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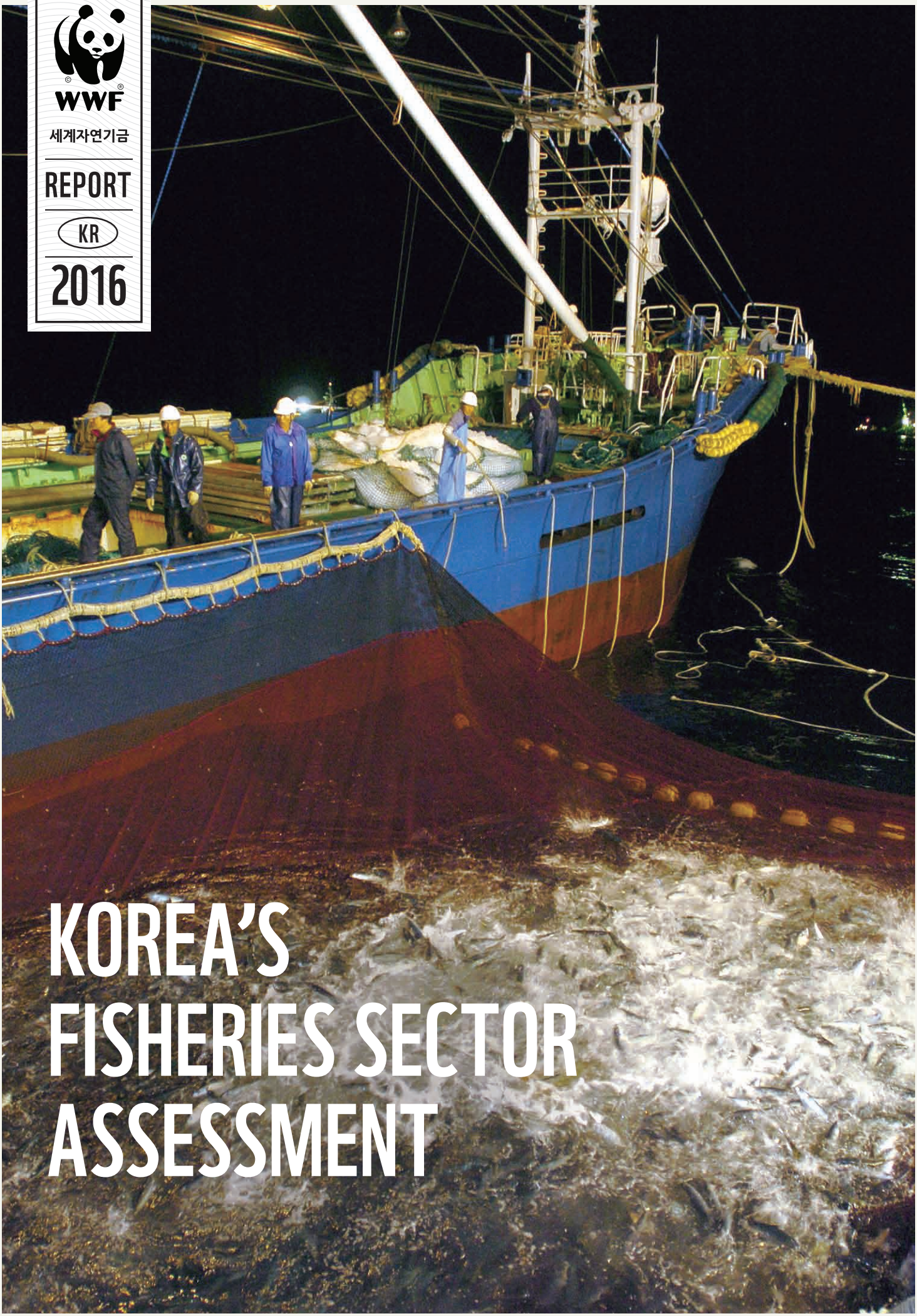

KOREA'S FISHERIES SECTOR ASSESSMENT

Front cover

WWF is one of the world's largest and most experienced independent conservation organizations, with over 5 million supporters and a global network active in more than 100 countries. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

This report aims to enhance the understanding of Korea's fisheries sector, providing a comprehensive analysis on the fisheries, policy, trade and seafood distribution. Information and data are sourced from the government statistics and research reports of governmental institutions and academia. Data sources are cross-checked. To narrow the information gap, interviews with the relevant stakeholders or filed visit were conducted.
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EXECUTIVE SUMMARY

Korea has a long tradition with fisheries, like many other Asian countries, as it is surrounded by oceans. The coastal and offshore fisheries first developed naturally in Korea's EEZs and the distant water fisheries commenced in 1957. Currently Korea's fisheries sectors are categorized into four major areas: domestic waters fisheries (coastal and offshore fisheries), distant waters fisheries, aquaculture (mainly mariculture), and inland waters fisheries.

Overview of fisheries sector with data

The total production of four fisheries areas was about 3,135,250 MT with a value of 7,227.3 billion KRW (about US$ 6.46 billion) in 2013. The production weight is on average more than 3 million MT every year with fluctuating value of fishery products. In 2013, about 48.3% of total fisheries production came from mariculture with about 1,515,200 MT, 33.3% from coastal and offshore fisheries with 1,044,700 MT and 17.5% from distant water fisheries with 550,000 MT. The proportion in value of each sector is different with about 51.8% being created by coastal and offshore fisheries, 24% by mariculture and 19.4% by distant waters fisheries.

The total number of fishing vessels has been decreasing since the 1990s to a record level of 71,287 by the end of 2013. Coastal and offshore fishing vessels account for 66.6% by number while distant water fishing vessels account for 0.4% with active number of 315.

Compared to other economic activities, the fisheries sector is relatively small, as this sector represents only about 0.2% of GDP and 0.3% of GVA according to Korea's National Accounts. The number of fishing households and fishermen population has been decreasing since 1990s due to demographic aging, urbanization, and decrease of fish resources with 147,330 in 2013.

With the enforcement of UNCLOS in November of 1994, Korea's coastal and offshore areas were rearranged following the declarations of 200-nautical mile EEZs from the neighboring nations, China and Japan. Both the Korea-Japan Fisheries Agreement, enforced in 1999, and the Korea-China Fisheries Agreement, enforced in 2001, demarcated each nation's EEZ fishing area with various middle zones allowing bilateral parties to share fishing grounds.

Thirty-three (33) fishing operations exist under the coastal and offshore fisheries including sectional fisheries. However, major fishing operations are trawl, purse seine, gillnet, angling, stow net and trap. Most of the fisheries overlap in terms of fishing grounds and target species regardless of the fishing gear and method. For example, there are 22 different fishing methods to catch anchovies, 25 for chub mackerel and 24 for largehead hairtail. This typical pattern leads to overfishing and is difficult to manage effectively. The top five species caught are anchovies, squids, chub mackerels, largehead hairtail and swimming crab (blue crab).

Since Korea started the first distant water fishery in the Indian Ocean with an exploratory tuna long line fishery in 1957, it has been continuously expanding its

fishing operations in various oceans. By mid 1990's, 185 Korean companies operated more than 800 fishing vessels in the global oceans. Since then, the distant water fisheries have been shrinking to decrease to 342 fishing vessels number and 75 companies in 2013 due to the increased regulation of high seas and waters of coastal states, the high operating costs and the free trade movement globally. The major fisheries are tuna purse seine, tuna longline, trawl, jigging, saury stick-held dip net, trap and bottom long line fisheries. The major species caught are tuna representing about 50% of total catches, squid (18.2%), followed by Alaska pollack (4.4%) and pacific saury (2.5%). Tuna is the most important species in terms of catch volume and fishing capacity. Tuna long line fishery produces 30,000~40,000 MT and purse seiner produces about 250,000 ~ 300,000 MT every year.

Korea's distant water fishing vessels are present in all oceans including the Southern Ocean, and they are operating in 23 countries with 25 port bases globally. Tuna is predominantly caught in the Western and Central Pacific Ocean, but the Indian Ocean is becoming important too. The biggest fishing ground for squid is around the Falkland Islands in the south Atlantic Ocean. The Russian EEZ in the north Pacific Ocean is a main fishing ground for Alaska pollack. Almost of all top distant water fishing companies are mainly operating tuna fisheries, which shows that tuna fisheries are the most profitable fishery. It is noticeable that Korea's tuna fishing capacity has been increasing in recent years for both of long line and purse seine fisheries. This is related to investment for building or buying new vessels by the distant water fishing companies.

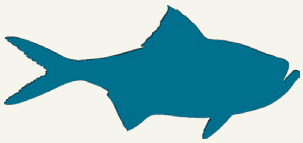
Mariculture production and extent have been increasing to cultivate more than 50 species including sea cucumber. Seaweeds represent 60 to 70% of total mariculture production and halibut, rockfish are main species in terms of fish.

Since the beginning of 2000s, Korea has been experiencing trade deficit in fishery products due to declining export and increasing import. The volume of pure fishery products export was about 1,072 thousand MT and import volume was 2,144 thousand MT in 2013 (live weight). Tuna and squid are the most important species in exports while Alaska pollack, squid, saury and shrimp (and shrimp flesh) are the most important in imports. The top five export partners of Korea by value are Japan, China, USA, Thailand and Vietnam, and they possess 78% of total seafood exports to Korea in terms of value. Moreover, Japan shares 38% of total export of fishery products. The

major import partners are China, Russia, Vietnam, USA, Chile, and Norway, which take 64% of total Korean seafood imports; and a share of China is nearly equal to one-fourth of the total import value.

Fisheries policy and management

Modernized fisheries policy and management system in Korea was introduced during the end of 19th century. The Fisheries Act and Fishery Resources Management Act are key legislations that regulate and manage fisheries and marine resources for coastal and offshore fisheries. The Fisheries Act defines a fishing permit, license, fishing method, fishing gear, and sanction. The Fishery Resources Management Act is aimed at managing and protecting marine living resources and recovering the resources depleted by overfishing. This law defines the restrictions on fishing vessels, fishing method and gear, resources protection and recovery, Total Allowable Catch (TAC) and sanctions as well. TAC, which is aimed at limiting catches for certain species, was introduced for the first time in 1999 for four (4) species and expanded to 11 species at present. Fish in the TAC category system should be traded in the designated markets (121 places) according to the government rule. This is to increase the effectiveness of the TAC system. The total TAC for 11 target species has been more than 400,000 MT and its catch rate was between 70~80% in recent years. Through the TAC system, the government tries to regulate fish flow between all the catch data from vessels and the catch entry to the first whole market as well.



57% of 1950's

FISH STOCKS IN KOREA'S DOMESTIC WATERS HAVE FALLEN VERY SHARPLY SINCE THE MID-1990'S AND ITS ASSESSMENT REPRESENTS AT PRESENT 57% OF 1950'S

Fish stocks in Korea's domestic waters have fallen very sharply since the mid-1990's and its assessment represents at present 57% of 1950's. This resources reduction is mainly due to chronic overexploitation by overcapacity and implementation of production-oriented fishery policies. The Korean government has been implementing several resources management plans and programs to decrease decline of the fish stocks including such measures as artificial reefs and sea ranches, vessel reduction, TAC and fisheries stock rebuilding projects. Despite of these efforts, overfishing and illegal, unreported and unregulated fishing (IUU) didn't improve which undermined various resources management program driven by the government and the stock recovery.

WWF-Korea has analysed the data on IUU fishing cases of Korean domestic waters fishing vessels investigated by East/West Sea Fisheries Supervision Offices during the last two years - 2013 and 2014. There were 1,292 IUU fishing cases reported in the report on IUU fishing activities and 1,110 IUU fishing were involving small coastal fishing vessels of which gross tonnage is less 10 GT and 182 cases were from offshore fishing vessels of more than 10 GT. Fourteen per cent (14%) of total IUU fishing activities was conducted by offshore fishing vessels which are mostly owned by bigger fishing corporations. The most noticeable fact is that more than 50% of IUU fishing cases exposed were from trawl fisheries (Danish seine by one vessel, pair trawl, West southern pair trawl, offshore large otter trawl, East Sea trawl). About 28% of IUU fishing activities were involving offshore jigging for squid. This report outcome is consistent with general comments received from the field interview with fisheries stakeholders. Most of interviewees pointed out large and medium trawl fisheries as major IUU fishing players with large purse seine. Of interest is that there has not been one case of IUU fishing from the large purse seine during the last two years.

The fishing vessel reduction programme, a core part of the fisheries restructuring program, was started in 1994 but conducted intensively since the beginning of 2000 with reduced fishing grounds as a result of fisheries agreements with Japan and China. The number of vessels has been reducing between 1994 and 2013, down

to 18,560 with 1,589 billion KRW cost. However, despite of this massive reduction program, the experts say that the fishing capacity of coastal and offshore fisheries is still 11~13 % beyond the appropriate level.

The Distant Water Fisheries Development Act was originally promulgated in 2007 with objective to promote Korea's distant water fisheries and related industry. However, following the IUU fishing activities by Korean fleets and the resulting international pressure such as "IUU fishing nation" designation by EU and USA in 2013, this law, the Distant Water Fisheries Development Act, was revised through 2013 and 2014 two times to strengthen MCS (Monitoring, Control and Surveillance) for this fishery sector. With this strong sanction, Fisheries Monitoring Center (FMC) has been opened in Busan to monitor and control all distant water fishing vessel with 100% of VMS. This center's mission is to monitor in real time the distant water fishing vessels in all oceans. Currently the center has seven staff and it will employ more experts with the introduction of electronic logbook from September in 2015. The vessel scrapping in West African waters will be conducted by the Ministry of Oceans and Fisheries in 2015. The Ministry established a budget of 9.9 billion KRW to scrap the distant water fishing vessels that operated in Guinea, Guinea Bissau, and Sierra Leone waters.

Korea is a member nation of 21 international organizations including Regional Fisheries Management Organizations (RFMOs), and member of all five tuna RFMOs. Korea has 'official' fisheries agreements with 12 countries: Australia, China, Cook Islands, Ecuador, Iran, Japan, Kiribati, Mauritania, Papua New Guinea, Russia, Solomon Islands, and Tuvalu. Most of the agreements aim to obtain permission for the Korean fleet to fish in the EEZs of other countries either by paying fees for the fishing operation or to promote the fisheries related cooperation for business.

The most representative subsidizing programmes in Korea are fuel tax reduction and price support programmes, support for closing fishery, various indirect support programmes such as modernizing vessels and investment for infrastructure through all fisheries sector including marine aquaculture. Korea's distant water fishing industry is not subsidized very much compared to other fishing nations in EU or USA. Most support programmes are low interest rate loans for the industry and fuel tax reduction programmes.

Seafood market and distribution

Korea is one of the main importing countries in terms of global fisheries imports in value following after USA, China, Japan and European Union according to the FAO yearbook Fishery and Aquacultures Statistics 2012. It also is one of the highest seafood consuming countries, alone with Japan, in terms of seafood consumption per capita with more than 50 kg per year onaverage. Korea consumes more than 4 million MT of fisheries products per year. The demand for fisheries products is higher than supply including distant water fisheries products; thus the so a self-sufficiency rate with respect to seafood has decreased to 64% in 2004, while it recovered to about 80% thereafter. It still falls short of 100% and this leads to the increasing dependency of imported fisheries products.

Fisheries products are marketed through a complex distribution system in Korea, which can be largely divided into two categories: one is institutional distribution and the other is non-institutional distribution. Regarding the institutional channels, distribution of fisheries products takes place through local port markets on commission at producers' sites or joint markets run by National Federation of Fisheries Cooperatives (NFFC). Non-institutional distribution is through private channels, which varies from individual consumer to processing company, private dealer, and supermarkets. The importance of this institutional distribution is decreasing more and more due to increasing non-institutional channel driven by big supermarkets. Around 50% of domestic consumption (coastal and offshore fisheries, mariculture) are through local port markets of institutional distribution, which has better traceability when compared to non-institutional channel. In conclusion, about 16% of coastal and offshore fisheries products, 65% of mariculture products and 90% of distant water fisheries products are through non-institutional channel, which is difficult to be traced.

Regarding international trade, Japan, China and USA are the most important trading countries for Korea's fisheries products export. Tuna is the most important item for export to Japan and toothfish is important for the USA market. China, Russia, and Vietnam are major importing countries for Korea. Imported fisheries products from China and Vietnam include domestically popular seafood and aquaculture industry. The major species imported from China to Korea are sand lance, long arm octopus, croakers, and black mouth goosefish. These fishes are also commonly consumed by Koreans. Pollack is the main imported fisheries commodity from Russia. Most of imported fisheries products (70%) enter the Busan port in frozen form. In most cases, the first wholesaler imports frozen fisheries products via the import dealer who receives 3 to 5 % of commission. Specifically, frozen croakers from China are mostly caught in Fujian and processed in Shandong, then shipped to Korea though Busan although few of them are shipped to Incheon. The distributional channel of Korea for imported fisheries products are not going through institutional distribution channel. Typically traders import products and then sell them to wholesale markets, mainly to non-institutional wholesale markets. It has been studied that only 10% of all imported fisheries products are distributed through wholesale markets. As of February 2015, there are 209 fishery-trading companies registered in Korea Fishery Trade Association.

Regarding the Alaska pollock and crab imports from Russia, Korean trading companies play major role. The trading company purchases the pollack from their usual partners-fishing companies when the catch is transferred to a carrier. With ordering, the carrier transports directly the frozen Pollack to China for processing into filets. Processed Pollack fillets is exported to USA, Europe and Brazil mainly and the remainder is distributed in Russia. Depending on the schedule of carrier, the carrier comes to Busan port, but not often recently. Nowadays most of catch is going directly to China. But in case of cod, halibut, crab which are expensive items, the carrier come to Busan for checking then the products are exported to Japan, China or Europe.

The 'traceability system' targeting the most popular 24 seafood item provides just basic information on the producer name including processing and distribution, origin, year and product type in Korea. Actually this system was introduced to give credibility to domestic seafood as Koreans prefer domestic seafood to imported seafood. And as explained above, most fishery products are traded through non-institutional, which is an unknown channel. Even through the institutional channel, the fisheries management to deter IUU fishing is not secured in Korea's domestic waters fisheries. In this context, there are no Marine Stewardship Council (MSC) certified fisheries and Chain of Custody (CoC) in Korea's coastal and offshore fisheries. There are 25 MSC certified products from 20 distribution companies, but most of them are CoC certification for exports to USA and Europe. There are very few MSC-certified products in Korea's domestic market.

Conclusion

As seen above, generalized overfishing and IUU fishing in domestic waters fisheries make all efforts, such as TAC, ineffective and does not address the sustainability of fisheries and fish stock recovery including protection of the marine environment. Another main challenge is lack of traceability in Korea's fisheries products market and international trade. Given that 16% of domestic waters fisheries products, 35% of mariculture products, and 90% of distant waters fisheries products are distributed via non-institutional channel, the Korean government is not equipped with effective traceability system for fisheries products. We suggest that these two main challenges are addressed and Korea implements a policy to manage the whole fisheries based on sustainability and ecosystem based management and control the whole sea food chain of custody from the production to the consumption and ensure traceability. Also with recent increase of fishing capacity of tuna distant water fisheries, it is imperative to encourage the tuna fishing industry to adopt sustainable fishing practices and offer greater transparency in their overseas operations.

Acronyms

EEZ	Exclusive Economic Zone
MT	Metric Ton
IUU	Illegal, Unreported and Unregulated
KRW	Korean Won
GT	Gross Tonnage
DWF	Distant Water Fisheries
KOFA	Korea Overseas Fisheries Association
NFFC	National Federation of Fisheries Cooperatives
TAC	Total Allowable Catch

FOREWORD

Challenges of domestic and international fisheries sector need to be addressed by collective actions of various actors.

Simon Yoon
WWF-Korea CEO

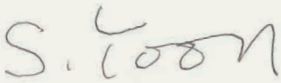
Korea is a leading importer of fisheries, consuming more than 4 million MT (metric tons) of fisheries products per year. Korea has a long history and tradition of fisheries and currently is one of the biggest fishing nations in terms of both production and consumption. With this current and historical significance of fisheries in Korea as a backdrop, WWF has conducted an assessment of fisheries sector in Korea in order to diagnose the current status of Korea's fisheries, identify challenges and find solutions.

In our earlier publication the Living Blue Planet Report we found that populations of fish species have fallen by half since 1970s, while some of the species with a particular importance—such as tuna and mackerel—experienced even greater declines of 74% in the same period. The main cause of this dramatic decline is overfishing. This problem affects all the people in Korea as well as in the rest of the world, and will affect generations to come. We have found through this report that generalized overfishing and illegal, unreported and unregulated (IUU) fishing in domestic waters undermine the sustainability of fisheries, fish stock recovery and protection of marine environment. Another main challenge is the lack of traceability in Korea's fisheries product market and international trade.

Challenges of domestic and international fisheries are as vast as the sea (literally), and need to be addressed by collective actions of governments, private sectors and NGOs. Perhaps more important an actor would be we individuals who can influence the fishery market by choosing the right fishery products. The synergy between different organizations and individuals can shift the global fisheries trend away from its current destructive path and lead to the one more sustainable.

We need to know where we stand before we proceed for the better. We believe this Korea's Fisheries Sector Assessment will give us a clearer understanding of the current status of Korean fisheries and ultimately contribute to expanding sustainable fishery practices in Korea and beyond.

Simon Yoon, CEO of WWF-Korea



INTRODUCTION

The seas that surround the Korean peninsula have made Korea a fishing nation for centuries. Most of fisheries sectors are still influenced by conservatism of traditional fisheries, so the fisheries are slow to change. Since the 1950's, Korea's fisheries have experienced quantitative development. Korea's global fisheries production is more than 3 million tons on average every year; it ranks as one of the top ten producing countries in the world, and ranked among the top five nations in terms of tuna catch. Korea is also one of the global fisheries importing nations in value following the USA, China, Japan and European Union according to the FAO yearbook Fishery and Aquacultures Statistics 2012.

Korea started the development of its modern fisheries in earnest during the middle of the 20th century with the introduction of fisheries legislation and agency. The government at that time sent bottom trawlers to East China Sea in 1948, which was the stepping stone for the offshore fisheries. In 1957, the first distant water fisheries was launched for tuna fishing in the Indian Ocean. Since then, the fisheries have been developing constantly focusing on the quantitative growth. However, this policy direction was tackled in 2013 with the designation of Korea as pre-IUU fishing nation under the EU IUU Fishing Regulation and US's Magnuson–Stevens Reauthorization Act on IUU Fishing. In early 2015, Korea was finally delisted from pre-IUU fishing nations list by USA and EU. This delisting was the result of significant efforts by the Government of Korea to improve the policy and practice of its distant water fisheries operations. "Distant water Fisheries Development Act" was revised two times to prevent and deter IUU fishing and severe penalties resulting from IUU activities. This revision of the distant water fisheries legislation and the delisting of Korea by EU and USA were a pre-condition to discussing sustainable fisheries in Korea and in East Asia. The momentum should be extended to an overarching policy and system that ensures sustainability. There is an opportunity for Korea to position itself as a progressive catalyzer to impact the neighboring countries like Japan and China and major international players on sustainable fisheries and ocean management. From this perspective, this fisheries sector assessment is a basic tool to understand Korea's fisheries and envision the future of cooperation of East Asian countries, and advance WWF's global goals on oceans.

CHAPTER ONE

KOREA'S FISHERIES SECTOR OVERVIEW WITH DATA

Korea's fisheries are categorised into four major areas: (i) Coastal & Offshore fisheries, (ii) Distant Waters Fisheries, (iii) Mariculture (Marine aquaculture) and (iv) Inland Waters Fisheries. This categorization is generally used in national fisheries statistics of the Republic of Korea. The focus of this assessment will be on coastal and offshore fisheries, distant waters fisheries and mariculture.

Fisheries sectors[1]

Domestic Waters Fisheries

Fisheries in this sector are operated in waters adjacent to the Korean coast, which primarily fall within the exclusive economic zone (EEZ) of Korea.

1) Coastal Fishery: small scale fishery within the distance of 1 day sailing in general and which uses a non-powered fishing vessel or a powered fishing vessel with less than ten GT, other than an offshore fishery in coastal waters.

2) Offshore Fishery: fishery in waters farther off shore of 2 to 6 days sailing with larger vessel such as powered fishing vessel with more than ten GT or sometimes less than ten GT for particular protection of resources.

Distant Waters Fishery

These are fisheries which lie far beyond Korean territorial waters. According to the Distant Water Fisheries Development Act of Korea, the distant waters area is defined as 'international waters excluding East Sea, West Sea, East China Sea, the Pacific Ocean areas between north of the 25 degrees north latitude and west of the 140 degrees east longitude'.

Mariculture (Marine Aquaculture)

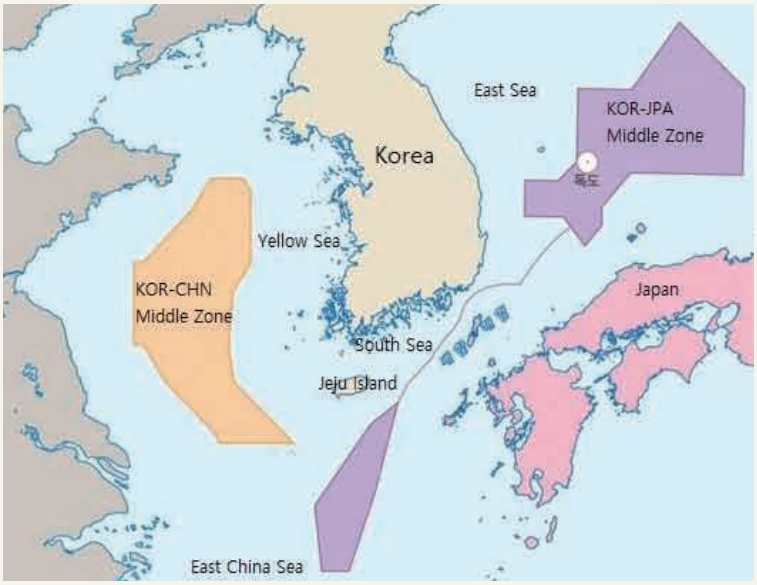
Mariculture is related to cultivating aquatic products under controlled conditions with seawater.

Inland Waters Fishery

These are small scale fisheries from activities in lakes, rivers, or any type of artificial reservoir or fish farm using freshwater.

1. Definition of each fishery here is combined explanation from definitions sourced from Fisheries Act, Distant Water Fisheries Development Act, terminology of Statistics Korea and Overseas Fisheries Information System. http://www.ofis.or.kr/ (Retrieved March 2015)

Figure 1: Korea's EEZ and overarching zones with neighboring countries
(Edited from the Korea's fishing ground and EEZ map from the Korean Ministry of Oceans and Fisheries)



Fisheries Production

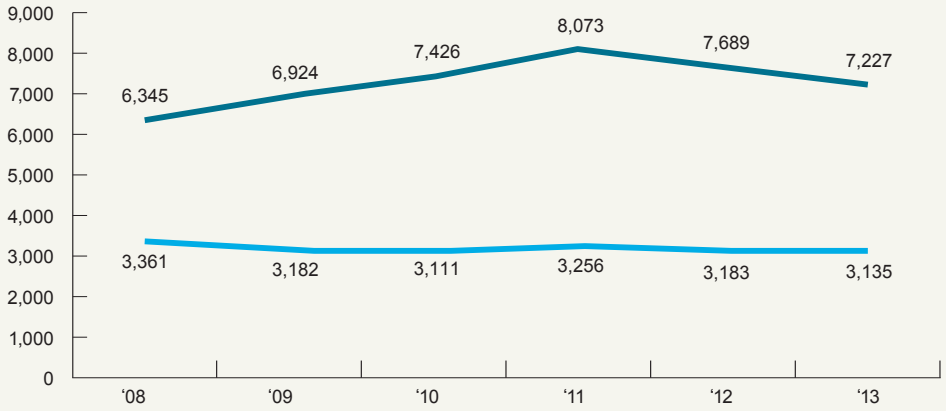
According to Korea's national statistics, the total fisheries production of these four areas above in 2013 was about 3,135,250 MT with a value of 7,227.3 billion KRW (around US$ 6.46 billion)[2]. Life forms produced are numerous including finfish, crustacean, shellfish, mollusca, and many varieties of seaweed. Mariculture production has been increasing while coastal and offshore fisheries and distant waters fishery are decreasing gradually.

Table 1: Fisheries Production 2008~2013
Unit: Weight-Thausand ton, Value-Billion KRW
(Data sources: Oceans and Fisheries Yearbook 2014 by Ministry of Oceans and Fisheriews; Press Release of Statistics Korea, 2014 February 20)

Yearw	Total		Domestic Waters Fishery		Mariculture		Distant waters Fishery		Inland Waters Fishery	
	Weight	Value	Weight	Value	Weight	Value	Weight	Value	Weight	Value
2008	3,361.2	6,345	1,285	3,222.2	1,381	1,520.1	666.1	1,327.4	29.1	275.3
2009	3,182.3	6,924.3	1,227	3,640.4	1,313.3	1,846.3	612	1,163.8	30	273.8
2010	3,111.6	7,425.7	1,132.6	3,911.7	1,355	1,815.6	592.1	1,364.5	31	333.8
2011	3,255.9	8,072.9	1,235.5	4,444.1	1,477.6	1,784.2	510.6	1,467.0	32.3	377.5
2012	3,183.4	7,689	1,091	3,951	1,488.9	1,759.3	575.3	1,655.4	28.1	323.3
2013	3,135.3	7,227.3	1,044.7	3,747.2	1,515.2	1,731.1	549.9	1,403.6	25.4	345.4

2. According to Statistics Korea and Oceans and Fisheries Yearbook 2014 by Ministry of Oceans and Fisheries, the total fisheries production is raw weight before being processed. http://kosis.kr/statisticsList/statisticsList_01List.jsp?vwcd=MT_ZTITLE&parentId=F (Retrieved March 2015)

Figure 2: Korea's Fisheries production by volume and by value
(Data sources: Oceans and Fisheries Yearbook 2014 by Ministry of Oceans and Fisheries; Press Release of Statistics Korea, 2014 February 20)

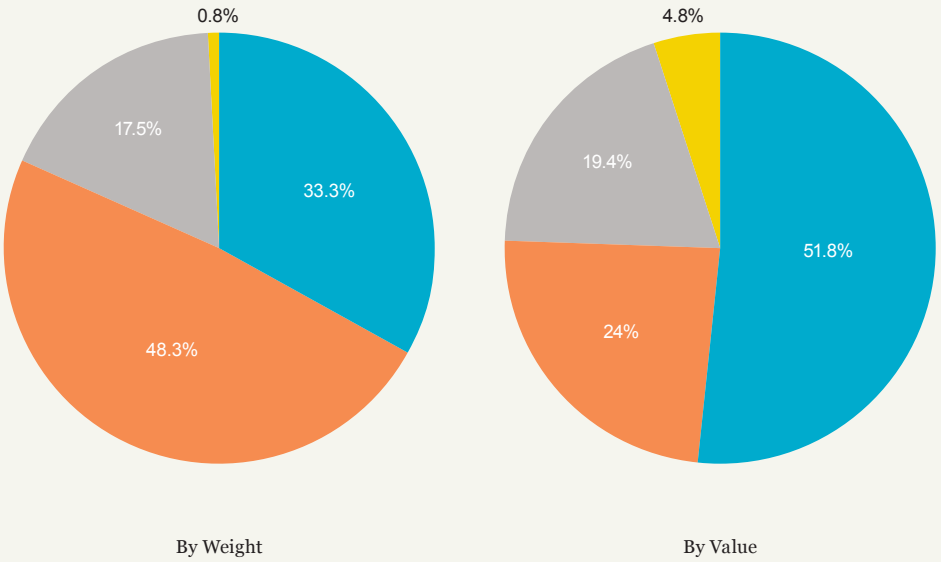


Key

- Production weight (Thousand ton)
- Production value (Billion KRW)

Proportion of each fishery sector in total production for 2013 is shown below. Mariculture production is the highest in terms of volume, but coastal and offshore fisheries are much higher in terms of production value.

Figure 3: Relative Importance of Different Fisheries by Weight & Value of Seafood Production in 2013
(Data sources: Oceans and Fisheries Yearbook 2014 by Ministry of Oceans and Fisheries ; Major Statistics of Oceans and Fisheries 2014 by Ministry of Oceans and Fisheries; Statistics Korea http://kostat.go.kr)



Key

- Inland Fishery
- Domestic Waters Fishery
- Mariculture
- Distant Waters Fishery

Fishing Fleet Capacity

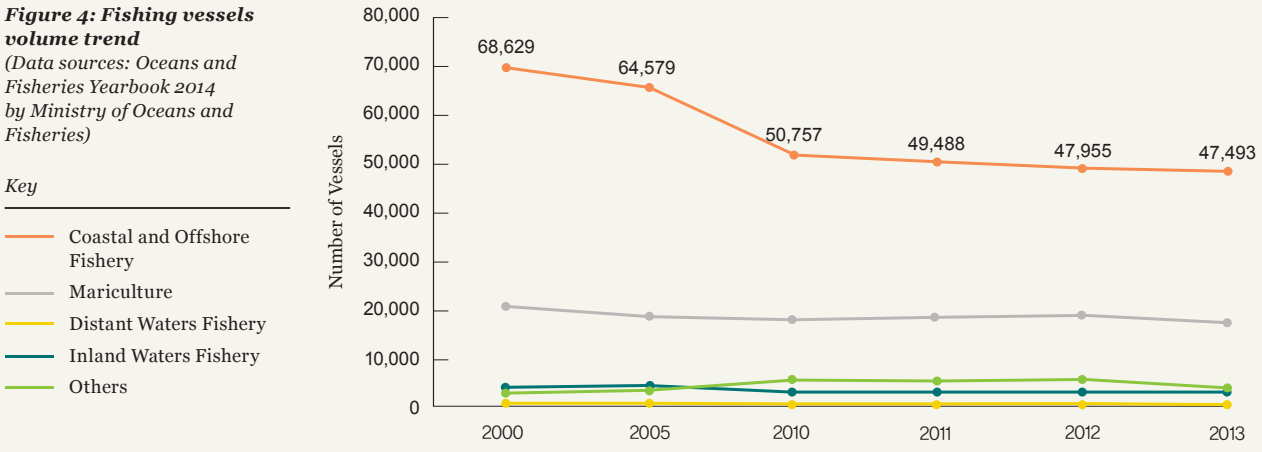
Korea's fishing vessels number related fisheries is 71,287 and its total capacity is about 607,224 GT by the end of 2013. The total number of vessels has decreased by 3,744 (5%) compared to 2012 and total tonnage is also slightly reduced by about 2,781 tons (0.5%). As seen in the appendix table 1, powered vessel represents 95% of total vessel number with 69,323. In terms of fisheries category, coastal and offshore fisheries vessels account for 66.6% by number (coastal fishing vessels: 2,780, offshore fishing vessels :44,713), mariculture operation vessels for 23.5%, inland waters fisheries for 4.1% and distant waters fisheries for 0.4% and others (research, inspection vessels, carriers etc) for 5.3%.

85.4% of total fleet is small vessels of less five GT while large vessels of more than 50 GT represent only 2.2%. Given that the coastal fishery is conducted only by non-powered vessel or powered vessels with less than 10GT, according to the Fisheries Act, it is noted that most of fishing fleet is coastal fishing vessels. This is related to the fact that 90.3% of the total fleet is Fiberglass Reinforced Plastic vessels.

Table 2: Fishing vessel volume trend by year and by fisheries
(Data sources: Oceans and Fisheries Yearbook 2014 by Ministry of Oceans and Fisheries)

		2000	2005	2010	2011	2012	2013
Total	Number	95,890	90,735	76,974	75,629	75,031	71,287
	GT	923,099	700,810	600,622	606,627	610,005	607,224
Coastal and Offshore Fishery	Number	68,629	64,579	50,757	49,488	47,955	47,493
	GT	397,868	322,811	249,694	248,233	234,702	242,944
Mariculture	Number	20,359	18,244	17,594	17,737	18,389	16,772
	GT	28,516	27,131	32,845	35,155	41,302	38,586
Distant Waters Fishery	Number	597	493	379	377	349	315
	GT	349,420	257,614	199,859	200,316	195,073	178,580
Inland Waters Fishery	Number	3,664	4,164	2,973	2,860	2,937	2,908
	GT	2,874	3,518	2,149	1,714	1,863	1,765
Others	Number	2,641	3,255	5,271	5,167	5,401	3,799
	GT	144,421	89,736	116,074	121,210	137,063	145,347

Figure 4: Fishing vessels volume trend
(Data sources: Oceans and Fisheries Yearbook 2014 by Ministry of Oceans and Fisheries)



For the more detailed information on the fishing fleet, refer to Appendix Table 1.

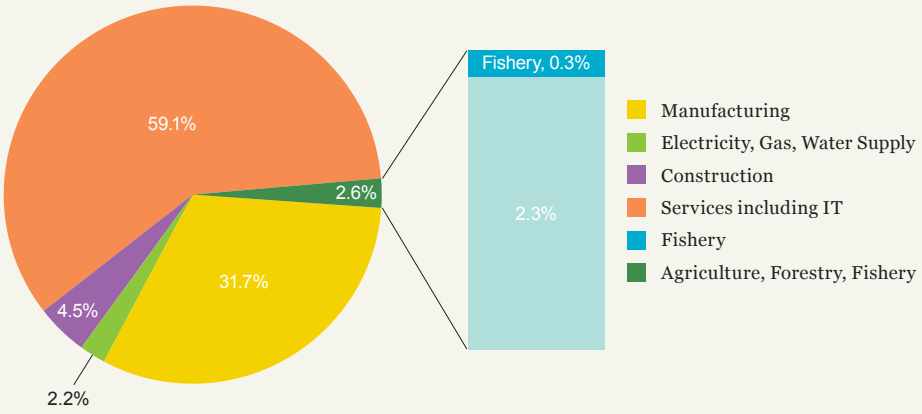
Fisheries Socio-Economy

As shown in the table 3 and figure 5 below, the fisheries represent only about 0.3% of total national GVA (Gross Value Added) in the recent years according to the Bank of Korea[3]. It is only possible to compare GVA by economic activities given that Bank of Korea provides only GVA data by each economic activities. Regarding the contribution of fisheries to national GDP (Gross Domestic Products), the Korean government announced that the fisheries represented only 0.21% in 2006[4], and it is assumed that this proportion is still similar nowadays.

Table 3: GVA by economic activities
Unit: Billion KRW
(Data sources: National Accounts by Bank of Korea)

	2011	2012	2013	2014
Agriculture, Forestry, Fishery	27,744.60	27,506.90	29,089.70	29,969
Fishery	3,392.70	3,306.10	3,135.50	
Manufacturing	374,782	383,682.60	396,235.70	411,918
Electricity, Gas, Water Supply	25,687.40	26,710.30	27,097.50	27,688
Construction	55,432.20	54,430.50	56,390,40	56,608.20
Services including IT	699,580.80	718,906.20	739,515	762,916.50
Total GVA	1,185,403.20	1,213,224.40	1,250,559.70	1,291,078
Total GDP	1,311,892.70	1,341,966.50	1,381,837.70	1,427,656.10

Figure 5: Proportion in GVA by economic activities in 2013
(Data sources: National Accounts, Bank of Korea, http://ecos.bok.or.kr/)



Regarding the fishing households and population, there are total 60,325 households and 147,330 fishermen depending mostly on the fisheries in 2013 according to Statistics Korea[5]. The number of fishing households and fishermen population has been decreasing since 1990's due to demographic aging, urbanization, and decrease of fish resources. According to the statistics, fishermen represented only around 0.3% of total population in Korea for 2013. With respect to the small proportion

3. Economic Statistics System(National Accounts) by Bank of Korea, http://ecos.bok.or.kr/ (Retrieved March 2015)

4. 마창모 외,『우리나라 수산업의 선진화를 위한 기초연구』, 한국해양수산개발원(KMI), 2009년 42쪽, SHIN Yong Te, MA Chang Mo et al. 2009. Fundamental Research for Advancement of Korean Fishing Industry. KMI(Korea Maritime Institute)

5. Statistics Korea. Fishery Household Economy Survey Report for 2013. 2014 May.; Survey of Agriculture, Forestry And Fisheries by Statistics Korea, http://kosis.kr/

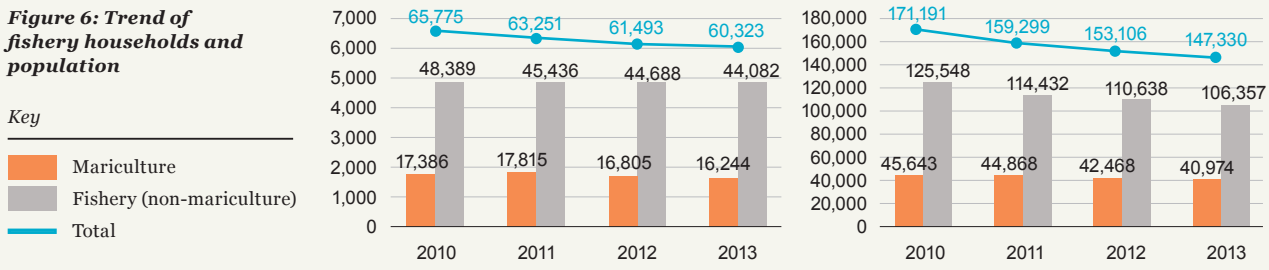
of fishermen, some experts believe this is because national statistics cover only individuals directly related to coastal and offshore fisheries and mariculture without including large fishing companies, distant water fisheries and inland waters fisheries, wage workers such as crew and other distribution or processing sector[6]. Due to these statistical data limitations, the Korean Ministry of Oceans and Fisheries is planning to change the categorization fishery population in order to reflect all related sector for future[7]. Therefore, it is safe to say 147,330 fishermen mostly represent small scale fisheries in coastal and offshore waters.

As shown in the table 4 and figure 6 below, fishermen population has been continuously decreasing recently and it is noticeable the small scale fishermen is aging, so that the ratio of those over the aged of 60 has increased by 41.5% in 2013 while that of those aged below 30 has reduced during or the last 3 years.

Table 4: Annual Trend of Fisheries Population 2010-2013
(Data sources: Korea Fisheries Association. Korean Fisheries Yearbook 2014)

		2010	2011	2012	2013
Fishermen	Total(Round-Off)	171,000	159,000	153,000	147,000
	Under 15	17,000	13,000	12,000	11,000
	15 ~ 29	19,000	16,000	14,000	12,000
	30 ~ 59	78,000	71,000	66,000	63,000
	Older than 60	57,000	59,000	61,000	61,000
Ratio to Total Population (%)		0.35	0.32	0.31	0.29
Total Population		49,410,000	49,779,000	50,004,000	50,220,000

Figure 6: Trend of fishery households and population



By household

By population

The annual average income of fishery households as well as agriculture households is lower than that of urban households as seen in the figure 7: it was 38,586,000 KRW, 69.8% of urban household income in 2013. The survey of fishery households income covers fishery households in which either householders or family members catch aquatic animals and plants, or operate maricultures for the purpose of selling them for one month and over the year. And any household which earned 1,200,000 KRW per year from fishery is included in this sector. The types of fishery households are as follows:

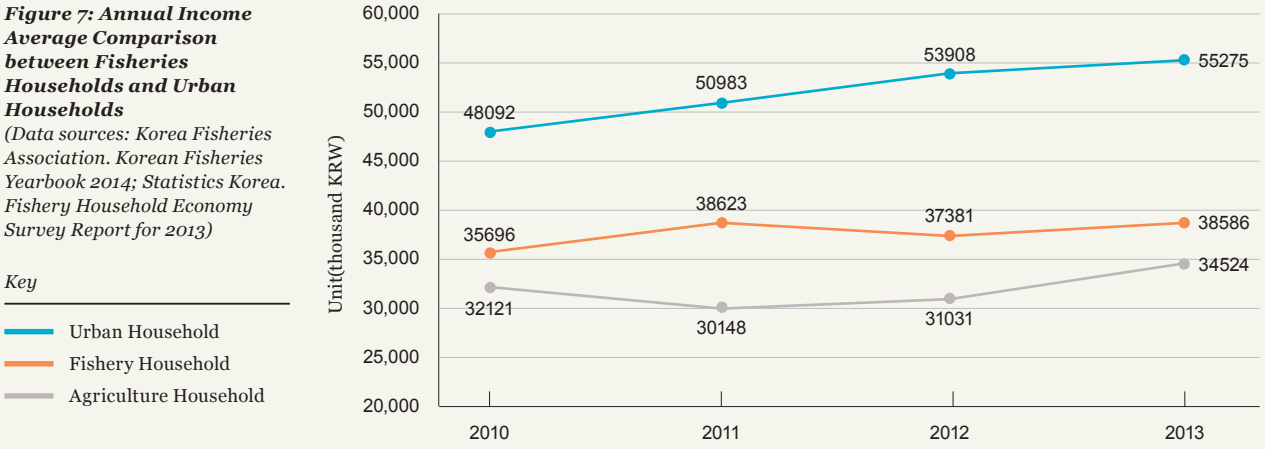
6. Fisheries News. 5 April 2013. Column on fisheries population statistics by KIM Hyun Yong of Fisheries Economy Institute, http://www.fisheriesnews.co.kr/news/articleView.html?idxno=25663

7 Susanin Journal, 25 April 2014, http://www.isusanin.com/news/articleView.html?idxno=20492

- Fishery households without boats
- Fishery households with non-powered boats
- Fishery households with motor boats
- Marine aquaculture fishery households

According to this survey, this annual average income totals up fishery earnings (48%) and other sources income (52%) in 2013. The fisheries earnings represent only about 40~50% every year since 2010, which shows that fisheries earnings are not enough for primary income for households in general. The fisheries households and its family members have income from non-fishery sector such as agriculture, fishery products processing or collecting wild plants. They also generate income from physical labor.

Figure 7: Annual Income Average Comparison between Fisheries Households and Urban Households
(Data sources: Korea Fisheries Association. Korean Fisheries Yearbook 2014; Statistics Korea. Fishery Household Economy Survey Report for 2013)



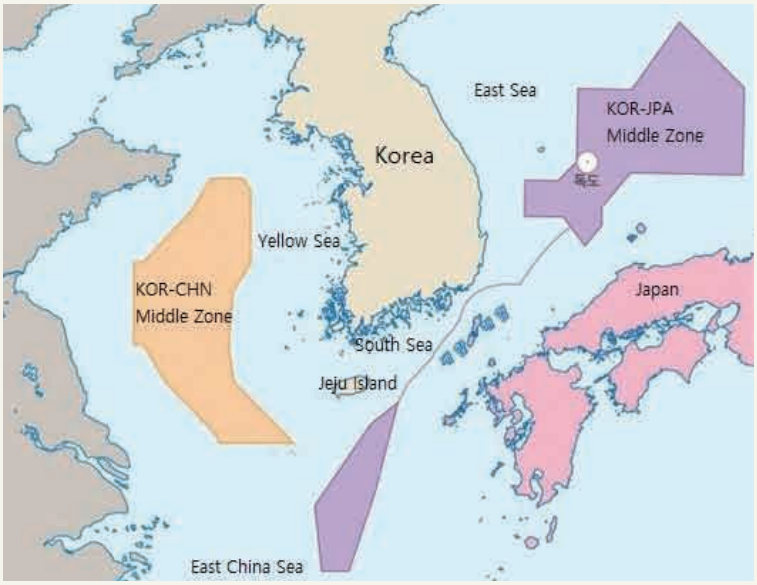
1.1 Coastal and Offshore Fisheries

Fishing Ground

Korea's traditional coastal and offshore fisheries area was the area from Socotra Rock and extending south and from the Yamato Rise area to west of Japan[8]. But with the enforcement of UNCLOS in November of 1994, Korea's coastal and offshore areas were forced to be rearranged following the declarations of 200-nautical mile EEZs from the neighboring nations – China and Japan. Korea, Japan and China have not yet agreed on each country's EEZ due to geopolitical reason, but fisheries agreements were introduced after a series of negotiation. Both the Korea-Japan Fisheries Agreement, enforced in 1999, and the Korea-China Fisheries Agreement, enforced in 2001, demarcated each nation's EEZ fishing area with various middle zones allowing bilateral parties to share fishing grounds. According to the agreements, bilateral parties operate fisheries under agreed condition in the middle zone and discuss issues through fisheries committee. Beyond this EEZ fishing ground, some offshore and distant waters fishing vessels such as angling and trawling enter into enter into Primorsky Krai area located north of Korea Japan middle zone (see below) following negotiation from the Korea-Russia fishing committee every year.

8. Korean Fisheries Yearbook 2014 by KFA(Korea Fisheries Association

Figure 8: Korea's coastal and offshore fishing ground
(Edited from the Korea's fishing ground and EEZ map from the Korean Ministry of Oceans and Fisheries)



Fishing Operation

According to Korea's national legislation, Fisheries Act[9], the coastal fishery is conducted with non-powered fishing vessel or powered fishing vessel with less than ten GT[10] and there are eight kinds of fisheries under the coastal fisheries category. Most coastal fisheries are small scale, operated by families in sea villages, while the offshore fishery is a much more commercialized and sizeable business. Offshore fisheries use powered fishing vessels of more than ten GT and there are 21 fisheries permitted under this category. The number of fishermen or corporation permitted in this offshore fisheries sector are 3,188 in 2013. Also there is "sectional fishery" which is run by installing fishing gear or using non-powered or powered fishing vessel of less than five GT within a demarcated area. Twelve types of fishery exist in this "sectional fishery". Apart from this categorization, in reality, there are various types of fishing operation without fishing boats such as community fishery to collect shellfish or seaweed, diver fishing without an oxygen feeder (free diving). Major coastal and offshore fisheries are in general trawl, purse seine, gillnet, jigging, stow net, and trap in terms of catch volume which is more than at average 40,000 MT every year. The following table 5 is brief summary of major fishing operations in Korea's domestic waters.

9. Article 41 of Fisheries Act.
10. Korean Fisheries Yearbook 2014 by Korea Fisheries Association.

Table 5: Main Coastal and Offshore fisheries
(Edited based on data sources from Korean Fisheries Yearbook 2014 by Korea Fisheries Association; Oceans and Fisheries Yearbook 2014 by Ministry of Oceans and Fishery; Fisheries Act)

Fishery		Vessel Tonnage (GT)	Target species	Fishing area and note
Offshore Purse Seine	Large Purse Seine	50~140	Multi: Chub mackerels, Spotted sardine, Trevally, Mackerels	South area of Yellow Sea and East China Sea with South Sea as the centre, around Jeju island and south area of East Sea
	Small Purse Seine	Less 30		
Offshore Large Trawl	Danish Seine (one vessel)	60~140	Multi: Largehead hairtail, Flounders, Croakers	Around Jeju Island and central area of Yellow Sea
	Pair Trawl (two vessels)			
Offshore Medium Trawl	East Sea Danish Seine	20~60	Multi: Squids, Flounders, Sailfin sandfish, Shrimps	East Sea
	West Southern Danish Seine		Multi: Flounders, Black mouth goosefish, Croakers, Shrimps, Cuttlefish	Yellow Sea and South Sea
	West Southern Pair Trawl			
Offshore jigging		10~90	Mainly Squids Others: Largehead hairtail, Puffers	Fishing ground varies through East Sea (Jun~Dec), Yellow Sea(Jul~Nov) and South Sea(Dec~May)depending on the migration of Squids.
Stow Net	Offshore Stow Net	8~90	Multi: Largehead hairtail, Croakers, Anchovies, Pomfret, Black mouth goosefish, Swimming crab, Akiami shrimp	Fishing ground varies north south in Yellow Sea and East China Sea
	Coastal Stow Net			
Anchovy Trawl	Fleet composed of two fishing vessels (under 40t), a fish finding vessel, a processing vessel, and a carrier		Anchovies	South Sea
Gill Net	Coastal Gill Net	More 10	Multi: Croakers, Anchovies, Flounders, Swimming crab	All around the peninsula
	Offshore Gill Net	Less 10		
Offshore Trawl	Large Otter Trawl	60~140	Multi: Squids, Largehead hairtail, Pomfret, Mackerels	Yellow Sea, South Sea and East China Sea
	East Sea Trawl	20~60	Multi: Shrimps, Flounders, Sailfin sandfish, Pacific herring, Squids	Through south to north in East Sea
Trap	Offshore Eel Trap[11]		eel species	Around South Sea
	Offshore Various Trap		Multi: fish, crabs and gastropods	East Sea, Yellow Sea and South Sea
	Costal Trap		Fish, crabs and gastropods	East Sea, Yellow sea and South Sea
Offshore Long Line	various		Multi: Largehead hairtail, Horsehead, Black mouth goosefish, Puffers, Flounders, Eel, Rockfishes	East Sea, Yellow Sea, East China Sea

11. For more detailed explanation on this fishing method with video by Ministry of Oceans and Fisheries, https://www.youtube.com/watch?v=YceiADlw9os, retrieved in April 2015

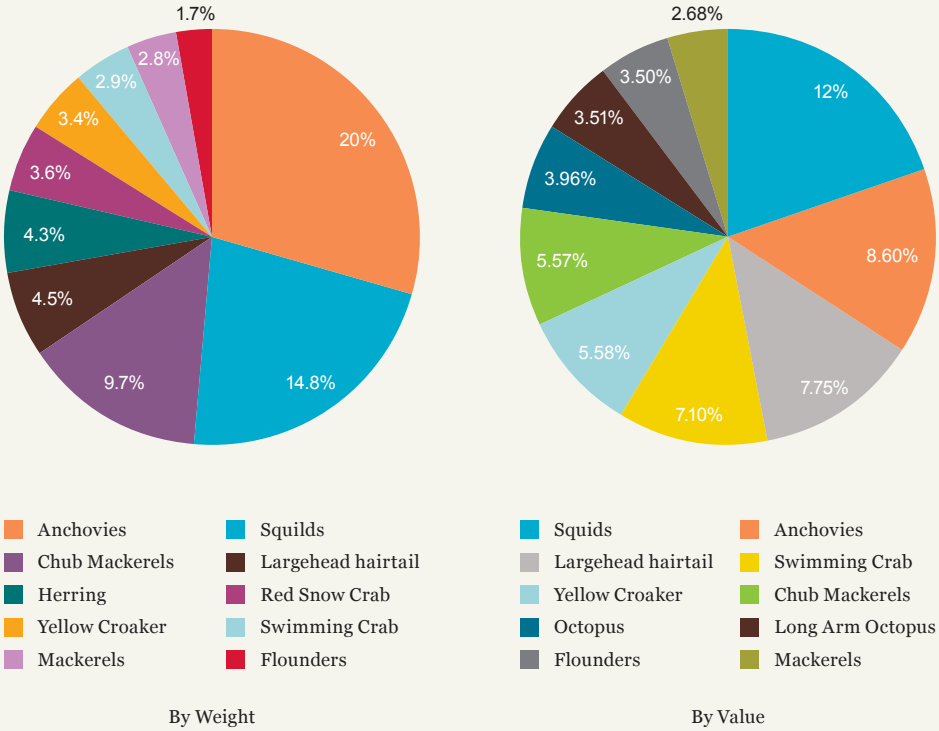
As seen in the table 5, most fisheries are overlapping in terms of fishing ground and target species regardless of the fishing gear and method. This typical pattern leads to overfishing and difficulty to manage effectively. There are more than 120 target species in the coastal and offshore fisheries. In terms of fishing methods and gears, there are 22 different fishing methods for catching anchovies, 17 different fishing methods for catching squids, 25 for chub mackerel and 24 for largehead hairtail. In this context, it is not easy to manage all the fisheries in proper manner.

The total production of coastal and offshore fisheries in 2013 was 1,044,697 MT. The production depends on the climate and marine environment condition every year.

Table 6: Coastal and Offshore Fisheries Production by Life Form
Unit: 1,000 MT
(Data sources: Korean Fisheries Yearbook 2014 by Korea Fisehries Association; Oceans and Fisheries Yearbook 2014 by Ministry of Oceans and Fishery)

	2008	2009	2010	2011	2012	2013
Total	1,286	1,227	1,134	1,235	1,091	1,045
Fish	878	796	736	843	704	695
Shellfish	82	90	80	72	58	50
Crustaceans	88	100	108	102	105	106
Molluscs	216	223	188	197	207	178
Seaweeds	14	11	13	15	10	9
Others	8	7	8	7	6	7

Figure 9: Top ten Species Caught by Weight and Value in Coastal Fishery 2013
(Data sources: Oceans and Fisheries Yearbook 2014 by Ministry of Oceans and Fisheries)



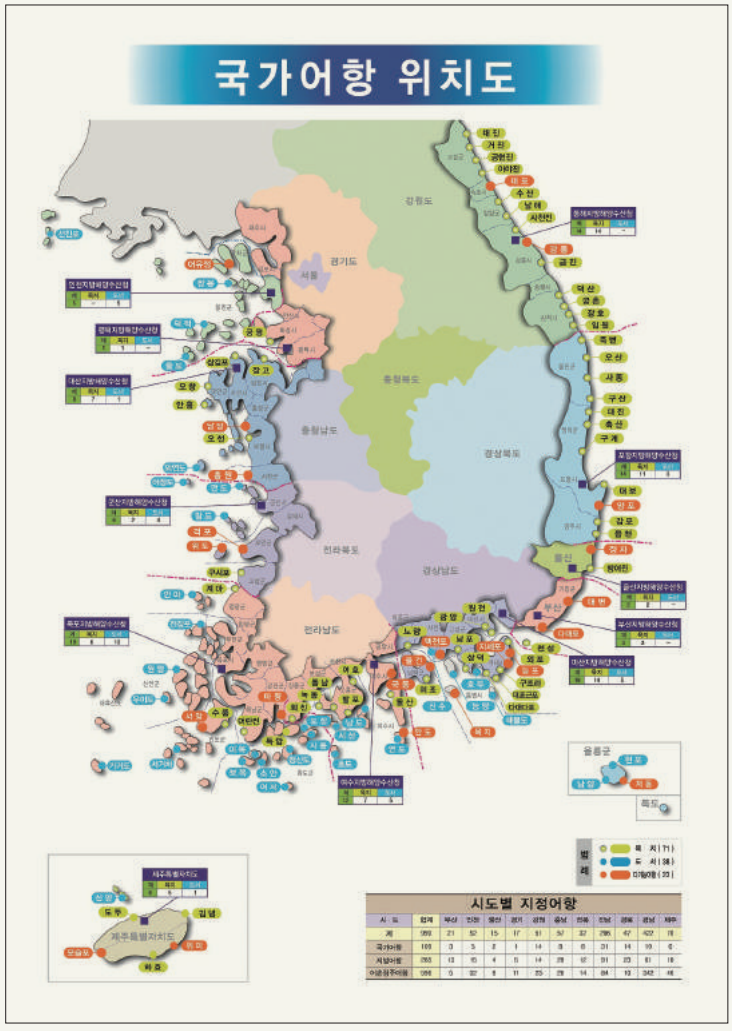
By Weight

By Value

Fishing ports

According to Fishing Villages and Fishery Ports Act, fishing ports are categorized 'national fishing ports', 'regional fishing ports', and 'municipal fishing ports' and 'communal fishing ports of villages'. The national fishing port is defined as port of which range of use is national. The national fishing ports are appointed by Minister of Oceans and Fisheries and they should meet several criteria in order to be appointed. The number of local fishing vessels incoming and outgoing should be more than 70, the number of external vessels should be more than 100, and the volume of consignment sale of fishes should be more than 200 MT etc. The Korean government first named 62 ports in 1972 and has built 109 national ports since then[12]. Currently 100 national fishing ports have been constructed. Most of national fishing ports are located in Gangwon, Jeonnam, Gyeongbuk, and Gyeongnam provinces which are facing the East Sea and the South Sea.

Figure 10: Location of national fishing ports



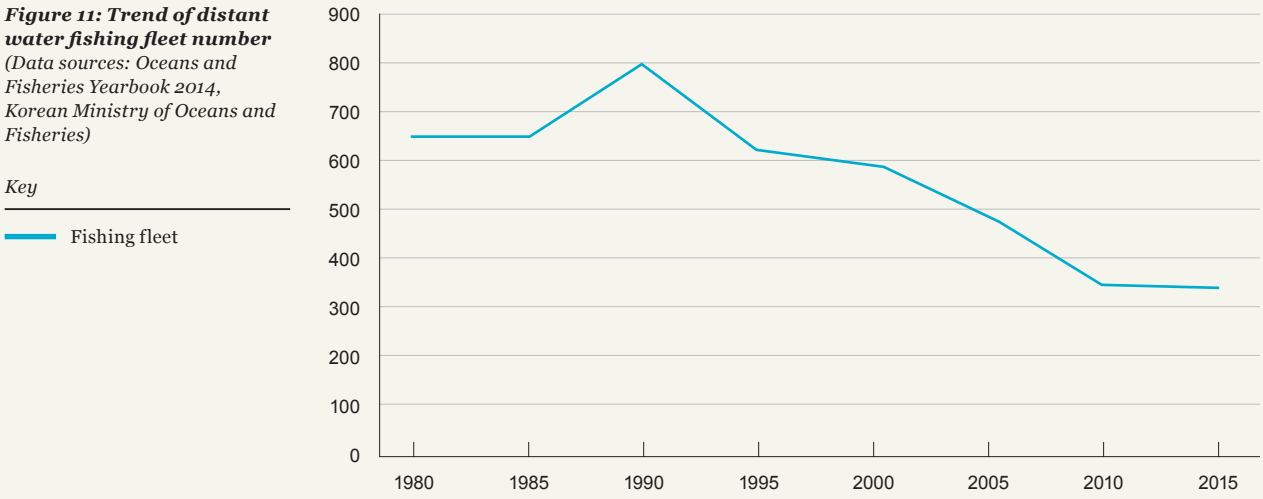
12. Korea Fisheries Association. Korean Fisheries Yearbook 2014 , pp. 176

1.2 Distant Waters Fisheries

Fishing operation

Korea started the first distant water fishery in Indian Ocean with an exploratory tuna long line fishery in 1957 and continued to develop to various fisheries until the 1970s. The number of distant water fishing fleet was more than 800 in 1990 and the number of companies was 185 in 1995. Since then, Korea's distant water fisheries have been eroded due to the increased regulation in high seas and waters of coastal states, the high operating costs and the free trade movement globally[13]. The number of vessels and companies have reduced continuously to 342 and 75 respectively in 2013[14] and 2014, as presented in Figure 11 and Table 7 below (currently 71 companies for 2015[15]). Tuna fishing vessels represented the largest number of total distant water fishing vessels with 182 (53%) followed by trawl fisheries for the end of 2013 as detailed in Table 10.

Figure 11: Trend of distant water fishing fleet number *(Data sources: Oceans and Fisheries Yearbook 2014, Korean Ministry of Oceans and Fisheries)*



13. Min Gyu PARK & Seong Bum LIM. 2007 Dec 'An Analysis on cognition regarding Korea's Distant Water fishing industry and its positioning strategy'. 한국 원양산업에 관한 인식 및 포지셔닝 전략 분석, 박민규 임성범

14. The number of distant water fishing vessel differs from the statistics. According to Statistics Korea and Oceans and Fisheries Yearbook 2014 by Ministry of Oceans and Fisheries, the number is 315 in 2013 as seen in the table 2 while it is 342 from Korea Overseas Fisheries Association(KOFA) yearbook 2014.This is because KOFA here includes all vessels registered in distant water fishery even though some of them are not active. Confirmed with official from Ministry of Oceans and Fisheries.

15. Confirmed with Korea Overseas Fisheries Association (KOFA) in June 2015

Table 7: Fishing fleet number by fishery during the last decade
(Data sources: Statistical Yearbook of Overseas Fisheries 2014, Korea Overseas Fisheries Association)

Year	Total	Tuna Fishing Industry			Trawl Industry			Squid Fishing Industry		Saury Stick held-Dip Net	Etc	Total GT
		Sub Total	Long Line	Purse Seine	Sub Total	North Pacific Trawl	Base Trawl	Sub Total	Jigging			
2001	507	220	193	27	179	30	149	64	64	23	21	287,527
2002	482	219	193	26	165	23	143	56	56	20	21	269,186
2003	464	217	190	27	153	11	143	51	51	20	22	230,155
2004	433	210	182	28	146	8	139	31	31	20	25	212,571
2005	410	205	177	28	130	7	124	31	31	20	23	204,160
2006	393	197	169	28	125	7	119	31	31	20	19	197,685
2007	387	193	165	28	122	6	116	30	30	20	22	192,936
2008	380	187	158	29	120	6	114	30	30	20	23	192,765
2009	362	182	153	29	106	5	101	31	31	17	26	184,850
2010	353	179	149	30	102	5	97	30	30	17	25	191,111
2011	359	179	149	30	107	7	100	31	31	17	25	195,357
2012	344	179	148	31	97	6	91	32	32	13	23	199,761
2013	342	182	150	32	93	6	87	32	32	14	21	202,172

Table 7 above shows more in detail the trend of distant water fishing vessels number by fisheries. The North Pacific Trawl has downsized by 80% since 2001 and most fishing activities have been decreasing during the last decade. But tuna purse seining capacity has increased in terms of number and tonnage since 2001. This is related to investment for building new purse seiners by big distant water fishing companies[16]. It is also noticeable that the number of Long Line fishery vessels has increased in recent years.

Table 8: Major Fisheries in Distant Water Fisheries
(Data sources: Statistical Yearbook of Overseas Fisheries 2014, Korea Overseas Fisheries Association)

Fishery	Target species	Fishing area and note
Tuna Long Line	Skipjack tuna, Albacore tuna, Southern Bluefin tuna, Bigeye tuna, Yellowfin tuna, Sharks, Marlins, Swordfishes and Billfishes	Atlantic Ocean, Pacific Ocean, Indian Ocean
Tuna Purse Seine	Skipjack tuna, Albacore tuna, Bigeye tuna, Bluefin tuna, Yellowfin tuna	Pacific Ocean, Atlantic Ocean, Indian Ocean
Squid Jigging	Squids	Atlantic Ocean, Pacific Ocean
Base Trawl	Multi: Rays, Skates, Mackerels, Goatfishes, Flounders, Largehead hairtail, Halibuts, Hake, Seabreams, Croakers etc	Atlantic Ocean, Indian Ocean, Pacific Ocean
North Pacific Trawl	Pollack, Cod	North Pacific Ocean in Russian EEZs
Saury Stick-held Dip Net	Saury	Pacific Ocean
Trap and Bottom Long Line	Rays, Skates, Cod, Toothfish, Crab, etc	Pacific Ocean, Indian Ocean, Atlantic Ocean, Southern Ocean

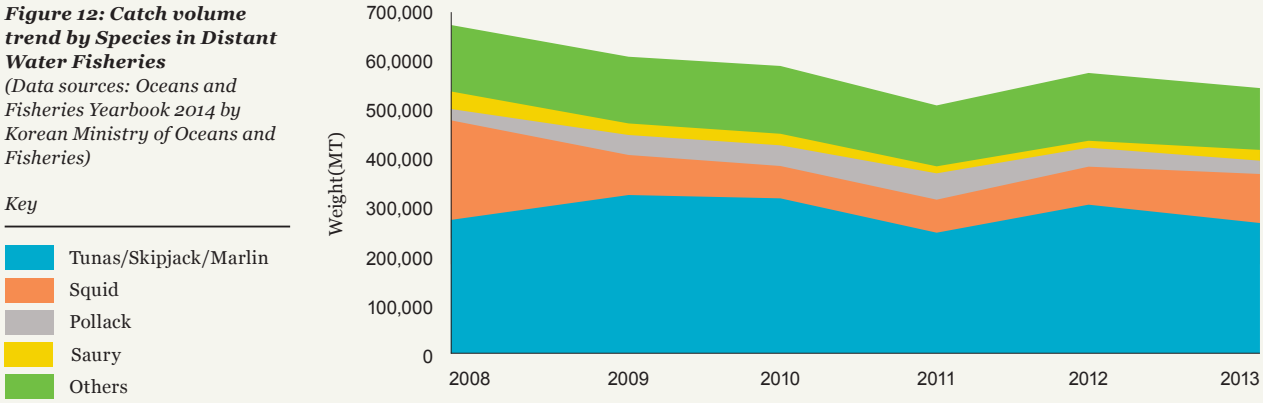
16. Three new purse seiners over 2000G/T was built and introduced mid-late 2000s by Dongwon Industries. Statistical Yearbook of Overseas Fisheries 2011, II-8, P.38. Between 2011 and 2013, Dongwon industries and Sajo industries have increased the Purse Seiner by one vessel respectively.

The total production of distant water fisheries in 2013 was 549,928 MT and if included 135 joint venture fisheries vessels, the total production is up to 739,000 MT according to Statistical Yearbook of Overseas Fisheries 2014 by KOFA. The major species caught in the distant waters fisheries are tuna (including skipjack and marlin) which represents about 50% of total catches 2013. The next major species are squid (18.2%), followed by Alaska pollack (4.4%) and Pacific saury (2.5%). This percentage is similar from 2008 to 2013[17].

Table 9: Top four species production in distant water fisheries
Unit: MT
(Data sources: Oceans and Fisheries Yearbook 2014 by Ministry of Oceans and Fisheries)

	2008	2009	2010	2011	2012	2013
Total catch Weight	666,182	611,950	592,116	501,624	575,308	549,928
Tunas/Skipjack/Marlin	286,889	327,181	319,712	251,093	305,335	274,909
Squid	181,780	84,652	65,416	70,130	81,526	100,129
Pollack	27,980	38,996	46,794	48,793	39,025	24,341
Saury	29,591	22,001	21,360	18,068	13,961	20,055
Others	139,942	139,120	138,834	122,540	135,461	130,494

Figure 12: Catch volume trend by Species in Distant Water Fisheries
(Data sources: Oceans and Fisheries Yearbook 2014 by Korean Ministry of Oceans and Fisheries)



Tuna Long Line fishery produces 30,000~40,000 MT and Purse Seiner produces about 250,000 ~ 300,000 MT every year. 100% of skipjack and significant part of Yellowfin tuna are caught by Purse Seine, and most Bigeye tuna along with Albacore are caught by Long Line fisheries.

Fishing Ground

Korea's distant water fishing vessels are present all oceans as seen in Figure 13 below. These distant water fishing vessels are operating in various oceans and countries for end of 2013 as seen in the Table 10 below. Most tuna fisheries are located in the Pacific Ocean, but the Indian Ocean is also becoming an important area for Korea. Four tuna Purse Seine vessels are operating in the Indian Ocean at the end of 2013, while there were no tuna purse seine by Korean vessels in 2010.

17. Oceans and Fisheries Yearbook 2014 by Ministry of Oceans and Fisheries, November 2014

Figure 13: Korea's Distant Water Fisheries Fishing Ground
(Edited from Statistical Yearbook of Overseas Fisheries 2014, Korea Overseas Fisheries Association)

Key

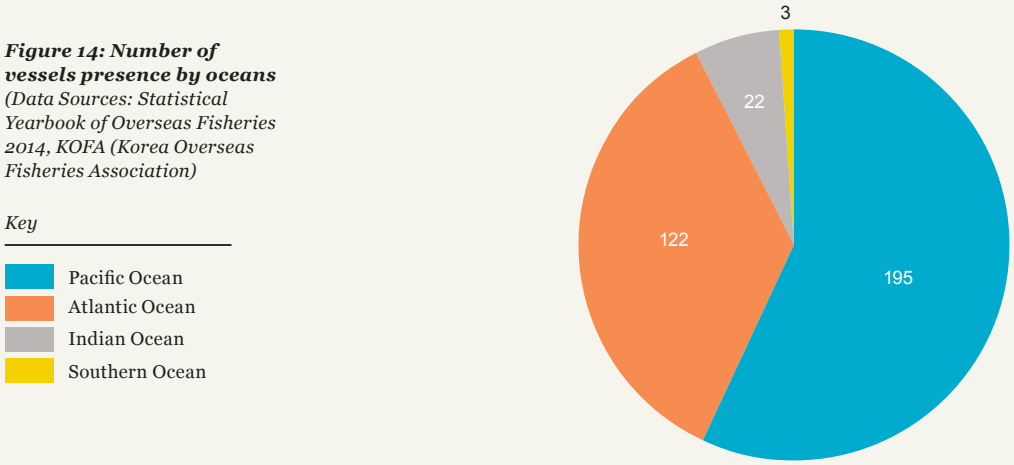
- Pollack
- Tuna
- Squid
- Trawl/Etc
- Fishing Agreement

Table 10: Status of Korea's distant water fishing vessels presence by oceans, nations and fisheries
(Data sources: Statistical Yearbook of Overseas Fisheries 2014, Korea Overseas Fisheries Association)

Ocean	Nation	Base	Tuna Long Line	Tuna Purse Seine	Squid Jigging	North Pacific Trawl	Base Trawl	Saury Stick-held Dip Net	Etc	Total
Total : 23 countries		25 bases	150	32	32	6	87	14	21	342
Pacific	Sub Total : 9 nation	8 bases	125	27		6	20	14	3	195
	INDONESIA	AMBON					5			5
		BITUNG					1			1
	KOREA(RUSSIA)	BUSAN				6		14	2	22
	NEW ZEALAND	CHRISTCHURCH					7			7
		TIMARU					6		1	7
	FIJI		75							75
	KIRIBATI			6						6
	PNG			8						8
	TAHITI		40							40
	SOLOMON	HONIARA	10	6						16
	FSM	PONAPE		7						7
	High Seas	CALLAO					1			1
Atlantic	Sub Total : 10 nations	12 bases	16	1	32		58		18	125
	ANGOLA	LUANDA	13				9		1	23
	GABON	DAKAR							1	1
	FALKLAND	STANLEY			32					32
	GUINEA	CONAKRY					17		3	20
	GUINEA BISSAU	BISSAU					6			6

Ocean	Nation	Base	Tuna Long Line	Tuna Purse Seine	Squid Jigging	North Pacific Trawl	Base Trawl	Saury Stick-held Dip Net	Etc	Total
Atlantic (Continued)	MAURITANIA	NOUAKCHOTT					1			1
	SOUTH AFRIA	CAPE TOWN	3	1						4
	SIERRA LEONE	FREETOWN					11		3	14
	SURINAME	PARAMARIBO					1			1
	NAMIBIA	WALVIS BAY					2		1	3
	High Seas	MONTEVIDEO					8		9	17
		CAPE TOWN					3			3
Indian	Sub Total : 4 nations	5 bases	9	4			9			22
	MAURITIOUS	PORT LOUIS	9							9
	SEYCHELLES	VICTORIA		4						4
	MOZAMBIQUE	BEIRA					3			3
	SOMALIA	SALALAH					5			5
	High Seas	CAPE TOWN					1			1

Figure 14: Number of vessels presence by oceans *(Data Sources: Statistical Yearbook of Overseas Fisheries 2014, KOFA (Korea Overseas Fisheries Association)*



The Pacific Ocean is the main fishing area for Korean distant water fishing vessels. According to Statistical Yearbook of Overseas Fisheries 2014 by KOFA, over 64% of total production coming from the Pacific Ocean with 356,847 MT in 2013. Tunas is predominantly caught in the Western and Central Pacific Ocean with 250,486 MT[18] and the Eastern and Central Pacific. But tuna fishing vessels also operate in Atlantic and Indian oceans. The biggest fishing ground for Squids is around Falkland Islands in the South Atlantic Ocean[19]. The North Pacific Ocean is main fishing ground for Pollack, saury fishery and also trawl fishery targeting various species. The North Pacific Ocean Trawl Fisheries are fishing Alaska Pollack and its main fishing ground is in Russian EEZ in the North Pacific.

18. Oceans and Fisheries Yearbook 2014 by Ministry of Oceans and Fisheries, November 2014

19. Korean Fisheries Yearbook 2012 by KFA(Korea Fisheries Association)

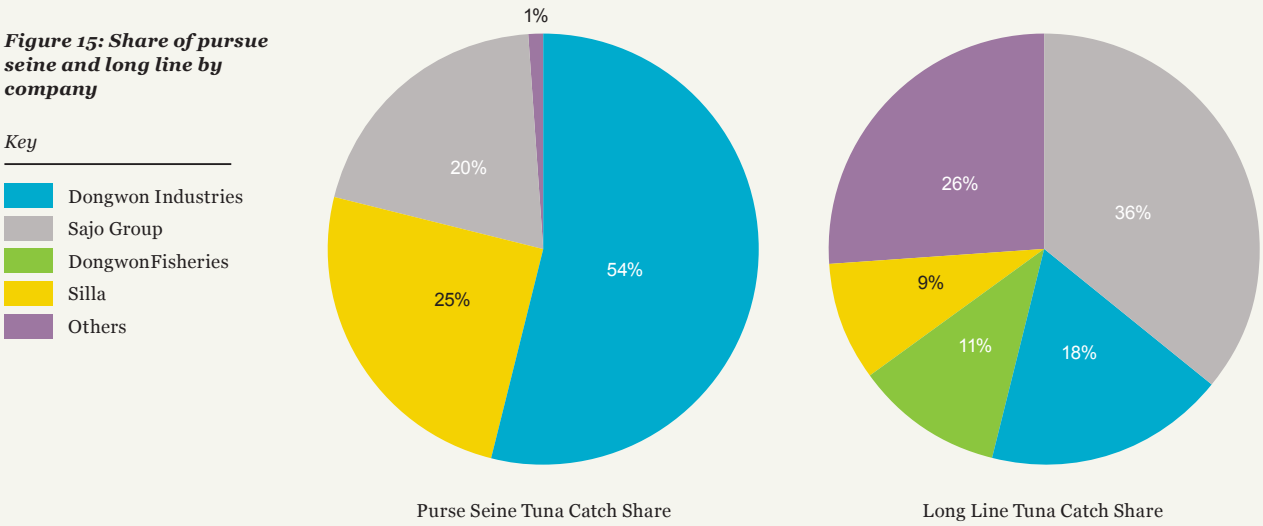
Fishing Industry

In 2013, approximately 78% of Korean's distant water fishing companies were small companies operating less than five fishing vessels per company. These small companies are mostly operating trawl fisheries, which are currently under a vessel scrapping programme by the government (refer to the 2.3 of Chapter 2). The top eight fishing companies in terms of vessel number and catch volume are provided in Table 11. Except for Insung Corp, all other fishing companies are mainly operating tuna fisheries, which shows that tuna fisheries are the most profitable fishery for Korea's distant water fishing industry. While Dongwon Industries are ranked first in terms of Purse Seine tuna catch, Sajo group companies (Sajo Industries, Sajo Daerim, Sajo Seafood, Sajo Oyang) are the first in terms of Long Line tuna catch as seen in Figure 15.

Table 11: Top eight distant water fishing companies in 2015
Note: Checked and confirmed the information with each company for May 2015

Company	Total Vessel Number by Company	Number of Vessel by Fishery type					
		Tuna Long Line	Tuna Purse Seine	Trawl	Jigging	Trap/Bottom Long Line	
Dongwon Industries	35 (+5 Carriers)	18 (15 Pacific, 3 Indian)	16 (13 Pacific, 3 Indian)	1 (Antarctic)			
Sajo Industries	34	30 (Pacific)	4 (Indian)	0			
Sajo Daerim	3 (All Pacific)	3	0	0			
Sajo Seafood	3 (All Pacific)	2	1	0			
Sajo Oyang	8	4 (Pacific)	1 (Pacific)	3 (2 Falkland, 1 North Pacific)			
Dongwon Fisheries	16	13 (3 Indian, 10 Pacific)	1 (Indian)	3 (2 New Zealand, 1 Falkland)			
Silla	17(All Pacific)	11	6				
Insung	13	2	0	4	4	3	

Figure 15: Share of pursue seine and long line by company



Purse Seine Tuna Catch Share

Long Line Tuna Catch Share

1.3 Mariculture

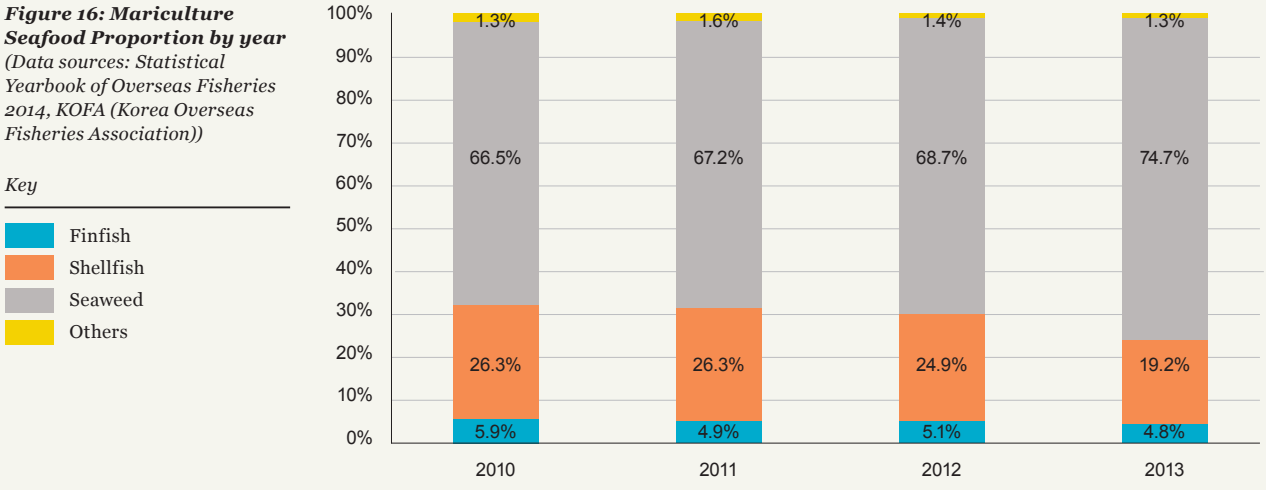
Korea's mariculture was focusing on seaweed in 1960s but since 1970s it has been expanding to various species such as crustaceans, finfishes and shellfish. The number of species cultivated now is more than 50 and recently it is developed to even sea cucumber[20]. Mariculture production and extent have been increasing as seen in the Table 12. The main reason for this expansion is that wild caught seafood price is increasing so the consumers choose cheaper mariculture seafood. With increasing demand and decreasing wild caught seafood resources, the Korean government has been supporting the development of mariculture as an alternative.

Total mariculture production was 1,515 thousand MT in 2013. Table 12 and Figure 16 below show the number of Seaweeds present more than 60-70% of total production. Especially in 2013, the Ministry of Oceans and Fisheries has developed a new species of laver (seaweed) called 'Super laver' and this attributed to the good harvesting of seaweeds in 2013.

Table 12: Mariculture Production by Species
Unit: Weight(MT)
(Data sources: Korean Fisheries Yearbook 2014 by KFA)

	Total	Finfish	Shellfish	Seaweed	Others
2010	1,355,000	80,110	355,699	901,672	17,519
2011	1,477,546	72,449	389,159	992,283	23,655
2012	1,488,950	76,308	370,074	1,022,326	20,242
2013	1,515,211	73,108	291,026	1,131,305	19,772

Figure 16: Mariculture Seafood Proportion by year
(Data sources: Statistical Yearbook of Overseas Fisheries 2014, KOFA (Korea Overseas Fisheries Association))



20. Korean Fisheries Yearbook 2014 by KFA, December 2014

Table 13: Top three species by life form in mariculture
Unit: MT
(Data sources: Statistics Korea ; Korean Fisheries Yearbook 2014 by KFA)

		2010	2011	2012	2013
Total		1,355,000	1,477,546	1,488,950	1,515,211
Finfish	Subtotal	80,110	72,449	76,308	73,108
	Halibut	40,925	40,805	39,371	36,944
	Rockfishes	20,918	17,338	23,085	23,757
	Mullets	4,657	4,850	5,839	4,788
Shellfish	Subtotal	355,699	389,159	370,074	291,026
	Oysters	267,776	281,022	284,856	239,779
	Mussels	54,440	70,554	61,310	34,429
	Japanese Littleneck	23,430	25,862	12,623	4,580
	Abalone	6,228	6,779	6,564	7,479
Seaweed	Subtotal	901,672	992,283	1,022,326	1,131,305
	Sea Mustard	393,616	393,724	339,924	327,375
	Kelp	241,322	246,701	308,601	373,264
	Laver	235,534	316,729	349,827	405,525

As shown in the Table 13, halibut, rockfishes, oyster, mussel, Japanese littleneck, abalone and seaweeds such as sea mustard, kelp and laver are the main products of Korea's mariculture.

The total mariculture area was 141,312 ha for 2013 and 47.7% of mariculture area is less 1ha still, but bigger size of mariculture business has been increasing annually. Major maricultural grounds are located in Jeonnam and Gyeongnam provinces. These two provinces produced 70% and 19% of total mariculture production weight respectively, which is nearly 90% in sum. Seaweeds are most largely grown in Jeonnam and shellfish in Gyeongnam.

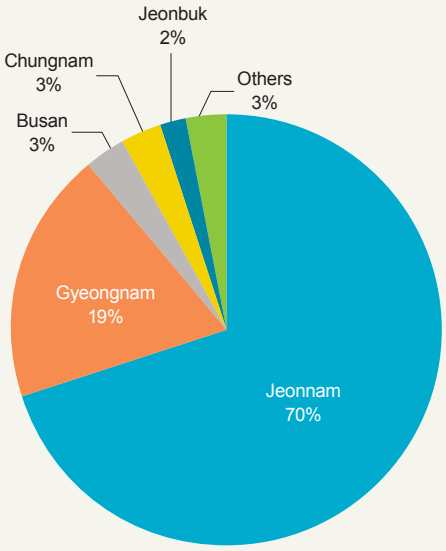


Figure 17: Mariculture production proportion by provinces in Korea in 2013
(Data sources: Edited based on the statistics from Statistics Korea. Available from Korean Statistical Information Service (KOSIS), http://kosis.kr/)

Finfish Mariculture

Finfish mariculture production was 73,108 MT, which is equivalent to 749,139 million KRW in value in 2013. Halibut represents 54% of total finfish production with 36,944 MT followed by rockfishes as shown in the Figure 18. Jeonnam, Gyeongnam, and Jeju provinces are the major culture ground for finfish mariculture in terms of weight and value. Especially Jeju province produces more than half of total production of Halibut. Halibut is very popular fish for sashimi in Korea and also a major export item to Japan.

Figure 18: Farmed finfish proportion by species in 2013
(Data sources: Statistics Korea)

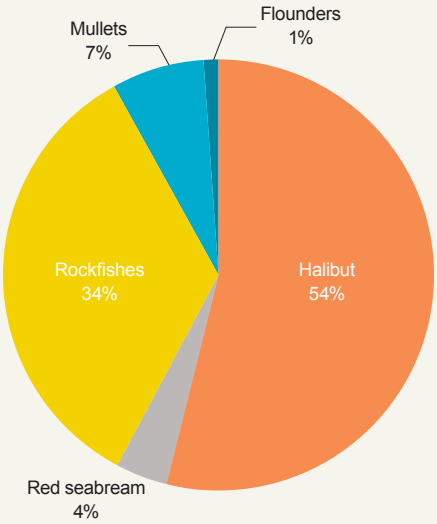
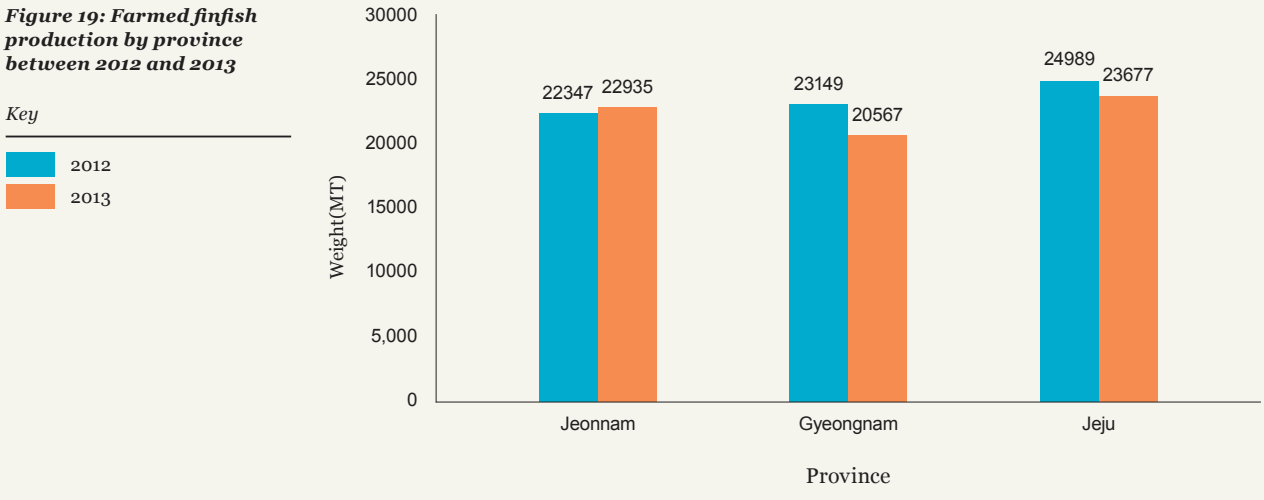


Figure 19: Farmed finfish production by province between 2012 and 2013



1.4 Trade

Fishery Products Trade Trend

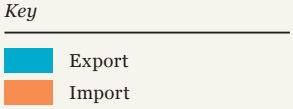
Korea's export of marine products has been growing since 1980's to record levels, reaching more than US$ 2 billion recently. Regarding the import, it has been increasing since 1997 due to free trade movement and increasing demand for seafood to finally turn into the trade deficit. The export and import of marine products represented 0.4% of total annual export value and 0.8% or total annual import value in recent year.

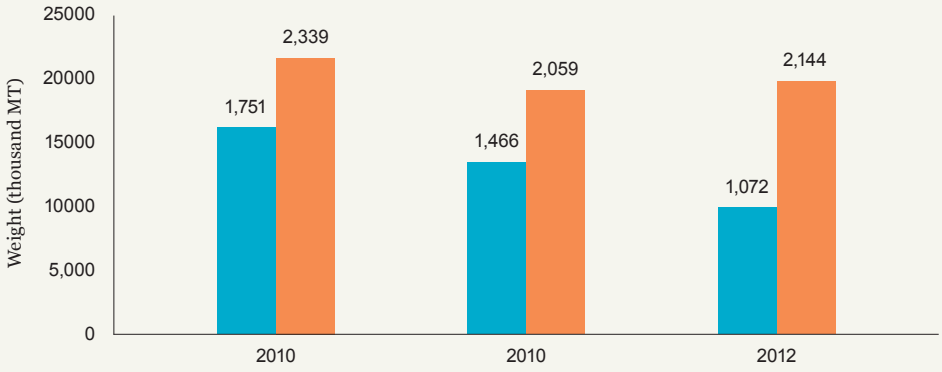
Table 14: Trend of marine products trend
Note: Customs data includes salts and processed products in the marine product category. (Data sources: Customs data of Korea Customs Service)

	By volume(MT)		By value(Thousand US$)	
	Export	Import	Export	Import
2010	792,045	4,715,726	1,798,172	3,458,400
2011	686,715	4,845,662	2,307,798	4,191,944
2012	708,683	4,829,157	2,362,050	3,974,627
2013	687,569	5,387,008	2,151,951	3,894,740

Table 14 edited directly from Korea's Customs data includes salt in the category of 'marine products' together with all wild capture and farmed seafood since 2008. Also the volume is the total volume of final products processed (canned, dried and salted products included), which doesn't reflect the live weight. So, with regards to the live weight of fishery products, the Ministry of Oceans and Fisheries excludes salt and also converts processed weight to its live weight equivalent. The volume of pure seafood export was about 1,072 thousand MT and import volume was 2,144 thousand MT as seen in figure 20.

Figure 20: Fishery products export and import volume
(Data sources: Korean Fisheries Yearbook 2014 by KFA from calculation of Ministry of Oceans and Fisheries)





As seen in figures 21 and 22, tuna and squid are the most important species in exports for Korea. The export volume of tuna decreased very sharply in 2011 from 333,924 to 144,253 MT but the profit value increased rather slightly in the same year and has risen in the next following years despite of export volume reduction. Tuna catch was reduced by more than 20% between 2010 and 2011 due to increased regulation in tuna fisheries from RFMOs and coastal states. But the demand for tuna has been increasing so that the export value is being maintained after the catch reduction[21].

Regarding the main species for import, Pollack, squid, saury and shrimp (and flesh) are the most important. Pollack is the most popular fish in terms of daily diet and tradition for Korea. Squid and shrimp are also popular item for domestic demand.

Figure 21: Top ten exported species by volume
(Data sources: Oceans and Fisheries Yearbook 2014 by Ministry of Oceans and Fisheries, November 2014 based on Customs Data (not live weight))

Key

- Tunas
- Squid
- Pollack
- Chub Mackerel
- Sea Mustard
- TrevallyCrab meat
- Laver
- Mackerel
- Cod
- Japanese littleneck

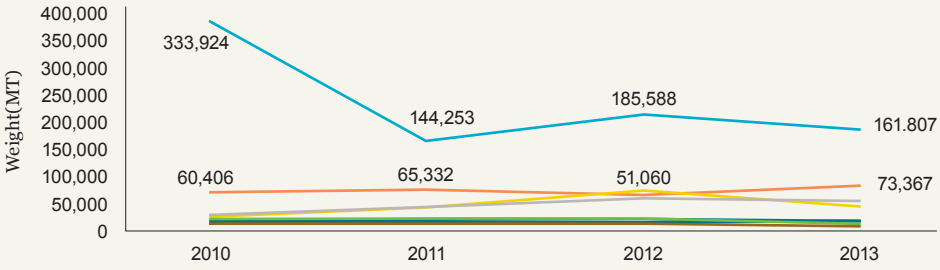


Figure 22: Top ten exported species by value
(Data sources: Same as above)

Key

- Tunas
- Laver
- Squid
- Halibut
- Oysters
- Common Conger
- Crab meat
- Pollack
- Abalones
- Chub Mackerel

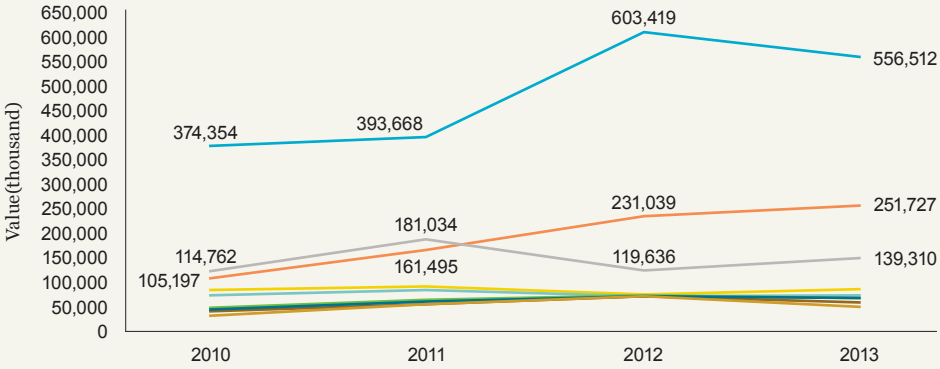


Figure 23: Top ten imported species by volume
(Data sources: Same as above)

Key

- Pollack
- Squid
- Pacific Saury
- Shrimp
- Long arm octopus
- Largehead hairtail
- Cod
- Halibut
- Croaker
- Webfoot octopus

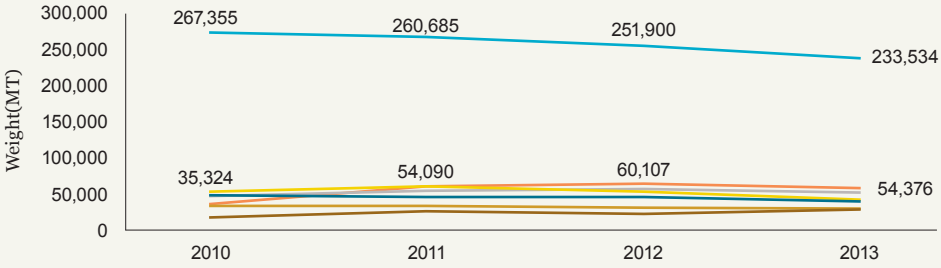
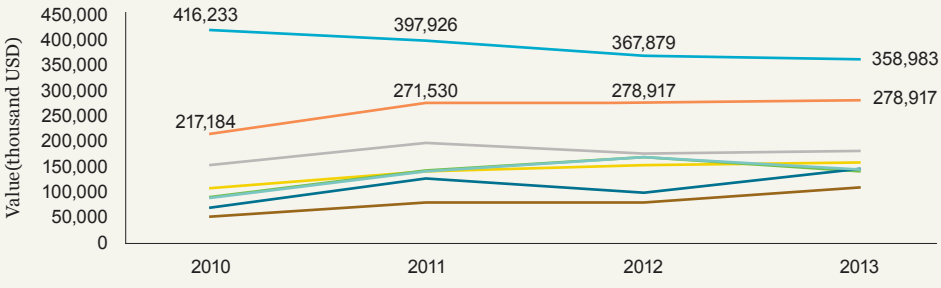


Figure 24: Top ten imported species by value
(Data sources: Same as above)

Key

- Pollack
- Shrimp
- Long arm octopus
- Shrimp Flesh
- Squids
- Tuna
- Salmon
- Glass eel
- Largehead hairtail
- Croaker



21. Trade status report 2012 from KATI, www.kati.net

Major Trading Partners

Korea's top five export partners in value are Japan, China, USA, Thailand and Vietnam, and they possess 78% of total export in terms of value. Moreover, Japan shares 38% of total export of fishery products as seen in the table below. The major import partners are China, Russia, Vietnam, USA, Chile, and Norway which take 64% of total; share of China is nearly equal to one-fourth of total import.

Table 15: Annual trade value of fishery products by country[22]
Unit: thousand US$

		2010	2011	2012	2013
Exports	Total	1,798,162	2,308,155	2,362,050	2,151,951
	Japan	859,483	993,537	981,683	815,506
	China	231,223	464,819	372,257	370,446
	USA	142,166	180,852	191,004	217,490
	Thailand	126,824	173,433	260,783	206,890
	Vietnam	32,009	61,453	54,465	70,089
	New Zealand	71,915	92,707	72,663	48,848
Imports	Total	3,458,400	4,191,944	3,974,627	3,894,740
	China	1,095,264	1,250,436	1,082,620	1,026,162
	Russia	495,267	662,758	654,125	590,087
	Vietnam	376,338	482,607	506,886	484,108
	USA	126,179	155,412	177,421	221,407
	Chile	76,957	142,581	110,864	120,718
	Norway	97,108	138,833	114,402	120,249

Trading ports

There are 28 trading ports in Korea; among them, Busan has the largest volume both in inbound and outbound of fishery products. The second-largest is Incheon for inbound and Gwangyang for outbound for 2009 - 2012[23]. Table 16 shows annual fishery products volume traded in top 3 trading ports of Korea: Busan, Incheon, and Gwangyang. Busan and Incheon ports have larger volume in import than in export; yet Gwangyang, except 2013, has had larger export volume corresponding to previous data of fishery product inbound and outbound.

22. Korean Fisheries Yearbook 2014 by KFA, December 2014

23. Shipping Statistics Handbook 2013 by Korea Maritime Institute, November 2013

Figure 25: Location of top three trading ports in Korea

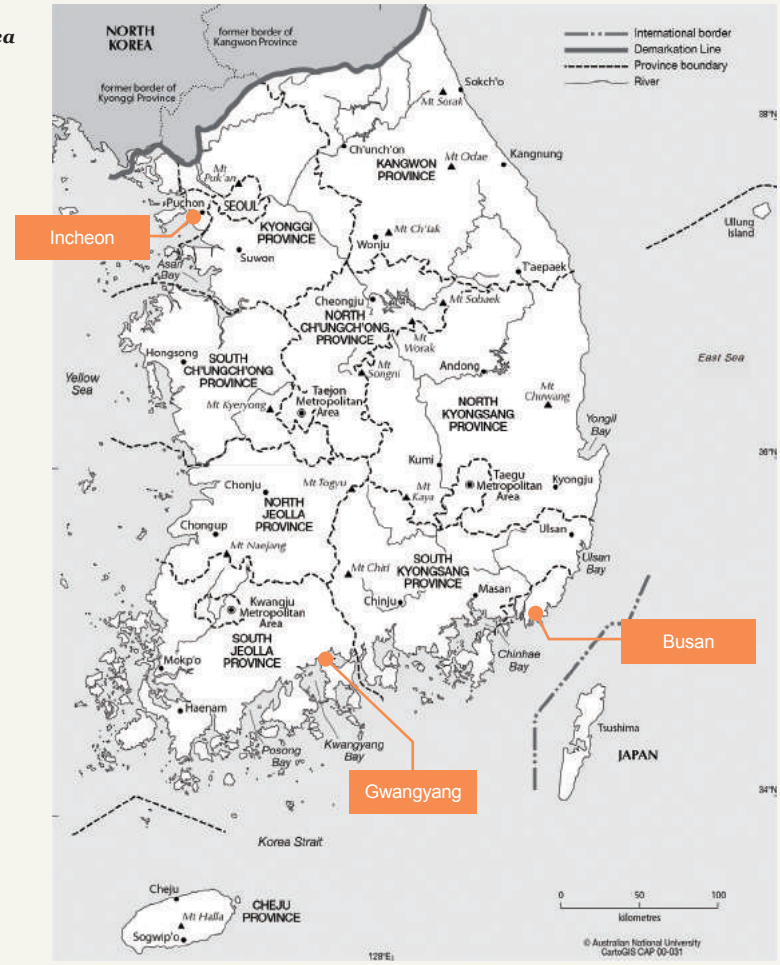


Table 16: Annual export and import of fishery products by top three trading ports 2011-2013

Unit: R/T

Note: Revenue Ton (R/T) is a ton on which the shipment is freighted. If cargo is rated as weight or measure whichever produces the highest revenue will be considered the revenue ton. Weights are based on metric tons (MT) and measures are based on cubic meters (CBM)[25]. For example, if a pipe is 1,800 MT and 4,800 CBM (= 4,237 MT, as 1.133 CBM = 1 MT) then it is 4,237 R/T.

		2011	2012	2013
Busan	Total	3,317,275	3,367,450	3,430,325
	Import	2,299,143	2,188,187	2,250,714
	Export	1,018,132	1,179,263	1,179,611
Incheon	Total	314,504	253,770	250,971
	Import	297,111	224,109	228,047
	Export	17,393	29,661	22,924
Gwangyang	Total	390,389	450,540	166,070
	Import	119,273	138,587	87,674
	Export	271,116	311,953	78,396

24. Edited with statistics from Cargo Handling Results at Seaports by Ministry of Oceans and Fisheries (Available from KOSIS)

25. Definition from European Shippers' Council, http://www.europeanshippers.eu/

CHAPTER TWO

FISHERIES POLICY AND MANAGEMENT

Modernized fisheries policy and management systems in Korea developed during the end of 19th century in Korea. The Fisheries Act was enacted for the first time in 1950 to manage fishing permits and fishing operations in the waters adjacent to the Korean peninsula. This Fisheries Act, being not only related to 'fisheries', was dealing with all matters of marine resources and fisheries. In 1955, the government agency on marine issues was created to coordinate all oceans issues and thanks to this management system, Korea started to promote offshore fisheries and also mariculture focusing on sea laver. Since 1962, Korea started to pro-actively support the fisheries in line with implementation of 'Five Year National Economic Development Plan'. With these efforts, the fishing fleet capacity increased rapidly and the fishing ground was also extended to distant waters beyond coastal and offshore waters. Fisheries governance was creating the infrastructure for the development of fisheries and started to manage the resources by controlling the fishing permit and total quota for coastal and offshore fisheries. Mariculture was growing and starting to export oyster to USA market from 1970s and the distant water fisheries was expanding the fishing ground to the Pacific, Atlantic and Indian oceans already in 1960s and made a huge development in 1970s. Growth started to slow down and even stagnated between 1980 and 1990s. The domestic waters fisheries were affected by depletion of fish resources internally from overfishing and free trade movement externally. The distant water fisheries were also hit by increasing regulation in high seas and declaration of EEZs by coastal states from the late 1970s and the fuel oil crisis. The stagnation of fisheries from the mid-1990s led to restructuring of fisheries[26].

2.1 Fisheries legislations

Coastal and offshore fisheries are managed mainly under the Fisheries Act and the Fishery Resources Management Act while the distant waters fisheries by the Distant Water Fisheries Development Act. However, the Fisheries Act is a basic law to manage the whole fisheries so it deals partially with fishing permit and license issue of the distant water fisheries and mariculture. The Seafarers Act is related to labour conditions of crew in all the fisheries. This act is a special act for only crew, apart from general labor law. In case of absence of any criteria in this Seafarers Act, the Labor Standards Act will be applied[27]. The following table shows the relevant legislations for each sector of Korea's fisheries. All the legislations have relevant Administration rules consist of public notices or directives from the President or ministers.

26. SHIN Yong Te, MA Chang Mo et al., (2009), KMI, Fundamental Research for Advancement of Korean Fishing Industry., Chapter 1 ; PARK Sung-kwae et al.,(2010) Theoretical Consideration on Advancement of Korean Fisheries

27. Professor YU Sung Je(Law faculty of JoongAng University), Mr.OH Mun Wan 'Labor relation of crew in fisheries' Labor Law Vol.15, 2002. Dec. http://contents.archives.go.kr/next/content/listSubjectDescription.do?id=000278

Table 17: Major legislation for fishery sectors

Coastal and Offshore Fishery	Distant Water Fishery	Mariculture
Fisheries Act	Distant Water Fisheries Development Act	Fisheries Act
Fishery Resources Management Act	International Ship Registration Act	Public Waters Management and Reclamation Act
Conservation and Management of Marine Ecosystems Act	Ship Act/Fishing Vessels Act/ Seafarers Act	Fishing Ground Management Act
Ship Act/Fishing Vessels Act/ Seafarers Act	Quality Control of Fishery Products Act	Quality Control of Fishery Products Act
Quality Control of Fishery Products Act	Act on Origin Indication of Agricultural & Marine Products	Act on Origin Indication of Agricultural & Marine Products
Act on Origin Indication of Agricultural & Marine Products		Act on the Prevention of and Countermeasures against Agricultural and Fishery Disaster
Special Act on Assistance and Restructuring of Coastal & Offshore Fisheries		
Fishing Ground Management Act		

The Fisheries Act defines all basic matters related to fisheries (wild capture fisheries and mariculture), fishery catch transportation and processing business. This legislation is the key regulation which defines fishing permit & license, coordination, fishing method and gear, and sanction. The Fishery Resources Management Act is a legislation enforced in 2009 to manage/protect marine living resources and recover the resources exploited from overfishing. This law defines limit on fishing vessel, fishing method and gear, resources protection and recovery, TAC (Total Allowable Catch) and sanctions. According to this act, the first phase of Master Plans for Fish Resources Management (2011~2015) was established in 2011 and each provincial government establishes resources management plans by region and implement them.

Distant Water Fisheries Development Act was originally promulgated in 2007 with objective to promote Korea's distant water fisheries and related industry. However, following the illegal, unreported and unregulated (IUU) fishing activities by Korean fleets and resulting international pressure such as 'IUU' nation designation by EU and USA in 2013, this law, the Distant Water Fisheries Development Act, was revised through 2013 and 2014 to strengthen MCS (Monitoring, Control and Surveillance) for this fishery sector.

2.2 Coastal and offshore fisheries management policy

For coastal and offshore fisheries, key tools to regulate the fisheries are as follow.

Table 18: Key tools to manage the coastal and offshore fishery
(Data sources: the Fisheries Act, Fishery Resources Management Act)

Input Control	Fishing permission and license system Restriction on vessel gross tonnage, fishing method and gear, and fishing number. Fishing permission quota
Output Control	TAC
Technical Measures	Closed seasons and areas, Bycatch restriction, Restriction on weight and length of fish, Release of fry and illegal catch, Mesh size etc
	Report on catch, Restriction on catch landing, transhipments and place of sale, Prohibition of sales of illegal catch

Input and Output Control

Fishing license system in coastal and offshore fisheries is divided in three categories depending on the fishery scale and type as seen in the table 19. For offshore fisheries, all the vessels, fishing method and gear should have permit from the Ministry of Oceans and Fisheries as the scale of fishery is bigger than any other fisheries. In the all permitted fishery, 'Fishing permit quota' exist to limit the fishing capacity and protect resources.

Table 19: Fishing license system in coastal and offshore fishery
(Edited from the Fisheries Act)

	Category	Given by	Period
Permitted Fishery-Fishing Permit	Offshore Fishery (>10GT) : 21 fishery type	Minister of Oceans and Fisheries	5 years
	Coastal Fishery (<10 GT, non-powered): 8 fishery type	Governors of provinces	
	Sectional Fishery: 12 fishery type	Heads of local governments(Si, Gun, Gu)	
Licensed Fishery-Fishing License	Set Net Fishery	Heads of local governments(Si,Gun,Gu) *For mariculture in open sea, the license by the Minister is mandatory.	10 years
	Mariculture		
	Community Fishery		
	Cooperative Farmed Fishery		
Reported Fishery – Declaration Certificate	Diver Fishery, Bare-Hands Fishery and others	Heads of local governments(Si,Gun,Gu)	5 years

As seen in Table 19 above, Korea's coastal and offshore fisheries management traditionally had consisted of input control based in licensing system and technical measures. Total Allowable Catch (TAC) aiming at limiting catches for certain species[28] was introduced the first time in 1999 with 4 species (chub mackerel, trevally, spotted sardine, red snow crab) and expanded to 11 species at present (chub mackerel, trevally, red snow crab, snow crab, Korean common penshell, butter clam, Jeju turban shell, swimming crab, squid, sailfin sand fish, raju). Setting TAC for each species every year is based on the resources assessment of National Fisheries Research and Development Institute (NFRDI) with socio-economic factor consideration. Then it is allocated to individual vessel by fisher's cooperatives and local governments on the basis of historical fishing record. Fishes in the category TAC system should be traded in the designated markets (121 place) to increase the effectiveness of the system. The total TAC for 11 target species has been more than 400,000 MT and its catch rate was between 70~80% in recent years[29]. The government tries to regulate fish flow between all the catch data from vessels and the catch entry to the first whole market with TAC.

Resources management and conservation[30]

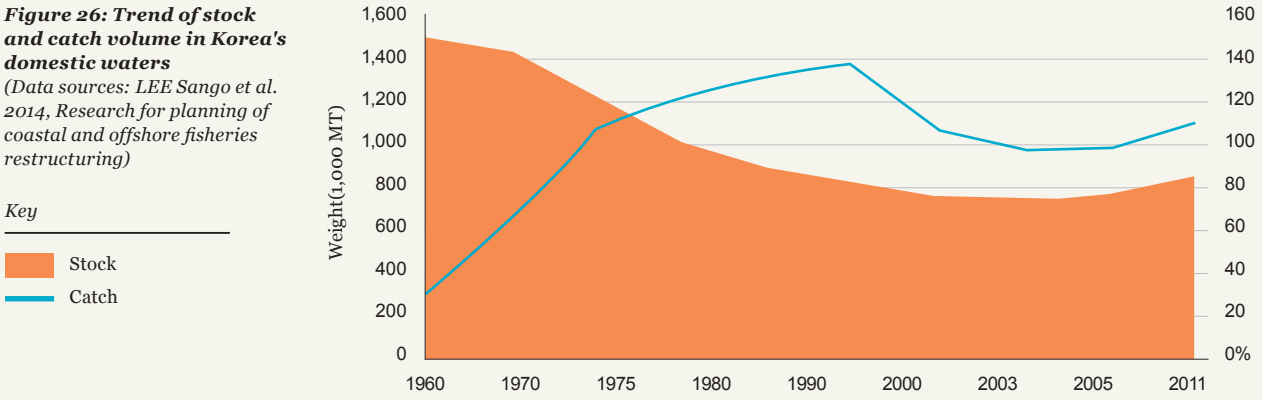
Resources in Korea's coastal and offshore have been decreasing due to accumulative intense overfishing focusing on catch increase, habitat loss and climate change. As seen in Figure 26, the stocks have fallen very sharply since the mid of 1990's and its assessment represents at present 57% of 1950's.

28. Korea Maritime Institute (2010), White Paper on Maritime Affairs and Fisheries 2006-2008, pp. 457-458.

29. LEE Sango et al. 2014, Research for planning of coastal and offshore fisheries restructuring, pp 54(연근해어업 구조개선 기본계획 수립을 위한 연구)

30. This section was drafted referring to Korean Fisheries Yearbook 2014 by KFA ; LEE Sango et al. 2014, Research for planning of coastal and offshore fisheries restructuring; Lee Sango et al. Creative Economy Potentials and Fisheries Development in South Korea published in World Journal of Fish and Marine Sciences 6 (1): 49-56, 2014

Figure 26: Trend of stock and catch volume in Korea's domestic waters
(Data sources: LEE Sango et al. 2014, Research for planning of coastal and offshore fisheries restructuring)



The Korean government has been conducting several resources management plans and programs to solve this problem of stock reduction: artificial reef project from 1971, vessel reduction from 1994, creation of sea ranches from 1998, introduction of TAC from 1999 and improvement of fishing ground environment from 2000 and marine forests from 2009, stock rebuilding plan in 2006. These programmes are conducted mainly by affiliated organization of the Ministry of Oceans and Fisheries such as National Fisheries Research and Development Institute (NFRDI) and Korea Fisheries Resources Agency (FIRA), local governments and agencies, fisheries organisations like National Federation of Fisheries Cooperatives (NFFC).

First, the artificial reef project was started in 1971 and the total surface for 2013 was 218,009 ha[31]. The government then created Sea Ranches in 2008 with release of seeds of fish. The total cost invested to recover the resources from the 1970's to 2010 was 1,259 billion KRW[32]. The fishing vessel reduction program followed in 1994 and remains a large project until today. The protected area for fisheries resources was also designated first in 1975 and extended to 2,526 ha in the sea.

Despite these efforts, overfishing and IUU fishing by fishermen didn't improve which undermined various resources management program driven by the government. So the government introduced Community Based Fisheries Management among fishermen and their communities from 2001. This is to induce more fishermen and fishing communities voluntarily to participate in the management of fisheries, so fishers are the partners and initiators of management actions for their fisheries, not the rule-taker, in addition to the already-established rules and regulations for the sustainability of their local fisheries. Under this system, fishers' groups take management measure on their own fisheries through ownership and participate in the decision making process for dispute settlement, income generation, fishing ground and resource management, and stock enhancement in line with the relevant legislation and regulations. The number of fishing communities participating in this Community Based Fisheries Management increased to 1,039 in which 67,687 fishermen joined in 2013. This is accompanied by raising awareness program with adjusted training for each community.

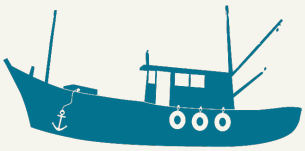
The resources stock research began in 1997 and one research vessel (885 T) has been conducting the stock investigation two times per year in 75 areas of domestic waters. This research surveys mainly stock status and sea temperature and salinity.

31. Korean Fisheries Yearbook 2014 by KFA

32. LEE Sango et al. 2014, Research for planning of coastal and offshore fisheries restructuring

In 2005, the government established a basic and comprehensive plan to rebuild the fisheries resources in crisis. Fisheries Stock Rebuilding Plan started in the next year 2006 is the comprehensive plan to rebuild fish stock that is excessively exploited within a certain period. To conduct this, the Ministry carries out scientific research and assessments on resources by species, fishery type and fishing aground to set a clear goal of targeting stock for recovery. This process also implies all stakeholders from governments bodies, fishermen and experts participated together to prioritize the targeting goal and coordinate other related policies. In order to support this massive plan, the government created the Fishery Resources Management Act in 2009. In practice, targeting species for recovery started from three species in 2006 is extended to 15 species for 2012. The overall objective of FSRP and its fisheries management policy is to enhance the total fish stock to the level of 10 million MT by 2017 in order to maintain the stable catch limit of 1.3 million MT annually in coastal and offshore fisheries.

The most recent project 'New Jasanobo' was supposed to start from 2014 for seven years. This project was aiming at establishing sustainable management of fish resources with sub 11 tasks for sophisticated survey of resources. According to this project, 75 research areas would be extended to 500 areas in the domestic waters with three more research vessels by 2019. The original budget was 350 billion KRW, however, it has been shrank recently to about 150 billion KRW[33] and finally cancelled.



DESPITE OF THE FISHING VESSEL REDUCTION PROGRAMME CONDUCTED SINCE 1994, THE FISHING CAPACITY OF COASTAL AND OFFSHORE FISHERIES IS STILL 11~13 % BEYOND THE APPROPRIATE LEVEL.

Fishing vessel reduction programme[34]

The fishing vessel reduction programme, a core part of the fisheries restructuring programme, was started in 1994 but conducted intensively since the beginning of 2000 with reduced fishing grounds as a result of fisheries agreements with Japan and China. The programme was mainly targeting coastal and offshore fisheries. Due to decrease of fish resources after 1980s and increase of fishing cost, Korean government started to restructure coastal & offshore fisheries from 1994 to reduce fishing effort and help marine resources recover. However, it was extended to some domains of distant water fisheries as well. Most of vessels removed from coastal fisheries were used as an artificial fish-reef or recycled for sculpture. Regarding offshore or distant water fisheries, vessels aged less than 10 years were exported to other countries excluding Russia, Japan, China, and Taiwan, rivals of Korea's fisheries[35]. This restructuring focused on just numerical reduction of vessels and didn't draw the active support from the relevant operators. Due to increasing problems with the past programme, the government organized a workshop on legislation of special law aiming for the restructuring of the fisheries in February 2010[36] and conducted a research project to legislate. Finally, the new Special Act on Assistance and Restructuring of Coastal & Offshore Fisheries has gone through the Parliament in 2012. In conclusion, the number of vessel was reduced by 18,560 between 1994 and 2013 at a cost of 1,589 billion KRW. However, despite of this massive reduction programme, experts say that the fishing capacity of coastal and offshore fisheries is still 11~13 % beyond the appropriate level[37].

33 Leader Economy Dailypaper, November 4th 2014, http://www.leaders.kr/news/articleView.html?idxno=10379

34 Korean Fisheries Yearbook 2014 by KFA, Chapter 4

35. Research on improvement of fishing vessels reduction program 2006 Dec. The Fisheries Science Institute of Junnam University; The Hankyoreh dailypaper 2010.Feb.15th, http://www.hani.co.kr/section-005000000/2000/005000000200002152150006.html

36. Reported in Korea daily for farmers and fishermen at 8 Feb.2010. http://agrinet.co.kr/news/news_view.asp?idx=90370&main_idx=9&CCD=%BC%F6%BB%EA&main_link=1&menu_color=%C1%A4%C3%A5 KOFA press release http://www.kosfa.org/

For distant water fisheries, some domains which were vulnerable to the global trend for increased regulation in high seas, including creation of new EEZs. The fishing grounds of distant water fisheries shrank due to the declaration of EEZs by coastal states (USA and Russia) since 1977 and UN conventions. As a result, North Pacific Ocean trawl vessels withdrew from the USA EEZ and the waters off of Kamchatka peninsula since 1988. In addition, squid drift gillnet fishing was banned in the North Pacific in 1992 by UN Moratorium. Due to this decision by the UN, Korean government encouraged the vessels of this drift gillnet fishery to switch to squid jigging in the North Pacific. But with the enforcement of 'Korea-Japan Fisheries Agreement' in 1999, the fishing vessel reduction program was introduced to subsidize the fisheries most affected by the agreement. In this context, Hokkaido North Pacific Ocean trawl and Saury stick-held dip net vessels were targeted first for this reduction. Since 2002, this reduction program was also applied to squid jigging vessels, of which fishing capacity exceeded the limit. In total 1,308 vessels were scrapped between 1999 and 2002.

Absence of MCS and overfishing problems

The biggest problem of Korea's coastal and offshore fisheries is generalized overfishing accelerated by IUU fishing activities and an absence of effective Monitoring, Control and Surveillance (MCS) on the fisheries.

As seen in Figure 26, while the fish stock has been declining during the last several decades in the domestic waters, the catch volume of coastal and offshore fisheries has been maintained at similar level despite of catch reduction since 1990's. Furthermore, fisheries agreements with Japan and China had negative impact on offshore fisheries, with significant reduction of fishing grounds. All of this context has led to more intensive competition between the coastal and offshore fishing vessels given that most of fishing grounds are overlapped between two fisheries sectors in the inshore waters. In consequence, excessive competition is creating overfishing and IUU fishing activities. As a general, Korean public and media believe that Korea suffers from IUU fishing by Chinese vessels entering into Korea's EEZs; however the IUU fishing activities by national fishing vessels are also serious. IUU fishing cases by Chinese vessels reported to the Ministry of Oceans and Fisheries reached 534 cases in 2011, 467 cases in 2012, 487 cases in 2013, 341 in 2014[38]. According to one official from the Ministry of Oceans and Fisheries, about 2,000 to 3,000 Chinese fishing vessels are present in Korea's EEZs including middle zone.

What about IUU fishing by Korean vessels? looked into the data on IUU fishing cases of Korean vessels investigated by East/West Sea Fisheries Supervision Offices during the last two years 2013 and 2014, thanks to the help of PARK Minsoo parliamentarian office and the Ministry of Oceans and Fisheries. IUU fishing activities are supervised by three bodies: East/West Sea Fisheries Supervision (Management) Offices, Coast Guard and local governments. Given that the lack of capacity and absence of IUU fishing reports by the Korean Coast Guard and local governments, this report provides only a fragment of whole IUU fishing activity.

There were 1,292 IUU fishing cases reported in the report on IUU fishing activities by East/West Sea Supervision Offices. About 1,110 IUU fishing cases involved small

37. Korean Fisheries Yearbook 2014 by KFA, pp 129 ; LEE Sango et al. 2014, Research for planning of coastal and offshore fisheries restructuring

38. Korean Fisheries Yearbook 2014 by KFA, pp 137

coastal fishing vessels of which gross tonnage is less 10 GT and 182 cases were from offshore fishing vessels of more than 10 GT. Fourteen per cent (14%) of total IUU fishing activities was conducted by offshore fishing vessels which are mostly owned by fishing corporates.

The most noticeable fact is that large and medium trawl fisheries, offshore angling, and large otter trawl and East Sea trawl. More than 50% of IUU fishing cases exposed were from trawl fisheries (Danish Seine by one vessel, Pair Trawl, West Southern Pair Trawl, Offshore Large Otter Trawl, East Sea Trawl). About 28% of IUU fishing activities were involving offshore angling. Angling fisheries violated the measure related the limit of illuminating power to fish for squids. Trawl fishing vessels violated the conservation measures on fishing gear and closed area for fishing. This report outcome is in line with general comments received from field interviews with fisheries stakeholders. Most interviewees pointed out large and medium trawl fisheries as engaging in major IUU fishing activities with large purse seine. Also the very strange thing is that there has not been one IUU fishing case from Large Purse Seine during the last two years.

For the total fisheries production of 2013, offshore fisheries represented 72.6% in catch weight and 59% in value while coastal fisheries represented 16.3% in catch weight and 31.6% in value. Moreover, the offshore fisheries produce 263.6 MT and 169 million KRW on average per vessel while coastal fisheries produces 3.6 MT and 25 million KRW on average per vessel. The gap of average catch and value per vessel between two fisheries sector is respectively 73 times and 30 times[39]. Among the offshore fisheries, purse seine, large and medium trawl fisheries are the most profitable fisheries. Catch value per fishing permit is 14,630 million KRW for Purse Seine, 4,086 million KRW for Pair Trawl in Medium Trawl, and 4,017 million KRW for Large Pair Trawl. When it comes to the punishment for violation on the fishing gear regulation and closed fishing area, the strongest punishment is only up to 2 years imprisonment or fine of 20 million KRW.

Regarding the MCS, the criteria to judge the MCS effectiveness is as follow:

1. Whether the legislation or policy could foster IUU fishing, by creating economic incentives to fish illegally, or not creating disincentives, and do not adequately punish IUU fishing.
2. Whether policies don't sufficiently control fishing activities, thus enabling IUU fishing to occur.

By reflecting on these criteria, Korea's coastal and offshore fisheries management is likely to be in the criteria as described below.

- Absence of monitoring and surveillance of fishing operation: even though inspection on the fishing vessels are conducted randomly, there is no observer on fishing vessels. All data related to fishing operation, fishing area and date, catch and bycatch etc rely on captain or fishermen.
- Absence of mandatory Vessel Monitoring System (VMS) or AIS (Automatic Identification System)
- Absence of cross checking between the catch report and trade volume at first producers sites market
- Weak punishment for mis-reporting, or under reporting: According to

39. LEE Sango et al. 2014, Research for planning of coastal and offshore fisheries restructuring

Article 102 of the Fisheries Act, only administrative penalty of 5 million KRW is imposed to failure of reporting.

- Lack of coordinated investigation of IUU fishing activities

With this lack of effective MCS, it is also doubtful if TAC works as an effective tool for resources management. There are 2,780 offshore fishing vessels which is about 5.8% in the total coastal and offshore fishing fleet number. As seen below, offshore fisheries catches more than 70% of total domestic waters production. As their catching effort and fishing capacity are not comparable to the small scale of coastal fisheries, their fishing practice have significant impact on the fisheries management. Therefore, it is very important to implement effective MCS on the offshore fisheries.

2.3 Distant Water Fisheries Management and Policy

Distant waters fisheries are managed by the Distant Water Fisheries Development (Management) Act. This Act was promulgated in 2007 with the objective to promote Korea's distant water fisheries and related industry. Due to several cases of illegal, unreported and unregulated (IUU) fishing activities by Korean vessels in recent years, USA and EU had identified Korea as pre-IUU nation in 2013. Following these incidents and resulting international pressure, Korea revised its distant water fisheries legislation, the Distant Water Fisheries Development Act, for the second time in 2013 and again in 2014. The new revised legislation took effect in July 2015.

New revised legislation on distant water fisheries

Before the amendment of 2013, the industry involving in serious IUU fishing had been just imposed only maximum US$ 5,000 of administrative penalty and they had been supported unconditionally by the government. Key points of this legislation amendment are strengthening MCS (Monitoring, Controlling and Surveillance) and sanction as seen in the table below.

Table 20: Key provisions of the revised Distant Water Fisheries Development Act of Korea

Fishing permit control	-Permitted by the Minister of Oceans and Fisheries on every vessel in relation to the fishery, fishing ground, relation with foreign countries -Joint venture with foreigner abroad should notify to the Minister -Fishing permit quota, Restriction on the fishing permit depending on international requests, conservation measures, absence of MSC in the coastal states, IUU fishing activities and violation of relevant measures in the past, and for public reason and safety issue
Monitoring, Controlling, Surveillance	-100% of VMS, E-logbook system, Reporting on the fishing operation such as catch, landing volume, transhipment volume and sales. Transhipment should be permitted in prior by the Minister. -Detailed definition of Illegal, Unreported and Unregulated fishing activities - Detailed rules to comply with for industry and employees → Serious IUU fishing activities to be sanctioned - Control of nationals(South Koreans) to keep them from getting involved in IUU fishing and also the same rules to comply with on serious IUU fishing activities -Monitoring of special 'high risk vessels' which were involved in IUU fishing or suspicious vessels
Port state inspection	-Prohibition of the vessels engaged in IUU fishing from entering the Korean ports and inspection if necessary
Sanction	-Serious IUU fishing activities: imprisonment of up to 5 years, or higher fine between a criminal fine of up to 5 times the whole sale value of the fishery products obtained from relevant violation based on the average wholesale prices of the products for the preceding three years and a criminal fine at least KRW 0.5 up to 1 billion (US$ 1 million).

IUU FISHING OF DISTANT WATER FISHERIES OF KOREA HAD BEEN JUST IMPOSED ONLY MAXIMUM US$ 5,000 OF ADMINISTRATIVE PENALTY, BUT NOW THE PUNISHMENT HAS BEEN STRENGTHENED. IMPRISONMENT OF UP TO 5 YEARS, OR HIGHER FINE BETWEEN A CRIMINAL FINE OF UP TO 5 TIMES THE WHOLE SALE VALUE OF THE FISHERY PRODUCTS OBTAINED FROM RELEVANT VIOLATION BASED ON THE AVERAGE WHOLESALE PRICES OF THE PRODUCTS AND A CRIMINAL FINE AT LEAST KRW 0.5 UP TO 1 BILLION (US$ 1 MILLION).

New revised legislation mentions the fishing permit quotas for the distant water fisheries. The mentioned quotas for permission may be used as a tool for reduction of fishing capacity and also a limit on new vessels entering the fishery. The quotas can be decided by fishing type or by ocean based on the decree of the Minister. But this provision just describes a possibility, it has not yet been implemented. In fact, the Korean government allocates the catch quota decided by each RFMO among the relevant fishing companies. This allocation of the catch quota limits fishing capacity and new vessels entering the fishery. It is almost impossible for a new company to penetrate into existing fishing areas. The new-comers cannot enter unless an existing company quits, which is usually a major fishing company.

Due to a criticism on the major fishing companies' monopoly and a controversy around transparency & equity of quota allocation, the Ministry hosted a workshop on the current fishing license system and quota allocation in September 2011. Based on the discussion outcome, they planned to amend the article related to the fishing permission to lower the barrier to entry for newcomers and increase the equity between existing companies and newcomers. According to this plan, the Minister should permit all requests for fishing except for the cases which are not suitable. This has been finally reflected in the recent amendment of the Distant Water Fisheries Development Act after IUU fishing nation scandal globally.

Apart from this, the Minister can place restrictions or suspensions on the fishing permission subject to an issuance or that has already been issued, or detain or place restriction on the departure or entry of the vessel for many reasons described in the table 19. It is remarkable to limit the fishing operation in the waters of costal states with poor management systems.

With respect to sanctions, penalties will include criminal prosecution, and higher financial fines. This sanction applies to serious IUU fishing activities which are as follow:

1. fishing without valid license, authorization or permit duly issued by the flag state or relevant coastal states;
2. not fulfilling its obligations to record and report catch or related detailed data, including data to be transmitted by satellite vessel monitoring system or falsely reporting such data in violation of applicable reporting requirements established by international fisheries management organizations;
3. fishing in a closed area, during a closed season, or without or in excess of a quota allocated by a relevant international fisheries management organization;
4. engaging in directed fishing for a stock which is subject to a moratorium or for which fishing is prohibited;
5. using prohibited fishing gears;
6. falsifying or concealing its markings, identity or registration;
7. concealing, tampering with or destroying evidence relating to an on-board inspection;
8. breaching conservation and management measures in the areas under the competence of a relevant international fisheries management organization;
9. transhipping or participating in joint fishing operations with, supporting or re-supplying other fishing vessels identified by an international fisheries management organization as having engaged in IUU fishing;
10. obstructing the work of observers, throughout the entire processes including the

travel, embarkation on and disembarkation from the vessel, in the exercise of their duties of observing compliance with the applicable measures;

11. obstructing the work of inspectors, either in port or at sea, in the exercise of their duties including the embarkation on and disembarkation from the vessel, inspection and communication or non-compliance with measures taken as part of a port inspection; or
12. not having a vessel fitted with a vessel monitoring system (VMS) or intentionally tampering with the VMS or rendering it non-functional

Fisheries Monitoring Center (FMC), Electronic logbook and vessel scrapping

Following the strong IUU sanctions, the Fisheries Monitoring Center (FMC) was opened in Busan in March 2014 to monitor and control all distant water fishing vessel with 100% of VMS. This center has for mission to monitor in real time the distant water fishing vessels in all oceans. Currently seven staff working and the center will employ more experts with introduction of electronic logbook as from September 2015.

The vessel scrapping in West African waters will be conducted by the Ministry of Oceans and Fisheries in 2015. The Ministry has established the budget of 9.9 billion KRW to scrap the distant water fishing vessels which have operated in Guinea, Guinea Bissau, and Sierra Leone waters[40]. This vessel scrapping is in line with the Korean government's efforts to deter IUU fishing activities. Also the government will not allow individual industry to negotiate privately fishing entrance with African country and the industry will be allowed to operate fishing activities only in the waters agreed between the governments.

2.4 Power analysis of stakeholders in the fisheries sector

Administration Bodies

Korea's fisheries governance is mainly driven by the government bodies in terms of policy making and implementation. The Ministry of Oceans and Fisheries (MOF) is main agent to manage all fisheries and marine issues. It covers all aspects of fisheries which are policy, fishermen & infrastructure, enforcement & safety, aquaculture & distant water fisheries industry, fisheries resources & environment, market distribution & economics, international relation and trade[41]. Regarding the structure, the MOF is composed of three offices and three bureaus as seen in the figure below. The three offices are **Planning & Coordination Office, Oceans Policy Office and Coastal Fisheries Policy Office;** and the three bureaus are **Marine Logistics Bureau, Port Bureau and Maritime Safety Bureau.**

The most important office for the fisheries are **'Oceans Policy Office'** and **'Fisheries Policy Office'.** Under these offices, there are three sub-offices of which General Directors are present to manage several divisions for specific task.

Fisheries Policy Office is responsible for all matters related to coastal and off-

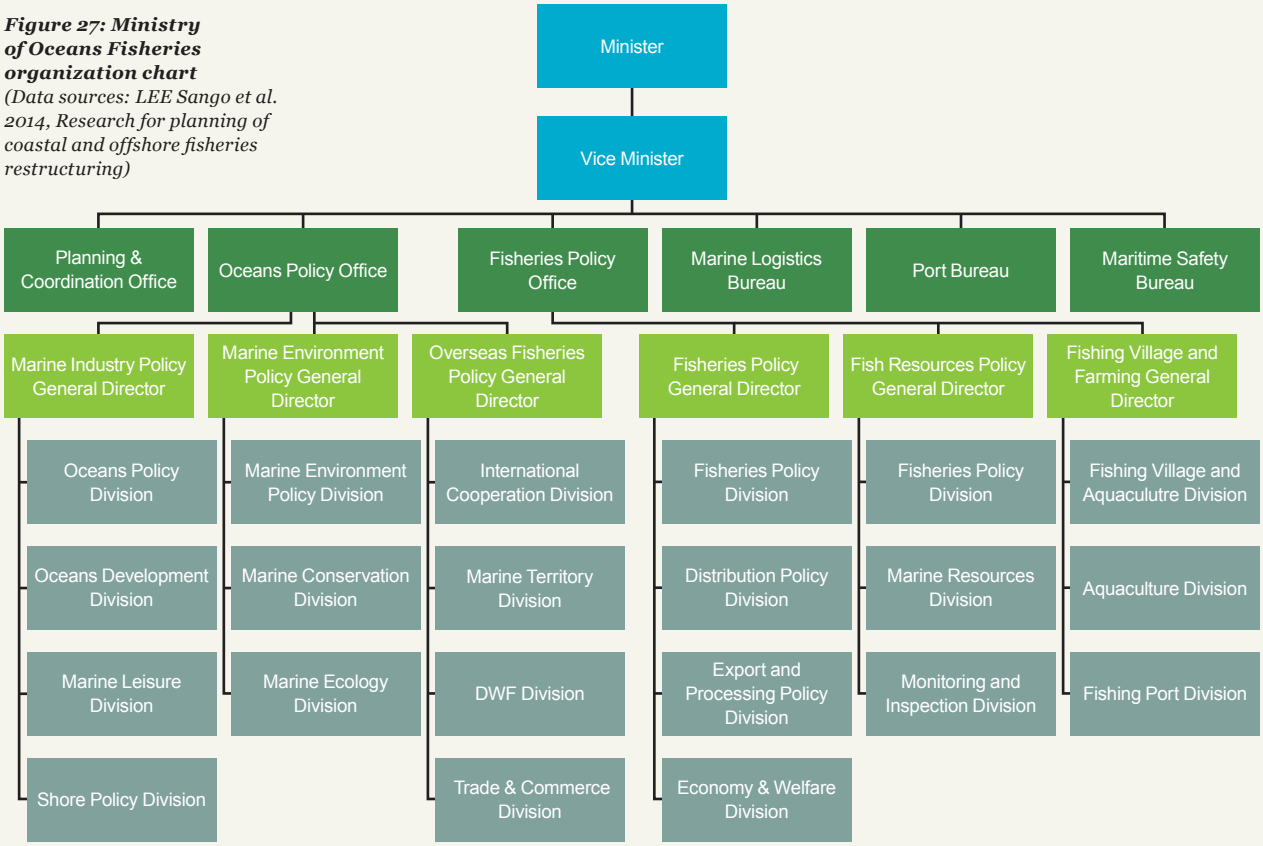
40. Press Release of Ministry of Oceans and Fisheries, March 2015, http://www.mof.go.kr/article/view.do?articleKey=7047&searchSelect=title&boardKey=10&menuKey=376&currentPageNo=2

41. The structure of MOF is available on https://www.mof.go.kr/index.do, Retrieved in April 2014

shore fisheries with aquaculture. There are two Fisheries Policy Divisions under the different General Directors of Fisheries Policy Office. The first Fisheries Policy Division under Fisheries Policy General Directors works on the overall policy issue of fisheries industry. Another Fisheries Policy Division under Fish Resources Policy General Director is practical body to manage the coastal and offshore fisheries and fish resources. For mariculture and Inland waters fishery, it is managed by Fishing Village and Aquaculture Division.

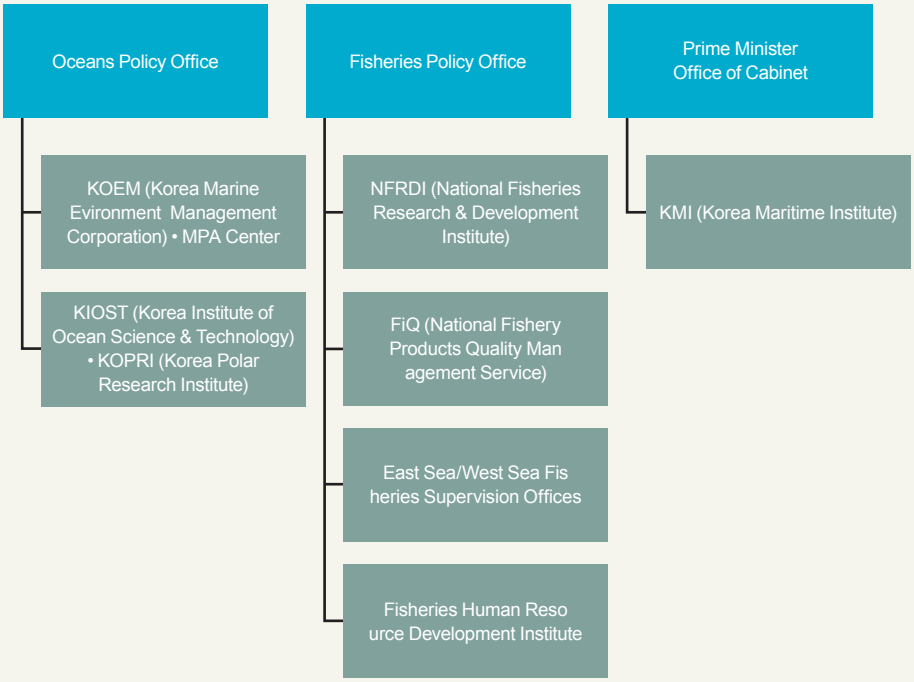
In terms of the Distant Water Fisheries, International Cooperation Division and Distant Water Fisheries (DWF) Division are the competent bodies under the Overseas Fisheries Policy General Director. DWF Division administers the distant water fisheries. The main goal has been promoting this industry by focusing on increasing the catch and developing new fishing ground. But after having been identified as IUU fishing nation in 2013 and 2014, the division has created new team on IUU fishing activities and legal amendment. International Cooperation Division works on the international relation and negotiation on the fisheries in international organizations such as RFMOs. This division is also involved in Official Development Assistance (ODA) for coastal states.

Figure 27: Ministry of Oceans Fisheries organization chart
(Data sources: LEE Sango et al. 2014, Research for planning of coastal and offshore fisheries restructuring)



The Ministry works together with many affiliated institutions and institutes for various missions as follow[42].

42. Ministry of Oceans Fisheries , Available on https://www.mof.go.kr/index.do 2014



The key institute for fisheries is National Fisheries Research and Development Institute (NFRDI). This institutes assists the Fisheries Policy Office by providing the expertise in terms of fishery science and technology. It conducts scientific researches on resources and fisheries such as stock assessment for TAC and marine ecosystem management. It is involved in resource management on specific species such as tuna for not only distant waters but also offshore fisheries because of Bluefin tuna bycatch in South Sea. The institute also develop the technology for marine aquaculture like pilot operation of tuna farming. NFRDI scientists attend major international meetings related to fisheries from WCPFC to CCAMLR.

Korea Maritime Institute (KMI), one of more than 20 affiliated institutes under the Prime Minister, is an institute specialized in marine and fishery policy. This institute conduct all kinds of research on maritime affairs, fisheries, marine environment and marine resource management, sponsored by the government.
It releases the largest number of reports on those issues. It operates international collaborative research activities as well as holding domestic and international forums such as KOSOPFF (Korea-South Pacific Fisheries Forum), KORAFF (Korea Africa Fisheries Forum).

National Fishery Products Quality Management Service (FiQ) is special affiliate in charge of managing the quality and safety of all seafood including overseas fisheries products. The work has been divided into three categories: quarantine, maintaining the quality for exports and domestic consumption and certification management. From 2014, this organization is assigned to conduct port state control according the Ministry's implementation plan to prevent IUU fishing.

East/West Sea Fisheries Supervision (Management) Offices supervises illegal fishing activities with 21 national inspection ships. West Sea Supervision Office sent one of its patrol ship to Western Central Pacific Ocean in 2013 as well to monitor the Korean flagged distant water fishing vessels.

Apart from the Ministry of Oceans and Fisheries and its affiliated agencies, the

Ministry of Foreign Affairs (MOFA) and the Ministry of Environment (MOE) are partially involved in oceans and fisheries matters. The Ministry of Foreign Affairs is engaged in general oceans policy for high seas and international cooperation such as Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) and high sea issues at the UN. The Ministry of Environment is related to general marine biodiversity and marine protected areas issues especially as it relates to CBD and CITES.

In addition to the central government bodies, Agriculture, Food, Rural Affairs, Oceans and Fisheries Committee in the National Assembly is involved in the fisheries in terms of legislation and supervision of the relevant Ministry.

Fisheries Organizations

There are many organizations that work with the government on the fisheries sector. Among these, National Federation of Fisheries Cooperatives (NFFC), which consists of about 159,000 members under 92 member fisheries cooperatives (70 by regions, 20 by fishery type, two processing cooperatives) and 1,982 fishing fraternities around the nation. NFFC carries out three main business which are marketing service (joint marketing of fishery products, selling fish products on commission, and price stabilizing), educational service (from reconciliation of conflicts to education of new technologies) and credit service (fisheries fund and finance management) for members[43]. NFFC also has 'Fisheries Economy Institute' to develop programmes for the benefit of fishery stakeholders.

There are also more than 35 organizations that are relevant to domestic waters fisheries, distant water fisheries, promotion of overseas fisheries, fishing ports, marine environment, seafood trade and mariculture etc. Among those, Korea Fisheries Association (KFA) and Korea Overseas Fisheries Association (KOFA) are the most important association. KFA is the biggest corporation working on the fisheries. It is facilitating the discussion between the central government and several stakeholders in fisheries and also publishes the fisheries yearbook every year. While KFA is mainly relevant to the coastal and offshore fisheries, Korea Overseas Fisheries Association (KOFA) is an association of 71 distant fishing companies. KOFA is a special corporation that supports the distant water fishing industry, including by providing statistics on fishing activities every year, analysis and research of foreign markets, etc. It plays a key role in non-governmental cooperation with foreign countries as well.

43. About NFFC , Available on http://suhyup.co.kr/

44. Dongwon Group homepage, https://www.dongwon.com/eng/content/subsidiary/04020100 , Retrieved in June 2015

Distant Water Fisheries Companies

Among the major distant water fishing companies seen in the Table 10 in the Chapter 1, the two most influential companies are Dongwon Industries and Sajo group companies (Sajo Industries, Sajo Seafood, Sajo Oyang and Sajo Daerim).

Dongwon Industries, founded in 1969, was the matrix of Dongwon Group which developed various sectors of businesses such as food processing, logistics, telecommunications, livestock as well as construction. As one of the 17 subsidiaries of Dongwon Group[44], Dongwon Industries has three main business areas which are distant water fisheries, processing & distribution and logistics. Regarding processing and distribution, Dongwon Industries processes sashimi-grade tuna in their Busan factory, Dongyoung Cold Plaza, near Gamcheon port of Busan and distributes for the domestic market or exports to USA and Europe[45]. For the domestic, Dongwon Industries runs franchise "Dongwon Tuna" and more than 74 stores in Korea. Apart from long sashimi-grade tuna, Dongwon Industries catch mainly skipjack tuna for canning. Tuna for canning are sold to regular buyers of USA, Thailand, and Europe (including canned tuna certified by ISSF). Also it is supplied to its affiliated companies – Dongwon F & B, Starkist and Société de Conserverie en Afrique SA (S.C.A SA)- to produce canned tuna. Dongwon Industries has been ranked first position in terms of total export value every year among the companies. Its export value was US$ 172,165 thousand in 2013[46].

Sajo group companies like Sajo seafood and Sajo Industries were ranked second and fifth in terms of total export value in 2013. The core business of Sajo Industries is distant water fishery (tuna long liner and purse seiner), but diversified the business areas to butchery, food processing and logistic. Regarding processed food business, Sajo Industries produces canned tuna and traditional Korean bean pastes (chili, soybean), etc[47].

Dongwon and Sajo started its distant water fisheries in 1969 and 1971 respectively and have grown to be sizable group of various business sectors. Each group's holding company coordinates, through its subsidiaries, and leads the group's various businesses. These two major companies have successfully built the vertical systemization from tuna catching to the related food processing and distribution.

45. Dongwon Industries homepage>Business>tuna distribution : http://www.dwml.co.kr/eng/contents/distribution/distribution, Retrieved in June 2015

46. KOFA yearbook 2014 p.246

47. Sajo Industries homepage http://ind.sajo.co.kr/, http://www.sajo.co.kr/eng/business/seaField.asp

2.5 International relations

Korea is a member nation of 21 international organizations including Regional Fisheries Management Organizations (RFMOs) for now. It is remarkable that Korea is a member of all five tuna RFMOs.

Table 21: Korea's membership of RFMOs
(Data sources: KOFA yearbook 2014 and Ministry of Oceans and Fisheries)

Organizations	Korea's membership year	Area in question	Import
FAO Committee on Fisheries	Dec 1965	Global	Management, policy development, and research of world fishery,
UN	Sep 1991	Global	International policy related to oceans and fishery management
OECD Committee for Fisheries	Dec 1996	Global	Fisheries policy at OECD level, considering economic cooperation and development
APEC Fisheries Working Group	Mar 1991	Global	Management of fish stocks and promoting collaboration in technology transfer, trade, etc.
ICCAT (International Commission for the Conservation of Atlantic Tunas)	Aug 1970	Atlantic	Tuna stock management in the Atlantic Ocean
IOTC (Indian Ocean Tuna Commission)	Mar 1996	Indian Ocean	Tuna stock management in the region
CCSBT (Commission for the Conservation of Southern Bluefin Tuna)	Oct 2001	Migration route for Southern Bluefin	Southern Bluefin tuna management
WCPFC (Western and Central Pacific Fisheries Commission)	Oct 2004	Western and Central Pacific	Tuna stock management in the W/C Pacific Ocean
IATTC (Inter-American Tropical Tuna Commission)	Dec 2005	East Pacific	Tuna stock management in the East Pacific Ocean
IWC (International Whaling Commission)	Dec 1978	Global	Conservation and management of world whale stocks
CCAMLR (Commission for the Conservation of Antarctic Marine Living Resources)	Apr 1985	Antarctic Ocean	Conservation and management of fish stocks in the region
CCBSP (Convention on the Conservation and Management of Pollack resources in the Central Bering Sea)	Dec 1995	High seas in the Central Bering Sea	Management of Pollack resources in the Central Bering Sea
NPAFC (North Pacific Anadromous Fish Commission)	May 2003	North Pacific	Conservation and management of Anadromous fish stocks in the region
NAFO (Northwest Atlantic Fisheries Organization)	Dec 1993	Northwest Atlantic	Sustainable use and management of fish stocks in the region
CECAF (Fishery Committee for the Eastern Central Atlantic)	Jan 1968	Eastern and central Atlantic	Conservation and management of fish stocks in the region
WECAFC (Western Central Atlantic Fishery Commission)	Jan 1974	Western and Central Atlantic	Conservation and management of fish stocks in the region
SEAFO (South East Atlantic Fisheries Organization)	Apr 2011	South East Atlantic	Conservation and management of non-tuna species in the region
SPRFMO (South Pacific Regional Fisheries Management Organization)	Apr 2011	South Pacific	Conservation and management of non-tuna species in the area
APFIC (Asia Pacific Fishery Commission)	Jan 1950	Indian-Pacific ocean including inland fisheries	Conservation and management of certain species in the region.
PICES (North Pacific Marine Science Organization)	Jul 1995	Northern Pacific above 30 degrees north latitude	Scientific research in the region
SIOFA (Southern Indian Ocean Fisheries Agreement)	Oct 2014	South Indian	Conservation and management of fish resources in the area
NPFC (North Pacific Fisheries Commission)	To be joining in 2015	North Pacific	Management of bottom fishery and non-tuna species

Korea has 'official' fisheries agreements with 12 countries: Australia, China, Cook Islands, Ecuador, Iran, Japan, Kiribati, Mauritania, Papua New Guinea, Russia, Solomon Islands, and Tuvalu. Most of agreements are made in order to get permission to fish in their EEZ either by paying fees for the fishing operation or to promote the fisheries related cooperation for business. Tuvalu, Solomon Islands, Kiribati and Papua New Guinea are still very proactive for tuna long line and purse seine fishery. Korea has paid US$ 2,717,000 for Tuvalu, US$ 8,330,500 for Solomon Islands, US$ 16,578,000 for Kiribati, and US$ 9,900,000 Papua New Guinea to fish for tuna in these countries' waters[48].

Agreements with neighboring countries, Japan and China, were introduced to rearrange the fishing ground in the overlapping EEZ from each party. Korea-Japan Fisheries Agreement enforced in 1999 and Korea-China Fisheries Agreement enforced in 2001 demarcated each nation's EEZ fishing area with various middle zones allowing bilateral parties to share fishing grounds.

The fishery agreement between Korea and Russia is related to pollack. Korea has been operating trawl fishing for pollack in Russian waters since 1991 by the first fishery agreement between Korea and USSR. The negotiation on the quota at this early stage was divided into inter-governments and private quota, however the private quota was removed in 2003 to deter IUU fishing and black fish trade. Since then most of pollack fishing by industry was conducted under joint venture while only about 5 Korean flagged vessels operated the trawl fishing under the quota set by two governments every year which is about between 25,000~40,000 MT. However this amount of catch is not enough to offer in the Korean market, so Korea imports pollack from Russia and the joint venture plays an important role for this pollack supply. For 2013, 25 vessels of 14 joint venture companies operated in Russian waters. The volume imported from these joint ventures was 181,330 MT. In addition to the quota agreement, the Russian government began discussing bilateral agreements with Korea to curb illegal harvesting of pollack and crab and the bilateral IUU agreement was signed in December 2009. As explained in the Chapter 1.1, some of offshore angling vessels enter into Russian waters which is Primorsky Krai area located north of Korea Japan middle zone. This is to fish for squids and puffer and 108 vessels caught 4,467 MT in 2013. Korea-Russia Fisheries Committee negotiate the quota and the price before starting this fishery. This was initiated by one of the National Federation of Fisheries Cooperatives (NFFC) in 1991 and the government has been subsidizing some fishing cost since 2006[49].

Further, Korean fishing vessels are operating in the following nations' EEZ on the basis of non-governmental cooperation: Seychelles, Surinam, South Georgia, Guinea, Sierra Leone, Angola, Guinea Bissau, Somalia, Micronesia, Marshall Islands, Nauru, Gabon, Falkland Islands, Indonesia, Mozambique, Liberia, Madagascar, Mauritius, Tokelau, and Namibia.

2.6 Subsidies

This section provides the information on the subsidies in the distant water fishing industry given that the subsidies for coastal and offshore fisheries are too huge and not offering the exact data. However, the most representative subsidies programmes in Korea are fuel tax reduction, price support programmes, support

48. KOFA yearbook 2014 p 160~161

49. KOFA yearbook 2014 p.276

for closed fishery, various indirect support programmes such as modernizing vessels and investment for infrastructure through all fisheries sector including marine aquaculture.

The data shown here refers to the National Audit documents provided by the Ministry of Oceans and Fisheries in 2013 and Korea Overseas Fisheries Organization (KOFA) yearbook 2014 for the recent information.

Korea's distant water fishing industry is not highly subsidized compared to other fishing nations in EU or USA. Most support programs are low rate loans for the industry and fuel tax reduction programs. Because of this, it is difficult to calculate exact financial support provide to the industry and here it provides rough assumption by referring to the National Audit document in 2013.

First, this table summarizes the different programmes for the period 2010-2012. There are various support programmes benefiting the distant water fishing industry of Korea.

Table 22: Financial support programmes for distant water fisheries in Korea *(Data source: Source: KOFA (Korea Overseas Fisheries Association) yearbook 2012, 2013, 2014)*

Name	Description
Distant Water Fishing Industry Support Fund	Under the national 'Distant water fishereis Development Act'[50], this programme provides loans at preferential rates. Although the smaller fishing companies or the newcomers are supposed to be the main beneficiaries, it also supports large DWF companies' activities aimed at developing new fisheries and fish exports. The funds available for this program amount to 143 billion KRW for fishing operations and 5 billion KRW to support the establishment of joint ventures abroad (including in the aquaculture sector). The support consists of loans at a low interest rate (3%) for 1 year of loan term. The credit ranges from 40% to 60% of the total cost depending on the amount granted.
Old Vessel Replacement (constuction)	This programme benefits companies operating purse seiners under the Ocean Industry Development Act. It provides low interest loans for the construction of new purse seine vessels. 70% of the cost is covered by the loan and 30% is paid by the company. The program offers a 4% interest rate under the condition of repayment in 7 years, with a 3 year grace period. The KOFA (Korea Overseas Fisheries Association)[51] is in charge of this program.
Vessel Equipment Modernization	Supports the renewal of equipment on board vessels older than 21 years in the trawler and jigging sectors. 100% of the coast is covered by the loan, at a 3% interest rate under the condition of repayment in 7 years, with a 3 year grace period.
Assistance to Promote Exports	Aimed at fishing companies exporting processed seafood. This program provides low interest rate loans to purchase raw materials for export. 100% of loan and payment in 1 year term with the 3 % low rate.
Investment Support for Fishing Facilities Abroad	It supports companies involved in business abroad in the areas of aquaculture, distribution and processing. 80% of the costs are covered by the loan and 20% by the companies at a 2% interest rate. Repayment is expected in 7 years, with a 3 years grace-period.
Industry Promotion Subsidy – Exploratory fishing	This programme grants money to companies participating in exploratory fisheries abroad.
Foreign Market Development	This is a grant programme that aims to promote seafood exports. It supports promotion and marketing costs such as entry fees to Fisheries International Exhibitions or other expenses related to the promotion of Korean fish products abroad. The grant covers between 50% and 100% of the total cost depending on the content.

In this support programmes, 'Industry promotion subsidy' and 'Foreign Market Development are direct payment to the industry by the government, so it doesn't have to be repaid by the companies. The amount of this grant is as follows.

50. The National Legislative Information Center of Korea. http://www.law.go.kr/lsSc.do?menuId=0&p1=&subMenu=1&nwYn=1&query=%EC%9B%90%EC%96%91%EC%82%B0%EC%97%85%EB%B0%9C%EC%A0%84%EB%B2%95&x=-1006&y=-208#liBgcolor1

51. KOFA(Korea Overseas Fisheries Association) is a 'special corporation' which is an industry association with members comprise of distant water fishing companies, but with special mandates entrusted from Korean relevant law that the association need to prefer some public tasks.

Table 23: Grants to distant water fisheries in Korea
Unit: Korean Won
(Data sources: Data of Ministry of Oceans and Fisheries submitted for 2013 National Audit document)

Year	Foreign Market Development	Industry Promotion Subsidy
2010	28,000,000	1,400,000,000
2011	31,000,000	506,000,000
2012	34,000,000	800,000,000
Total	92,000,000	2,706,000,000

A major form of indirect support is fuel subsidies. The fuel tax exemption provided to the DWF industry is estimated at 170.2 billion KRW from 2008 to 2012 according to the official data, 'Fuel tax exemption to the Distant Water Fishery 2008-2012' provided by the Ministry of Oceans and Fisheries for 2013 National Audit. This fuel support includes exemptions from taxes such as the 'Transport Energy Environment Tax', 'Education Tax', 'Transport Tax' or VAT.

CHAPTER THREE

SEAFOOD MARKET AND DISTRIBUTION

3.1 Domestic supply and demand of seafood products and consumption trend

Korea is one of the main importing countries in terms of global fisheries imports in value after China, Japan, European Union and USA according to the FAO yearbook Fishery and Aquacultures Statistics 2012. It also is one of the highest seafood consuming country with Japan in terms of seafood consumption per capita. Korea's seafood consumption per capita is more than 50 kg at average, three times more than the global average[52].

Korea's Ministry of Oceans and Fisheries Korea Rural Economic Institute (KREI) provide the fisheries products balance sheet every year based on the raw data from the Ministry of Oceans and Fisheries. Total supply consists of total national fisheries production, import, and stock from the previous year. Total demands consists of domestic consumption, export, and carry-forward to the following year. Table 24 is the balance sheet of seafood calculated by the Ministry of Oceans and Fisheries.

Table 24: Domestic supply and demand of seafood in Korea
Unit: Thousand Ton
(Data sources: Korean Fisheries Yearbook 2014 by KFA, Division of Distribution and Processing of Ministry of Oceans and Fisheries. The weight here is the converted live weight of fishery products)

		2005	2006	2007	2008	2009	2010	2011	2012
Supply	Total National Production	2,714	3,032	3,032	3,360	3,182	3,111	3,256	3,170
	Import	2,557	2,646	2,646	2,135	2,186	2,339	2,059	2,144
	Stock from previous year	531	512	512	618	567	528	603	639
Total Volume		5,802	6,190	6,190	6,113	5,935	5,978	5,918	5,953
Demand	Domestic Consumption	4,169	4,568	4,568	4,280	4,071	3,624	3,813	4,024
	Export	1,121	1,047	1,047	1,266	1,336	1,751	1,466	1,072
	Carry over from the current year	512	575	575	567	528	603	639	857

Self-sufficiency of Korea for seafood was more than 100% in the 1990's but the rate has decreased to record 64% in 2004 then recovered to 81% in 2011 as seen in the Table 22[53]. The total production of all Korea's fisheries sector has been decreasing while the demand has been growing, therefore, the self-sufficiency still falls short of 100% and this leads to the increasing dependency of imported seafood.

Table 25: Self-sufficiency rate of seafood in Korea
Unit: %
Note:

$$\text{Self-sufficiency rate} = \frac{\text{Domestic consumption}}{\text{Domestic production}} \times 100$$

'Domestic consumption' used in the formula is calculated after taking the loss rate during processing and distribution into account, thus differ from figures in table 21.

	2005	2006	2007	2008	2009	2010	2011	2012
Self-sufficiency Rate	73.0	72.5	79.1	80.8	83.0	78.0	81.0	75.3

52. According to the 'Food Balance Sheet' by KREI, Korea's seafood self-sufficiency was 126.8% in 1990 and 92.5% in 2000. ; 박원규 외, 기르는 어업 발전 기본계획 수립을 위한 연구 보고서, 2013년 12월. PARK Wonkyu et al. Report on the basic planning for the aquaculture, Dec 2013

53. 박원규 외, 기르는 어업 발전 기본계획 수립을 위한 연구 보고서, 2013년 12월. PARK Wonkyu et al. Report on the basic planning for the aquaculture, Dec 2013

When it comes to the balance sheet by organism, the self-sufficiency of fish stocks was 118.3% in 1990 and decreased to 73.4% in 2000, 59.7% in 2012 and 63.6% in 2013[54]. Other organisms such as shellfish and molluscs are also far from 100%. Only seaweed production keeps the self-sufficiency of more than 100%. The importance of imported fisheries products is more visible when looking into the balance sheet of top five fish - pollack, squids, chub mackerel, large head hairtail, croaker - which are the most popular in daily diet of Koreans. Squids and chub mackerel are quite self-sufficient with around 100%. Large head hairtail and croaker are low at about 60%. Pollack has the lowest self-sufficiency which was 13.1% in 2012 and 9.9% in 2013.

Table 26: Self-sufficiency of top five fishes in Korea
(Data sources: 'Calculation of the balance sheet of fishery products and its challenge' Dec 2014)

Year	2012	2013
Pollack	13.10%	9.90%
Croaker	55.20%	61.20%
Largehead hairtail	61.20%	63.60%
Squids	90.40%	80.00%
Chub Mackerel	122.90%	108.20%

Fishery commodities are important to Kora's daily diet. Protein supply per capita per day of Korea is 99.91 g and fishery products represented 19.439 (20%) for 2012. Compared to the meat which is 22.63g, the proportion of fishery products as protein supply food is significant in Korea. Table 27 shows the seafood consumption per capita has been gradually increasing.

Table 27: Annual seafood consumption per capita
Unit: kg
(Data sources: Korean Fisheries Yearbook, KFA, 2014)

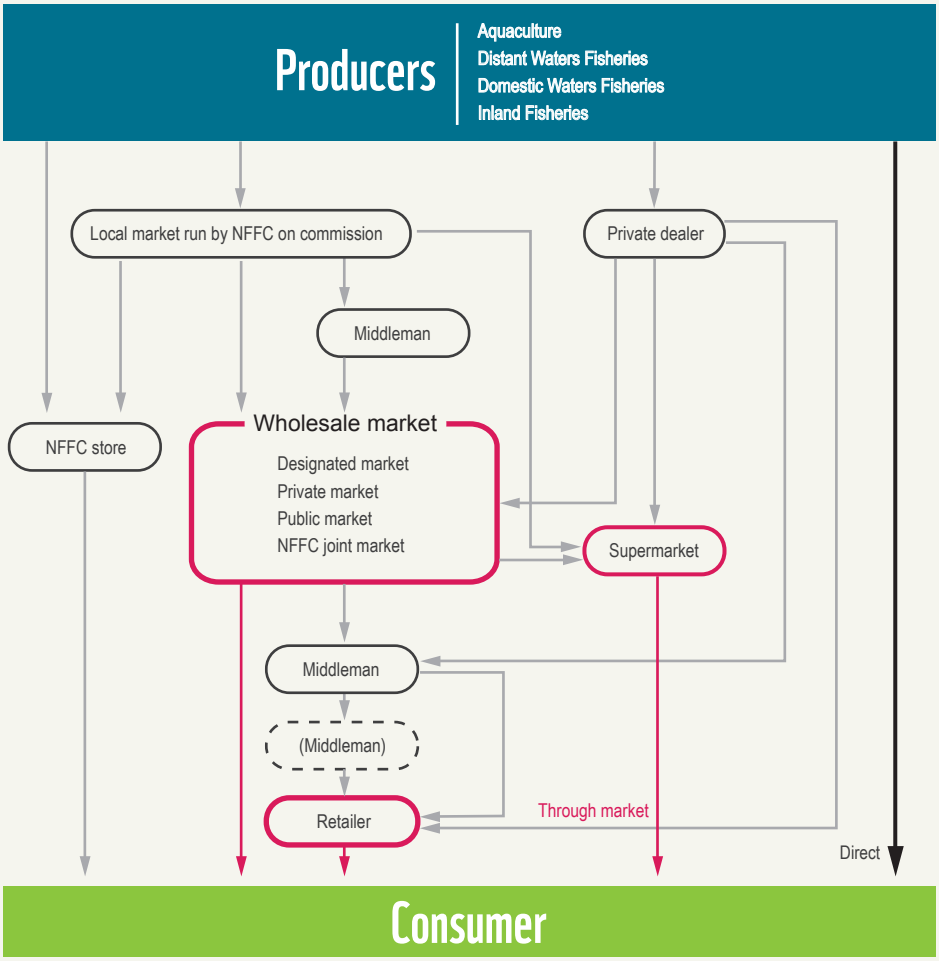
	2005	2006	2007	2008	2009	2010	2011	2012
Total	49.5	56.6	56.5	54.9	49.8	51.3	53.5	54.9
Fishes and others	39.9	43.5	42.1	39.1	35.4	36.6	37.8	37
Seaweeds	9.6	13	14.4	15.8	14.4	14.7	15.7	15.9

3.2 Seafood Products Distribution and Market

Distribution of fisheries products in Korea is very complicated and distribution channels are also various. In general, it is divided into two systems- institutional distribution and non-institutional distribution. Fish catches are sold from producers (fishermen) either through conventional channel (this channel is called institutional distribution) or to private channel (various from individual consumer to processing company, private dealer, and supermarkets, called non-institutional distribution). Regarding the institutional channel, there are local port markets on commission at producers' sites, joint markets run by NFFC as wholesale market, other wholesale markets at consumers' sites. The distribution channel and structure is different depending on the fisheries sector. The overview of the fisheries products distribution is described as follow, however the structure is more complicated in reality.

54. 이헌동 KMI '수산물 자급률 산정 및 개선과제' 2014.12 Lee Hundong, 'Calculation of the balance sheet of fishery products and its challenge' Dec 2014

Figure 28: Fishery products distribution



1. **Coastal and offshore fisheries' products** are mainly fresh and chilled fishes from the vessels, so the institutional channel is dominant. The fishermen sell their catches at port markets on commission by NFFC (first auction), then some of catches are sold through many steps including the wholesale markets (second auction) at consumers' sites before being purchased by individual consumers. As seen in the below, 84 % of coastal and offshore fishery products is traded through The NFFC port markets on commission. Non-institutional channel is expanding recently as big supermarkets like E-mart and Lotte Mart make deals directly with private wholesalers without passing through the wholesale markets.

2. **Mariculture products** are mainly traded in live form. Only about 35% of total products is through port markets at producers' site while 65% is traded via private wholesalers at producers' sites then non institutional channel. Due to big portion of private distribution, the transparency about the trade flow and trade volume/value is very low.

3. **Distant water fisheries products** are mainly traded in frozen form. These products 100% are almost going through private route. The distant water fishing companies trade the catches upon the prior contracts with distributors. Also all the information is not so transparent in terms of the criteria price and volume.

Status and problem

Both NFFC local port markets and joint markets are set up upon the 'Act on Distribution and Price Stabilization of Agricultural and Fisheries Products' to stabilize the food supply for the nation, therefore the system is under institutional governance. However the importance of this institutional distribution is decreasing more and more due to increasing non-institutional channel driven by big supermarkets.

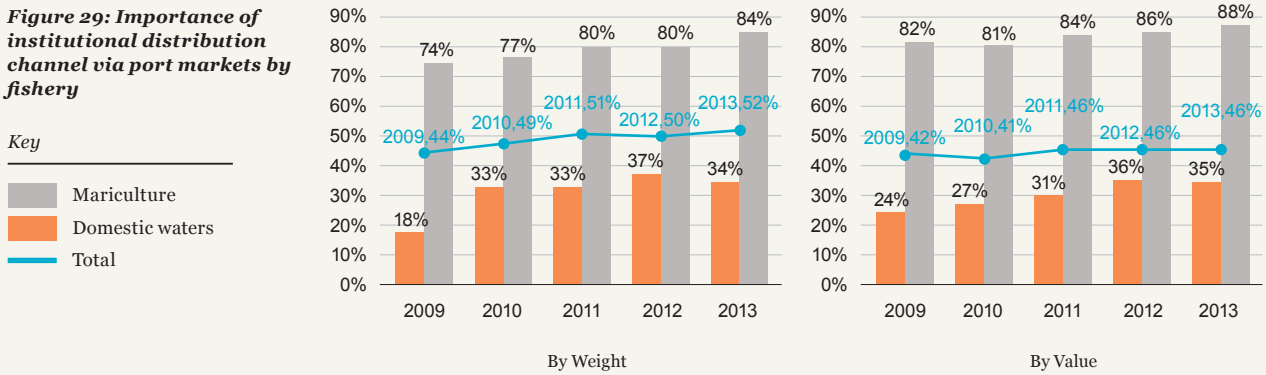
Even though the relative importance by fishery sector is different, around 50% of domestic consumption (coastal and offshore fisheries, mariculture) are through local port markets of institutional distribution as seen in the table 25.

Table 28: Importance of institutional distribution channel between 2009-2013
Unit: 1000ton/%
(Data sources: Edited with statistics from Oceans and Fisheries Yearbook 2014 of Ministry of Oceans and Fisheries and Fishery Production Survey by Statistics Korea)

		2009	2010	2011	2012
Domestic Consumption (A)		4,071	3,624	3,813	4,024
Transaction Weight	Local port markets (B)	1,325(33%)	1,287(36%)	1,489(39%)	1,470(37%)
	Joint markets (C)	412(10%)	418(12%)	444(12%)	451(11%)
	Subtotal (D)	1,737(43%)	1,705(47%)	1,933(51%)	1,921(48%)

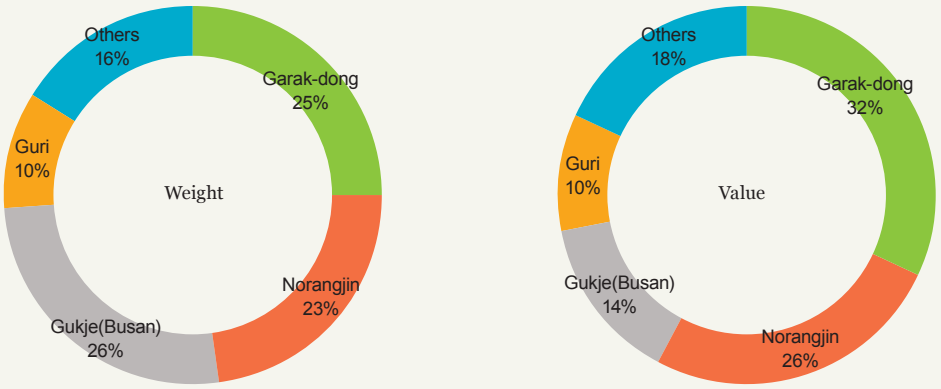
There are 180 local port markets in Korea as of December 2013. Gyeongnam has 47 markets as the largest number among the regions, 33 in Jeonnam, 23 in Gangwon, and 19 in Gyeongbuk[55]. Most recently, in 2013, 46.2% of total fisheries products in weight were distributed through the institutional channel. In detail, 87.9% of domestic waters fisheries (coastal and offshore fisheries) and 35% of maricultural products were traded through local port markets. As seen in the Figure 29, 65-66% of mariculture products trade flow is in black box.

Figure 29: Importance of institutional distribution channel via port markets by fishery



As of December 2014, there are 16 wholesale markets nationwide which are publicly or para-publicly managed[56]. Gukje wholesale market in Busan has the largest transaction by weight in 2013 and Garak-dong has slightly less transaction weight. However, Garak-dong market has the largest transaction value which is more than 30% of total transaction value in Wholesale Markets. Noryangjin Market, which is third largest by weight, is also twice as large as Gukje Market by value. Thus, it is likely that high-valued fisheries products are mainly traded in those two markets located in Seoul-Garak-dong and Naryangjin. Major species distributed through wholesale markets were squids, Pollack, anchovies, and mackerels in 2013[57].

Figure 30: Transaction in wholesale market in 2013
(Data sources: Statistical Yearbook of Agriculture and Fishery Wholesale Markets 2013 by Ministry of Agriculture, Food and Rural Affairs, November 2014)



As mentioned before, Korea's fisheries products distribution is very complicated. The traditional distribution of domestic waters fisheries products is going through almost six stages from the producers to the consumers. This complicated channel leads to increase of distribution cost. The distribution cost proportion (distribution cost/ ultimate price) is 55% compared to 42% of agricultural products[58]. Second major problem is that private distribution channel is not transparent either traceable for the government. With regards to the domestic waters fisheries, 16% at the producers' sites is traded through these private dealers and after 90% of products is through the non-institutional distribution in terms of wholesale markets. For mariculture products, it is much more serious given that 65% is traded via private dealers and after 95% is traded non-institutional channel. Distant waters fisheries products is also going through their private distribution channel and the government relies on the information shared by the companies. Traceability is the main challenge for the whole distribution in Korea.

3.3 International Distribution Channels related to Korea

According to FAO yearbook Fishery and Aquacultures Statistics 2012, Korea is the 21st largest exporter and 9th importer of fisheries products in value globally. The

55. National Federation of Fisheries Cooperatives (2014), Fisheries Joint Markets Yearbook 2013., pp. 4
56. According to the 'Food Balance Sheet' by KREI, Korea's seafood self-sufficiency was 126.8% in 1990 and 92.5% in 2000. ; 박원규 외, 기르는 어업 발전 기본계획 수립을 위한 연구 보고서, 2013년 12월. PARK Wonkyu et al. Report on the basic planning for the aquaculture, Dec 2013

57. Ibid., pp. 93-94.
58. 수산물 유통구조 개선 종합대책, 관계부처 합동, 2013. 7월. 'Comprehensive plan to improve the distribution of fishery products' Consortium of relevant ministries July 2013

59. Korean Fisheries Yearbook 2014 by KFA, December 2014

percentage of fisheries products represents only about 0.4% in the total national export value for 2013[59]. In overall the trade balance of Korea in the fisheries sector has been running deficit for the recent years, yet there are several major trading partners against which Korea is running trade surplus. Korea exports more to Japan, Thailand, and the USA more than it import from those countries. Its trade balance is negative with China, Vietnam, and Russia. In addition, China has been the largest trading partner of Korea since 2010. Japan has been the second largest although trading size is decreasing after the big earthquake in 2011.

Table 29: Trade balance of fishery products between Korea and major trade partners
Unit: 1 million US$
Note: EX=Export; IM=Import; TB=Trade balance=EX-IM
(Data sources: Korea Customs Service)

	2010			2011			2012			2013		
	EX	IM	TB	EX	IM	TB	EX	IM	TB	EX	IM	TB
Total	1,798	3,458	-1,660	2,308	4,192	-1,884	2,362	3,975	-1,613	2,152	3,895	-1,743
Japan	859	226	633	994	169	825	982	116	866	816	106	710
China	231	1,096	-865	465	1,250	-785	372	1,083	-711	370	1,026	-656
USA	142	126	16	181	155	26	191	177	14	217	221	-4
Thailand	127	101	26	173	135	38	261	144	117	207	119	88
Vietnam	32	376	-344	61	483	-422	54	507	-453	70	484	-414
Russia	6	495	-489	5	663	-658	8	654	-646	10	590	-580

Fisheries Products Exported from Korea

As seen in the table below, Japan, China and USA are the most important trading country for Korea's fisheries products export. In its relation, tuna is the most important item for export to Japan and for USA market, toothfish is important.

The tuna catch in round weight by Korea was 274,909 MT and longline tuna was about 36,000 MT.

Table 30: Korea's tuna catch by year
Unit: MT
(Data sources: KOFA yearbook 2014)

	2008	2009	2010	2011	2012	2013
Tunas/Skipjack/Marlin	286,889	327,181	319,712	251,093	305,335	274,909

Given that Japan imports most of longline tuna from Korea for Sashimi, most of long line tuna catch is exported to Japan when comparing the Table 27 and 28.

Table 31: Export details to Japan
Unit: MT, 1000US$
(Data sources : Customs Data)

	2012		2013	
	Weight	Value	Weight	Value
Total	145,548	981,683	144,914	815,506
Salt	33,609	1,683	35,293	1,806
Tunas	24,457	238,293	31,117	258,290
Other animal products	8,506	9,632	15,924	15,098
Japanese littleneck	11,271	35,968	7,987	24,822
Oysters	4,475	33,617	4,867	29,975
Crab flesh	4,607	49,383	4,858	45,781
Common conger	4,880	62,115	4,438	57,461

The distribution abroad of longline tuna for sashimi is as follows;

Catch → bleeding and Gill and Gut on board → Super frozen(-60℃) and kept in cold storage → deep-freezer cargo ships(under -60℃ storage) → Gamcheon port in Busan for processing → Export

- Or deep frozen tuna is directly transshipped to Shimizu port of Japan (landing port) → Customs → Wholesale market, processing facilities in Japan

Regarding the export to USA, 1,376 MT of toothfish was exported in 2013 and the top ranking item, Laver for the USA reflects a recent trend of laver consumption increase in the USA[60].

Table 32: Export details to USA
Unit: M/T, 1000US$

	2012		2013	
	Weight	Value	Weight	Value
Total	29,556	191,004	29,372	217,490
Laver	4,502	51,259	5,134	67,285
Tooth fish	1,369	26,195	1,376	25,720
Other finfish	1,605	20,298	1,585	17,083
Oysters	959	5,648	2,536	15,255
Squids	9,459	20,132	5,298	13,374
Halibut	397	7,682	455	9,870
Tunas	783	8,257	910	9,810

Table 33: Export details to Thailand
Unit: M/T, 1000US$

	2012		2013	
	Weight	Value	Weight	Value
Total	125,135	260,783	98,716	206,890
Tunas	106,958	201,942	82,739	147,529
Power from other marine animals	6,768	5,651	3,052	2,470
Chub mackerels	2,646	1,914	3,015	2,200
Cods	1,555	5,296	2,759	7,885
Laver	2,237	33,578	2,464	36,629
Squids	1,116	1,907	1,990	2,367
Trevally	993	1,079	835	758

Seafood Products Imported to Korea

China, Russia, and Vietnam are major importing countries for Korea. Imported fisheries products from China and Vietnam include domestically popular seafood and industrial material as well. The major species imported from China to Korea is Sand lance; long arm octopus, croakers, and black mouth goosefish. These fishes are also commonly consumed by Koreans. Pollack is the main imported fisheries commodity from Russia[61].

60. Korea Agro-Fisheries & Food Trade Cooperation (February 13, 2014), WEBZINE Korea Agricultural Trade Information Newsletter., "미국, 국산 김 최대 수출대상국 부상"

61. Statistics Report of Food, Agriculture, Forestry and Fisheries Trade 2013 of Korea Agro-Fisheries & Food Trade Cooperation, pp 281

Table 34: Import details from China
Unit: M/T, 1000US$

	2012		2013	
	Weight	Value	Weight	Value
Total	819,516	1,082,620	907,991	1,026,162
Salt	428,943	33,529	541,481	40,094
Sand lance	41,542	19,070	49,149	21,427
Japanese littleneck	44,007	41,438	38,716	40,077
Other finfishes	28,916	59,304	35,538	69,464
Long arm octopus	36,313	149,328	33,448	153,640
Croaker	27,925	126,703	24,798	104,818
Black mouth goosefish	18,739	48,220	20,333	44,963
Shrimps	21,774	56,492	13,634	51,144
Swimming crab	10,256	34,198	11,626	30,708
Venus clams	9,684	8,714	10,652	9,218

Table 35: Import details from Russia
Unit: M/T, 1000US$

	2012		2013	
	Weight	Value	Weight	Value
Total	308,211	654,125	289,046	590,087
Pollack	229,168	298,844	208,602	290,076
Cods	15,810	39,221	18,845	38,049
Pacific herring	6,156	5,448	17,397	12,211
Fish eggs	15,948	106,890	13,244	78,636
Halibut	11,893	32,058	10,965	36,492
Arabesque greenling	13,690	31,585	6,993	22,012
Chum salmon	674	1,367	721	1,488
Other crustaceans	2,247	22,088	1,768	18,486
Snow crab	4,016	55,973	3,719	59,179
Other finfish	879	2,438	1,590	1,632

Table 36: Import details from Vietnam
Unit: M/T, 1000US$

	2012		2013	
	Weight	Value	Weight	Value
Total	146,219	506,886	122,894	484,108
Other finfish	67,900	116,660	58,647	101,742
Webfoot octopus	18,032	68,564	15,993	65,601
Shrimps	9,599	82,445	10,473	89,865
Shrimp flesh	9,378	82,741	9,908	91,840
File fish	6,011	42,195	5,186	37,535
Salt	7,811	922	3,886	496
Finfish powder & fillet	4,208	18,668	3,844	15,358
Power from other marine animals	1,623	1,782	3,180	4,696
Long arm octopus	3,707	16,443	3,015	13,778
Squids	1,939	38,860	1,690	36,347

According to the Ministry of Oceans and Fisheries, most of imported fishery products in frozen form are coming through Busan port (70%). In most cases, the first wholesaler imports frozen fisheries products via the import dealer who receives 3 to 5 % of commission. Specifically, frozen croakers from China are mostly caught in Fujian and processed in Shandong, then shipped to Korea though Busan although few of them are shipped to Incheon[62]. Black mouth goosefishes, both caught and processed to be frozen in Shandong, also imported via Busan port. In case of live or fresh fishes, the fish carriers come to Incheon, Tongyeong and Yeosu port from the neiboring countries like China and Vietnam. The import of long arm octopus differs according to their processing. It is widely caught throughout the east coastal area of China, especially from Shandong and Jiangsu. In the case of frozen long arm octopus, they are processed at the production site and shipped to Busan. Yet, live fishes are imported to Korea via Incheon Harbor since it is closest from the east coastal area so that live octopuses can maintain freshness. Vietnamese long arm octopus are also known to follow the same route as Chinese long arm octopuses after they are moved into Ho Chi Minh City to be imported to Korea.

The distributional channel(s) in Korea for imported fisheries products are not going through institutional distribution channels. Most of them do not pass through port markets or joint markets of NFFC. Typically traders import products and then sell them to wholesale markets, mainly to non-institutional wholesale markets. It has been studied that only 10% of all imported fishery products are distributed through Wholesale Markets[63]. As of February 2015, there are 209 fishery-trading companies registered in Korea Fishery Trade Association[64].

BOX 1 POLLACK DISTRIBUTION - INTERVIEW WITH A KOREAN SEAFOOD TRADING COMPANY

Regarding the pollack and crab imports from Russia, trading companies play a major role. Pacific Andes (headquarted in Hongkong and listed in Singapore) is the global number one in terms of pollack fisheries and trade globally. According to an interview with Korean seafood trading company, the trading company purchases the pollack from their usual partners-fishing companies when the catch is transferred to carrier. With ordering, the carrier transports directly the frozen pollack to China for processing like filet. After this processing, processed pollack is exported to USA, Europe and Brazil mainly and the remainder is distributed in Russia. Depending on the schedule of carrier, the carrier comes to Busan port, but not often recently. Nowadays most catch is going directly to China. But in case of cod, halibut, crab which are expensive items,
the carrier come to Busan for checking then the products are exported to Japan, China or Europe.

Apart from this international distribution, Pollack for domestic market comes to Busan in whole round form as Koreans use the whole body of Pollack for food. For dried Pollack, some of catch are processed in Yanbian of China for drying. IUU catch is not allowed to land in Busan port anymore and most of IUU catch goes to China. Most of IUU crab from Russia also go to China and Japan due to Russia-Korea bilateral agreement. There are concerns raised due to the recent change: China tends to trade directly the raw material from Russia, so the trade volume for the company is decreasing.

62. 2013 수입수산물 가격조사·분석사업 최종보고서., pp. 28-46, 'Final report on the imported seafood', Fishery Policy Insititute, 2013

63. Korea Maritime Institute (2010), 수산물 유통 효율화를 위한 비용절감 방안 연구 최종보고서., pp. 15

64. List of Members of Korea Fishery Trade Association

3.4 Seafood Traceability

Korea's Ministry of Oceans and Fisheries started a seafood traceability system in 2003 for seafood produced from domestic according to the Act on Quality Control of Agricultural and Fishery Products. The system is operated targeting 24 seafood (chub mackerel, croaker, halibut, oyster, crab, anchovies, etc). The system is called 'traceability system' but provides just basic information on the producer name including processing and distribution, origin, year and product type. Actually this system was introduced to give credibility to domestic seafood as Koreans prefer domestic seafood to imported seafood. Thus, it is different from the traceability which ensures the whole supply chain from catching to consumption for sustainable fisheries. For imported seafood, Korea's Customs manages the trace of 15 imported seafood (frozen croaker, puffer, frozen chub mackerel, pollack, etc).

Absence of authentic traceability for sustainable fishery

As explained in Chapter 3.2, 16% of domestic waters fisheries is traded through non institutional channel and 65% of mariculture products are traded in unknown channel. Even through institutional channel, the fisheries management to deter IUU fishing is not secured in Korea's domestic waters fisheries. In this context, there are no Marine Stewardship Council (MSC) certified fisheries and Chain of Custody (CoC) in Korea's coastal and offshore fisheries.

According to the data received from Control Union, third party certifier in Korea, MSC-certified products include 25 items from 20 distribution companies. But most of the MSC-certified products are CoC certification for exports to USA and Europe. Very few of MSC-certified products for domestic market exist. Canned tuna from a green consumer cooperative, and some imported seafood consumed in big hotel chains like the Hyatt Hotels.

CHAPTER FOUR

CONCLUSION

As explained above, Korea is one of the most important countries in the world in terms of fisheries production, but also in terms of consumption. With respect to fisheries production, Korea is among the top 10 producing nations with more than 3 million tons/year on average. Korea is also a major seafood importer (in value), after the USA, China, Japan and European Union (FAO, 2012). Korea is one of the top ten tuna fishing nations with 250,000 to 300,000 MT every year.

Despite this quantitative importance, fisheries management and policies in Korea have several issues that must be improved. As observed by Korea's IUU fishing nation designation scandal during the last two years, overfishing and IUU fishing remain a main challenge to be addressed in domestic waters fisheries (coastal and offshore fisheries) and distant water fisheries. For domestic waters fisheries, most fisheries (different fishing methods) are overlapping in terms of fishing ground and target species, which leads to overfishing and IUU fishing sometimes because of severe competition.

Prohibiting and eliminating IUU fishing of domestic waters fisheries is urgent as addressed in distant waters fisheries policy reform. Current generalized overfishing and IUU fishing in domestic waters fisheries make all efforts such as TAC ineffective and does not address the sustainability of fisheries and fish stock recovery including protection of the marine environment. Thus, Korean government and fisheries stakeholders should strengthen the MCS (Monitoring, Controlling, Surveillance) for not only distant waters fisheries but also coastal and offshore fisheries. Implementing the precautionary principle and ecosystem based management with current legislations are needed. The key recommendations are as follows:

- Effective implementation of MCS (Monitoring, Controlling, Surveillance) in all fisheries to eliminate unsustainable fishing practices: 100% of VMS for at least big corporate fisheries in domestic waters fisheries like distant waters fisheries, Introduction of observers on board of vessels, strengthened regulations on IUU fishing and non-compliance of technical measures of legislations.
- Precautionary and ecosystem based fishing limits using maximum sustainable yield (MSY) as a minimum reference point and ensuring the recovery of fish stocks;
- Incentives to encourage the fishermen and fishing industry to conduct environmentally sustainable fishing;
- Investment in fundamental research on 11 TAC species for stock recovery;
- Reduction of over-capacity in line with sustainable fishing opportunities and taking into account the following social and environmental criteria; and
- Incentives for community based management of fisheries and self-motivated actions of industry for sustainable fisheries practice (eg, allocation of quota etc).

Another important challenge is lack of traceability of Korea's fisheries products market and international trade. Given that 16% of domestic waters fisheries products, 35% of mariculture products, and 90% of distant waters fisheries products are distributed via non-institutional channel, the Korean government is not equipped

yet with effective traceability system for fishery products. There is no MSC-certified fisheries in Korea, and in addition, the MSC-certified products represent only 25 items from only 20 distribution companies who are aiming at exporting to EU and USA market. As presented in this report, most of Korea's domestic waters fisheries are small-scale and family run fisheries, for which the MSC or ASC are not easily applicable sometimes. It is realistic to apply traceability system to quite big offshore fisheries and distant water fishing industry first. This needs to collect basic information on the all phases of fishing operations for offshore fisheries, which means the described MCS and fisheries management system should be introduced effectively first.

WWF-Korea suggests that these two main challenges be addressed, and that Korea implement a policy to manage the whole fisheries based on sustainability and ecosystem based management and control the whole seafood chain of custody from the production to the consumption and ensure traceability.

It is noticeable that Korea's tuna fishing capacity has been increasing in recent years for both long line and purse seine fisheries. This is related to investment for building or buying new vessels by the distant water fishing companies. In this context, it is important that the tuna fishing industry improves its transparency and traceability. FIP (Fisheries Improvement Projects) or MSC would be a starting point to encourage them to adopt sustainable fishing practices and offer greater transparency in their overseas operations.

APPENDIX: DATA TABLES

Data in details and more Tables on Korean fisheries.

Korea's total fishing fleet number is 71,287 in 2013. All the vessels should be registered to operate fishing and all kinds of vessels related to fishing operation such as carrier and research vessel are included in this data according to the Ministry of Oceans and Fisheries.

Table 1: Fishing fleet capacity - 2013
Note: Data on vessel length not available. (Data sources: Registered Fishing Vessels Statistics, Statistics Korea)

Fishery type	Gear type	Power	Number of Vessel	Gross Tonnage	Horsepower
Distant Waters Fishery		Sub total	315	178,580	545,165
		Powered Vessel	315	178,580	545,165
	Long Line	Sub total	151	62,525	175,164
		Powered Vessel	151	62,525	175,164
	Trawl	Sub total	85	61,367	187,306
		Powered Vessel	85	61,367	187,306
	Purse Seine	Sub total	29	31,912	111,965
		Powered Vessel	29	31,912	111,965
	Drift Gill Net	Sub total	0	0	0
		Powered Vessel	0	0	0
	Stick-Held Lifting Net	Sub total	2	925	3,050
		Powered Vessel	2	925	3,050
	Angling	Sub total	40	18,987	58,600
		Powered Vessel	40	18,987	58,600
	Trap	Sub total	1	60	480
		Powered Vessel	1	60	480
	Others	Sub total	7	2,800	8,600
		Powered Vessel	7	2,800	8,600
Offshore Fishery		Sub total	2,780	126,340	1,777,286
		Powered Vessel	2,780	126,340	1,777,286
	Large Danish Seine	Sub total	47	3,179	29,473
		Powered Vessel	47	3,179	29,473
	Large Pair Bottom Trawl	Sub total	72	8,464	88,657
		Powered Vessel	72	8,464	88,657
	East Sea Danish Seine	Sub total	38	2,208	16,588
		Powered Vessel	38	2,208	16,588
	Medium Danish Seine	Sub total	39	1,847	17,704
		Powered Vessel	39	1,847	17,704
	Medium Pair Bottom Trawl	Sub total	18	1,022	6,626
		Powered Vessel	18	1,022	6,626
	Large Otter Trawl	Sub total	52	7,215	76,275
		Powered Vessel	52	7,215	76,275

Fishery type	Gear type	Power	Number of Vessel	Gross Tonnage	Horsepower
Offshore Fishery (continued)	East Sea Trawl	Sub total	38	2,039	44,400
		Powered Vessel	38	2,039	44,400
	Large Purse Seine	Sub total	143	22,834	198,771
		Powered Vessel	143	22,834	198,771
	Small Purse Seine	Sub total	72	1001	36,361
		Powered Vessel	72	1001	36,361
	Angling	Sub total	480	17,728	274,364
		Powered Vessel	480	17,728	274,364
	Anchovy Trawl	Sub total	383	17,315	193,064
		Powered Vessel	383	17,315	193,064
	Drift Gill Net	Sub total	377	10,027	209,898
		Powered Vessel	377	10,027	209,898
	Stow Net	Sub total	208	10,951	141,127
		Powered Vessel	208	10,951	141,127
	Stick-Held Lifting Net	Sub total	3	28	1,415
		Powered Vessel	3	28	1,415
	Diver fishery	Sub total	235	1,171	102,719
		Powered Vessel	235	1,171	102,719
	Trap	Sub total	200	10,655	133,071
		Powered Vessel	200	10,655	133,071
	Shellfish Beam Trawl	Sub total	74	804	34,685
		Powered Vessel	74	804	34,685
	Long Line	Sub total	301	7,847	172,088
		Powered Vessel	301	7,847	172,088
Coastal Fishery		Sub total	44,713	116,603	8,522,477
		Powered Vessel	43,926	115,800	8,522,477
		Non-Power Vessel	787	802	-
	Drift Gill Net	Sub total	13,401	33,334	2,921,037
		Powered Vessel	13,316	33,280	2,921,037
		Non-Power Vessel	85	53	-
	Stow Net	Sub total	487	3,415	206,328
		Powered Vessel	486	3,414	206,328
		Non-Power Vessel	1	0.8	-
	Shellfish Beam Trawl	Sub total	0	0	0
		Powered Vessel	0	0	0
		Non-Power Vessel	0	0	-

Fishery type	Gear type	Power	Number of Vessel	Gross Tonnage	Horsepower
Coastal Fishery (continued)	Purse Seine	Sub total	265	1,644	87,193
		Powered Vessel	257	1,640	87,193
		Non-Power Vessel	8	3.8	-
	Long Line	Sub total	0	0	0
		Powered Vessel	0	0	0
		Non-Power Vessel	0	0	-
	Angling	Sub total	0	0	0
		Powered Vessel	0	0	0
		Non-Power Vessel	0	0	-
	Trap	Sub total	5,409	14,963	1,076,380
		Powered Vessel	5,395	14,950	1,076,380
		Non-Power Vessel	14	12.3	-
	Lift Net	Sub total	133	595	34,002
		Powered Vessel	133	595	34,002
		Non-Power Vessel	0	0	-
	Shrimp Beam Trawl	Sub total	172	1,095	60,675
		Powered Vessel	172	1,095	60,675
		Non-Power Vessel	0	0	-
	Small Anchovy Trawl	Sub total	4	26	1,138
		Powered Vessel	4	26	1,138
		Non-Power Vessel	0	0	-
	Combo Fishery	Sub total	22,173	55,403	3,802,505
		Powered Vessel	21,998	55,276	3,802,505
		Non-Power Vessel	175	126.9	-
	Sectional Fishery (Setting)	Sub total	1,547	3,320	223,559
		Powered Vessel	1,515	3,259	223,559
		Non-Power Vessel	32	60.8	-
	Sectional Fishery (Non-Setting)	Sub total	774	1,156.9	49,891
		Powered Vessel	353	692.4	49,891
		Non-Power Vessel	421	464.5	-
	Set Net	Sub total	348	1,647	59,769
		Powered Vessel	297	1,567	59,769
		Non-Power Vessel	51	80	-
	Others	Sub total	0	0	0
		Powered Vessel	0	0	0
		Non-Power Vessel	0	0	-

Fishery type	Gear type	Power	Number of Vessel	Gross Tonnage	Horsepower
Mariculture		Sub total	16,772	38,586.5	2,256,994
		Powered Vessel	16,458	38,231	2,256,994
		Non-Power Vessel	314	355	-
Inland Waters Fishery		Sub total	2,908	1,765.6	172,124
		Powered Vessel	2,593	1,675	172,124
		Non-Power Vessel	315	90	-
Others		Sub total	3,799	145,347	911,268
		Powered Vessel	3,251	144,674	911,268
		Non-Power Vessel	548	672.9	-
	Fish Carrier	Sub total	189	21,295.7	104,199
		Powered Vessel	189	21,295.7	104,199
	Patrol Vessel	Sub total	132	23,027.8	129,961
		Powered Vessel	132	23,027.8	129,961
	Research & Education Vessel	Sub total	43	10,135.5	42,073
		Powered Vessel	42	10,134.9	42,073
		Non-Power Vessel	1	0.5	-
	Others	Sub total	3,435	90,888	635,035
		Powered Vessel	2,999	90,215.8	635,035
		Non-Power Vessel	547	672.3	-
Total		Sub total	71,287	607,224.5	14,185,314
		Powered Vessel	69,323	605,303	14,185,314
		Non-Power Vessel	1,964	1921.3	-

Table 2: Mariculture production by province in Korea
Unit: MT

	Total	Jeonnam	Gyeongnam	Busan	Chungnam	Jeonbuk	Others
2010	1,355,000	834,952	333,365	57,208	35,799	42,648	51,028
2011	1,477,546	938,365	361,182	63,344	32,000	35,117	47,538
2012	1,488,950	973,757	362,773	42,548	38,416	23,978	47,478
2013	1,515,210	1,057,927	281,825	42,997	47,549	30,734	54,178

Table 3: Number of National Fishing Ports by the Region and by the Management Office
(Data sources: Shipping Statistics Korea 2013 by Korea Maritime Institute, December 2013)

Region	Total	Land	Island
Total	109	71	38
Busan	3	2	1
Incheon	5	0	5
Ulsan	2	2	0
Gyeonggi	1	1	0
Gangwon	14	14	0
Chungnam	8	7	1
Jeonbuk	6	2	4
Jeonnam	31	13	18
Gyeongbuk	14	11	3
Gyeongnam	19	14	5
Jeju	6	5	1

Management Office	Total	Land	Island
Total	109	71	38
Busan	31	22	0
Gangneung	21	21	0
Mokpo	31	13	18
Incheon	20	10	10
Jeju	6	5	1

Table 4: Top 5 Annual Fishery Products Exports and Imports by Species
Unit: Weight(MT), Value(Thousand US$) (Data sources: Oceans and Fisheries Yearbook 2014 by Ministry of Oceans and Fisheries, November 2014; Korean Fisheries Yearbook 2014 by Korea Fisheries Association, December 2014)

Exports								
	2010		2011		2012		2013	
	Weight	Value	Weight	Value	Weight	Value	Weight	Value
Total	793,045	1,798,162	686,930	2,308,155	708,638	2,362,050	687,569	2,151,951
Tunas	333,924	374,354	144,253	393,668	185,588	603,419	161,807	556,512
Laver	9,560	105,197	11,964	161,495	15,136	231,039	15,914	251,727
Squid	60,406	114,762	65,332	181,034	56,724	119,636	73,367	139,310
Halibut	8,216	78,845	9,483	79,372	8,486	69,023	10,740	79,483
Oysters	9,544	66,057	10,909	81,689	7,347	55,843	9,859	70,163
Imports								
	2010		2011		2012		2013	
	Weight	Value	Weight	Value	Weight	Value	Weight	Value
Total	4,715,726	3,458,400	4,845,662	4,191,944	4,829,157	3,974,627	5,387,008	3,894,740
Pollack	267,355	416,233	260,685	397,926	251,990	367,879	233,534	358,983
Shrimp	49,499	217,184	57,548	271,530	52,127	278,917	41,224	281,719
Salt	3,471,819	224,727	3,482,412	220,889	3,533,199	193,312	4,714,490	209,312
Long arm octopus	44,853	154,129	42,237	194,527	42,206	174,911	38,535	176,033
Shrimp flesh	17,435	106,037	19,918	141,224	21,046	152,879	19,608	155,898

Table 5: Distribution Weight & Value through Joint Markets according to the Fishery Type, 2009-2013
Note: 'Institutional' designates Joint Markets; 'Non-institutional' for channels other than Joint Markets. (Edited with statistics from Fishery Production Survey (Available from KOSIS))

Weight (M/T)						
Fishery Type	Channel Type	2009	2010	2011	2012	2013
Total	Subtotal	3,182,342	3,110,634	3,255,929	3,183,424	3,135,250
	Institutional	1,324,673	1,287,045	1,488,833	1,470,174	1,448,692
	Non-Institutional	1,857,669	1,823,589	1,767,096	1,713,250	1,686,558
Domestic Water	Subtotal	1,226,966	1,132,536	1,235,489	1,091,034	1,044,697
	Institutional	1,005,376	919,537	1,035,933	935,002	918,788
	Non-Institutional	221,590	212,999	199,556	156,032	125,909
Mariculture	Subtotal	1,313,355	1,355,000	1,477,546	1,488,950	1,515,210
	Institutional	319,297	367,508	452,900	535,172	529,904
	Non-Institutional	994,058	987,492	1,024,646	953,778	985,306
Deep Waters	Subtotal	611,950	592,116	510,624	575,308	549,928
	Non-Institutional	611,950	592,116	510,624	575,308	549,928
Inland Fishery	Subtotal	30,071	30,982	32,270	28,131	25,414
	Non-Institutional	30,071	30,982	32,270	28,131	25,414
Value (1mKRW)						
Fishery Type	Channel Type	2009	2010	2011	2012	2013
Total	Subtotal	6,924,249	7,425,686	8,072,860	7,689,051	7,226,887
	Institutional	3,049,032	3,609,330	4,134,064	3,837,150	3,729,993
	Non-Institutional	3,875,217	3,816,356	3,938,796	3,851,901	3,496,894
Domestic Waters	Subtotal	3,640,437	3,911,681	4,444,106	3,951,034	3,747,607
	Institutional	2,708,568	3,016,166	3,545,493	3,177,686	3,135,637
	Non-Institutional	931,869	895,515	898,613	773,349	611,970
Mariculture	Subtotal	1,846,311	1,815,646	1,784,244	1,759,271	1,725,808
	Institutional	340,464	593,164	588,572	659,464	594,356
	Non-Institutional	1,505,847	1,222,482	1,195,673	1,099,806	1,131,452
Deep Waters	Subtotal	1,163,751	1,364,524	1,467,044	1,655,406	1,408,034
	Non-Institutional	1,163,751	1,364,524	1,467,044	1,655,406	1,408,034
Inland Fishery	Subtotal	273,750	333,834	377,466	323,340	345,437
	Non-Institutional	273,750	333,834	377,466	323,340	345,437

Table 6: Annual Transaction Weight and Value in Major Fisheries Wholesale Markets, 2013
Unit: Weight(M/T), Value(1mKRW)

	Total	Garak-dong	Noryangjin	Gukje(Busan)	Guri	Others
Weight	392,617	100,038	89,121	101,559	40,902	60,997
Value	1,326,134	426,087	344,618	184,129	128,130	243,170

WWF in numbers

100% RECYCLED

1961/2014

WWF was founded in 1961 and WWF-Korea was founded in 2014

+100

WWF is in over 100 countries, on 6 continents

+5M

WWF has over 5 million supporters

+5000

WWF has over 5,000 staff worldwide

As one of the world's largest banking and financial services organisations, HSBC serves around 48 million customers through four global businesses: Retail Banking and Wealth Management, Commercial Banking, Global Banking and Markets, and Global Private Banking. HSBC supports WWF-Korea's conservation efforts to bring the future where humans live harmony with nature.

WWF
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Why we are here
To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

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