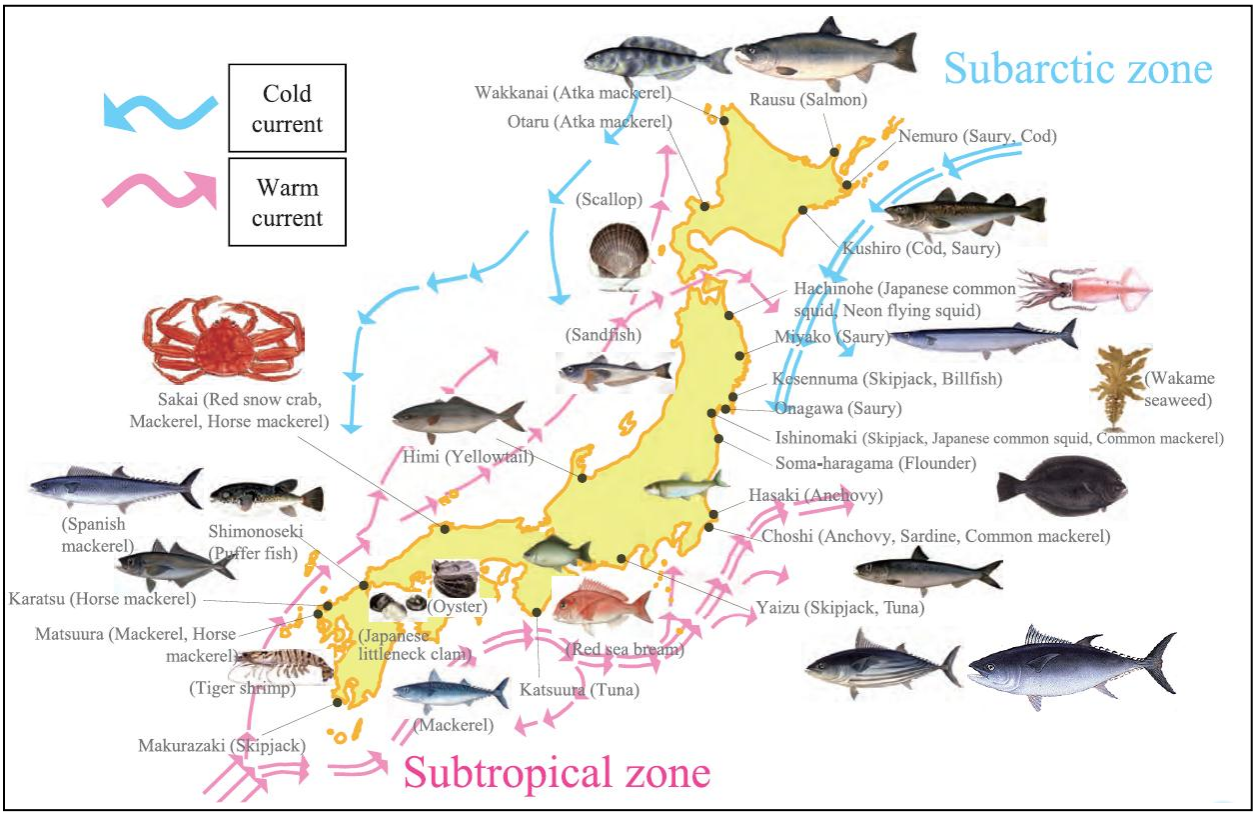
Using the abundant resources, Japan has long developed a fish-rich culinary culture. With a per-capita fish consumption of 56.9 kg (2007), Japan is one of the world's top fish-consuming countries (Table 2). Although the traditional dietary habits of the Japanese people based on rice and fish have changed with the increasing consumption of meat and dairy products, fish products still provide 40% of the animal protein supply (Fisheries Agency 2012b).

Figure 4: Ocean currents around Japan



Source: Fisheries Agency (2011a)

Figure 5: The main species caught in fishing grounds around Japan



Source: Fisheries Agency (2012b)

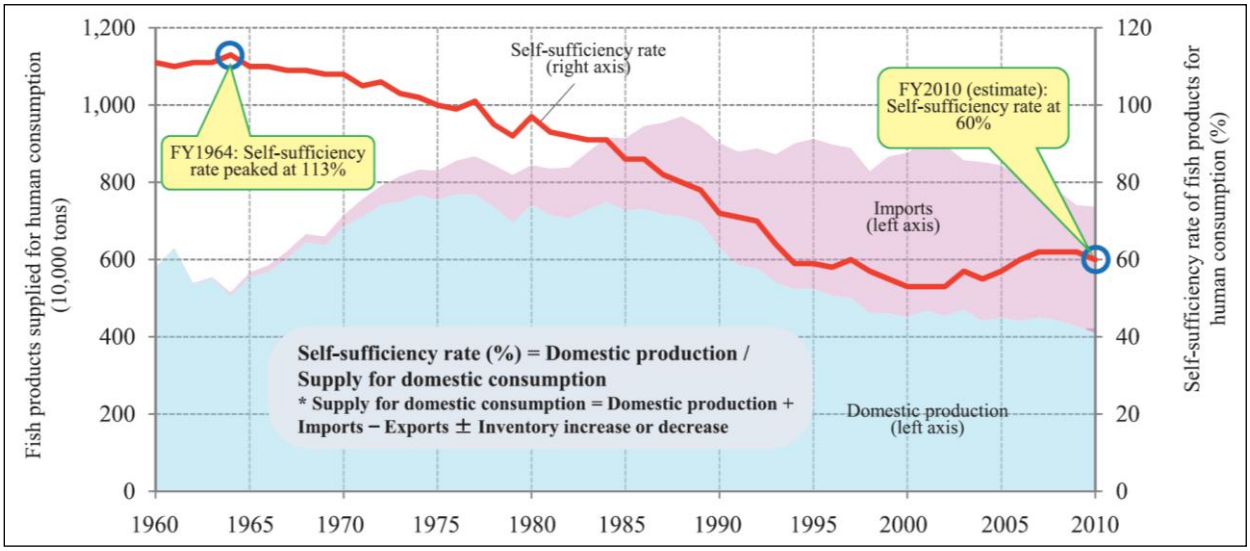
Table 2: Consumption of fish products per capita per year (1961-2007)

	1961	1970	1980	1990	2000	2005	2006	2007
Japan	50,4	61,3	65,5	71,2	67,2	61,5	58,0	56,9
China	4,9	4,6	5,3	11,5	24,5	25,7	26,0	26,5
United States	13,0	14,5	15,4	21,1	21,7	23,9	24,7	24,1
EU (27 countries)	14,5	17,1	16,6	20,1	21,0	22,2	22,1	22,0
India	1,9	2,8	3,1	3,8	4,5	4,8	5,2	5,1
World average	**9,0**	**10,9**	**11,5**	**13,5**	**15,7**	**16,5**	**16,6**	**16,7**

Source: Fisheries Agency (2011a)

Japan is one the world's top producer countries (the 5th on a global scale in 2008; FAO 2010), and its fishing industry is an important sector for providing a vital source of food protein and for maintaining local communities. Nevertheless, the sector has been on a decline for several decades. The total production of fisheries and aquaculture has decreased by more than half from the peaks of the mid-1980s, and the distant water fishing fleets, once operating around many of the world's productive fishing grounds, faced with increased costs, in particular from accessing foreign waters under the EEZ regime. Japan, which used to be the biggest fishing nation in the world, has become a major destination for seafood products, with its imports significantly increasing over the same time period.

Figure 6: Japan's self-sufficiency rate for fishery products for human consumption (1960-2010)



Source: Fisheries Agency (2012b)

As a result, Japan's self-sufficiency rate[3] for fishery products has declined from 113% in 1964 to 60% in 2010 (Figure 6). A number of factors are pointed out as causes: the constant decrease of the number of fishery enterprises and employees, rising fuel-costs, insufficient conservation measures for some species in Japan's EEZ as well as a lack of international cooperation for controlling fish stocks, particularly migratory fish species.

Moreover, the March 2011 catastrophic earthquake and tsunami and the Fukushima nuclear accident ravaged Japan's fisheries, destroying fishery and aquaculture facilities and fishing vessels on the Pacific coast, particularly in the prefectures Iwate, Miyagi and Fukushima. The subsequent Fukushima nuclear accident has caused concerns over the safety of fishery products, which further damaged the fishing sector and the economy of local communities. However, considerable efforts have been made for reconstruction of the various segments of the fishing industry devastated by the disaster (see section 7).

[3] The self-sufficiency rate indicates the percentage of domestic production out of the total supply for domestic consumption.

2. FISHERIES MANAGEMENT

2.1. Legal and institutional framework

The main laws concerning Japanese fisheries are:

- The Fisheries Law (1949, revised in 2007) specifying basic rights to fisheries;
- The Fisheries Cooperation Association Law (1948, revised in 1962) providing a legal framework for Fisheries Cooperation Associations;
- The Fisheries Resources Conservation Law (1951, revised in 2007);
- The Law Concerning Preservation and Management of Living Marine Resources (1996, revised in 2001) introducing a Total Allowable Catch (TAC) system and a Total Allowable Effort (TAE);
- The Sustainable Aquaculture Production Assurance Law (1999, revised in 2005) detailing on measures to promote sustainable aquaculture productions;
- The Basic Law on Fisheries Policy (2001, revised in 2005).

The Basic Law on Fisheries Policy was established in 2001 to overhaul Japanese fisheries in a comprehensive manner. Repelling the Coastal Fishery Promotion Law of 1963, the Basic Law on Fisheries Policy aimed to provide measures for ensuring sustainable exploitation of fisheries resources, a stable supply of fishery products for the country, the development of fisheries communities, as well as the protection of the marine environment. In line with the concept of the Basic Law on Fisheries Policy, the Fisheries Law and the other principal laws have been amended and supplemented with some additional legislation.

In 2002, the Japanese government developed the Basic Plan on Fisheries Policy, in order to realize the measures stipulated in the Basic Law. The Basic Plan, which is subject to change every five years, was last revised in March 2012. This Basic Plan includes concrete measures for reconstructing fisheries industry damaged by the March 2011 earthquake and tsunami.

The **Ministry of Agriculture, Forestry and Fisheries of Japan (MAFF)** is the main governmental body responsible for Japanese fisheries. The **Fisheries Agency**, affiliated to the MAFF, is directly in charge of planning and implementing Japan's fisheries management. The Fisheries Agency hosts 908 employees whereas the MAFF has a total of 18 470 civil servants (2010 figures, in MAFF 2012).

The Fisheries Agency is divided into four departments:

- The Fisheries Policy Planning Department, consisting of the Divisions Policy Planning, Fisheries Management, Fisheries Processing Industries and Marketing;
- The Resource Management Department, consisting of the Divisions Resource Management, Fisheries Management, and International Affairs;
- The Resource Enhancement Promotion Department includes the Divisions Research and Technological Guidance, Resources and Environment, Fish Farming and Aquaculture;
- The Fisheries Infrastructure Department comprises the Divisions Planning, Construction, Fishing Communities Promotion and Disaster Prevention.

In addition, the **Fisheries Policy Council** was established in 2001 within the agency as an advisory body at national level, tasked with setting up the framework of the Basic Plan on Fisheries Policy. The members of the Council are appointed by the government.

Other important fishery organizations include:

- **Area Fishery Coordinating Committees (AFCCs):** the AFCCs are set up at prefectural level as coordinating bodies consisting of nine elected fishermen, four academic experts and two representatives of public interests. There are three broader AFCCs which are covering regional waters across prefectures (Pacific, Seto Inland Sea and Sea of Japan);
- **Fishery Cooperative Associations (FCAs):** FCAs are voluntary associations of fishermen at local level, with the responsibility of managing fish stocks, fishing grounds and the marine environment in designated coastal areas. FCAs are given the exclusive right to operate in certain coastal waters;
- **Fishery Management Organizations (FMOs):** FMOs are more specialised fishing industry associations from the same fishing segment and are mainly involved in offshore or distant waters.

2.2. Fisheries budget

Japan's annual fisheries budget during 2011-2013 averaged 192 billion yen (excluding special shadow budgets as well as supplementary budgets for reconstruction after the March 2011 earthquake and tsunami and the Fukushima nuclear accident). There has been a downward trend over the past decade, with the budget diminishing by 30% from 274 billion yen in 2005 to 193 billion yen in 2013. In 2013 around half of the fisheries budget was allocated to infrastructure-related projects, whereas financial support for fishermen and cooperatives represented 16.5% of the total. Both categories involved significant supplementary budgets. Support for shipbuilding and repair amounted to ca. 6% of the total budget, as well as resource assessment and management measures, Table 3).

With regard to World Trade Organization (WTO) rules on fisheries subsidies, the Japanese government made clear its position as follows (Fisheries Agency 2011a):

- Fisheries subsidies do not always contribute to overcapacity/overfishing;
- Implementation of appropriate fisheries management can prevent or offset the negative effects on fisheries resources even if capacity/effort-enhancing effects are induced by subsidies;
- Prohibition of subsides should be limited to those which are indeed contributing to overcapacity/overfishing.

In addition, Japan's major proposals regarding the WTO rules include:

- Such subsidies as support for fish processing and distribution industries, development and maintenance of infrastructures and income support for fishermen should be eliminated from the proposed list of prohibition by Chair's 2007 text.
- Support for acquisition, construction, repair and modernization of fishing vessels may be prohibited in principle, but exceptions should be granted for certain purposes, such as reducing the total gross tonnage of fishing vessels concerned, ensuring sea safety, and measures necessary for fisheries resource management.

- With regard to support for operating costs of fishing vessels, such support as labor costs and insurance fees should be eliminated from the prohibition list. Support for fuel and fishing gear may be prohibited, but exceptions should be granted in such cases as necessary to mitigate damage to fishermen due to unexpected incidents.

Table 3: Fisheries budget in billion yen (2013)

Budget in detail	Budget 2013	Suppl.	Total	%
Financial support for fishermen and cooperatives	37.3	11.1	48.4	**16.5**
Investment for processing and marketing	1.1	2.5	3.6	**1.2**
Reinforcing fisheries community's multi-functionality	4.8	0	4.8	**1.6**
Financial and other supports for new recruits	2.8	0.5	3.3	**1.1**
Supporting measures for fish farming (eel and bluefin tuna)	0.9	0	0.9	**0.3**
Measures for conservation of fishing grounds	4.6	0	4.6	**1.6**
Resource assessment and management measures	17.4	0.5	17.9	**6.1**
Reinforcing the R&D for eco-friendly vessels	0.2	5.0	5.2	**1.8**
Disaster prevention measures	6.1	4.6	10.7	**3.7**
Infrastructure related projects	85.2	71.2	156.4	**53.3**
Support for ship repairing and building	15.4	3.0	18.4	**6.3**
Others	17.2	1.8	19.0	**6.5**
Total	**193.1**	**100.2**	**293.3**	**100**

Source: Fisheries Agency[4]

2.3. Fisheries management measures

Japan's fisheries management is structured around a fishing rights system for coastal fisheries, and a fisheries licencing system for offshore and distant waters fisheries. Management measures include input control (restriction of fishing effort), output control (restriction of catches) and technical control (restriction of fishing gear and areas), as well as fishermen's voluntary regulations.

Table 4 provides an overview of **input controls** through **licencing and fishing rights**. The Ministry and the prefectural governments share the responsibilities depending on fishery types and fishing areas. The Ministry has responsibility over licences for FMOs in distant waters and in certain offshore fisheries, whereas prefectural governments approve some other offshore fisheries. The coastal fisheries are characterised by a co-management system, which is a combination of governmental or local authority control and self-regulation by FCAs. Prefectural governments are in charge of supervising coastal fisheries by issuing different fishing rights.

[4] http://www.jfa.maff.go.jp/j/budget/25_kettei/pdf/zentaiban.pdf

Fishing rights in coastal areas, or **territorial use rights in fisheries (TURF)**, can take three forms: common fishing rights, large-scale set-net fishing rights and demarcated fishing rights. **Common fishing rights** are given exclusively to FCAs and are used collectively among its members. The rights are non-transferable and subject to update every 10 years. **Large-scale set-net fishing rights** and **demarcated fishing rights** are given to FCAs or other private enterprises, but priority is given to local FCAs when the number of applications exceeds their limit. AFCCs are in charge with providing the MAFF and prefectural authorities with necessary information, and with supervising the process of fishing rights authorization. If necessary these organizations are to provide expertise for a new management plan.

Table 4: Input control through licencing and fishing rights

Public control	Fishery
Designated fishery permitted by the Ministry	Offshore trawl-fishery using vessels over 15 gross tons
	Trawl-fishery in the East China Sea using vessels over 15 gross tons
	Distant waters trawl-fishery using vessels over 15 gross tons
	Medium and large-size purse seine fishery using vessels over 40 gross tons
	Distant waters tuna fishery using vessels over 120 gross tons
	Offshore tuna fishery using vessels of 10-120 gross tons
	Medium-scale salmon drift net fishing (within EEZ) using vessels over 30 gross tons
	Squid jigging using vessels over 30 gross tons
	Saury fishery using vessels over 10 gross tons
	Red snow crab fishery in the Japan Sea
	All types of whaling (including small, medium and large vessels)
Fisheries licensed by the Ministry	Snow crab fishery using vessels over 10 gross tons
	Driftnet fishery in the Japan Sea and East China Sea (within EEZ) using vessels over 10 gross tons
	Long-line fishery in East China Sea using vessels over 10 gross tons
	Long-line fishery in the Atlantic Ocean
Fisheries licensed by prefectural governments	Snow crab fishery using vessels over 10 gross tons
	Driftnet fishery in the Japan Sea and East China Sea (within EEZ) using vessels over 10 gross tons
	Long-line fishery in East China Sea using vessels over 10 gross tons
	Long-line fishery in the Atlantic Ocean
	Bottom gillnet fishery in the Pacific Ocean
Coastal fishing rights by prefectural governments	Common fishing rights (only for FCAs)
	Large-scale set-net fishing rights
	Demarcated fishing rights

Source: Fishery Agency

A **Total Allowable Effort (TAE)** system further reinforces the input control. The purpose of the TAE system is to limit the total fishing capacity, by regulating the number of fishing days and the number of vessels entering certain waters within the EEZ. It can be relatively easily introduced for certain species which are potentially overexploited but for which scientific evidence is insufficient. At present, nine species are subject to the TAE system (flathead flounder, sandlance, Japanese Spanish mackerel, Japanese pufferfish, yellow striped flounder, roughscale sole, willowy flounder, spear squid, and marbled flounder).

As regards **output control**, Japan introduced the **Total Allowable Catch (TAC)** system in 1997. TACs have been set for seven commercially important species that account for ca. 35% of domestic landings on an annual basis (saury, walleye pollock, jack mackerel, sardine, mackerel, common squid and snow crab). The target species for TACs were selected based on three criteria: a) species whose catches rank among the top 30 species; b) species considered overexploited; c) species caught by foreign vessels in Japan's EEZ. Highly migratory species that move across several EEZs are excluded from the TAC system, as well as species located in a specific area only.

In setting a TAC system, the term **Allowable Biological Catch (ABC)** is used as a scientific assessment of the fish stock. Based on historical catch levels and scientific estimation for potential catches, the ABC is calculated with the assistance of a group of external experts. Taking into consideration the ABC and the potential social impact on fisheries enterprises, the Fishery Agency determines the annual TAC in consultation with the FPC and AFCCs, as well as with other stakeholders. However, it is worth noting that TACs have often been set at levels higher than that of ABCs (Figure 7).

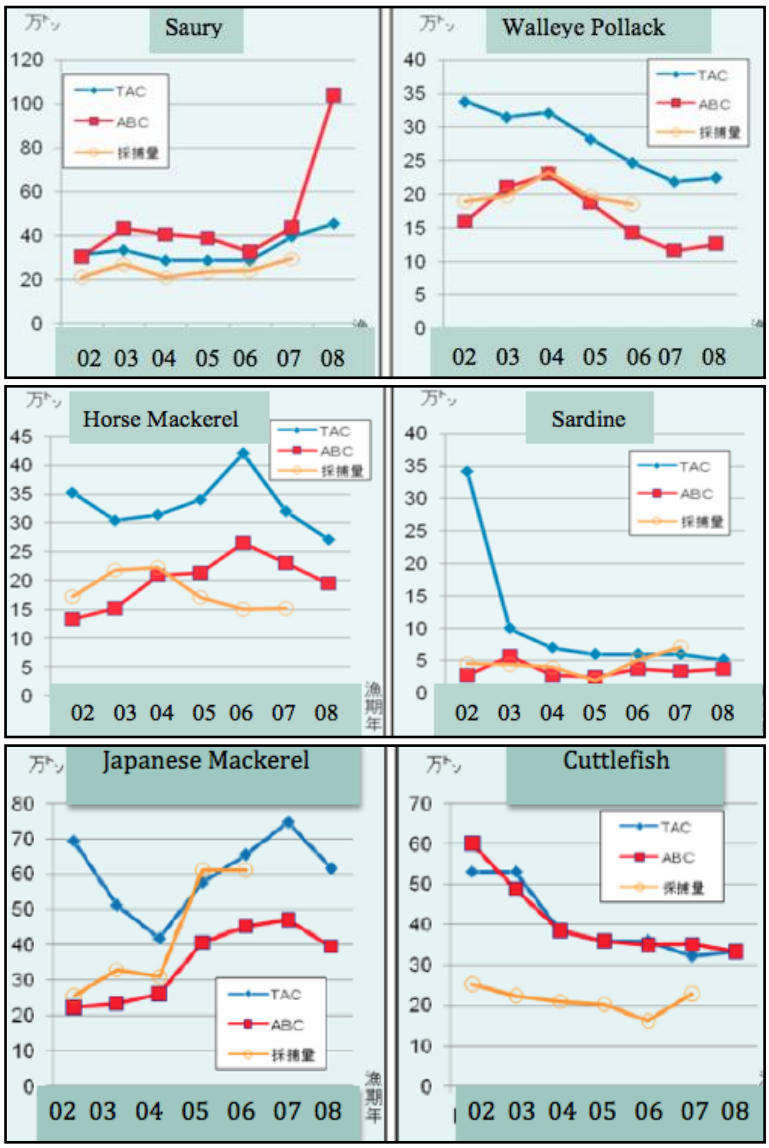
Other hybrid forms of control are the **Resource Recovery Plans**, in which various types of conservation and management measures including TAC and TAE are implemented in a coordinated manner. The plans are elaborated by the AFCCs in consultation with the national and prefectural government for offshore waters. They can involve a combination of measures such as 1) adopting TAEs through reduction of vessel numbers, technical adjustments, setting stock protected areas; 2) promotion of resource recovery through release of fish fry; 3) preservation of the fishery environment. Resource Recovery Plans targeting specific fish species were carried out in 50 areas and other comprehensive plans in 16 areas in Japan (data for March 2012). In coastal waters, **Resource Management Fisheries** are carried out based on FCAs self-regulation.

There is no official system for **Individual Quotas (IQ)** or **Individual Transferable Quotas (ITQ)** in Japan. In only two cases IQs have been partially applied to offshore waters vessels for Red snow crab in Japan Sea as part of a Resource Recovery Plan since 2007, and to distant waters vessels for southern bluefin tuna (Fisheries Agency 2012). There have been discussions whether the introduction of IQ or ITQ is a suitable way to achieve a good balance of improving the efforts of resource conservation and preserving fishery communities (Yagi *et al.* 2012). Several proposals have been presented and discussed in and outside the fishery sectors (Takagi Paper 2007[5]).

As for a **discard ban**, Japan has not explicitly introduced such regulations yet.

[5] http://www.nikkeicho.or.jp/report/takagifish_summary_english.pdf

Figure 7: ABC (red line), TAC (blue line) and actual catch (yellow line) for six species, in thousand tonnes (2002-2008)



Source: Fisheries Agency (2008a)

2.4. Combatting IUU fishing

Illegal, unreported and unregulated (IUU) fishing is a global problem, which damages fisheries stocks and the marine environment. IUU practices are estimated to ca. 10 billion Euros every year worldwide, representing 19% of the reported value of the global catches (European Commission[6]).

Japan has put in place legal instruments to combat IUU fishing, in particular its Fisheries Law and the Act on Regulation of Fishing Operation by Foreign Nationals (1967, revised in 2001). To prevent, deter and eliminate IUU fishing and uncontrolled importation of their catch, the Law of Special Measures for Strengthening Conservation and Management of Tuna Resources was established in 1996 and has been controlling trade of tunas caught by IUU and reflagged fishing vessels (FAO 2009).

[6] http://ec.europa.eu/fisheries/cfp/illegal_fishing/info/index_en.htm

Furthermore, the Organization for the Promotion of Responsible Tuna Fisheries (OPRT) was established in Tokyo in 2000 as an initiative taken by the tuna industries to combat IUU fishing and to promote sustainable use of tunas. The OPRT is an international non-governmental organization supported by stakeholders involved with production, trade, distribution and consumption of tuna and by public interest organizations in Japan, and including tuna longline producers from various countries (Chinese Taipei, Republic of Korea, the Philippines, Indonesia, China, Ecuador, Seychelles, Fiji, Federated States of Micronesia, Malaysia, Tuvalu, Kiribati, Marshall Islands, Vanuatu and Cook Islands).

The Japanese government has been speeding up its efforts to combat IUU fishing both in its EEZ and in international waters, by strengthening monitoring of fisheries activities and by introducing strict importation procedures. In July 2012 the Japanese government and the EU issued a joint statement recognising that voluntary cooperation and sharing of information are essential in the global fight against IUU fishing[7].

Japan also makes efforts to tackle IUU fishing through Regional Fisheries Management Organizations (RFMO), by promoting the VMS, as well as on-board observer programs and standard port inspection measures (WCPFC 2012)[8].

2.4.1. Monitoring and surveillance in Japan's EEZ

The Fisheries Agency and the Coast Guard of Japan closely cooperate to conduct monitoring and surveillance of fishing activities. The Fisheries Agency has seven branches around the country with ca. 39 patrol boats and several aircrafts for deployment. In 2011 the Fisheries Agency identified 15 Japanese vessels involved in illegal fishing, most of which were small trawlers (11 cases; Table 5). As for foreign vessels operating in Japan's EEZ, the Fisheries Agency conducted 115 on-board inspections in 2011, out of which 12 cases were found to represent illegal fishing (Table 6). Foreign vessels are allowed to operate in designated areas of Japan's EEZ under bilateral fishery agreements (e.g. China, Korea and Russia[9]).

Since 2012 Japan's designated vessels which operate in offshore and distant waters are requested to use the Vessel Monitoring System (VMS) in order to ensure monitoring and management measures.

Table 5: Japanese vessels involved in IUU fishing (2007-2011)

Year	Offshore trawler	Purse seiner	Red snow crab fishery	Driftnet fishery	Small trawler	Others	Total
2007	5	1	2	2	9	4	23
2008	2	2	-	3	13	3	23
2009	5	1	-	-	17	-	23
2010	-	-	7	1	13	4	25
2011	-	-	-	1	11	3	15

Data source: Fisheries Agency[10]

[7] http://www.jfa.maff.go.jp/j/press/kokusai/pdf/120711-01.pdf
[8] http://www.wcpfc.int/meetings/2012/9th-Regular-Session-Commission
[9] The agreement with China includes areas located in the East China Sea but not the disputed Senkaku Islands, whereas in the agreement with Korea, provisionally designated areas contain the waters around the disputed Liancourt Rocks.
[10] http://www.jfa.maff.go.jp/j/koho/pr/pamph/index.html (in Japanese)

Table 6: Foreign vessels involved in IUU fishing in Japan's EEZ (2004-2011)

Year	Korea	China	Russia	Taiwan	Others	Total
2004	14	5	2	7	1	29
2005	9	2	0	5	0	16
2006	8	1	0	1	0	10
2007	11	1	0	1	0	13
2008	18	2	0	0	0	20
2009	12	3	0	2	0	17
2010	13	1	0	5	0	19
2011	11	0	0	1	0	12

Data source: Fisheries Agency[11]

2.4.2. Measures against illegally imported products

Following reports that different types of illegally caught tuna were imported to Japan via various channels (e.g. ICCAT 2006), the Japanese government attempted to improve the control of imported products through a catch documentation scheme (CDS) introduced in 2007 (MAFF Fisheries Management directive 19: 480)[12].

The imports of bluefin tuna, big-eye tuna, swordfish, Patagonian toothfish or Antarctic toothfish must be accompanied by required statistical documents or catch documents in accordance with the rules set by the relevant international fisheries organizations. The government of Japan may suspend the import of these species, in accordance with decision by such organizations, if the fish was harvested in a manner to undermine conservation and management measures adopted by such international fisheries organizations (OECD 2005). Japan has pledged to strengthen the current measures to prevent illegal imports by adopting an electronic CDS for Atlantic bluefin tuna in line with ICCAT recommendation 12-08[13] and for Antarctic toothfish in line with CCAMLR conservation measure 10-05[14].

A strong signal was sent in 2009, when Japan refused entry of more than 3500 tons of suspicious shipments of Atlantic bluefin tuna — about one-sixth of the country's supply that year. Among the problems, the Japanese inspectors found ranch tuna fattened at rates that were biologically impossible, and some ranches having harvested more fish than they reported transferring into their cages (ICIJ 2010). Much of the rejected tuna had come from Maltese ranches[15].

Responding to concerns about plummeting bluefin stocks, Mitsubishi, the corporate giant better known for trading in cars which controls ca. 40% of the bluefin market in Japan, repeatedly pledged to work to improve the conservation of bluefin tuna stocks, and to source all bluefin tuna from sustainably managed fisheries[16].

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11 Idem

12 http://www.jfa.maff.go.jp/j/enyou/tuna/pdf/sireisyo.pdf

13 http://www.iccat.int/Documents/Recs/compendiopdf-e/2012-08-e.pdf. Although the ICCAT recommendation on an Electronic Bluefin Tuna Catch Document Programme (eBCD) had to be implemented by 16 May 2013, the Fisheries Agency of Japan announced its intention to use the paper-based CDS as the new electronic system is not available to most of exporting countries.

14 http://www.ccamlr.org/en/measure-10-05-2013

15 http://maltatoday.com.mt/en/newsdetails/news/national/Malta-the-worst-offender-for-tuna-ranching-infringements-in-2010

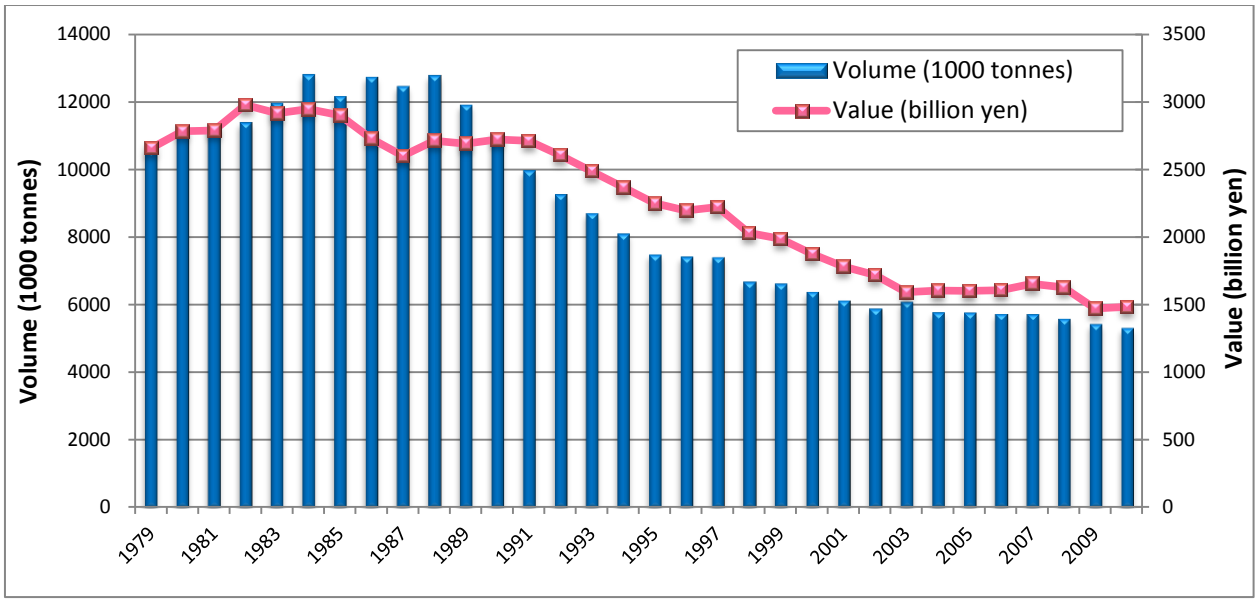
16 Mitsubishi Corporation's position on Atlantic bluefin tuna (2010) http://www.mitsubishicorp.com/jp/en/csr/management/supplychain.html

3. CATCHES

3.1. Total production

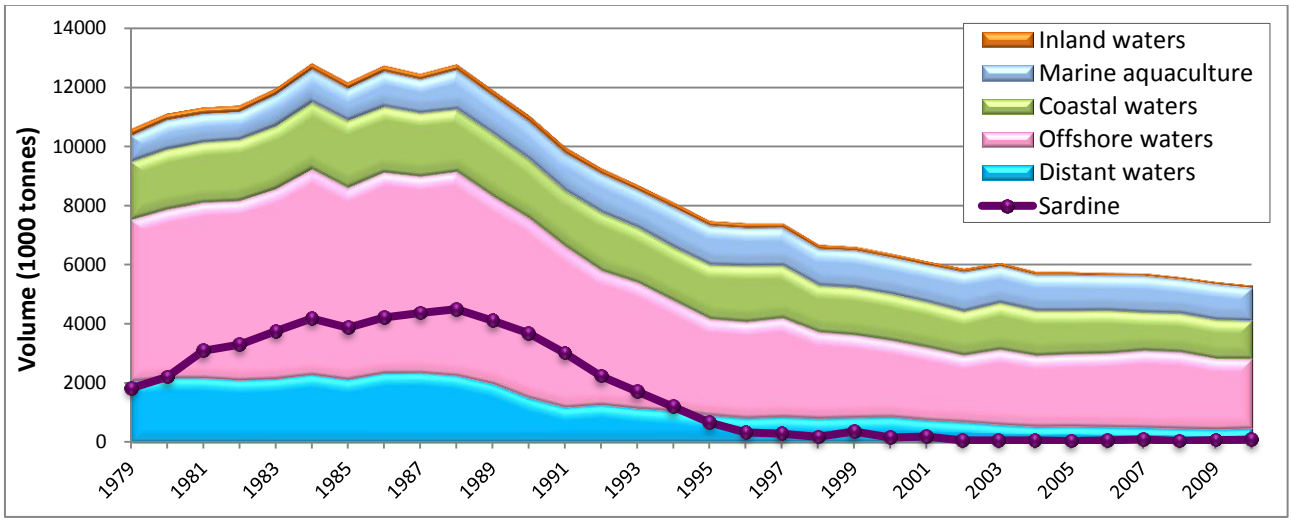
Japan's total fishery production (including marine and inland fisheries and aquaculture), has been on decrease since the late 1980s. The production volume fell to 5.32 million tonnes in 2010[17], declining by more than half from 12.82 million tonnes in 1984 (Figure 8). A similar downward trend can be seen in the value of the fishery production, which reached its highest at 2.9 trillion yen in 1982 but declined to 1.47 trillion yen in 2010.

Figure 8: Japan's total fishery production (1979-2010)



Data source: Fisheries Agency (2011a)

Figure 9: Total production volume by type and fishing area[18] (1979-2010)



Data source: Fisheries Agency (2011a)

[17] In 2011 due to the 11 March earthquake and its consequences, the total production volume fell to 4,76 million tonnes, almost 10% down from the previous year.

[18] After 2006 the breakdown of the marine production volume by fishing area (coastal, offshore and distant waters) is based on estimation due to lack of statistic data.

Japan's fishery production can be divided into five categories: distant waters (outside the Japanese EEZ), offshore waters (more than 5 km away from the coastline), coastal waters (within 5 km from the shore), marine aquaculture, and inland waters and aquaculture (Figure 9).

The post-war expansion of Japan's distant waters fisheries reached a maximum of 4 million tonnes in the early 1970s. The volume of the catches subsequently has declined, in particular after the gradual establishment of the 200 nautical miles EEZ which caused the withdrawal of many Japanese operators from distant waters fisheries. This downward trend has continued, and the weight of the landed catches from distant waters fell to 480 074 tonnes in 2010 (Figure 9).

At present only ca. 9.5% of Japan's marine production (excluding aquaculture and inland waters) comes from waters other than the North-Western Pacific covering Japan's EEZ (Table 7), out of which 53 915 tonnes or 1.3% of Japan's total marine catch volume were caught in the Atlantic in 2009. Japan has bilateral fishery agreements with 13 countries, most of them from the Pacific area[19], with the exception of Morocco[20] (MAFF 2010). There are also private sector agreements or arrangements which allow Japanese fishing vessels to access foreign waters in West Africa, the Indian Ocean and south-western Pacific, mainly for tuna fisheries (OECD 2012).

Japan's offshore fisheries have long represented the main part of its production (Figure 9). The offshore catches have been significantly decreasing since the late 1980s. However, it is worth noting that the peak landed volumes of ca. 6-7 million tonnes in the 1980s were mainly sustained by the high volume of the sardine catches (ca. 4.16 million tonnes in 1988). The drastic fall in the sardine resource level translated into the negative trend of the total offshore catches. Since 2002 the total volume of the catches in this category has remained stable at around 2.4 million tonnes.

As regards coastal waters and marine aquaculture, the production volume has been relatively stable since the late 1990s. A downward trend is visible in the production of inland waters, from 230 000 tonnes in 1979 to 79 317 tonnes in 2010.

Table 7: Japan's marine production by fishing area (2009)

Fishing area		Percentage of total production
Atlantic Ocean		1.3%
Indian Ocean		0.7%
Pacific Ocean	North-West	90.5%
	North-East	0.0%
	West-Central	5.9%
	East-Central	0.5%
	South-West	0.4%
	South-East	0.7%
	North-West	1.3%
	North-East	0.7%

Data source: Fisheries Agency (2011a)

[19] Russia, Korea, China, Papua New Guinea, Kiribati, Micronesia, Marshall Islands, Palau, Tuvalu, Nauru, Fiji, Morocco and Peru.

[20] The Morocco agreement includes the following clauses: 1) 15 Japanese vessels at maximum; 2) 2000 dollars per vessel; 3) licence 480 000 yen per vessel; 4) 4 scientific observers at maximum for the first half of the year and 2 for the rest of the year, 2 vessels for 6000 dollars and 3 vessels for 10 000 dollars; 5) Employment of local sailors is not obligatory.

In 2009 marine fisheries accounted for 76% of the total production volume, and for 66% of the total value. Marine aquaculture represented 22.1% in terms of production volume and 27.9% in terms of value, whereas inland waters fisheries and aquaculture with only 1.5% of the total volume reached a relatively higher value at 6% of the total figure (Table 8).

Table 8: Japan's fishery and aquaculture production by volume and value (2009)

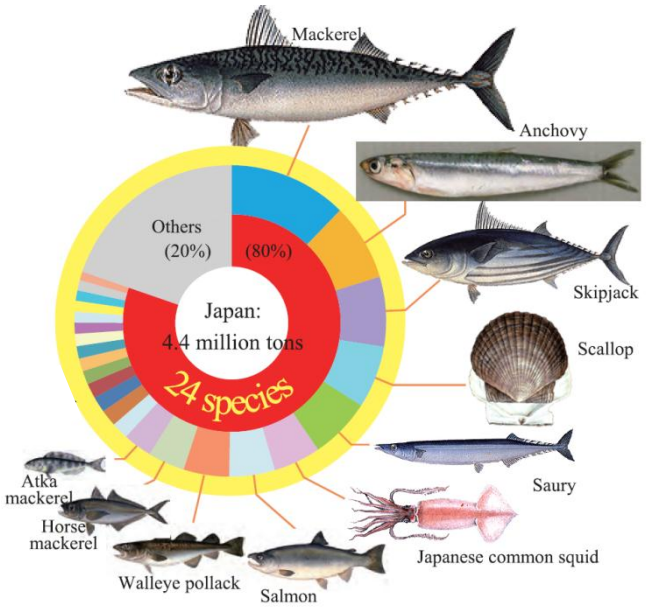
Species	Volume		Value	
	thousand t	%	million yen	%
Marine fishery	**4147**	**76.3**	**971,941**	**66.1**
Fishes	*3173*	*58.4*	*693,281*	*47.2*
Tunas	207	3.8	133,676	9.1
Swordfish, Marlin and Sailfish	16	0.3	9,963	0.7
Skipjack, Frigate Mackerel	294	5.4	66,276	4.5
Sharks	38	0.7	5,735	0.4
Salmos, Trout	224	4.1	72,718	4.9
Herring	3	0.1	1,252	0.1
Sardine	57	1.0	6,311	0.4
Round herring	54	1.0	3,803	0.3
Anchovy	342	6.3	18,446	1.3
Whitebait	57	1.0	25,411	1.7
Jack mackerel, Scad	192	3.5	37,537	2.6
Mackerel	471	8.7	36,352	2.5
Saury	311	5.7	21,916	1.5
Yellowtail	78	1.4	24,728	1.7
Flounder, Halibut, Sole	58	1.1	33,807	2.3
Cod	48	0.9	12,626	0.9
Alaska pollack	227	4.2	17,583	1.2
Atka mackerel	119	2.2	6,565	0.4
Bream	26	0.5	16,611	1.1
Sand lance	33	0.6	8,091	0.6
Other fishes	318	5.9	134,874	9.2
Lobster, Prawn and Shrimp	*20*	*0.4*	*29,196*	*2.0*
Crabs	*32*	*0.6*	*22,745*	*1.5*
Shellfish	*401*	*7.4*	*73,261*	*5.0*
Short-necked clam	32	0.6	11,212	0.8
Common scallop	320	5.9	29,966	2.0
Cuttlefish	*296*	*5.4*	*75,484*	*5.1*
Octopus	*46*	*0.8*	*21,513*	*1.5*
Sea urchin	*11*	*0.2*	*11,234*	*0.8*
Seaweed	*104*	*1.9*	*26,594*	*1.8*
"Kombu" tangle	80	1.5	20,987	1.4
Others	*64*	*1.2*	*18,633*	*1.3*
Marine aquaculture	**1202**	**22.1**	**409,497**	**27.9**
Inland waters	**83**	**1.5**	**88,740**	**6.0**
TOTAL PRODUCTION	**5432**	**100**	**1,470,178**	**100**

Data source: MAFF (2012)

3.2. Marine fisheries

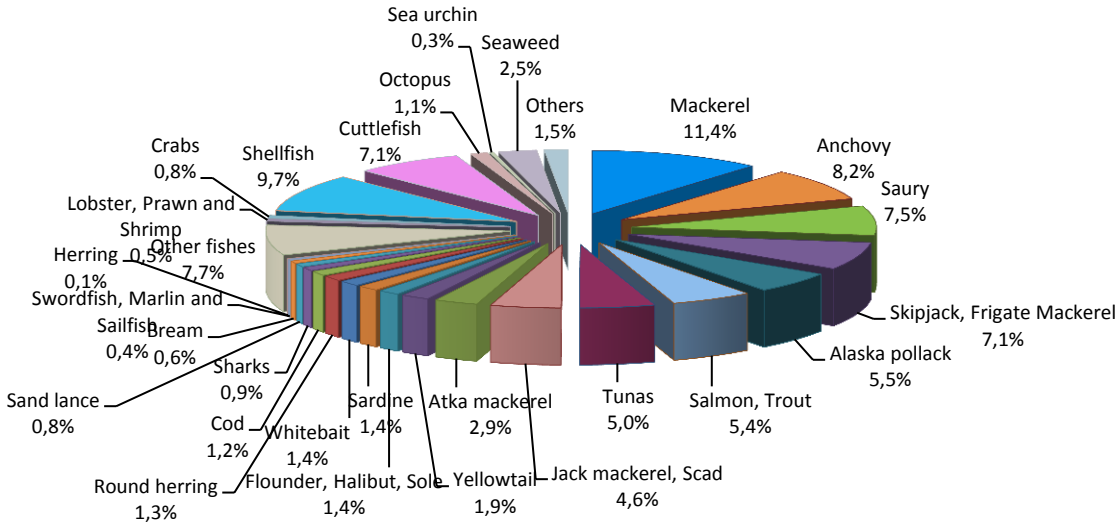
Japan's catch composition is extremely varied and reflects the high diversity of marine life in its waters. The majority of the catches consist of fish species, but shellfish and cephalopods also represent significant parts (9.7% and 8.2% respectively in 2009). On a multiannual average[21], mackerel, anchovy, skipjack and saury are the main fish species taken by the Japanese fisheries, whereas the main shellfish is the scallop (Figures 10 and 11). Tuna species are the most valuable fisheries and represented 14% of the total value of the marine catches in 2009, although their volume only accounted for 5% of the total (Figure 12).

Figure 10: The main species taken by the Japanese fisheries



Source: Fisheries Agency (2012)

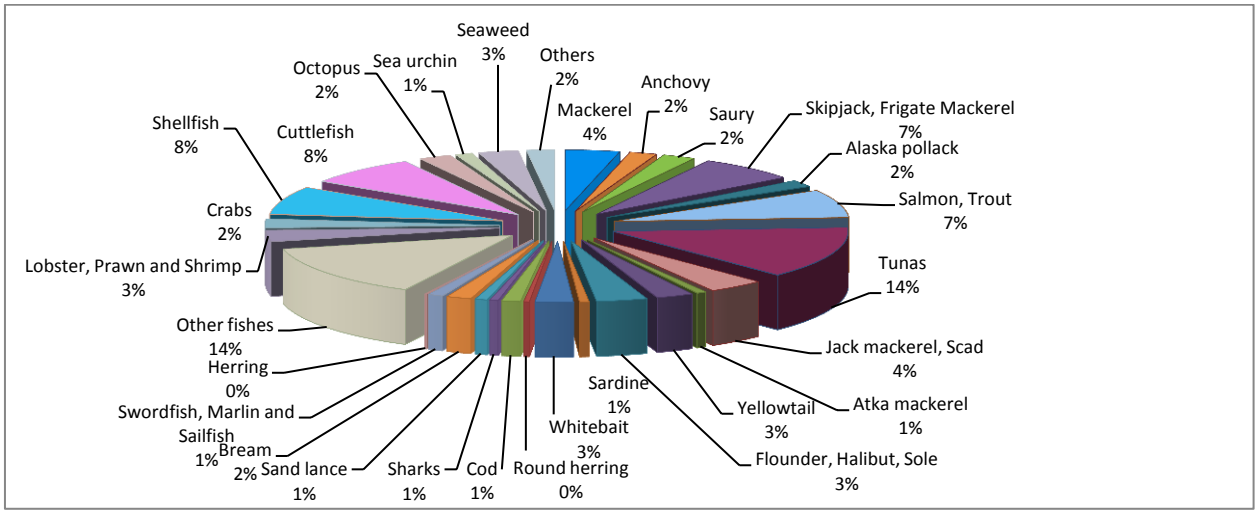
Figure 11: Marine fisheries production volume (%) by major species (2009)



Data source: MAFF (2012)

[21] The figures are three-year averages for 2005-2009 excluding the years accounting for the maximum and minimum figures.

Figure 12: Marine fisheries production value (%) by major species (2009)



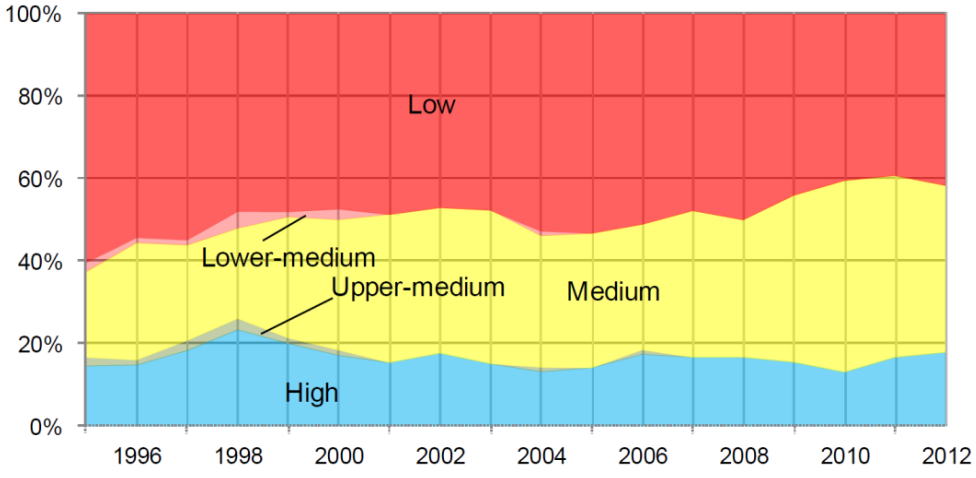
Data source: MAFF (2012)

Several specific fisheries which have a particular significance in Japan are addressed in more detail in the Annex (bluefin tuna, Japanese eel and whaling).

As regards the state of the resources, the Fishery Agency carries out annual stock assessments for 52 species and 84 stocks. In 2012, 41.7% of the targeted stocks were considered to be at low level, 40.5% at medium level and 17.9% at high level. Although the percentage of low level resources has decreased, whereas the medium level resources have slightly increased over the past decade (Figure 13), conservation efforts are necessary to achieve sustainable use of fishery resources.

In 2011 the MAFF conducted a survey of the perception of the state of fishery resources and the causes of their decline (MAFF 2011). According to the results, 87.9% of fishermen answered that fish resources are decreasing; 30% of the respondents attributed the cause of the decrease to overexploitation, while 51% of them blamed environmental changes such as water temperatures variation. Moreover, the survey showed that 55.4% of consumers recognize the decline of fisheries resources, while 22.4% see fishery resources as relatively stable. With regard to marine eco-labels, 69.9% of consumers responded to "choose products with the eco-labels if the prices and the freshness are the same" and 16% intended to "purchase products with the eco-labels even if the prices are slightly higher".

Figure 13: Evolution of the state of stocks (1995-2012)

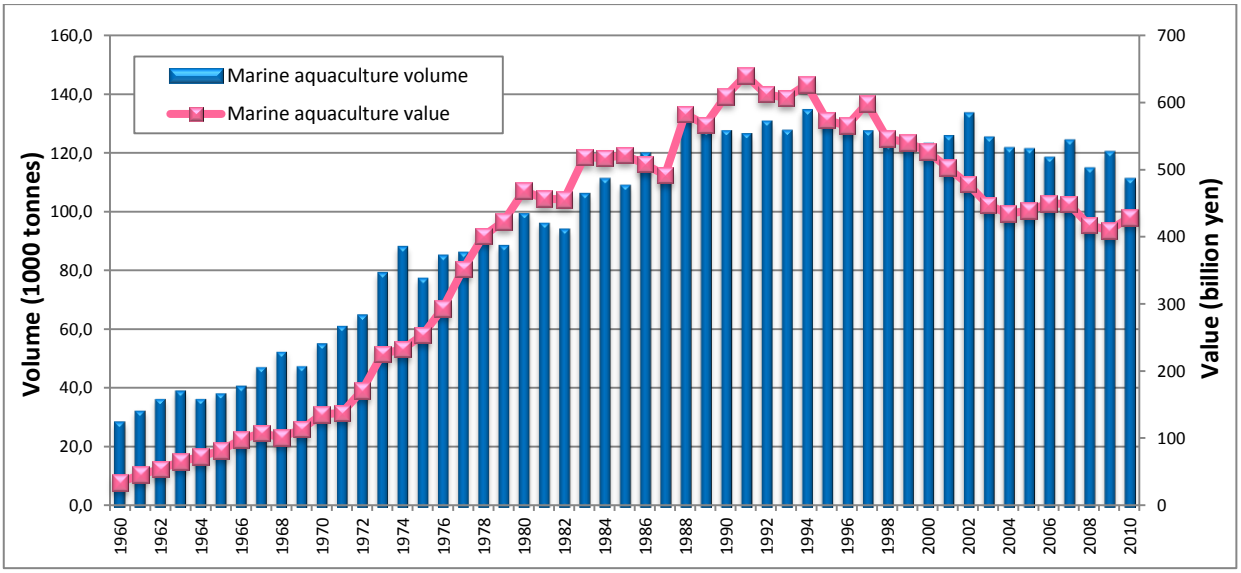


Source: Fisheries Agency (2013)

3.3. Marine aquaculture

Aquaculture plays a major role in the Japanese fisheries: the marine aquaculture production volume amounted to 1.1 million tonnes, or 21% of Japan's total production in 2010[22], whereas in terms of value the marine aquaculture production was 428 billion yen or 29% of the total production value in the same year (Figure 14). The marine aquaculture production volume has been stable or slightly decreasing over the past two decades, but its value, which peaked at 6.4 billion yen in 1994, has been in decline since the early 1990s. The largest fishery product by volume in this category is "*nori*" (or laver, 30%), followed by common scallops (23%) and by oysters (18%). In terms of individual fish species or products, the yellowtail (Japanese amberjack) represented the highest value of 117.6 million yen or 27.5% of the total marine aquaculture in 2010 (Table 7).

Figure 14: Marine aquaculture production volume and value (1960-2010)



Data source: Fisheries Agency (2011)

Table 9: Marine aquaculture production volume and value by major species (2010)

Species	Volume		Value	
	1000 tonnes	%	billion yen	%
Yellowtail	139	13	117.6	27,5
Oyster	200	18	33.6	7,8
Wakame (seaweed)	52	5	8.3	2
Nori (laver)	329	30	85.3	20
Silver salmon	15	1	6.5	1.5
Seabream	71	6	50.6	12
Common scallop	257	23	34.5	8.2
Sea squirt	10	1	1.4	0.3
Others	38	3	90.6	21,2
Total	**1111**	**100**	**428.4**	**100**

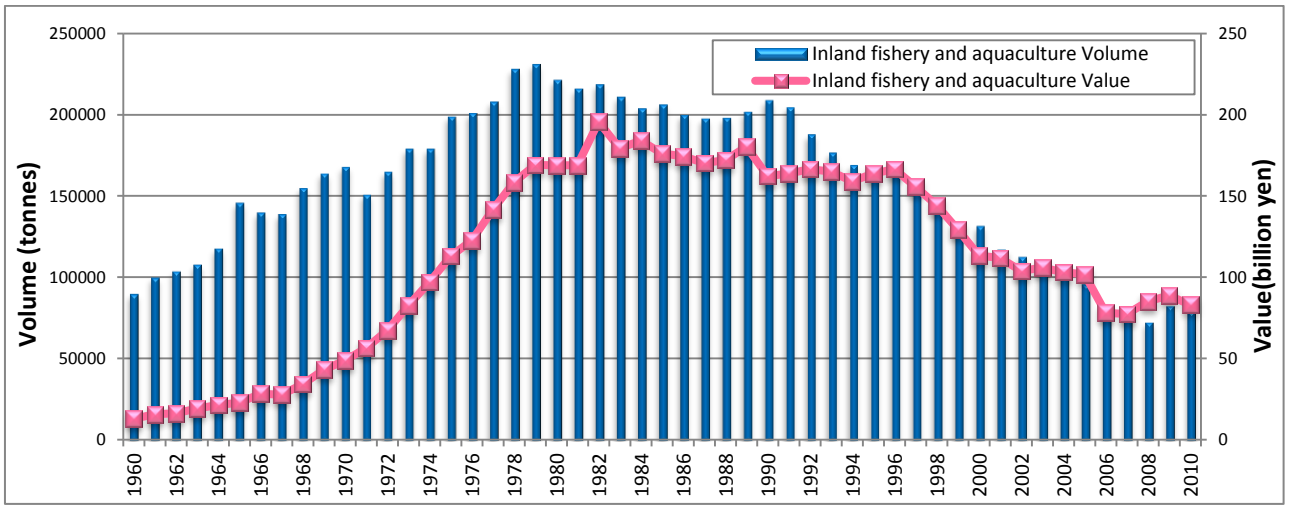
Data source: Fisheries Agency (2011)

[22] In 2012 the total production of marine aquaculture decreased to 868000 tonnes, almost 28% down from the previous year.

3.4. Inland fisheries and aquaculture

The total production of inland water fisheries and aquaculture was 79 317 tonnes, equivalent to 1.5% of Japan's total production in 2010, while the total value of this category was 83 billion yen or 5.5% of the total production in the same year (Figure 14). Inland water fisheries and aquaculture production has decreased both in volume and value since the 1990s due to various factors including degradation of the inland water environment and predation of indigenous fish species by black bass and other alien species.

Figure 15: Inland fisheries and aquaculture production volume and value (1960-2010)



Data source: Fisheries Agency (2011a)

Table 10: Inland water fishery and aquaculture volume and value by species (2010)

Species	Volume		Value	
	tonnes	%	billion yen	%
Inland water fishery	**41697**	**100**	**26**	**100**
Salmon	12727	30	1.5	6
Pond smelt	2009	5	0.8	3
Sweetfish	3625	9	10	39
Common carp	434	1	0.3	1
Crucian carp	847	2	0.4	1
Eel	263	1	1.3	5
Freshwater clam	10432	25	6.4	24
Shrimp	555	1	0.5	2
Others	10805	26	5	19
Inland water aquaculture	**40927**	**100**	**62**	**100**
Trout	9640	24	9	14
Sweetfish	5837	14	8	12
Common carp	2910	7	1.5	2
Eel	22406	55	41	66
Others	133	0.3	3.4	6
Total (fishery and aquaculture)	**82624**	**-**	**88**	**-**

Data source: Fisheries Agency (2011a)

Although the scale of inland water fisheries is relatively limited, Japan's rivers and lakes play a vital role in creating opportunities for freshwater fishing as well as for recreational fishing. Some valuable species are produced in inland waters, such as eels which account for 66% of the total value of inland aquaculture, and *ayu* (sweetfish) - 39% of the value of inland fisheries.

3.5. Aquaculture developments

The Japanese authorities make efforts to improve the development of aquaculture. Based on the Sustainable Aquaculture Production Assurance Law (1999), the Japanese authorities and the FCAs establish an Aquaculture Improvement Plan in which an appropriate scale of aquaculture production is specified on a case by case basis. If such a measure is adopted and managed appropriately, the FCAs or enterprises are eligible to receive some form of public subsidies in the framework of the "Resource Conservation and Fishery Income Compensation Measures". Currently more than 330 such plans have been adopted in Japan (January 2012).

In addition, the Japanese authorities and private enterprises accelerated their efforts to boost the large-scale aquaculture production for artificially hatched bluefin tuna and eel. Unlike typical fish farming which requires young fish to be caught in the ocean and raised in fish cage, the artificial hatching system has the potential to provide a stable fish supply without contributing to overexploitation of the natural stocks.

- **Bluefin tuna**

The Kinki University Fisheries Laboratory broke new ground by developing artificial hatching for bluefin tuna in 2002. Since then, there has been a growing interest and investment in the bluefin tuna aquaculture. From 2008 to 2011 the number of fishery enterprises that engage in Pacific bluefin tuna aquaculture has risen from 68 to 83 (Fisheries Agency 2008, 2012). The number of natural seed of Pacific bluefin tuna used for aquaculture in 2011 was 535 000, whereas the number of artificially hatched eggs was 141 000. It takes two or three years for artificially hatched eggs to be grown up for sale. In 2011, a number of 175 000 bluefin tuna, equivalent to 9044 tonnes, were sold on the market.

- **Japanese eel**

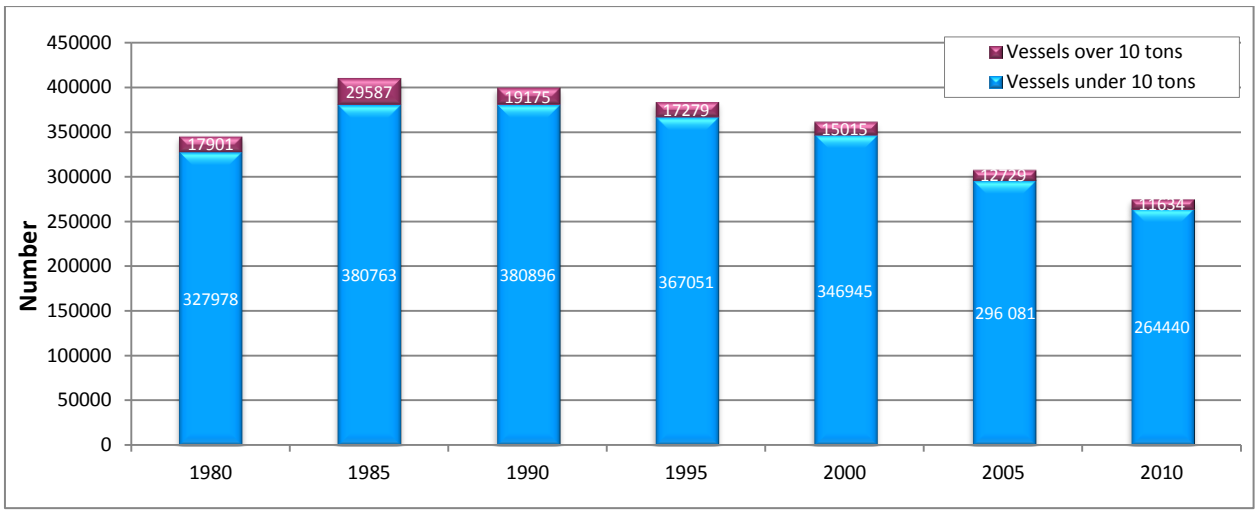
In 2010 a joint team of the Fisheries Research Agency (FRA) and other research institutes succeeded in developing closed cycle breeding of the Japanese eel for the first time. This was a major step in eel aquaculture, which paved the way for producing freshwater eel without relying on natural resources (FRA 2010). However, several hundred thousand/millions of eel fry (glass eel) are used in order to meet the current level of eel demand for the Japanese market every year, but the current artificial hatching system only produces several hundred eels per year. More research and development is needed in order to reach large-scale production from artificially hatched eels.

4. FISHING FLEET

Japan implemented various schemes in order to reduce its fishing fleet, which resulted in a net reduction in the number of vessels and in the gross tonnage. The number of registered fishing vessels has been constantly decreasing from 410 350 in 1985 to 276 074 in 2010[23] (Figure 16), with a further decrease in 2011 to 252 665 vessels. The same trend can be observed for actively used vessels: their number fell by 36% between 1983 and 2008, from 176 776 to 99 062 (Figure 17). In a similar way, the total gross tonnage of Japan's vessels has fallen to 1 112 127 tons in 2009, down by 23% from 1 447 960 tons in 2000. However, the total engine power conversely increased by 13% over this period, as well as the mean engine power (FAO 2012).

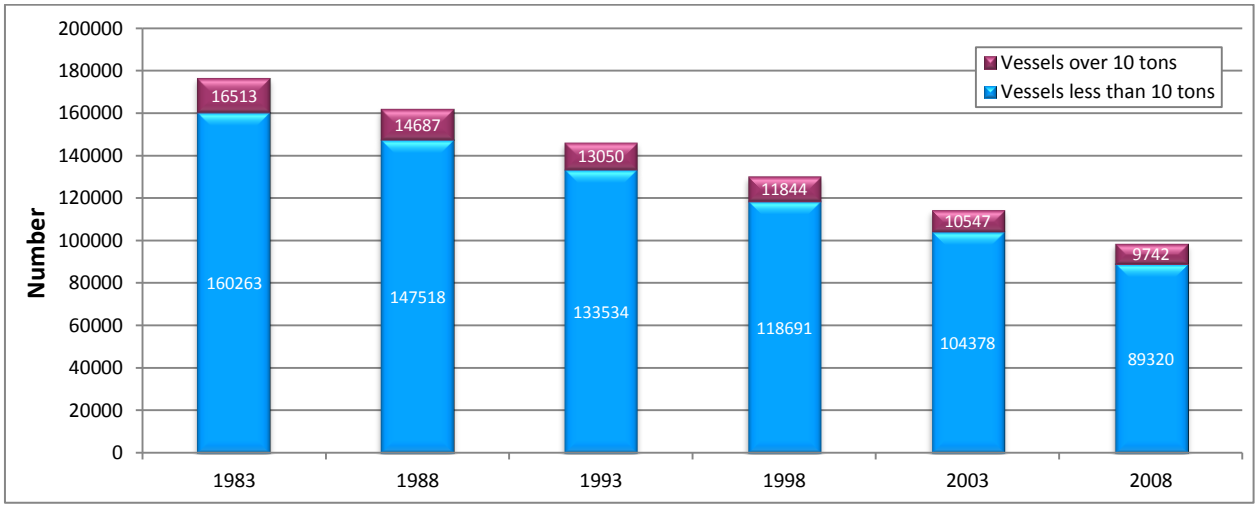
Small scale vessels dominate Japan's fisheries, as the fishing fleet over 10 tons accounted for only 4% of the total number of vessels (Figure 16). The age of the designated vessels which are subject to control by the MAFF is 20 years on average, and 47.1% of them are more than 21 years old (Fisheries Agency 2011a). The vast majority of the fishing vessels have a hull in fiberglass and reinforced plastics.

Figure 16: Evolution of the number of registered fishing vessels (1980-2010)



Data source: MAFF (2012)

Figure 17: Evolution of the number of actively used fishing vessels (1983-2008)

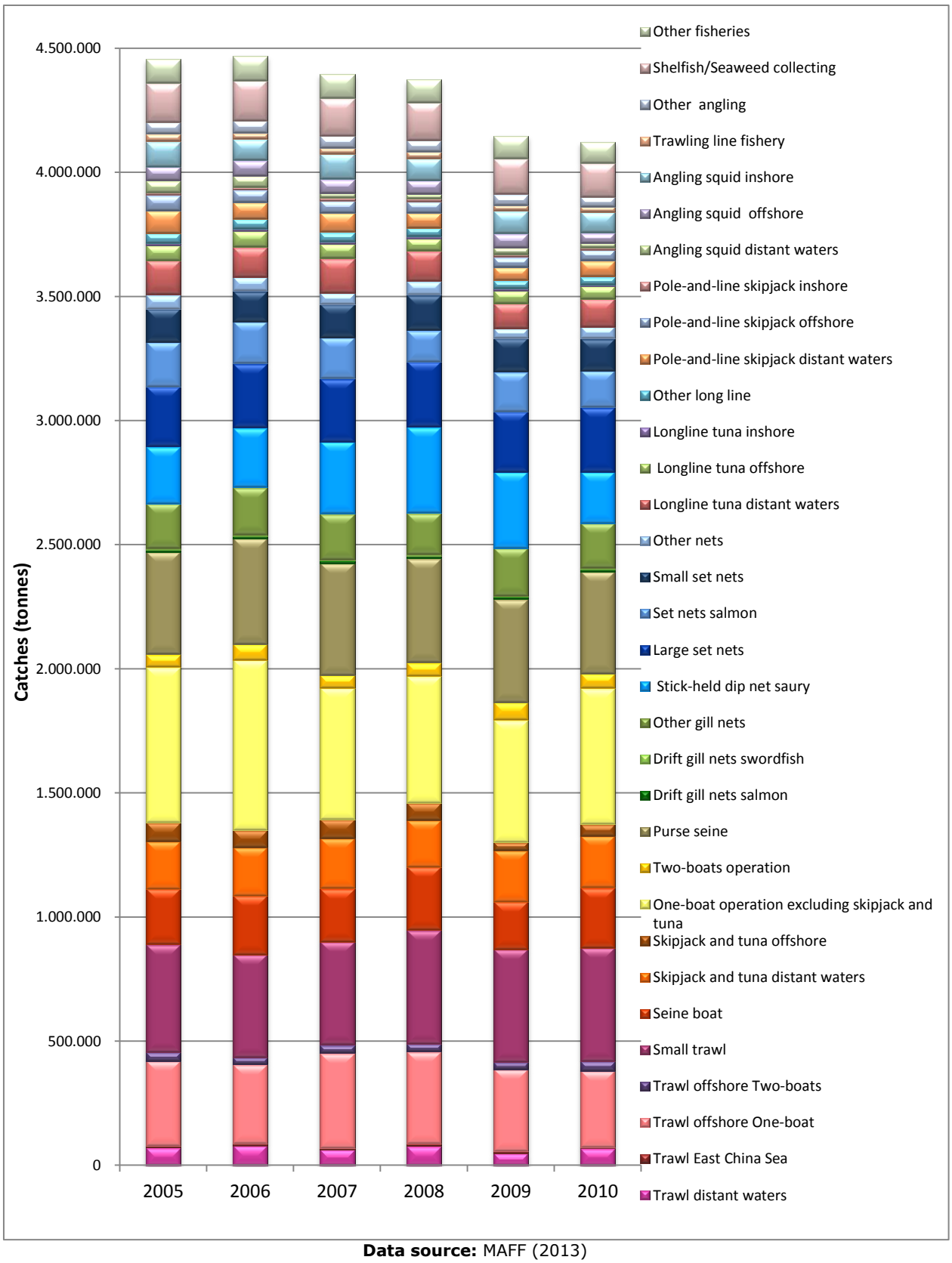


Data source: Fisheries Census 2008

[23] All figures in this section refer to powered vessels fishing in marine waters.

Figure 18 shows the marine landings by fishery type in 2005-2010. The trawling segment provides a significant part of the catches (21%), in particular small trawlers (11%) and offshore trawlers with one boat (7%). Ca. 10% of the catches come from purse seines, and ca. 13% from different types of set nets.

Figure 18: Catches by fishing gear (2005-2010)



Data source: MAFF (2013)

Table 11: Number of registered vessels by type of fishing gear (2011)

FISHERY	No. of vessels	%
Inland water fisheries	718	0,3
Shellfish and seaweed collecting	64218	25,4
Set net	8946	3,5
Pole-and-line	87294	34,5
Longline	5446	2,2
Gill nets	40381	16,0
Purse seine (netting boat)	1039	0,4
Purse seine (auxiliary boat)	1866	0,7
Lift netting	1363	0,5
Medium and small trawl	12309	4,9
Trawl in East China Sea	22	0,0
Distant water trawl	6	0,0
Other seine	6340	2,5
Skipjack and Tuna	921	0,4
Whaling	12	0,0
Government and public ship	1152	0,5
Fish carrier	1737	0,7
Miscellaneous fishery	18895	7,5
Total	**252665**	**100**

Data source: MAFF (2013)

The most common fishing gear in 2010 was pole-and-line, used by 34.5% of the vessels, followed by shellfish-seaweed collecting gear (25.4%) and gillnets (16%, Table 11).

In 2012 there were 2912 designated fishing ports in Japan. On average, there is a fishing port about every 12 km along Japan's coastline. Four types of fishing ports are distinguished: 1st class, used mainly by local fishermen; 2nd class, also local but used more extensively that those of 1st class; 3rd class, used by fishermen from all over the country; and 4th class, located on isolated islands or in remote places but important for developing fishing grounds (MAFF 2013). Three quarters of the ports (i.e. 2200) are 1st class.

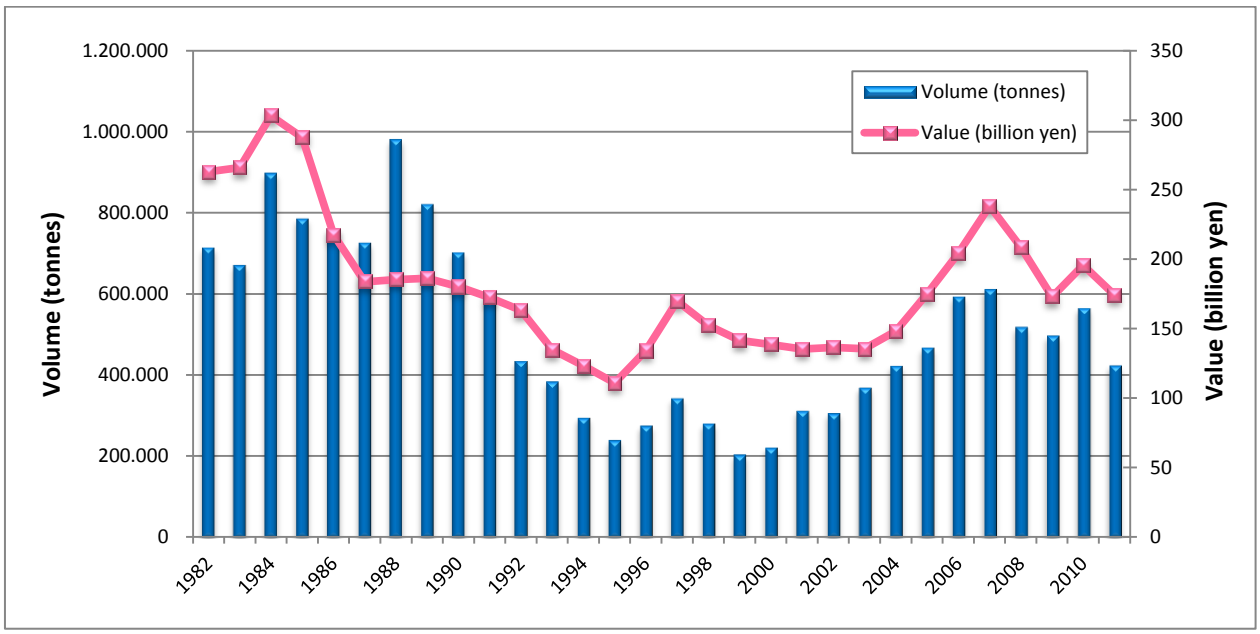
The prefectures with the highest number of ports are Nagasaki (285) and Hokkaido (282). Major fishing ports in these provinces include Nagasaki (in southwest Kyushu), Otaru, Kushiro and Abashiri (in Hokkaido). On the Pacific coast of Honshu there are Hachinohe, Kesennuma and Ishinomaki (along the Sanriku coast, much affected by the 2011 earthquake and tsunami), as well as Choshi, Yaizu, Shimizu and Misaki (located east and south of Tokyo). Yaizu is Japan’s biggest fishing port for tuna, with many large tuna longliners which operate in the Indian Ocean, the Atlantic and the Pacific landing their catches in this port. Makurazaki in southern Kyushu is famous for landing of skipjack pole and line fishing vessels, whereas Shimonoseki at the south-western tip of Honshu is well known for the locally caught *fugu* (puffer fish).

5. TRADE IN FISHERY PRODUCTS

5.1. Exports

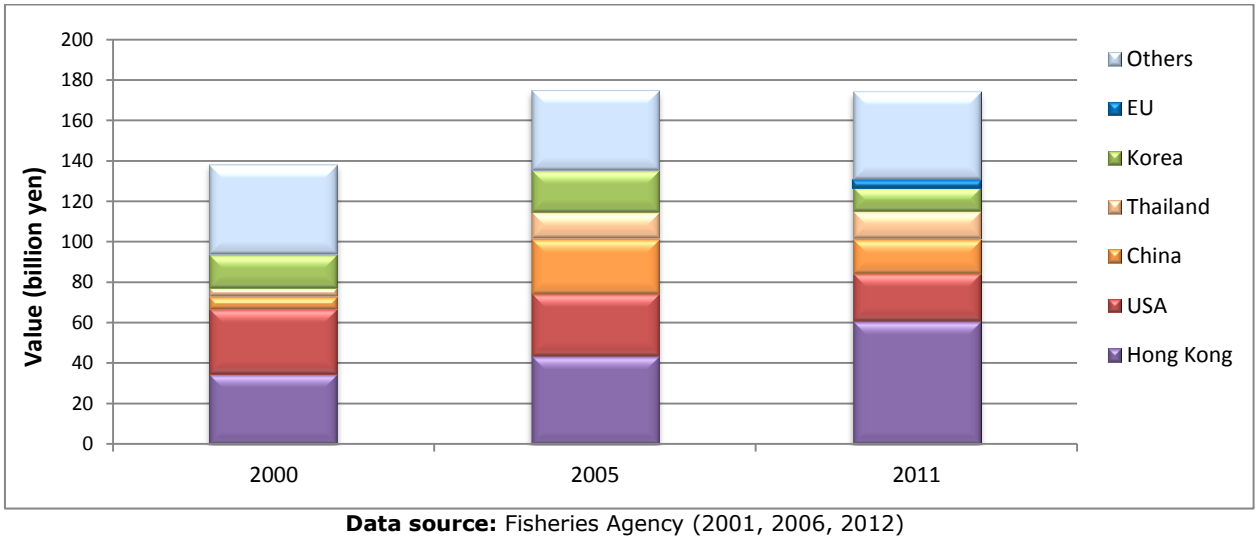
Almost 90% of Japan's fisheries production is used for domestic consumption. The exports of fishery products, which reached a peak in the 1980s, began to decline as the Japanese total production fell and the Japanese currency has appreciated significantly. Both the volume and the value of Japan's fishery exports had a period of recovery after the year 2000, but have shrunk again since 2008 due to the economic crisis and to the yen appreciating against the major currencies (Figure 19).

Figure 19: Japan's fisheries exports by volume and value (1982-2011)



Data source: Fisheries Agency (2008, 2011)

Figure 20: The value of Japan's exports of fishery products by country (2000, 2005 and 2011)



Data source: Fisheries Agency (2001, 2006, 2012)

In addition, the March 2011 earthquake and tsunami, and the subsequent Fukushima nuclear accident, have contributed to the decrease of the Japanese exports of fishery products, and to the increase of fishery imports to Japan. Japan's exports volume and value in 2011 contracted by 25% and 11% respectively compared to the previous year. However, given the increasing demand for fishery products around the world, Japan's exports are expected to rise (Fisheries Agency 2011a).

In 2011, Japan's fishery exports amounted to 424 000 tonnes and 174 billion yen. High volumes of mackerel and skipjack were exported (24% and 11% of the total respectively). However, the most valuable products were pearls (11% of the total export value), sea cucumber (7%) and scallop (6%; Table 12).

The most important destination country for Japan's exports of fishery products was Hong Kong, followed by the U.S., China, Thailand and Korea (Figure 20). The share of fishery exports to Hong Kong increased to 34% in 2011, up from 25% in 2000. Sea cucumber and mussels were the main fishery products exported to Hong Kong (89% and 70% of the total exports of these species, respectively). Most of the Japanese exports of salmon and trout went to China (70%), whereas most tuna and swordfish were exported to Thailand (37%, Fisheries Agency 2011a).

Japan’s export of fishery products to the EU is limited: the total export value of 4 billion yen is equivalent to 2.3% of the total export value[24]. In 2011 the top three valuable products exported to the EU were pearls (30.7%), aquarium fish (22.5%) and scallop (20.5%). The value of Japan's fisheries products exported to the EU fell only by 6% compared to 2010, despite the huge damages caused by the Fukushima accident in March 2011. This is mainly due to the fact that the main exports such as pearls and aquarium fish were not affected by the disaster.

Table 12: Exports by major type of fishery products (2011)

Products	Volume		Value	
	1000 tonnes	%	billion yen	%
Salmon/Trout	22	5	6.7	4
Pearl	0.034	0	18.3	11
Sea cucumber	0.195	0	11.8	7
Mussels	2	0	9.4	5
Scallop	10	2	11.3	6
Mackerel	98	24	8.8	5
Alaska pollack	40	9	4.1	2
Skipjack	47	11	5.5	3
Yellowtail	5	1	7.8	4
Tuna/Swordfish	23	5	7.5	4
Fish meal	7	2	5.1	3
Saury	13	3	1.4	1
Others	157	38	76.4	45
Total	**424**	**100**	**174.1**	**100**

Data source: Fisheries Agency (2011a)

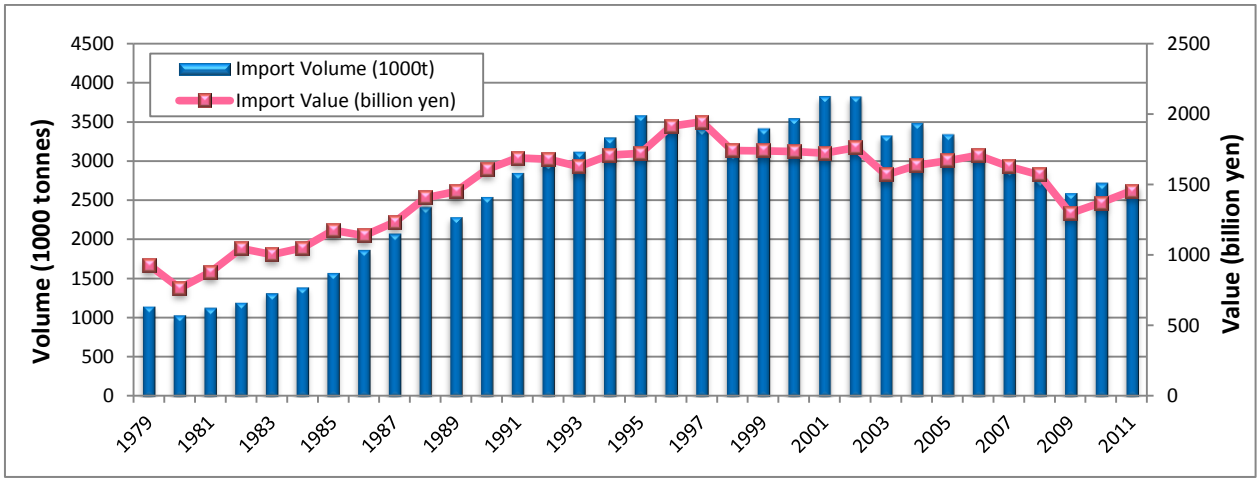
[24] Calculated for an exchange rate of 1 dollar / 80 yen.

5.2. Imports

Japan is the world's third biggest importer of fishery products after the EU and the USA (FAO 2012). Japan imports fishery products from more than 120 countries and is increasingly dependent on countries abroad. From insignificant quantities before 1970, imports gradually increased to ca. 1 million tonnes in the early 1980s, and reached a peak of 3.82 million tonnes in 2001. In 2011, the imports of fishery products amounted to 2.7 million tonnes and 1454.6 billion yen (Figure 21). As of 2011 Japan's tariff rate for fishery products varies from 0 to 40% but the average is roughly 4%.

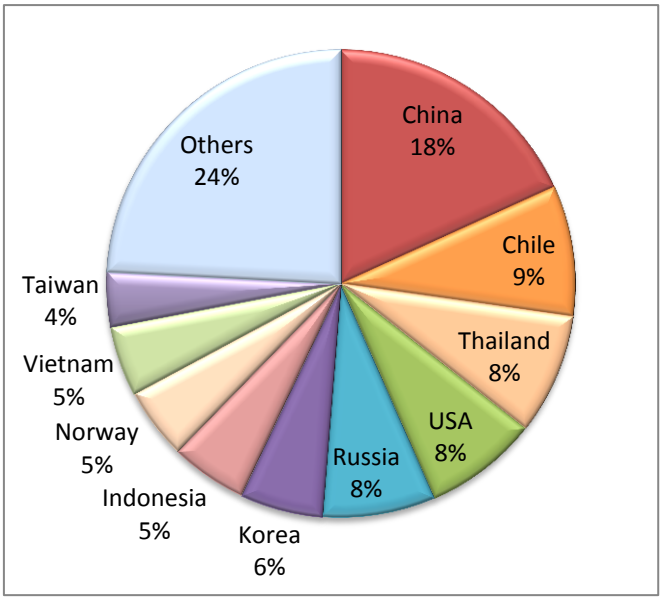
China (excluding Macau and Hong Kong) is Japan's most important source of fishery products, and provided 18% of the total value of the imports in 2011. Chile (9%) as well as Thailand, USA and Russia (8% each) are also important partners (Figure 22).

Figure 21: Evolution of imports to Japan by volume and value (1979-2011)



Data source: Fisheries Agency (2008, 2011)

Figure 22: The value of Japan's imports of fishery products by country (2011)



Data source: Fisheries Agency (2011)

In 2011 the main species imported to Japan were shrimps (which represented 13% of the total value of the imports, with processed shrimp adding a further 4%), tuna and swordfish (13%) as well as salmon (11%). Japan is also an important importer of fish meal (11% of the volume of the imports; Table 13). Shrimps, for which the Japanese production is

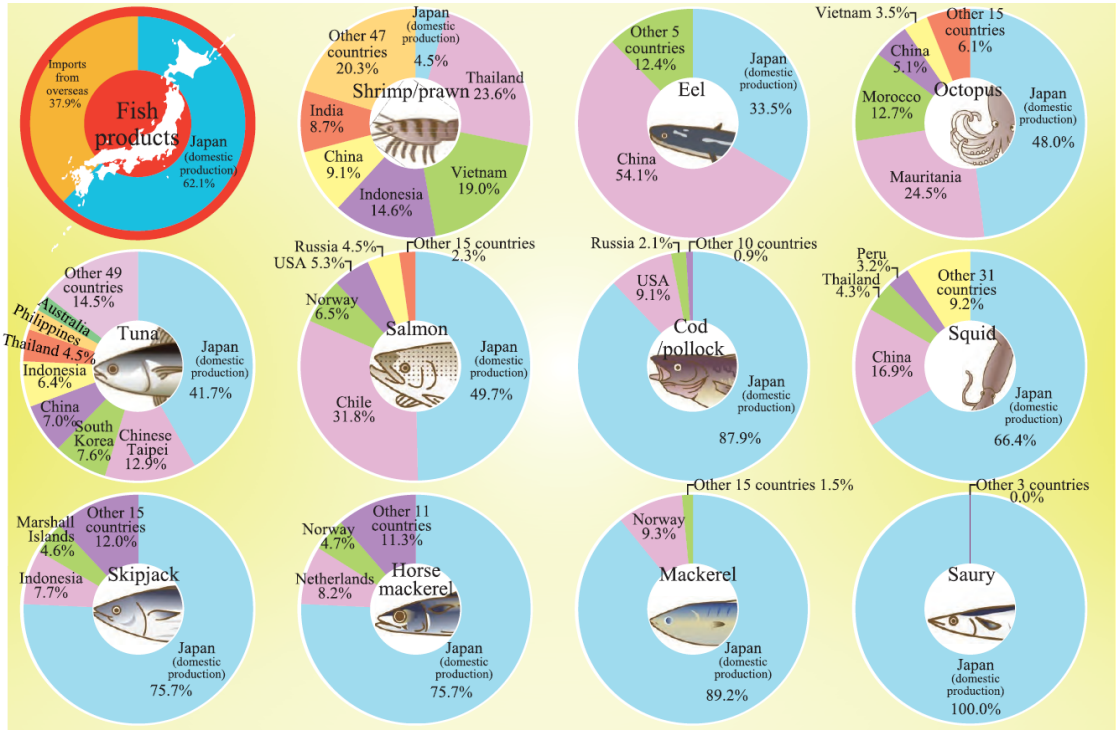
relatively limited, are imported mainly from Thailand and Vietnam, but also from Indonesia, China and India. The main sources for tuna are China, South Korea, Indonesia and Thailand, whereas salmon is mostly imported from Chile. The eel, which is an important product on the Japanese market, mainly comes from China. Mauritania and Morocco are Japan's main sources for octopus (Figure 23).

Table 13: Imports by major type of fishery products (2011)

Species	Volume		Value	
	1000 tonnes	%	billion yen	%
Shrimp	210	7	185.4	13
Tuna/Swordfish	214	8	184.4	13
Salmon/Trout	258	8	159.4	11
Processed shrimp	77	3	62.1	4
Crabs	49	2	59.8	4
Fish meal	234	11	27.3	2
Squid	90	3	42.0	3
Processed eel	15	1	34.0	2
Pearl	74	3	34.9	2
Cod eggs	40	1	30.8	2
Cod/Pollock	102	3	26.1	2
Octopus	38	2	28.2	2
Eel	10	1	24.1	2
Flounder	50	2	20.6	1
Processed crab	14	0	20.7	1
Others	1293	45	514.8	35
Total	**2694**	**100**	**1454.6**	**100**

Data source: Fisheries Agency (2011a)

Figure 23: Share of Japan's production and import volume in the total fisheries supply by species (2009)



Source: Fisheries Agency (2012)

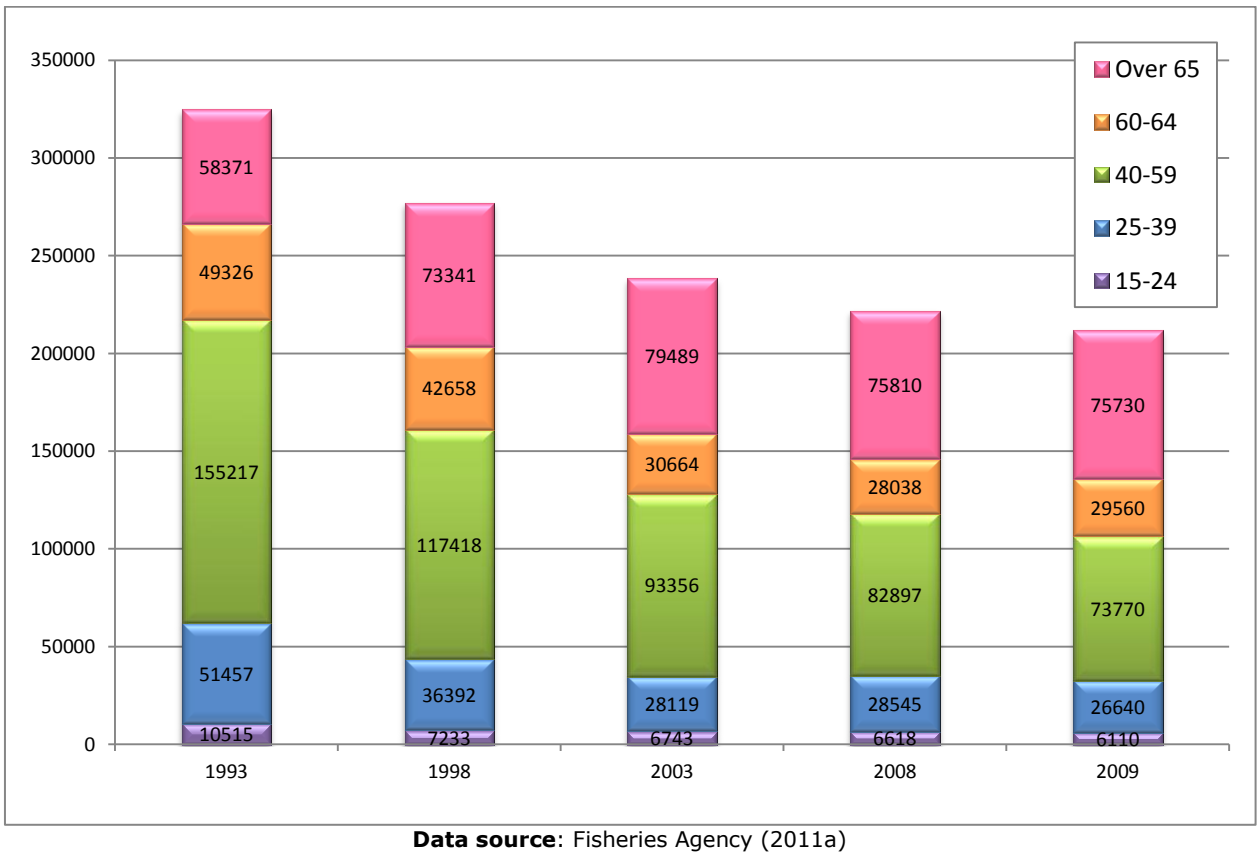
6. EMPLOYMENT

Although fisheries provide Japanese people with an essential part of their food supply, the economic weight of the sector is relatively small, as it represented only 0.2% of the national GDP in 2009. However, the fishing industry contributes more to the entire economy through its secondary effects on other sectors such as food and services industries, and forms a significant element of the regional economies in coastal areas.

In 2008, 221 908 people were engaged in fishing activities, in which male workers dominate. In contrast, the distribution and processing sectors, which employed 213 159 workers in 2008, are characterised by over-representation of female workers. The total number of employees in the fisheries sector was 435 067, which accounted for 0.68% of the total working population in Japan in 2008[25] (Table 14).

The number of fishermen declined from 324 886 in 1993 to 221 908 in 2008. This downward trend is likely to continue in the foreseeable future. In 2010 the fishermen aged 65 or above accounted for 36% of the total number, up almost twice from 18% in 1993 (Figure 24). Although the Fisheries Agency and the industries make efforts to increase new recruitment, the average number of newly recruited workers in 2000-2010 is 1484 (Fisheries Agency 2011a).

Figure 24: Number of fishermen by age category (1993-2009)[26]



Data source: Fisheries Agency (2011a)

[25] The total working population was 63 850 000 (2008).

[26] Fishermen are here defined as people who are engaged in commercial fishing activities at sea for more than 30 days in a year. The surveys conducted after 2008 changed the methodology used previously, so the comparison should be taken with caution.

Table 14: Number of workers in fishery industry by gender (2008)

Workers	Fishing sector	Distribution and processing sectors	Total	Part of the total employed population
	No.	No.	No.	%
Male	187820	77989	265809	0.42
Female	34088	135170	169258	0.26
(Foreigners)	(6170)	(11629)	(17799)	(0.027)
Total	**221908**	**213159**	**435067**	**0.68**

Data source: Fishery Census 2008, Labour Force Survey of Japan

Nevertheless, the number of full time workers increased from 70 530 in 2000 to 75 650 in 2010, whereas part-time workers, regardless of primary and secondary, decreased (Figure 25). In terms of percentage of the total figure, the share of full-time workers increased from 34.6% to 53.5% while part-time workers decreased by 18.9% from 65.4 to 46.5%.

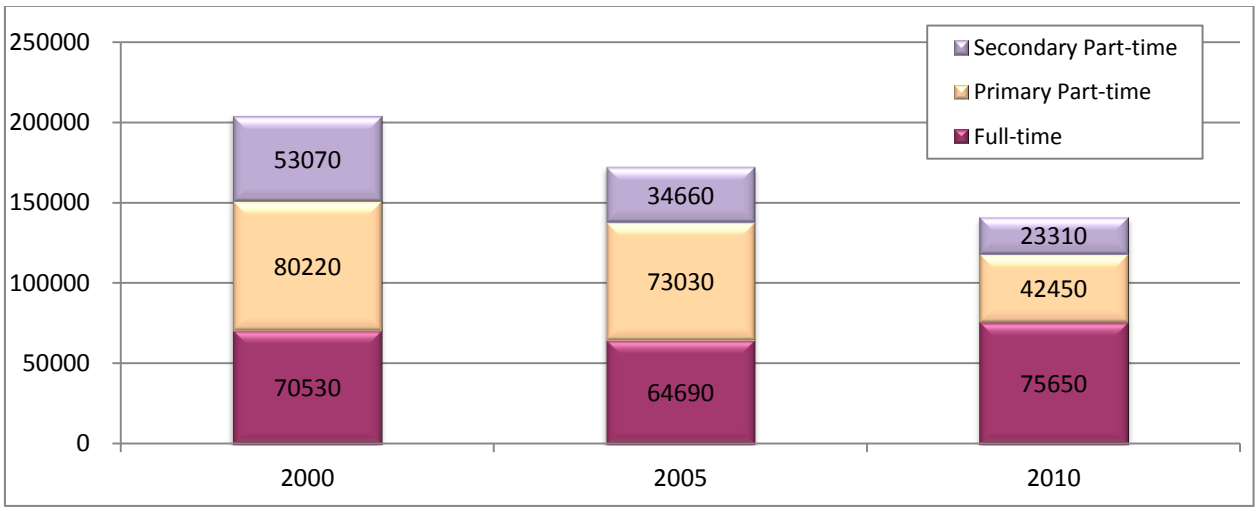
In addition, over the past two decades there has been a substantial decrease in the number of fishery enterprises with both individual and organizational management[27] (Table 15).

Table 15: Number of fishery enterprises (1993-2010)

Type of enterprise	1993	2000	2005	2010
Individual management	163923	137705	117629	98300
Organizational management	7601	8240	7087	5440
Total	171524	145945	124716	103740

Data source: Fisheries Agency (2011a)

Figure 25: Number of workers from enterprises with individual management (2000-2010)[28]

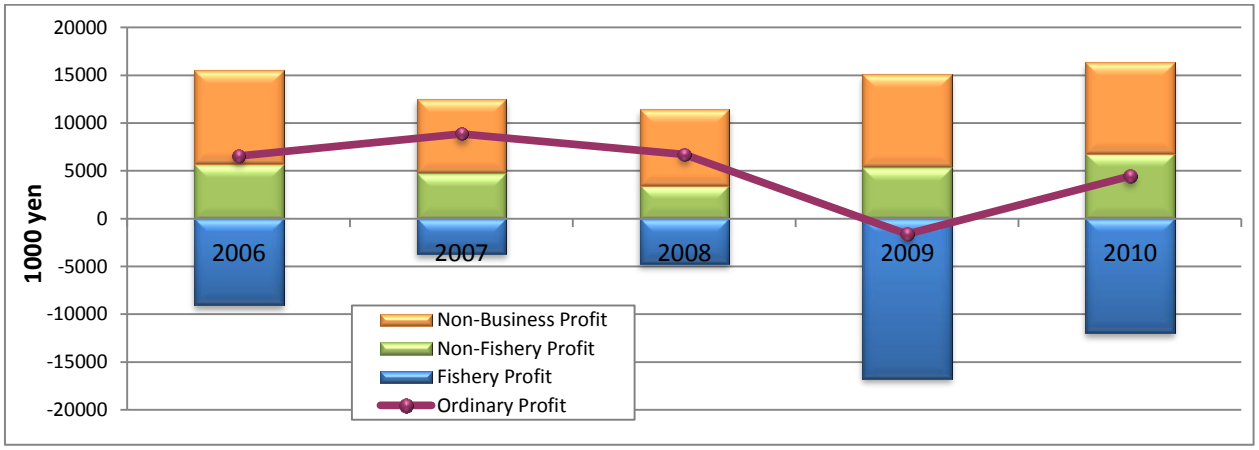


Data source: Fisheries Agency (2011a)

[27] Organizational enterprises include companies, fishery cooperatives, fishery production associations and joint management.

[28] A full-time worker is a person who solely relies on fisheries activities for their income. Primary part-time worker is a person whose main income is from fisheries activities whereas secondary part-time worker earns the main income from other jobs.

Figure 26: Change in the financial status of cooperate fisheries (2006-2010)



Data source: Fisheries Agency (2011a)

Fishermen's financial situation has been severe over the past decade, particularly due to high oil price. The average income of a coastal fishery household was approximately 2.2 million yen, as net operating profit from fishing during 2001-2010. When combined with other external incomes like pension and land rent, a fishery household earns annually 5 million yen, which is equivalent to the income of an average Japanese household. For a household that runs an aquaculture business, the average net operating profit was around 5.4 million yen in 2001-2010. When combined with external incomes, a household is estimated to earn 8-9 million yen yearly (Fisheries Agency 2011a).

Similarly, many fishery enterprises, which own vessels of more than 10 tons, have experienced net operating losses in fishery over the past decade (Figure 26). About 70% of fishery cooperatives faced net operating losses because of the difficulty of merging with other cooperatives, due to the large amount of losses carried forward (Fisheries Agency 2011). Their operating deficits in the fisheries sector have been covered by non-fishery and non-business revenues such as capital gains and possibly government subsidies.

Facing this long term crisis, the Fisheries Agency of Japan launched the "Projects for Promoting Reinforcement of Fisheries Cooperatives Management Base" (2009). Financial assistance is given to FCAs, which are to cooperate with the Japanese authorities in their measures, including fishery resource conservation, reduction of old vessels and development of energy-saving technologies for fishing tools.

7. THE "TRIPLE DISASTER": THE GREAT EAST JAPAN EARTHQUAKE AND TSUNAMI, AND THE FUKUSHIMA NUCLEAR ACCIDENT

7.1. Scale of damage

The 11 March 2011 earthquake and tsunami wreaked havoc on the Japanese fisheries. The sector suffered huge damage in a wide area along the Pacific coast, mainly concentrated in seven prefectures: Hokkaido, Aomori, Iwate, Miyagi, Fukushima, Ibaraki and Chiba. More than 19 000 people were killed or missing. The fisheries infrastructure was severely damaged: around 28 612 fishing vessels and 319 fishing port facilities were destroyed, and the value of the damages was estimated at 1263.7 billion yen (Table 16). In particular, the prefectures Iwate, Miyagi and Fukushima were heavily affected, with their damages reaching 91% of the national amount. More than 90% of the fishing ports and fishing vessels in these three prefectures were damaged (Table 17), as well as aquaculture facilities, fisheries processing plants and other communal facilities.

Table 16: Scale of damage after the earthquake and tsunami (as of 5 March 2012)

Infrastructure	Japan		North-east coast[29]	
	No.	Value (billion yen)	No.	Value (billion yen)
Fishing vessels	28612	182.2	28479	181.2
Fishing port facilities	319	823.0	319	823.0
Aquaculture facilities	-	73.8	-	71.9
Cultured organisms	-	59.7	-	53.4
Markets/Facilities for common use	1725	124.9	1714	124.7
Total	**-**	**1263.7**	**-**	**1254.4**

Source: Fisheries Agency (2012a)

Table 17: Number of damaged fishing ports in seven prefectures[30]

Prefecture	No. of fishing ports		No of fishing vessels	
	Total	Damaged	Total	Damaged
Hokkaido	282	12	16293	793
Aomori	92	18	6990	620
Iwate	**111**	**108**	**10522**	**13271**
Miyagi	**142**	**142**	**9717**	**12029**
Fukushima	**10**	**10**	**1068**	**873**
Ibaraki	24	16	1215	488
Chiba	69	13	5640	405

Source: Fishery Agency (2012c)

[29] The prefectures Hokkaido, Aomori, Iwate, Miyagi, Fukushima, Ibaraki, and Chiba

[30] The number of fishing vessels covers the vessels that are actively used and registered for insurance. In the case of the prefectures of Miyagi and Iwate the number of damaged vessels surpasses those registered for insurance.

Table 18: Fisheries and aquaculture production in six north-east coast prefectures: their share in Japan's production (2009)

Species	Aomori	Iwate	Miyagi	Fukushima	Ibaraki	Chiba	Share of Japan's production
Sea squirts	4%	14%	82%	-	-	-	**100%**
Wakame	0%	45%	34%	0%	0%	0%	**79%**
Tuna	2%	3%	11%	2%	1%	0%	**19%**
Mackerel	3%	2%	3%	5%	18%	6%	**37%**
Saury	2%	9%	15%	9%	-	6%	**41%**
Shark	7%	8%	48%	1%	0%	0%	**64%**
Cod	9%	19%	16%	2%	0%	0%	**46%**
Oyster	-	6%	23%	-	-	-	**29%**

Source: MAFF (2012)

The areas affected had played a significant role in supplying fish products and in supporting fishing industry in other regions. The seven most affected prefectures, from Hokkaido to Chiba, provided 53% of Japan's total fishery production and 38% of the marine aquaculture production in 2010. The seafood and seaweed produced in this region, which accounted for a significant share of the national total, include commercially harvested *wakame* (seaweed), shark, sardine, squid, cod, saury, anchovy, mackerel, abalone and sea urchin, and cultured *wakame*, oysters, scallops, sea squirts and salmon (Table 18). Seedlings of oyster and *wakame* from this region also formed a large share of the total production, and supported aquaculture production nationwide (Fisheries Agency 2012a,b).

In addition, the total number of fishery workers in six prefectures along the north-east coast (excluding Hokkaido) accounted for 15% of the country's total, and the number of workers engaged in the seafood manufacture sectors represented more than 30% of the total number in Japan (Fisheries Agency 2009).

7.2. Safety of fish products

Flooding from the tsunami overwhelmed the Fukushima Daiichi Nuclear Power Plant triggering hydrogen explosions on 12 and 14 March 2011, which dispersed massive amounts of radioactive material into the atmosphere. Most of the vented radiation was blown out to sea, due to prevailing westerly winds. A second calamity occurred from 2 to 6 April 2011, when an estimated 520 m^3 of highly contaminated cooling water leaked into the ocean (Normile 2013). The Japanese government estimated that about 18 PBq of Cesium-134 and Cesium-137 were released (European Commission 2011). The accident has provoked public concerns over radioactive contamination of sea food in and outside Japan.

In responding to these safety concerns, the Fisheries Agency established the "Basic Policy for Inspections on Radioactive Materials in Fishery Products" on 6 May 2011 and strengthened the monitoring efforts to offer accurate information (Fisheries Agency 2011b). Before the Fukushima accident, the maximum permissible level for radioactive contamination in food (Cesium) was 500 Bq/kg, which was in line with the EU standard. The Japanese government decided to lower the maximum permissible level to 100 Bq/kg

for food including fishery products as of April 2012. To this end, the Fishery Agency has focused its monitoring efforts on fishery species that exceeded 50 Bq in the past. If fish contains radioactive materials above the maximum permissible level, then fishing is suspended by the Japanese authorities. So far most species were found to be below the standard limit. The cases which exceeded the standard are bottom fish and freshwater fish caught in specific limited areas (e.g. Fukushima, Miyagi and Ibaraki).

No fishing activities are allowed in the Fukushima area except trial fishing for limited species. Fishing activities for some species in neighbouring prefectures are suspended, for example, seabass, olive flounder, Pacific cod and Japanese black porgy in the prefectures Miyagi and Ibaraki[31]. In addition, the Ministry of Health and some municipalities conduct monitoring of fishery products sold in stores. Also, some retailers have carried out their own monitoring, making sure that the origin of fish caught for domestic consumption is indicated.

7.3. Towards reconstruction

In March 2012 the Japanese government published the Basic Plan with concrete goals and measures, and launched a series of fishery-related supplementary budgets amounting to 1.03 trillion yen (total 2011 to 2013)[32]. According to this plan, approximately 52% of the total budgets are allocated to fisheries and aquaculture related fields (vessels repairing and building, restoring joint facilities, aquaculture facilities, and insurance for vessels), 40% to infrastructure for fishing ports and fishery communities, and 8% to assistance for building up distribution and processing plants (Fisheries Agency 2012c).

As of 11 December 2012, 13 505 fishing vessels were repaired, and 34% of all fishing ports, 68% of fishery markets and 66% of fishery processing plants were restored and re-opened in three prefectures (Iwate, Miyagi and Fukushima).

In addition, the catches landed during August-October 2012 in these three prefectures recovered to 65% in volume and 76% in value of those landed in the same period in 2010. Aquaculture production for w*akame* in Iwate and Miyagi prefectures has increased to 75% and 85% respectively of the figures recorded two years earlier. However, the Fukushima prefecture showed little sign of recovery in terms of the fish catch volume and marine aquaculture production due to the fact that fishing activities are not allowed in this area.

[31] MAFF, Current State of Public Regulation and Self-Regulation on Fishing Activities in North East Japan (in Japanese) http://www.maff.go.jp/e/quake/press_110312-1.html

[32] http://www.jfa.maff.go.jp/j/sinsai/pdf/3yosan.pdf; in 2014 the special budget is 185.4 billion yen http://www.jfa.maff.go.jp/j/budget/pdf/26yosankettei.pdf

8. MARINE RESEARCH

The **Fisheries Research Agency** (FRA) is at the centre of marine research in Japan, conducting a wide range of research and development activities in fisheries, from basic research to practical applications.

In 2001, following the reorganization of the central government ministries, the FRA was established as an administrative organization independent from the national government, by merging nine former National Fisheries Research Institutes (the oldest of which was established in 1929). The FRA expanded in 2003 to take over the duties of the Japan Marine Fishery Research Center and the Japan Sea-Farming Association, and in 2006 to include the National Salmon Resources Center. The FRA aims to secure the stable supply of fishery products and to promote the sound development of the fisheries industries, as stipulated by the Basic Law on Fisheries Policy. The FRA employs 968 full-time workers, of which 541 are engaged in research and development, while 159 people are employed as vessel staff (FRA 2012a). The FRA has its headquarters in Yokohama, and is divided into 10 institutes with specific areas of interest (Figure 27).

Figure 27: Location of FRA institutes

Source: Fisheries Research Agency

The work of the FRA is structured around three main areas:

- The Marine Resources section mainly focuses on estimating the size of the stocks and on defining the TAC for each stock. This section provides annual stock assessments for 52 species and 84 stocks, together with other external experts. Investigations on exploited stocks of fish, shellfish and marine mammals, including highly migratory species outside Japan's waters, are carried out every year. Some of the projects concentrate on searching for spawning areas for eel.
- The Marine Environment section focuses mainly on environmental conditions in the sea, marine geology and the ecology of fish species. Major projects concern research on the impact of climate change (such as sea temperature variation) on the biology, ecology and resources of fishery species.
- The Aquaculture (Fisheries Engineering) section mainly concentrates on development of aquaculture. Among the major projects undertaken are development and improvement of an artificial hatching system for bluefin tuna and eel. Genetic research is also used to identify effective genes for increasing the productivity of cultured fish.

Most of the FRA budget comes from the government. This budget amounted to 27 billion yen in 2012, of which 85% was allocated to research and development targeting aquaculture, and 15% to research on marine resources including stock assessments. The FRA is also involved in joint international research, and actively participates in the work of the **International Scientific Committee for Tuna and Tuna-like species in the North Pacific Ocean (ISC)**, and in the **Advisory Committee of the WCPFC**, by providing scientific data and knowledge on tuna and skipjack.

In addition, the FRA cooperates with the academic world on various projects such as regular works on fishery resource assessment. Currently there are at least 40 high schools and 22 universities in Japan involved in marine and fisheries research. One of the major universities in this field is **Tokyo University of Marine Science and Technology (TUMSAT)**, an academic institute established in 2003 after the merge of Tokyo University of Mercantile Marine (created in 1875), and Tokyo University of Fisheries (established in 1888). As of May 2012 the TUMSAT employed approximately 462 full-time workers, of which 242 work as researchers, and the combined number of students and researchers from undergraduate and graduate schools is 2839 (TUMSAT 2012).

"Priority research projects" developed at the TUMSAT include:

- Building of a surrogate parent fish farming system using marine fish;
- Basic research on controlling fish behaviour by means of complex stimuli cooperation including an underwater robot;
- Comprehensive study related to inhibition of organism proliferation due to release of ballast water;
- Seaweed Biofuel/Marine Resources Conservation Engineering Project;
- Efforts on monitoring, verification and development of countermeasures to the impact of global warming;
- Research on environmental conservation and biodiversity preservation in Tokyo Bay and island areas;
- Pilot study on a ship propulsion system using quick-charge lithium-ion batteries;

- Building of on-land fish farming systems using the most advanced engineering techniques;
- Development of a motor-driven water-jet boat;
- Reconstruction of the disaster areas of the Great East Japan Earthquake.

Finally, the **Institute of Cetacean Research (ICR)**, a semi-governmental organization, has been involved in Japan's scientific research whaling programmes and closely participates in the Advisory Committee of the International Whaling Commission (see the Annex, Section 3).

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ANNEX: SPECIFIC FISHERIES

1. Bluefin tuna

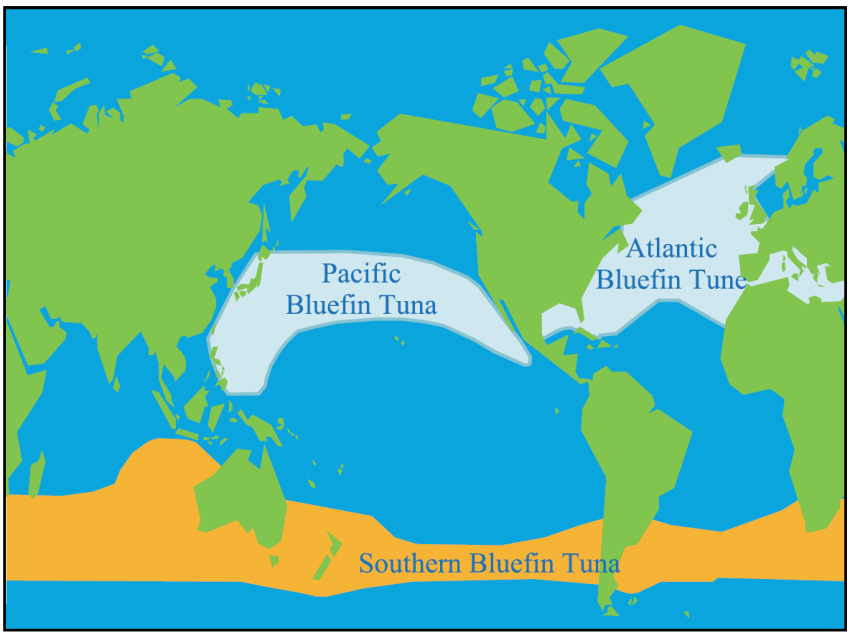
Japan is known as the world's biggest consumer of tuna, which is an essential element of its food culture. With a total volume of tuna catches reaching 206 298 tonnes in 2009, i.e. 11% of the global volume, Japan is also the main tuna-fishing nation in the world (Fisheries Agency 2011a).

Bluefin tuna in particular, known as *hon-maguro* or *kuro-maguro* and served mainly as sashimi, fetches the highest prices on the market[33]. Bluefin tuna is a common name used to refer to several species of tuna, including Atlantic bluefin tuna (*Thunnus thynnus*), Pacific bluefin tuna (*Thunnus orientalis)* and Southern bluefin tuna (*Thunnus maccoyii,* Figure 28). Japan consumes 80 to 90% of the global production of Atlantic and Pacific bluefin tuna (MAFF 2012).

The total supply of Atlantic and Pacific bluefin tuna to Japan in 2011 amounted to 40 700 tonnes, of which 62% came from Japan's production and 38% from imports (Table 19). While the majority of the Pacific bluefin is provided by Japanese catches and aquaculture, most of the Atlantic bluefin is imported.

In 2011 the main countries exporting bluefin tuna to Japan were Mexico (8.6%), Malta (7%), Croatia (6%), Spain (4%) and Turkey (4%; Figure 29). As regards fattened bluefin tuna from the Mediterranean Sea, Japan's imports reached a peak at 22 600 tonnes in 2006, but subsequently declined due to lower TACs for Atlantic bluefin tuna, tighter regulation imposed on aquaculture in the EU and strengthened control of imports in Japan (Figure 30).

Figure 28: Distribution of bluefin tuna species



Source: Fisheries Agency (2012)

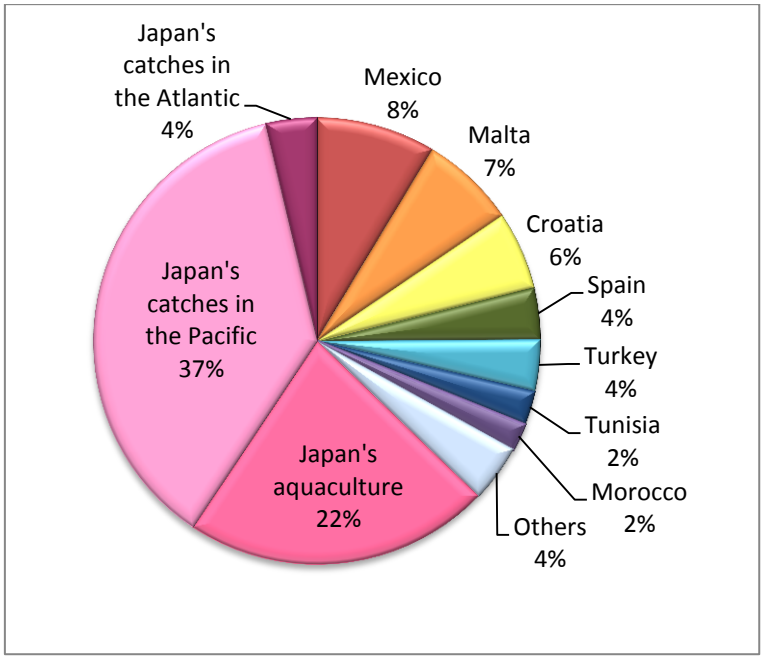
[33] In recent years, auctions at Tokyo's Tsukiji fish market have seen record-setting prices for bluefin tuna, reflecting the high demand. The current record for a single fish is 155.4 million Japanese yen (US $1.76 million) for a 221 kg bluefin tuna (January 2013).

Table 19: Supply of bluefin tuna to Japan by type of source and region (2011)

Areas	Source	Volume	
		Tonnes	%
Pacific	Japan's catches	15000	36
	Japan's aquaculture production	9000	22
	Imports	4000	10
	Total Pacific	*28000*	*68*
Atlantic	Japan's catches	1500	4
	Imports	11200	28
	Total Atlantic	*12700*	*32*
Total		**40700**	**100**

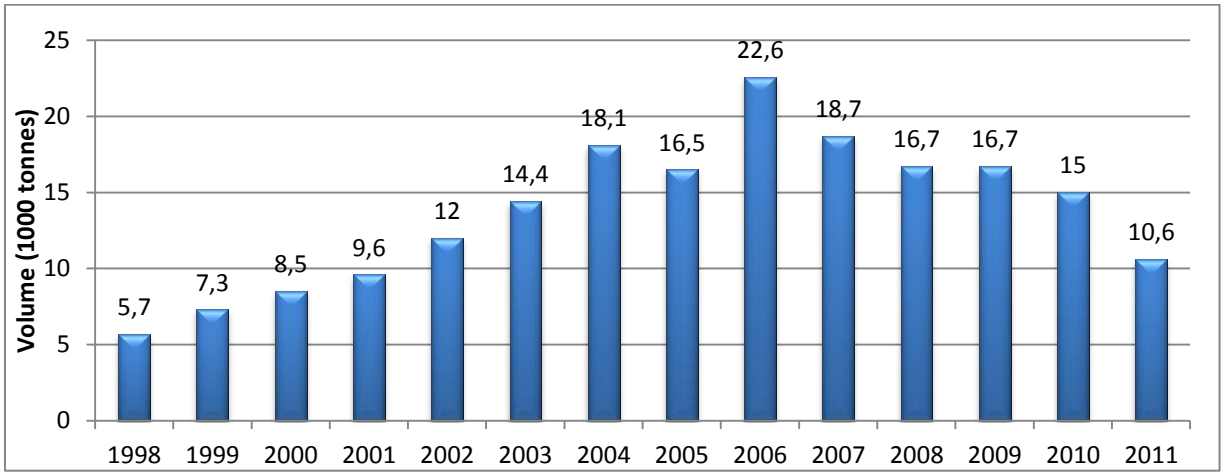
Data source: Fisheries Agency(2012d)

Figure 29: Supply of bluefin tuna to Japan by country (2011)



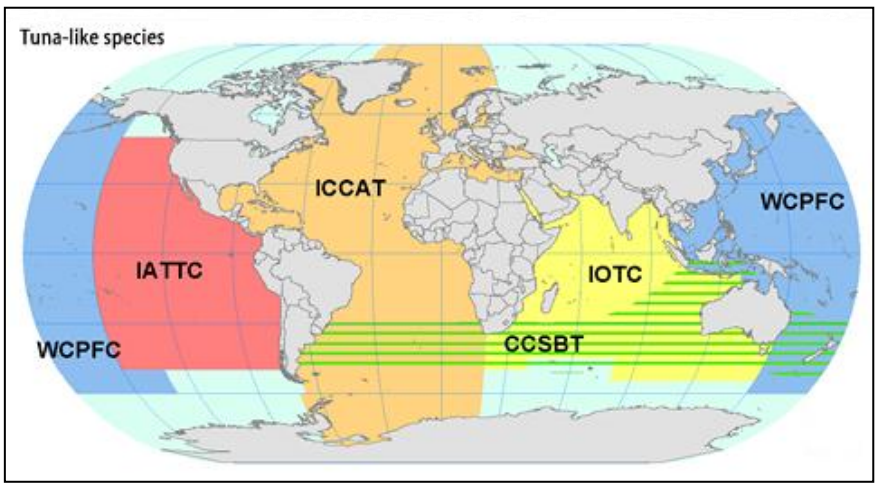
Data source: Fisheries Agency (2012d)

Figure 30: Imports of fattened bluefin tuna from the Mediterranean (1998-2011)



Data source: Fisheries Agency (2012d)

Figure 31: Tuna RFMOs



Source: European Commission

Japan is a member of the five tuna regional fisheries management organizations (RFMOs, Figure 31):

- Western and Central Pacific Fisheries Commission (WCPFC),
- International Commission for the Conservation of Atlantic Tunas (ICCAT),
- Commission for the Conservation of Southern Bluefin Tuna (CCSBT),
- Indian Ocean Tuna Commission (IOTC), and
- Inter-American Tropical Tuna Commission (IATTC).

Atlantic bluefin tuna is covered by ICCAT and Pacific bluefin tuna by WCPFC and IATTC.

Atlantic bluefin tuna has been attracting global attention due to its drastic stock decline during the past decades. The ICCAT 2008 assessment report noted that "substantial overfishing is occurring and spawning biomass is well below levels needed to sustain MSY". The ICCAT 2010 assessment report confirmed that "while the outlook for Eastern Atlantic and Mediterranean bluefin tuna had improved in comparison to previous assessments, the stock remained overfished".

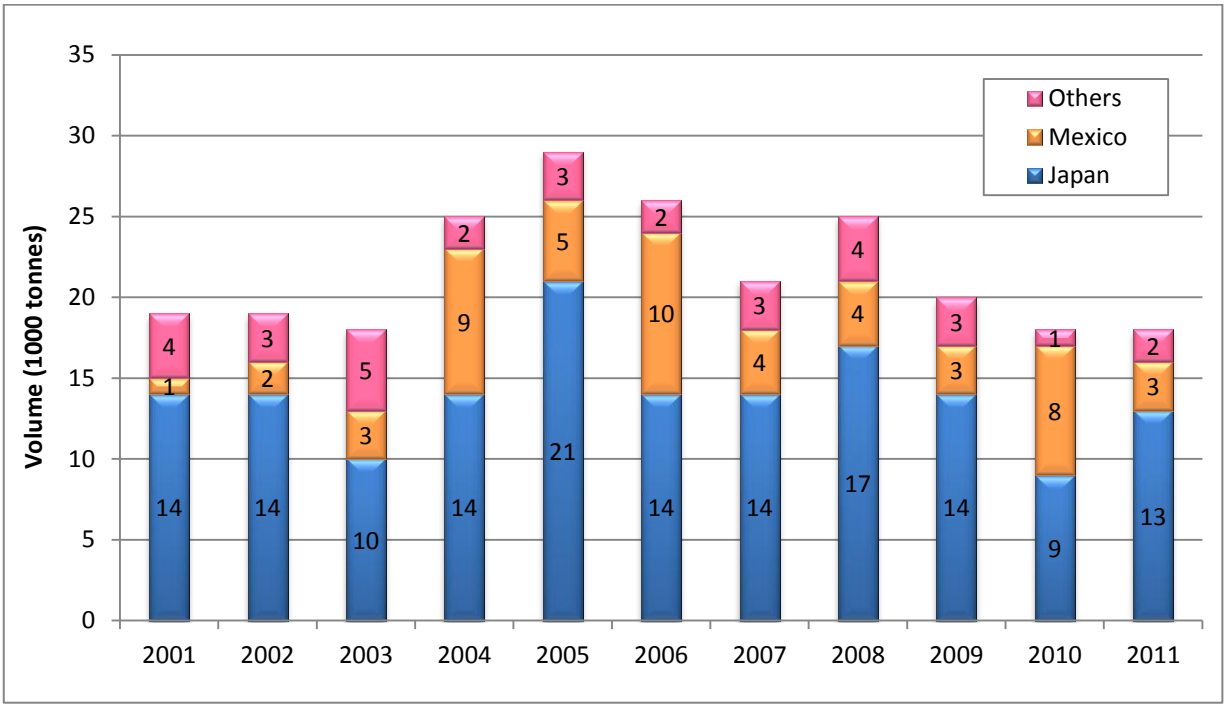
When a proposal to ban the international trade in Atlantic bluefin tuna was presented at the CITES in March 2010, Japan took the initiative to reject this proposal from the perspective that the Convention only controls trade and has no effect on countries that catch their own tuna supply, arguing that ICCAT is the appropriate body for conservation and management of Atlantic bluefin tuna.

With regard to **Pacific bluefin tuna**, the average volume of the catches in 2001-2011 was 14 000 tonnes for Japan, and 5000 tonnes for Mexico (Figure 32). Japan and Mexico's catches accounted for 64% and 21% respectively of the total catches of Pacific bluefin, most of which (ca. 60-70%) was caught by purse seiners.

The International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) was established in 1995 by the government of the United States and the government of Japan as an independent scientific body, to study the highly migratory species of the North Pacific. Whereas WCPFC and IATTC are the RFMOs responsible for coordinating conservation and management measures for Pacific bluefin tuna, the ISC plays an important role in providing scientific assessments for this species. According to the ISC

stock assessment in 2010, the overall stock of Pacific bluefin tuna was medium but its trend appeared to be on decrease. A new stock assessment released at the end of 2012 confirmed this trend, stating that "overfishing is occurring and the stock is overfished. Model estimates of 2010 spawning stock biomass (SSB) are at or near their lowest level and SSB has been declining for over a decade" (ISC 2012).

Figure 32: Pacific bluefin tuna catch volume by country (2001-2011)



Data source: Fisheries Agency 2012d

The main cause for this decline is the considerable fishing effort that specifically target juveniles (below 30 kg). According to the Fisheries Agency of Japan, almost 91.1% of the Pacific bluefin tuna catches consist of juveniles aged 0-1, and 5% are aged 2. In addition, the majority of vessels fishing juveniles are purse-seiners, some of which target the spawning areas. Thus, in order to maintain the Pacific bluefin tuna resource at a sustainable level, it is necessary to regulate fishing effort targeting juveniles.

In response to concerns regarding overexploitation of Pacific bluefin tuna, the Japanese government launched an action plan in May 2010 entitled "Toward effective conservation and management for Pacific bluefin tuna (Fisheries Agency 2010). These measures, which are in line with WCPFC's recommendations (WCPFC CMM 2010-04), include:

- an annual catch limit of 4500 tonnes for purse-seiners targeting juvenile Pacific bluefin tuna in waters off Western of Kyushu and the Sea of Japan, the volume of which represents a 26% decrease from the 2005–2009 average catch,
- an annual catch limit of 500 tonnes for purse-seiners fleet targeting juvenile Pacific bluefin tuna in the Pacific Ocean, and
- an annual catch limit of 2000 tonnes for the purse-seiners fleet targeting adult Pacific bluefin tuna in the Sea of Japan, a 13% of reduction from the 2005-2009 average catch.

Moreover, the Japanese government took additional measures requiring that all Pacific bluefin tuna aquaculture operations to be registered and reported, including the number of cages in operation and the source of the fry. The measures also limit the scale of Pacific

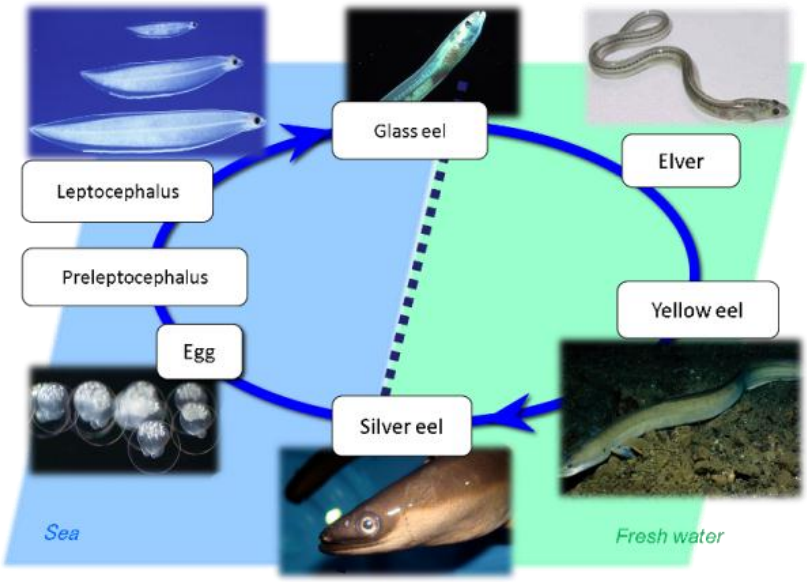
bluefin tuna aquaculture at the current level in order to avoid overexploitation of juveniles of natural resources, and promote the production of artificially hatched tuna.

Japan took the initiative to encourage other Pacific countries to implement resource management measures through IATTC and WCPFC. The Japanese government urged South Korea to participate in the framework of the WCPFC CMM 2010-04 in reducing the 2012-2013 juvenile catch volume of Pacific bluefin tuna to the 2002-2004 average catch level. Similarly, Japan urged Mexico to abide by the IATTC framework in restraining the total catch of Pacific bluefin tuna below 10000 tonnes during 2012-2013 (IATTC Resolution C-12-09).

2. Japanese eel

Japan is also the world's most important consumer of eel, accounting for nearly 70% of the global figure. The Japanese eel, or *Nihon unagi* (*Anguilla japonica*) has been a prized delicacy in Japan from ancient times, and an indispensable part of its cuisine. Like all the other eels from the Anguillidae family, it is a catadromous species, meaning that it spawns in the sea but lives part of its life in freshwater (Figure 33).

Figure 33: Eel lifecycle



Source: University of Tokyo (2011)

Table 20: Japan's total production and imports of eel, in thousand tonnes (1998-2011)[34]

Source	1998	2001	2003	2006	2009	2010	2011
Japan's production (including wild and farmed eel)	23	24	22	21	23	21	22
Total imports	65 (86)	86 (114)	66 (83)	55 (66)	32 (40)	38 (47)	24 (30)
Total consumption	**88 (109)**	**110 (138)**	**88 (105)**	**76 (87)**	**55 (63)**	**59 (68)**	**47 (53)**

Data source: Fisheries Agency (2011a), Ministry of Finance

[34] The numbers in brackets are the estimated volume of eel when taking into account the original size before processing (estimated original size is 1.4 times higher than that of processed eel).

Table 21: Eel imports by country, in tonnes (2010-2012)

Source	2010	2011	2012
Eel imports (processed)	**22938 (32113)**	**14642 (20498)**	**8990 (12586)**
South Korea	0.1	-	-
China	21198	13869	8818
Taiwan	1740	773	147
Spain	0.01	0.05	0.03
Denmark	-	-	20
Indonesia	-	-	6.3
Eel imports (live)	**14841**	**9658**	**4678**
South Korea	-	-	75
China	6009	4769	3183
Taiwan	8828	4839	1373
Indonesia	0.7	0.7	1.4
USA	0.6	14.5	8.7
Australia	2.4	6	8.6
France	-	-	27
Canada	-	-	0.6
Madagascar	-	-	0.2
Total eel import	**37779 (46954)**	**24300 (30156)**	**13667 (17263)**

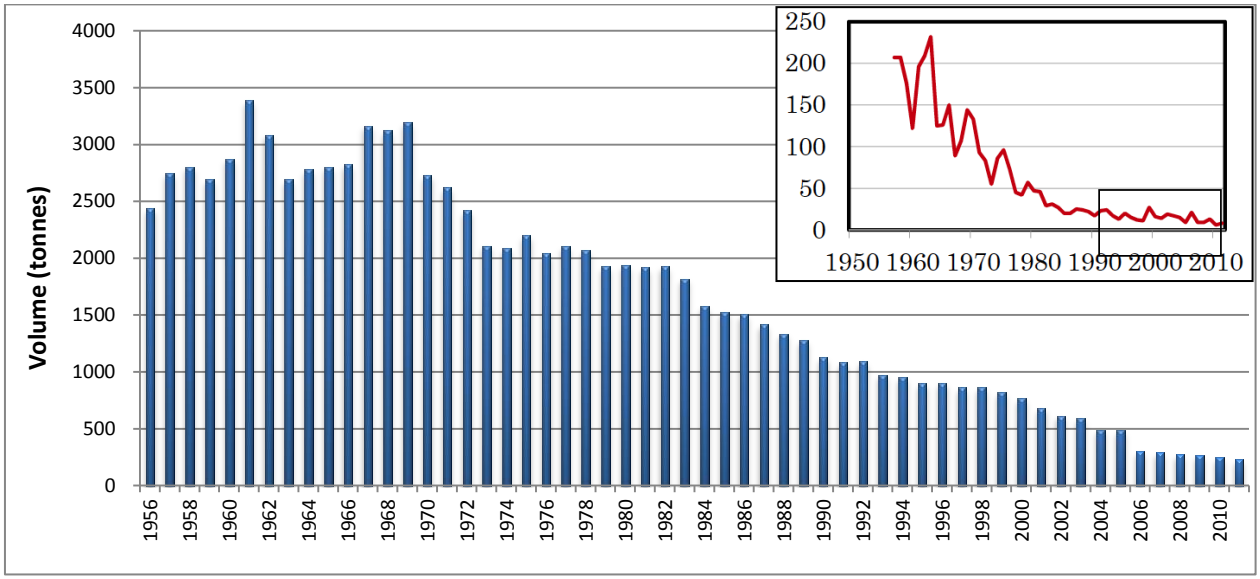
Data source: Fisheries Agency (2011a), Ministry of Finance

More than half of the eel consumed in Japan comes from imports (Table 20). Virtually all processed eel products are imported from China (98%), while live eel is mainly from China (68%) and Taiwan (29%; Table 21). Japan's eel production is dependent on aquaculture, which provides 99% of the total domestic production.

The catches of wild adult eel have declined by more than 90% since the late 1960s, falling from more than 3000 tonnes in this period to 229 tonnes in 2011 (Figure 34). This sharp decrease is attributed to a number of factors including overexploitation, changes in ocean currents, pollution, diseases and loss of river habitat. Similarly, the catches of glass eel have decreased to 10 tonnes in 2011, down from a peak of 240 tonnes in 1965 (Figure 34, inset box). The recent decline of the catches accelerated the import of glass eel from abroad, and the import price of glass eel soared to 1.8 million yen/kg, from 626 thousand yen/kg in 2011. In 2012, the biggest exporter of glass eel to Japan was Hong Kong (6142 kg), followed by Korea (990 kg).

Given the drastic decline of the Japanese eel, the Fisheries Agency of Japan issued a set of emergency measures, which include 1) financial and technical support for eel farmers, 2) improvement of river environment, 3) resource management plans that restrict fishing on matured eel in freshwaters, and that encourage efforts to protect glass eels swimming upriver, 4) more coordinated management efforts among neighbouring countries such as China and Taiwan (Fisheries Agency 2012e). Still, the effectiveness of this resource management plan remains debatable, as no explicit catch limit was imposed except for some prefectures (Tetsuji Ida 2012). Moreover, it is uncertain whether and to what extent an international framework is established and implemented. The Japanese government currently aims to establish a working group on Japanese eel within the framework of Asia Pacific Economic Cooperation while it continues to exchange information and views with China and Taiwan through a series of informal meetings.

Figure 34: Japan's catches of Japanese eel (1956-2011). The inset box shows the catches of glass eel (1950-2010).



Data source: Fisheries Agency 2011, Fisheries and Aquaculture Production Statistics 2011, FRA 2012b

In February 2013 the Japanese government's Environment Ministry officially added the Japanese eel to the "endangered" category of the country's Red List of animals. However, the Red List has no legal authority in Japan.

3. Whaling

Japan has a long tradition of hunting whales and was heavily involved in commercial whaling since the beginning of the 20th century. Its position in the controversial whaling issue is based on the idea that whales are not different from any other animals, and thus they can be sustainably used as a food resource (e.g. Morishita 2006).

Since 1951, Japan is a member of the International Whaling Commission (IWC) - the inter-governmental organization tasked with the conservation of whales and the management of whaling. The IWC was set up in 1948, under the 1946 International Convention for the Regulation of Whaling (ICRW), which was intended "to provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry". The Commission has a current membership of 89 countries, up from 15 at the establishment.

In 1982 the IWC adopted a moratorium to suspend commercial whaling, which entered into force in 1986 and is still in place today. Presently three types of whaling take place under the current IWC regulations:

- Commercial whaling conducted either under objection or reservation to the moratorium, exercised by Norway (which takes North Atlantic common minke whales within its EEZ) and Iceland (which takes North Atlantic common minke whales and North Atlantic fin whales within its EEZ). The Russian Federation has also registered an objection to the moratorium decision but does not exercise it. The moratorium is binding on all other members of the IWC;
- Aboriginal subsistence whaling to support the needs of indigenous peoples, recognized for Denmark (Greenland - fin, bowhead, humpback and minke whales), the Russian Federation (Siberia - gray and bowhead whales), St Vincent and The

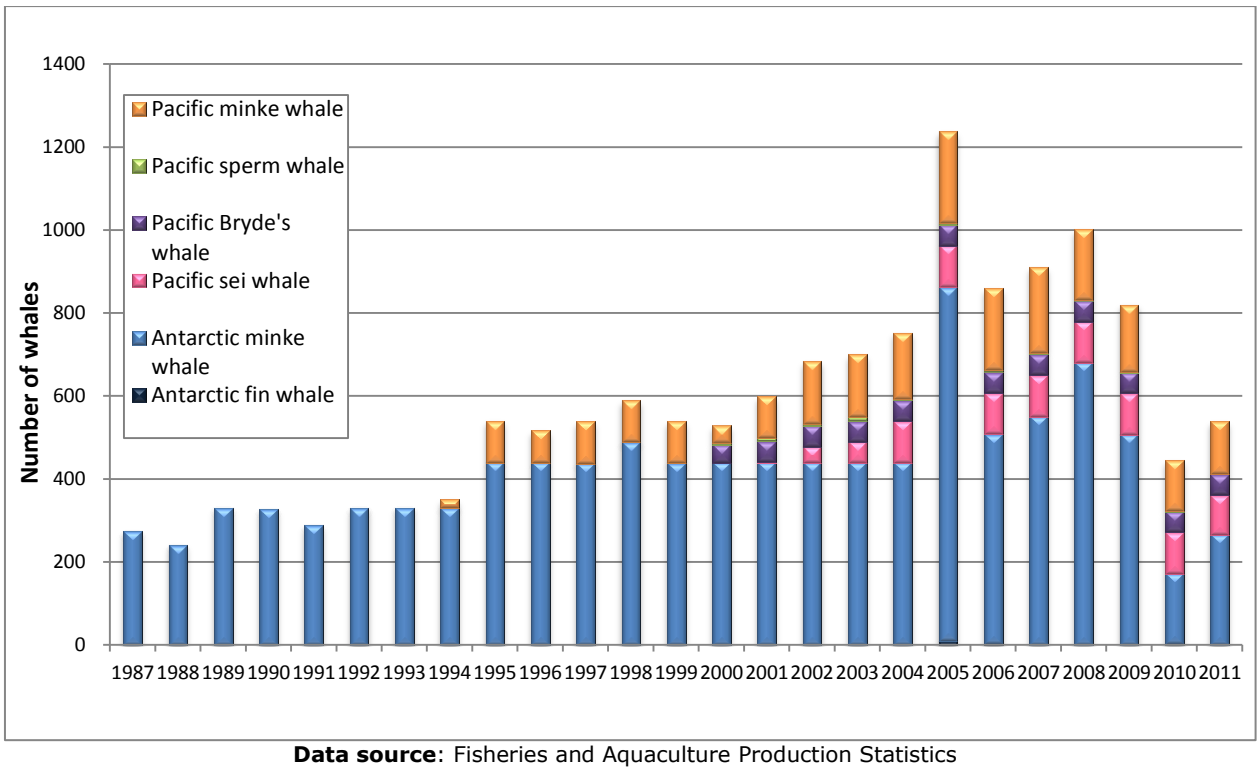
Grenadines (Bequia - humpback whales) and the USA (Alaska - bowhead whales; Washington State - gray whales);

- Whaling under special permit for scientific research, based on Article VIII of the Convention. Japan has issued scientific permits through the programmes JARPA I (1987/1988-2004/2005) and JARPA II (2005/2006-ongoing) in the Antarctic, and JARPN I (1994-1999) and JARPN II (2000-ongoing) in the western North Pacific. Iceland has also used the scientific research provision for its 2003-2007 programme.

After the moratorium was adopted at the IWC, Japan submitted an objection and continued its commercial whaling. Facing international pressure, in particular from the U.S., Japan accepted the moratorium in 1988, but launched a scientific whaling programme, aimed at collecting whale stock data to support resuming of commercial whaling. During the programme Japan has caught ca. 400 whales per year on average in the Antarctic, and ca. 150 whales in the Pacific, in particular minke whales[35] (Figure 35).

The Japanese scientific permit whaling is conducted by the Institute of Cetacean Research (ICR) - a nonprofit research organization established in 1987, and Kyodo Senpaku - converted from the former Nihon Kyodo Hogei Whaling Company (Hirata 2005). The proceeds from the sale of whale meat are used to support the research of the following year, complemented by subsidies from the government of Japan (Figure 36).

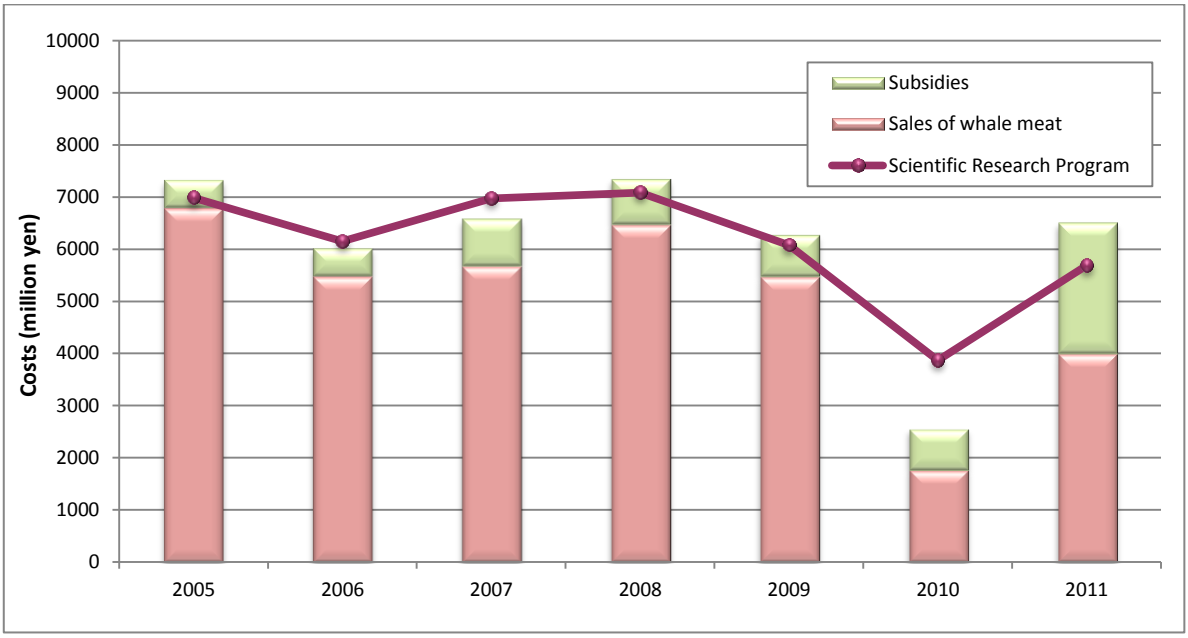
Figure 35: Evolution of the total number of great whales taken by Japan, by species and area (1987-2011)



Data source: Fisheries and Aquaculture Production Statistics

[35] In addition to whales caught for scientific purposes, more than hundred minke whales caught in set nets as by-catches were sold on the Japanese market (Iruka and Kujira Action Network 2012). Other smaller cetaceans (including dolphins), which are not subject to the IWC framework are caught under government control in Japan.

Figure 36: ICR income from sales of whale meat and subsidies vs. expenses for the Scientific Research Programme (2005-2011)



Data source: ICR (2011)

There has been considerable debate over the value of this research within the IWC and its Scientific Committee. Particular disagreement within the Committee has focussed on a number of issues, including the relevance of the proposed research to management, appropriate sample sizes and applicability of alternate (non-lethal) research methods. The IWC has passed a number of resolutions by majority vote asking Japan to refrain from issuing permits for its JARPA programme[36].

Japan's scientific whaling has been also criticized by anti-whaling groups and countries, for being used as commercial whaling in disguise: the process of conducting research and reviewing the results is considered not entirely transparent and possibly used in favour of pro-whaling policy, whereas the lethal method is judged as unnecessary for scientific research[37]. Moreover, as the IWC designated the "Southern Ocean Whale Sanctuary" - an area of 50 million km^2 surrounding the continent of Antarctica where all types of commercial whaling are banned, improving management of whaling in a sanctuary is considered inappropriate[38].

The Japanese government has systematically refuted such criticisms with different arguments. Scientific whaling is deemed legitimate because it is conducted under the Article VIII of the ICRW, which also stipulates that the sales of whales caught for scientific purpose is a legally recognized procedure. Lethal methods are considered justified for some of the scientific research, particularly on whale habitat and their ecosystem. Japan has also argued that the establishment of the sanctuary was in contravention of the ICRW, whose objective is to ensure the sustainable use of whales with proper management, and is therefore illegal[39].

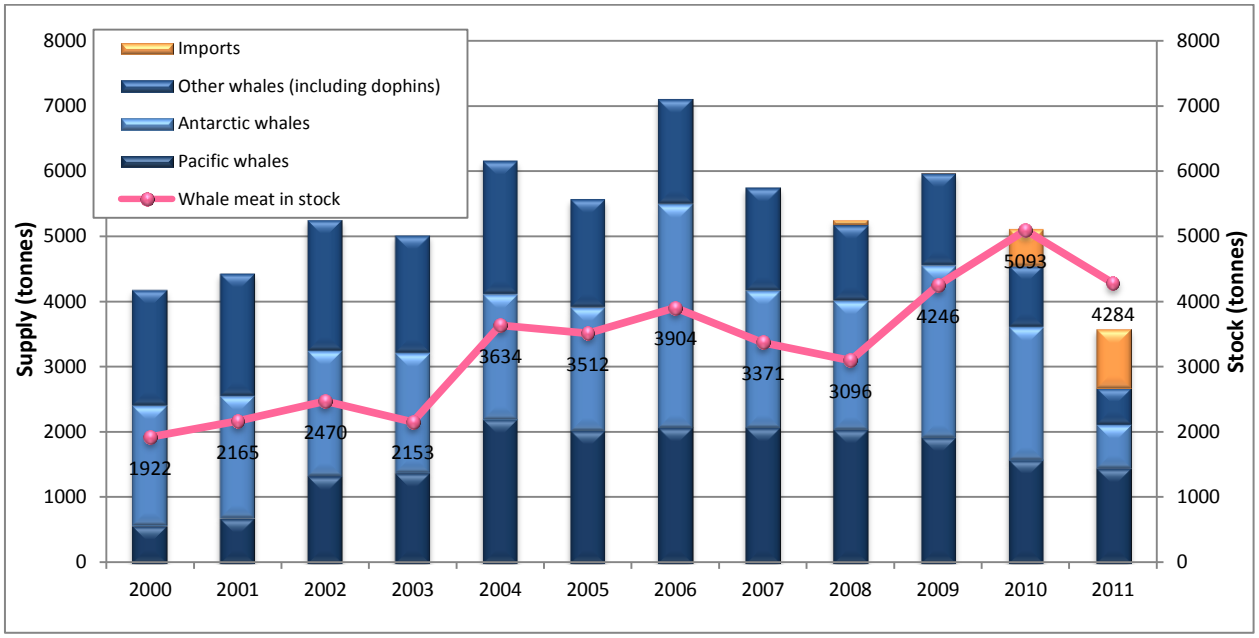
[36] http://iwc.int/permits

[37] http://www.environment.gov.au/resource/non-lethal-research-techniques-studying-whales

[38] On 31 May 2010 Australia initiated legal action against Japan in the International Court of Justice, considering that Japan's scientific whaling in the Antarctic designated as sanctuary is in breach of its obligations under international law including the ICRW. Hearings in the case were held in The Hague from 26 June to 16 July 2013. See http://www.icj-cij.org/docket/index.php?p1=3&p2=1&case=148

[39] http://www.icrwhale.org/Q_and_A.html

Figure 37: Whale meat supply and stock (2000-2011)



Data source: Fisheries and Aquaculture Production Statistics, Frozen Fisheries Products Statistics

Since the beginning of the whaling ban, the nature of the dispute between Japan and anti-whaling countries has grown from concerns over certainty of population estimates to a wide international issue involving a mix of legal, scientific, political, economic, ethical and cultural arguments. Japan has been constantly calling for the resumption of commercial whaling for stocks that can be used sustainably, such as minke whales[40]. Whereas this pro-whaling stance seems unlikely to change in the near future, some researchers argue that a confrontational approach might be counterproductive for the anti-whaling camp, as it contributes to provoking a nationalistic feeling against what is perceived as "cultural imperialism" and to strengthening public support for the whaling industry (e.g. Hirata 2005).

Nevertheless, it is debatable to what extent Japan's whaling is economically viable, as its domestic demand for whale meat has shrunk over the years: in 2009-2011 the amount of whale meat stock unsold amounted to 4000-5000 tones, almost the double of the amount in the early 2000s (Figure 37). In addition, cheaper whale meat is imported from Norway and Iceland, which can be detrimental to the Japanese whaling industry. Declining whale meat sales have also had an impact on the ICR's balance sheet. Since the ICR is dependent on sales which are its main source of income, this negative trend makes it difficult for the scientific research programmes to continue without relying on government subsidies (Figure 36).

[40] An alternative explanation of Japan's whaling diplomacy, put forward by Ishii and Okubo (2007), argues that the Japanese stance actually contradicts the official discourse and prioritizes continuation of scientific whaling over resumption of commercial whaling.

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