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Cover photograph:

Exemplary self-regulatory fishery fraternity, just before the beach cleaning in Yuho-ri. The Yuho-ri is a fishing village in Jangmok-myeon Geoje-si Gyeongsangnam-do in the Republic of Korea.

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Preparation of this document

These proceedings contain the submitted manuscripts from the Workshop on the Governance of Tenure in Fisheries and Aquaculture in the Republic of Korea, held in Seoul, the Republic of Korea, from 21 to 23 June 2011. All papers have been reproduced as submitted, with some post-translation corrections to spelling and grammar. The opening address and welcome address are also reproduced as submitted.

The Ministry of Food, Agriculture, Forestry and Fisheries of the Republic of Korea organized the workshop in collaboration with the FAO Fisheries and Aquaculture Department.

The objectives of the workshop were to: (i) upgrade fisheries governance in the Republic of Korea by reviewing the current status of the governance of tenurial arrangements in fisheries and aquaculture as well as enhance stakeholders' participation in the decision-making processes; and (ii) identify the best practices and create the implementation guidelines for the current governance of tenure in fisheries and aquacultures in the Republic of Korea, and present the highlighted results of the case study to a workshop in Rome, Italy (4–8 July 2011).

Abstract

These proceedings contain the submitted papers from the Workshop on the Governance of Tenure in Fisheries and Aquaculture in the Republic of Korea, held in Seoul, the Republic of Korea, from 21 to 23 June 2011. The papers cover the following topics:

- improving onshore fisheries governance in the Republic of Korea;
- research on a model case of governance of a coastal fishery;
- case study on the process of conflict settlement in coastal fisheries;
- current status and direction for improvement of inland fisheries governance in the Republic of Korea;
- research on a model case of governance in inland fisheries;
- institutional nature and the efficiency of offshore fisheries governance in the Republic of Korea;
- a study on the best practice of offshore fisheries governance;
- case study on disputes and conflicts settlement in the offshore fisheries;
- the effectiveness of the deep-sea fisheries governance in the Republic of Korea;
- model case for deep-sea fisheries governance;
- current status of and improvement plans for aquaculture governance in the Republic of Korea;
- a case of fisheries governance in aquaculture;
- a case study on the process of conflict resolution in aquaculture.

The workshop reviewed the status of the governance of tenure in fisheries and aquaculture in the Republic of Korea, suggested best practices in the governance of tenure, and provided information about conflict-solving processes.

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The Organizing Committee consisted of the following FAO personnel: Rebecca Metzner, fisheries planning analyst; Kwangsuk Oh, fishery officer; and Myeong Jin Jang, intern.

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Executive summary

The Governance of Tenure for Responsible Fisheries is an initiative of the FAO Fisheries and Aquaculture Department intended to contribute to the larger effort of the FAO's Natural Resources Management and Environment Department to develop the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security.

Tenure¹ in fisheries refers to the manner in which the relationship between people in the course of the utilization of the fishery resources is defined and negotiated. It is about the rights and the responsibilities that resource users take upon themselves in defining what resource, and where, when, how and by whom that resource will be appropriated for the use of society. Secure tenure is hence an important component of the larger pursuit of aquarian reforms. Governance of tenure² is then about the manner in which tenure is administered and conflicts resolved. It is about the incentives and enforcement mechanisms that may be put in place to ensure that the expected results from tenurial arrangements can be achieved effectively. Having good governance in place helps to protect and enable tenurial arrangements. Good governance also helps to prevent blatant malpractices commonly associated with administration of tenure.

The FAO Fisheries and Aquaculture Department has also been in the forefront of developing normative codes (e.g. the Code of Conduct for Responsible Fisheries in 1995) and technical guidance on issues pertaining to access and use rights in fisheries (e.g. The FishRights99 Conference, Use of Property Rights in Fisheries Management; Norway-FAO Expert Consultation on the Management of Shared Fish Stocks, 2002; and "Sharing the Fish'06: allocation issues in fisheries management" conference) that are akin to issues of tenure in relation to land. More recently, in the context of special attention on small-scale fisheries, the world has also focused more attention on issues of rights of access and the use of fisheries resources in the context of poverty alleviation, environmental protection and human rights. Between 2008 and 2010, many conferences and regional consultations organized by the FAO Fisheries and Aquaculture Department re-emphasized the need to prioritize the issue of fishing rights in order to achieve responsible fisheries.

The FAO Fisheries and Aquaculture Department hosted a multistakeholder workshop in Rome on 4–8 July 2011 to develop the basis of implementation guidelines that will be of practical use to States, fishers and other stakeholders in the fisheries sector for putting in place mechanisms and processes that can help to improve governance of tenure in fisheries.

¹ Tenure is an institution, i.e. rules invented by societies to regulate behaviour. The rules of tenure define how rights to land and other natural resources are assigned within societies. They define how access is granted to rights to use, control and transfer these resources, as well as associated responsibilities and restraints. In simple terms, tenure systems determine who can use what resources, for how long, and under what conditions.

² Governance of tenure comprises the mechanisms and processes according to which citizens and groups can articulate their interests, mediate their differences and exercise their legal rights and obligations in respect to land and other natural resources. Governance concerns the rules, processes and structures through which decisions are made about access to land/natural resources and their use, the manner in which the decisions are implemented and enforced, and the way that competing interests are managed.

In the case of coastal fisheries in the Republic of Korea, under traditional community-based systems (so-called village fisheries), marine resource exploitation has been governed by use rights to property. This has been supported by customary law and practice relating to the resource or benefits that derive from it. These rights have also been protected by laws defining the uses legitimately viewed as exclusive, as well as by the penalties for violating those rights. Each fishing village has a fishing fraternity protected by a law (there are 1 952 fishing fraternities), and there are 94 fisheries cooperatives governing coastal fisheries across the country. Coastal fishers can have up to three fishing licences from their local government to guarantee fishers' stable incomes so that the fishers can use three different types of fishing gear to catch fish. Since 1998, the Republic of Korea has introduced a community-based co-management system in coastal fisheries, while 45 percent of fishing villages have been participating in managing fisheries resources on their fishing grounds in a sustainable way. Recently, the government realized that strong leadership is a key tool in successful community-based co-management in coastal fisheries. In the early 2000s, a buyback programme demonstrated how such programmes will do little to manage fishing capacity if, as was the case in the Republic of Korea, the government allows fishers who participate in them to re-enter the fisheries.

In the offshore fisheries, the government set up a voluntary fishing-vessel buyback programme. However, the programme has not shown much effectiveness in managing fishing capacity as most offshore fishers were willing to join the programme as the profit was greater than the payment for scrapping their vessels. Most fishing rights are held by 20 fisheries cooperatives governing offshore fisheries across the country. In terms of responsible fisheries, offshore fisheries policy has focused on production by supporting bottom trawling fisheries, although the government ended fisheries by coastal bottom trawlers in 2004.

With respect to inland fisheries in the Republic of Korea, fishers work predominantly part-time in the fisheries sector, combining fishing and farming. Inland fishing rights are recognized as customary rights and registered to local governments. The Inland Fishery Act was enacted in 1980s to manage and conserve inland fisheries and aquaculture. However, the fisheries authorities have mainly focused on coastal and ocean fisheries, resulting in a governance vacuum for inland fisheries and freshwater aquaculture³. A lack of governance in inland fisheries demands a much more sophisticated governance system for responsible fisheries.

Regarding aquaculture, the Ministry for Food, Agriculture, Forestry and Fisheries launched offshore aquaculture to address pollution in coastal areas, significant red tide, and climate change effects. It revised relevant rules and regulations in 2010, and planned to increase the number of offshore aquaculture farms from 6 to 15 by 2012. More recently, the government has been trying to downsize aquaculture sites in line with coastal environmental capacity. Most aquaculture licences are regarded as a property right. There have been customary rights in aquaculture. The government has not yet revisited the effectiveness of its aquaculture policy in terms of environmental sustainability.

The Seoul workshop provided a constructive space for sharing ideas about the need for good governance as a prerequisite for sustaining appropriate tenure arrangements and promoting responsible fisheries and aquaculture.

³ There are only two persons in charge of inland fisheries at the Ministry for Food, Agriculture, Forestry and Fisheries.

PAPERS PRESENTED AT THE WORKSHOP

Bettering onshore fisheries governance in the Republic of Korea

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1. INTRODUCTION

Onshore waters and marine resources of the Korean Peninsula have been the foundation for the creation and development of Korean onshore fisheries and onshore communities for thousands of years, playing an important economic, social and political role. From the Three Kingdoms Period until the days prior to the Japanese colonization of Korea, fisheries, along with farming, have served as the foundation for Korea's monarchy system. During the colonial era, they became a target of plunder by the Japanese. After Korea regained its independence, fisheries became the major driving force of the country's economic development through export of fishery products and foreign currency earnings. In 1948, an administrative organization overseeing fisheries was set up under the Ministry of Commerce and Industry, which later would take a more concrete form with the establishment of the Fisheries Act in 1953. As fishery situations and governmental organizations changed, fisheries administrative organization also changed. Starting as the Fisheries Bureau under the Ministry of Commerce and Industry, the organization changed to the Fisheries Bureau under the Ministry of Maritime Affairs, to the Fisheries Bureau under the Ministry of Agriculture, to the Fisheries Agency, to the Fisheries Promotion Bureau/Fisheries Policy Bureau under the Ministry of Maritime Affairs and Fisheries, and finally to the Fishery Resources Office/Fisheries Policy Office/Ocean Cooperation Office under the Ministry for Food, Agriculture, Forestry and Fisheries. Consequently, fisheries law has also undergone 23 revisions since 1990.

Looking back over the past 100 years, the laws, institutions and governance of Korea's fisheries were initially designed to enable the Japanese government to dispossess Korea of its fishery resources during the Japanese colonial rule between 1910 and 1945. From the early 1960s onwards, the laws, tenures and administrative organizations have been formed with the intention to support the Korean government's national economic development initiatives in order to boost production and export. In particular, the rapid industrialization in major coastal areas that lasted from the 1960s to the mid-1980s brought about rapid changes in onshore fishing grounds, fishery resources and fishing communities. Onshore fishing grounds became contaminated with pollutants, massive land reclamation led to shrinking coastal spawning grounds and habitats, and many onshore fishing communities disappeared. Onshore fisheries and fishing communities are still in an awkward position under the fisheries law, institutions and governance. These problems have worsened the imbalance of utilization and management of onshore fishery resources, and stunted development of fishing communities. Moreover, continued advances in fishing technology, conflicts between the reality of onshore fisheries and their governing laws and institutions, and the dispersed administration for fisheries and maritime affairs (between the Ministry

for Food, Agriculture, Forestry and Fisheries and the Ministry of Land, Transport and Maritime Affairs) have all hampered the sustainability of onshore fishery resources and fishing communities while reducing the efficiency and effectiveness of relevant laws, institutions and governance.

Good fisheries governance is important because competition in fishing operations among stakeholders is likely to escalate due to limited fishery resources, occurrence of natural disasters and climate change. If governance is not effectively implemented or functioning properly, ensuring fair and reliable fishery rights, responsible management of resources, transparent and engaging decision-making, universal application of laws, and proactive prevention of conflicts become very difficult, and government policies can be distorted.

To resolve the conflicts between the reality of onshore fisheries and their governing laws and institutions in order to achieve a sustainable development of onshore fisheries and fishing communities, the government has implemented several new onshore fishery systems since 2000. One of these is the Fishermen's Agreement and Self-Managed Fisheries, based on the cross-compliance principles. This system runs parallel to the theory suggested by Elinor Ostrom (2003) in *the Governing the Commons* that "common pool resources can be managed by voluntary organizations."

The aim of this paper is to gain a better understanding of the concept of onshore fisheries governance in Korea. In order to achieve this, an analysis of the social, economic and political conditions surrounding the fisheries sector and the administrative organizations and institutional arrangements concerning onshore fisheries will be made. Furthermore, the problems related to onshore fisheries governance, and improvements to these problems will be explored.

2. CONCEPT OF FISHERIES GOVERNANCE

2.1 What is governance?

Governance is concerned with the exercise of political, economic and administrative authority in the management of a country's affairs at all levels. Good governance ensures that citizens and interest groups articulate their interests, exercise their legal rights and obligations and mediate their differences voluntarily and effectively. In other words, governance is about a state's or an organization's comprehensive supervisory scheme to achieve goals in an accountable, legal, ethical, transparent and effective manner. Governance therefore can be defined as the formulation of formal or informal rules, laws, regulations and policies at all levels (e.g., local governments, states, international organizations). Governance participants operate legal systems, mediate conflicts and maintain order in a transparent, fair, effective and accountable manner under the vision of their organizations.

Institutions are defined as a set of arrangements designed to regulate relationships between stakeholders regarding the interests and responsibilities of the members of a society. Institutions define how transferable rights are granted, what the associated responsibilities and restrictions are, and who can use what resources and services for how long and under which conditions. They are most concerned with laws and institutional systems. An institution is any structure or mechanism of social order among organizations or members of society, and is commonly applied to customs and behavior patterns important to a society, as well as to particular formal organizations of government and public services.

2.2 Concept of fisheries governance

Fisheries governance concerns with the legal, social, economic and political arrangements used to manage fisheries. It has international, national and local dimensions and includes legally binding rules as well as customary social arrangements (FAO, 2001).

Establishment of institutions, policies and processes through which management of fisheries can be realized is fundamental to effective fisheries governance. It is composed of a set of rules and arrangements –public and private, formal and informal–affecting fisheries, as well as the organizations that develop and implement those rules. National fisheries management authorities are usually a key part of governance structures, representing the legal state entity with authority for performing specific fishery management functions. Co-management committees, fishers' associations and other groups, and the partnerships among them, also form part of the institutional arrangements for fisheries governance.

Policies define the courses of actions of a government or decision-making body, and are designed to influence future decisions or actions. Fisheries policies are put into action through local management plans in a cyclical process and local plans should therefore be consistent with the overarching policy. Information is crucial to this process, informing the development of appropriate local plans. Monitoring and evaluation of local management plans during and after implementation is important to assess whether they are functioning as expected or not.

Governance is fundamental in ensuring effective fisheries management. While the management process is relatively straightforward, successfully putting it into practice is not. FAO reviews of the current state of fish stocks indicate that the prevailing systems of fisheries governance have been largely ineffective at controlling access to fishery resources to ensure their sustainability; one quarter of fish stocks are fished beyond their sustainable levels, and half of all stocks are fully exploited, with no potential for increases in production with increasing fishing effort (FAO, 1999). Fisheries are dynamic systems, and therefore management must take account of a variety of factors and uncertainties.

To summarize, fisheries governance is defined as a set of rules, processes or structures in which a country makes decisions about fishing (e.g. licensing rights) and fishery resources (use, management, control, transfer), and once those decisions are executed or enforced, conflicting interests are mediated. Legal rules include informal rules and customs, while structures include countries, civil societies, as well as private sectors, with the focus placed on validating the effectiveness of policy means (enforcement or incentives). A process is defined as a process of how fisheries-related social problems are adopted as policy agenda, how those policies are determined, who enforces the decided policies and how, and how conflicting interests among stakeholders are managed (Oh Kwang-Seok, 2011). What is important here is that there is a need to pay attention to the variety of methods, such as dialogue, cooperation, conflict, unilateralism, negotiation, compromise or withdrawal, by which stakeholders interact with one another. In fact, assessment of good governance not only requires assessment of the effectiveness of policy means against policy goals, but also parallel diagnosis and evaluation of the policy process.

2.3 Importance of governance management

As fishery resources are fundamentally limited by the ocean's biological capacity to sustain the resources and have a common-property nature, conflicts over fishing rights or use rights among stakeholders are frequent and may worsen due to natural disasters (e.g., typhoons, earthquakes) and climate change. In light of this, if governance is not operating effectively, a small minority group may occupy or monopolize resources and make decisions through a closed decision-making process in their favor, excluding the marginalized majority group.

On the contrary, if governance is properly constructed and operated, fair operation rights and stable fishing rights, accountable management of resources, transparent and equally participatory decision-making, universal application of laws, and prevention of conflicts can be ensured. In addition, good governance can lead to a more simplified, sustainable, effective and voluntary management of fisheries and fishery resources.

3. SOCIAL, ECONOMIC AND POLITICAL CONDITIONS IN THE FISHERIES SECTOR

3.1 Constitution and fisheries administrative organization

3.1.1 Form of state and fisheries administrative organization

The Republic of Korea is a unitary state, governed by one single unit. In a unitary state, powers are generally concentrated in the central government. In the context of Korea, however, the separation of powers does not exist horizontally among the executive, legislative and judicial branches. Central concentration of powers is substantially eased as the country pursues actualization of popular sovereignty, democracy and constitutionalism by vertically separating powers through the local government system (Seong Rak-in, 2003).

The local government system aims to (i) achieve the goal of power distribution and separation by addressing harmful consequences of excessive concentration of power in a unitary state, (ii) promote a balanced development between the central and local regions, and (iii) actualize popular sovereignty and promote democracy by realizing grassroots democracy. In Korea the local government system began in 1995.

Fisheries administrative organization started as the Fisheries Bureau under the Ministry of Commerce and Industry in 1955 and changed to the Fisheries Bureau under the Ministry of Agriculture in 1961 and then to the Fisheries Agency in 1966. The organization was again transformed to the Maritime Affairs and Fisheries Office following its integration with the Korea Maritime and Port Administration in August 1966 when the Ministry of Maritime Affairs and Fisheries was newly established. Following the reshuffle of government organizations in 2008, the Ministry of Maritime Affairs and Fisheries was abolished, the Ministry for Food, Agriculture, Forestry and Fisheries took over fisheries administrative functions, the Ministry of Land, Transport and Maritime Affairs took over maritime administrative functions, and the Maritime Affairs and Fisheries Office became regional maritime affairs and port offices. Today, fisheries and maritime administrative functions reside in the two different ministries.

3.1.2 Constitutional protection of agriculture and fisheries

Article 123 of the Constitution defines the nation's obligations to protect and foster vulnerable sectors in the current industrial society, such as farming, fishing and small and medium enterprises. This Article aims to protect people engaged in these sectors and address the imbalance of benefits caused by the uneven economic development among regions.

Article 123, paragraph 1 of the Constitution states, "The State shall establish and implement necessary plans to comprehensively develop and support the farm and fishing communities in order to protect and foster agriculture and fisheries". What this explains is the necessity for the state to support the farming and fishing communities with a comprehensive development plan since provision of fragmentary or superficial assistance cannot be the solution to protecting or fostering the agriculture and fisheries sectors that have been overlooked in the course of economic growth.

Article 123 of the Constitution defines the state's responsibility to provide economic support for economically backward areas of the country in order to address economic differences among regions. By specifically emphasizing the need to promote agriculture and fisheries sectors, regional competition, and small and medium enterprises, this enables certain parts of the economy to adapt to changing market conditions and adjust to competition. In other words, the goal and spirit of Article 123 of the Constitution is to facilitate market competition on the new basis coordinated by the country's support organizations by involving the state in certain regions or specific sectors of the economy. This is accomplished through government subsidies or tax benefits in the process of market establishment.

3.1.3 *Judicial system*

Korea's fisheries supervision system is designed to guide and supervise disorderly fishing conducts and violation of fisheries laws arising in the course of performing license fisheries or permit fisheries under the Fisheries Act of 1908. It provides the modern legal framework for fisheries in Korea. Fisheries supervision officials, or fisheries police, aim to maintain fisheries order and promote its sound development, prevent public interests from being infringed on by fisheries, and protect people engaged in fisheries. A fishery supervision public official is a public official responsible for the administration of the fulfillment of the law that defines these matters, which includes supervision of compliance with the law, investigation of violations of the law, identification of violators and taking administrative measures.

A fishery supervision public official is appointed by the superintendent public prosecutor of the district public prosecutor's office with jurisdiction over the appointed official's place of work on the recommendation of the head of his/her department. Those national public officials or local public officials nominated as fishery supervision public officials pursuant to the regulations of the Fisheries Act are known as judicial police officials (Article 5-20 of the Act on the Personnel and Duty Range of Judicial Police), and among these nominees, officials ranking 7 or higher perform duties of judicial police officers, while officials ranking 8 and 9 perform duties of judicial police officials.

Judicial police officials investigate fishery violations under the direction of the public prosecutor. Judicial police officers investigate suspects, violations and evidence of violations, while judicial police officials assist in the investigations (Article 2 of Office Regulations of Judicial Police Officials). As judicial police officials are appointed on the recommendation of the head of their department, their work scope is limited to the investigation of violations of fisheries or violations of the Fishery Resources Protection Act that occur in their own district (Article 6, paragraph 15 of the Judicial Police Officials Act) or to the investigation of violations of the law on the exercise of sovereign rights in regard to foreigners' fishing in the exclusive economic zone. However, the investigation can be made outside their own district when it is necessary to find evidence related to the cases that occur within their own district under Article 6 of Office Regulations of Judicial Police Officials. Supervision of fisheries is provided by the fisheries supervision offices (East Sea Fisheries Supervision Office and West Sea Fisheries Supervision Office) under the Ministry for Food, Agriculture, Forestry and Fisheries, as well as by fisheries guidance boats.

When a fishing vessel is found to be fishing illegally, the fishery supervision public official can stop the vessel and board the vessel using a patrol boat to inspect any violation at the site. Along with the on-site inspection, the official also checks for identification, vessel and license information via the situation room of the fisheries supervision office. When a violation is confirmed, the official determines whether the vessel is subject to administrative measures or legal penalties depending on the specific content of the violation, and writes a testimony report or interrogatory report of the suspect. The first round of inspection is completed by handing over evidence of the violation, such as fishing gear or catches, from the vessel to the fisheries guidance boat. Depending on what is found aboard, the seized vessel is then released or ordered to sail back to the port.

Once the fisheries guidance boat enters the port and the case is referred to the fisheries supervision office, the office conducts a complementary inspection of the vessel's violation. If it is confirmed that no violation has occurred, the office concludes the investigation by forwarding the case to the district's public prosecutor's office along with a report stating that the office drops the charges against the vessel. If it is confirmed that a violation has occurred and the vessel obtained its fishery permit

from an administrative office outside of jurisdiction of the fisheries guidance boat, the supervision office takes a transfer direction from the public prosecutor and transfers the case to the administrative office that issued the fishery permit to the concerned vessel. If the case is within the jurisdiction of the fisheries guidance boat, a complementary inspection is conducted, including summoning of the suspect for questioning. If the vessel is a licensed vessel, the office requests the administrative office that issued the license for an administrative measure. If the vessel is an unlicensed vessel, the office summons the suspect, collects relevant papers for the case, such as police records, takes an investigation direction or seized goods handling direction from the public prosecutor, and forwards the case to the court. If the case requires arrest, the office requests the public prosecutor for an arrest warrant. Violations of fisheries are subject to legal or administrative penalties depending on the type of the violation. Violations subject to legal penalties undergo a process under the criminal law procedure. Some cases undergo summary proceedings while other cases are brought to a formal trial according to the type and severity of the violation. In either situation, the case is taken to a district court. Administrative penalties involve taking an administrative measure against the license of the administrative office that issued the license or licensed person regarding the violation case referred to by the fishery supervision public official.

3.1.4 Civil society

In any of today's democratic civil societies, the roles and influences of environmental movements, charities, non-governmental development organizations, community groups, women's organizations, faith-based organizations, professional associations, trade unions, self-help groups, social movements, business associations, coalitions and advocacy groups are substantially increasing. Civil societies are the sum of non-political and voluntary public or social organizations, distinct from state or market in society. However, the boundaries between the civil society, state and market are quite blurred and fluid.

In theory, its institutional forms are distinct from the state, family and market, but in practice, the boundaries between state, civil society, family and market are often complex and require negotiation. Civil society commonly embraces a diversity of spaces, actors and institutional forms, varying in degree of formality, autonomy, and power.

For instance, Korea's environmental coalition history dates back to 1982 when the Anti-Pollution Research Institute was established as Korea's first environmental movement organization. The organization integrated with the Anti-Pollution Youth Council and the Anti-Pollution Civic Movement Council in September 1988 to launch the Korean Anti-Pollution Movement Association, which in turn became the basis for launching an integrated environmental movement association of eight environmental groups in April 1993. The association has joint representatives, an executive committee and organizations like secretariat under its board of representatives, a top deliberative body, and runs affiliated organizations, such as an environmental training center, civil environmental research institute and civil environmental information center. Today, members of the association nationwide engage in activities such as ecosystem conservation, anti-nuclear/peace campaigns, environment education programs, environment surveillance and work in collaboration with international environmental organizations like Greenpeace.

3.1.5 Community of Practice

Professionals are people who have a high degree of knowledge and experience derived from research or work in a certain field, and a community of practice is a group created by these professionals. Communities of practice vary as products, services and industrial sectors vary.

In today's information-oriented world, communities of practice are also expanding their influence in diverse fields through forming networks. Based on their intensive knowledge and experience, professionals work in multi-dimensional relationships with the government, civil society, industry and international organizations at local, national and global levels, and publish their literature. Most professionals (or professional communities) have stable positions in universities, research institutes or law firms. They work in a wide range of fields, ranging from consultation work to research to raising economic, social, political and environmental issues.

As fishery issues are becoming increasingly international, the roles and functions of fisheries communities of practice are widening at local, national and global levels. Especially the roles of international fisheries organizations, such as the United Nations Food and Agriculture Organization, the World Bank, and the United Nations Development Program are becoming more important than ever.

3.2 Scope of stakeholders

The scope of direct and indirect stakeholders in fisheries is very large. In this article, stakeholders refer to public officials, politicians, people in the legal profession, maritime police, fishermen (associations), and communities of practice. Public officials engage in public duties for the central or local governments. This paper defines public officials in the narrow sense, as public officials under the administrative law, and fisheries public officials as those who perform public duties related to fisheries belonging to the Ministry for Food, Agriculture, Forestry and Fisheries or local authorities. Fisheries public officials perform a wide range of duties, including operation of the permission/licensing system, inspection of fishery products and research and development of fishery technologies.

Politicians, especially members of the National Assembly and members of local governments, play a central role in enacting, amending and abolishing legislation and ordinances. They have a central role in supervising fisheries administration and deliberating budget. Judges, public prosecutors and lawyers serve as official mediators of conflicting interests arising from the fisheries society, while maritime police and fisheries judicial public officials are in charge of guiding fisheries and maintaining order. The National Federation of Fisheries Cooperatives is a representative federation of fisheries cooperatives, consisting of a primary cooperative and cooperatives of individual members (cooperatives for each district and cooperatives for each type of business), engaged in extension service business, economic business, and credit (mutual financing) business.

Fisheries communities of practice include fisheries-related universities, state-owned or local government-owned research institutes (e.g., National Fisheries Research and Development Institute), government-invested research institutes (e.g., Korea Maritime Institute) and other research institutes led by fishers' associations (e.g., Fisheries Economic Institute of The National Federation of Fisheries Cooperatives). These groups play a key role in the research and development of fishery science technologies and the development of fisheries policies. Besides these groups, Korea Overseas Fisheries Association, Korea Fisheries Infrastructure Promotion Association, Korea Fisheries Association and fisheries trade associations also comprise stakeholders in fisheries. These organizations also perform some tasks commissioned by the government.

3.3 Forms of onshore fisheries

Korea's onshore capture fisheries (OSCF) are diverse, dynamic and deep-rooted in the tradition of coastal fishing communities as part of their culture and values. Korea's OSCF requires approval of mayors, county governors and heads of Gu-offices. There are a total of 21 types of fisheries business, broadly divided into onshore fisheries, non-

stationary fisheries and stationary (fixed net) fisheries in demarcated zones. Onshore fisheries are composed of 8 types of fisheries, namely gill net fisheries, improved stow net fisheries, surrounding net fisheries, trap fisheries, lift net fisheries, catching net fisheries, boat seine fisheries and composite fisheries. Stationary demarcated fisheries are composed of 13 types of fisheries, including beach seine fisheries, boat seine fisheries, drift gill net fisheries, seine fisheries, barrier net fisheries, stow net on stakes fisheries, funnel net fisheries, rectangular set net fisheries, lift net fisheries, mid-water otter trawl, gape nets with wings fisheries, conic net fisheries and stow net on anchors fisheries (Shin Young-Tae *et al.*, 2002, Kim Byoung-Ho, Cha Cheol-Pyo, Park, Jin-Wu, 2010). Besides these types of fisheries, the number of notified fisheries, such as fisheries without gear, diving fisheries and cast net fisheries, reached 121 453 cases.

TABLE 1
Status of permits by type of onshore fisheries (2008) (Unit: number, %)

Name of Fisheries		Onshore Fisheries								Non-stationary Demarcated Fisheries		
		Gill net	Improved stow net	Surrounding net	Trap	Lift net	Catching net	Boat seine	Composite	Shellfish dredge	Shrimp beam trawl	Small eel stow net
Total	Allowed Number	17 379	631	331	4 680	781	1 143	14	27 682	556	850	941
	Actual Number	20 809	648	319	8 559	844	1 038	6	34 507	493	936	834
	Ratio	119.7	102.6	96.3	182.8	108	90.8	42.8	124.6	88.6	110.1	88.6

Source: Ministry for Food, Agriculture, Forestry and Fisheries, Research on the Improvement of Institutions for Proper Management of Coastal Fisheries, 2010.

As of 2008, four types of onshore fisheries, gill net fisheries (119.7 percent), improved stow net fisheries (102.6 percent), trap fisheries (182.8 percent) and lift net fisheries (108 percent) exceeded their allowed quota. In non-stationary demarcated fisheries, shrimp beam trawl fisheries (124.6 percent) exceeded their quota while a total of 4 875 permits were issued for the 13 types of stationary demarcated fisheries.

TABLE 2
Status of permits by type of stationary demarcated fisheries (2008)

Type of fishery	Number of permits
Beach seine	17
Boat seine	3
Drift gill net	338
Seines	308
Barrier net	399
Stow net on stakes	575
Funnel net	92
Rectangular set net	1 421
Lift net	36
Mid-water otter trawl	15
Gape nets with wings	1 656
Conic net	3
Stow net on anchors	12
Total	4 875

Source: Ministry for Food, Agriculture, Forestry and Fisheries, Research on the Improvement of Institutions for Proper Management of Coastal Fisheries, 2010

Onshore capture fisheries and offshore capture fisheries are distinguished according to the tonnage of fishing vessels, not based on geographic boundaries. Therefore onshore operations and offshore operations are often mixed in onshore and offshore waters. Most of fish captured through onshore capture fisheries are used as raw fish

dishes and sold through non-organized distribution channels. This often makes the collection of statistics on onshore capture fisheries output inaccurate. The difficulty of measuring onshore capture fisheries output makes it more difficult to distinguish objectives and means of fishing between onshore fishery policies and offshore fishery policies, which raises fundamental issues concerning institutional arrangements and governance of these two fishery systems.

4. ADMINISTRATIVE ORGANIZATION AND INSTITUTIONS FOR ONSHORE FISHERIES

4.1 Evolution of fisheries institutions and administrative organization

Korea's modern fisheries law is rooted in the country's first law institutionalizing the Court Organization Law in 1895. In 1897 the country was named the Daehan Empire, and in 1899 a founding Constitution was established (Kim Sae-shin, 1987). A number of laws were subsequently enacted, among which the laws governing industrial activities included the Mining Act in June 1906, the Uncultivated National Land Utilization Act in July 1907, the Whaling Management Act in October 1907, and the Fisheries Act, which provided the legal framework for Korean fisheries in November 1908.

Following the Japanese annexation of Korea, the Fisheries Law was abolished and the Fisheries Decree was promulgated in June 1911. With the enactment and enforcement of the Joseon Fisheries Decree in January 1929, the Fisheries Decree was abolished and Joseon's fisheries were governed by the Joseon Fisheries Decree until August 1945. This Joseon Fisheries Decree remained mostly unchanged in its content and functions, even after Korea regained independence from Japan, until the Fisheries Act was enacted in 1953. The Fisheries Act has undergone 23 amendments since 1990.

Over the past 100 years, the Korean institutions in fisheries have been designed to enable the Japanese government to dispossess Korea of its fishery resources between the period of 1910-1945. Following Korea's independence from Japan in 1945, these institutions primarily aimed at supporting the Korean government's national economic development initiatives to boost production. From the early 1960s onwards, the government's economic development policies have focused especially on rapid changes in onshore fishing grounds, fishery resources and fishing communities. Onshore fishing grounds became contaminated with pollutants, massive land reclamation resulted in shrinking of coastal spawning grounds and habitats, and many coastal fishing villages began to disappear due to intensive industrialization in coastal regions.

Onshore fisheries and its main participant - fishing communities (e.g., fishing village cooperatives) - are still in an awkward position under the current legal and administrative systems for Korean fisheries. Moreover, the discord between the reality of fisheries and the policies from onshore fishery institutions causes conflicts within and between the actors involved in fisheries. These situations are leading to vulnerable onshore fisheries governance and unbalanced usage and management of onshore fishery resources. In onshore fisheries, rapid advances in fishing technology and the discord between customs of fishing ground usage and the current legal system are largely responsible for the hampered sustainability of onshore fishery resources and fishing communities, as well as reduced efficiency and effectiveness of the current onshore fisheries governance.

4.2 Onshore fisheries management institutions

4.2.1 Fisheries Act

Fisheries institutions are governed by two laws - Fisheries Act (established in 1953) and Fishery Resources Management Act (established in 2009). Under the Fisheries Act, onshore fisheries are classified under permit fisheries and license fisheries. Onshore permit fisheries require acquisition of permits from mayors or governors and involve

use of non-motorized fishing vessels, motorized fishing vessels of less than 8 gross tons, or motorized fishing vessels of 8 to 10 gross tons as specified by the presidential decree to ensure safe operations of fishing vessels and coordination of fisheries. The rationale behind permit fisheries is that as the size of fisheries business is often related to local circumstances, it is appropriate to allow mayors or governors with good knowledge of their own regions make judgments and decisions of granting permits, and it is inappropriate for the state to centrally manage all fishing vessels because in reality there are too many vessels that receive permits.

The following are all categorized as mayor/governor permit fisheries: demarcated fisheries in which fishing gear is installed in designated fishery zones and fishing is done using non-motorized fishing vessels, motorized fishing vessels of less than 5 gross tons, or fishing gear; inland aquaculture in which marine animals and plants are cultivated in artificially constructed inland seas; and seed production fisheries in which fish seed is produced in facilities installed in seas, seashores or artificially constructed inland seas (Article 41, paragraph 3 of the Fisheries Act).

Fisheries subject to permits of mayors, governors or heads of Gu-offices (ward district offices) are subject to the demarcation of certain water zones. These zones are quite monopolistic or exclusive, and special care must therefore be taken when designating fishing ground locations or fishery zones. Furthermore, relationships with other fisheries, especially with community-based fisheries, must be taken into consideration. That is why permission by mayors, governors or heads of Gu-offices is needed. The types of fisheries are determined by the presidential decree, while the size of fishing vessels and the number of permits for each type of onshore fisheries are determined by the decree of the Ministry for Food, Agriculture, Forestry and Fisheries.

Fishery permits must be issued with certain conditions or constraints attached. Such conditions include the regulations set by the decree of the Ministry for Food, Agriculture, Forestry and Fisheries and are commonly applied to onshore and offshore fisheries, fishery zones, fishing gear and techniques, size of fishing gear and cover attachment and size of fishing vessels. In addition, limited permits or conditional permits can be issued when it is deemed necessary to protect the public good, coordinate fisheries, or to propagate and protect fishery resources in accordance with the regulations of Article 34, paragraph 1, items 1 through 6 of the Fisheries Act.

Onshore license fisheries also require acquisition of licenses from mayors, governors or heads of Gu-offices. This includes set net fisheries, seaweed farming, shellfish farming, fish farming, composite farming, community-based fisheries and cooperative aquaculture. When mayors, governors or heads of Gu-offices issue permits, they must do so within the scope of development plans. Types of fisheries and water level limits for community-based fisheries and cooperative aquaculture are determined by presidential decree. Besides these considerations, matters concerning each of the following items are determined by the decree of the Ministry for Food, Agriculture, Forestry and Fisheries:

- (i) Depth of water in fishing grounds (excluding community-based fisheries and cooperative aquaculture) and distance between fishery zones and fishing grounds
- (ii) Facility installation methods, farming methods or capture/collection methods in fishing grounds
- (iii) Matters concerning cultivated products or catches
- (iv) Matters concerning fishing vessels, fishing gear and their usage
- (v) Matters concerning installation of subsidiary facilities such as restroom and restricted actions in fish farms to enhance safety of fishery products
- (vi) Other matters relevant to license fisheries

Especially in the case of community-based fishers that have a close relationship with fishing communities (e.g., fishing village cooperatives), the Fisheries Act stipulates that community-based fisheries shall be limited to fishing village cooperatives or district-based fisheries cooperatives in order to promote the public good of fishermen residing in particular areas.

The current license and permit fisheries are a combination of fishery customs and newly developed institutional arrangements. This system is qualified under the Fisheries Act and is indiscriminately applied to individual fishermen or fishing communities. The trading of fishery rights is strictly prohibited by the law. However, trading of fishery rights using the exercise contract by those who have community-based fishery licenses is allowed. For instance, if a fishing village cooperative wants to sell its fishery rights in exchange for a fishing ground to which it has the fishery right, it must exercise its right at the corresponding fishing ground or enter into an exercise contract or entry contract with the person who wishes to enter the fishery in accordance with the fishing ground management regulations prescribed in Article 38, paragraph 1 of the law (Article 43, paragraph 1 of The Fisheries Act).

4.2.2 *Fishery Resources Management Act*

The purpose of the Fisheries Act is to formulate basic institutional arrangements pertaining to fisheries while promoting development of the fisheries sector and democratization of fisheries by boosting productivity in the sector through the use of fishery resources and waters. The purpose of the Fishery Resources Management Act is to facilitate a sustainable development of fisheries and contribute to the increase of income for fishermen by defining matters needed to protect, restore and foster fishery resources by effectively managing fishery resources.

The scope of the Fishery Resources Management Act includes; (i) seas, (ii) seashores, (iii) inland sea waters artificially constructed for fisheries, and (iv) shared waters designated to protect fishery resources in accordance with Article 40 of the National Land Planning and Utilization Act or their adjacent land (e.g. fishery resources protective areas). This law also defines provisions pertaining to the development of general plans for fishery resources management, protection of fishery resources (e.g. restrictions on capture and collection, restrictions on fishing gear, fishing vessels, and fishing techniques), restoration and creation of fishery resources, management of and supplementary rules on fishery resources protective areas (e.g. the establishment and operation of fishery resources management committee, establishment and operation of fishery resources initiative office, guidance and supervision, operation of fishery resources examiners), and penalties.

The important feature of the Fishery Resources Management Act is that it contains regulations aimed at promoting self-managed fisheries. Fishermen or fishers' associations can voluntarily enter into a contract ('fishermen's agreement') to effectively manage fishery resources in particular waters based on the agreement among fishermen or fishers' associations. In this case, the fishermen's agreement is only effective to those fishermen or fishermen belonging to fishers' associations that concluded the contract (Article 28, paragraph 1). Fishermen's agreement contains provisions concerning (i) target waters, target resources and target fisheries, (ii) measures and methods for managing fishery resources, (iii) valid period of the agreement, (iv) measures taken when the agreement is breached, (v) measures taken to facilitate engagement by those who have not participated, and (vi) other matters as determined by the decree of the Ministry for Food, Agriculture, Forestry and Fisheries.

The law also prescribes that the government (Minister for Food, Agriculture, Forestry and Fisheries) or local governments (mayors or governors) may provide guidance and financial assistance so that fishermen or fishers' associations can enter into and operate an agreement on their own.

5. STATUS AND PROBLEMS OF ONSHORE FISHERIES GOVERNANCE

5.1 Administrative organization

Fisheries administration was first overseen by the Maritime Transportation Bureau set up under the Ministry of Transportation and the Fisheries Bureau set up under the Ministry of Commerce and Industry in 1948. In 1955, the government established the Ministry of Maritime Affairs to oversee fisheries, maritime, port, ship-building and maritime police affairs in order to maintain maritime order and to facilitate quick recovery of the maritime sector. When the Ministry of Maritime Affairs was abolished in 1961, fisheries affairs became the responsibility of the Fisheries Bureau of the Ministry of Agriculture, and maritime affairs became the responsibility of the Maritime Transportation Bureau of the Ministry of Transportation.

The Fisheries Bureau of the Ministry of Agriculture was abolished and the Fisheries Agency was established in 1966. The Maritime Transportation Bureau was also abolished and the Port Authority was established in 1976. The Port Authority changed its name to the Korea Maritime and Port Administration in 1977. To be ready for the growing competition in oceans expected in the 21st century, the government combined the Fisheries Agency and the Korea Maritime and Port Administration to establish the Ministry of Maritime Affairs and Fisheries in August 1996 in an effort to create an integrated and organized maritime administrative system and to actively develop maritime potentials.

Following the reshuffle of government organizations in 2008, the Ministry of Maritime Affairs and Fisheries was abolished; the Ministry for Food, Agriculture, Forestry and Fisheries took over fisheries administrative functions; the Ministry of Land, Transport and Maritime Affairs took over maritime administrative functions; and the Maritime Affairs and Fisheries Office became regional maritime affairs and port offices. Subsequently, maritime and fisheries administration functions currently exist at two departments. These changes eventually led to two sets of laws, institutions and administration bodies, losing their consistency and integrity. Maritime and fisheries policies overseen by two departments are substantially lowering the efficiency of organizational and administrative functions due to the lack of an integrated approach by the central and local governments essential for the management of marine environment and marine biology resources (fishery resources).

The Ministry for Food, Agriculture, Forestry and Fisheries is responsible for general oversight of fisheries administration in Korea, including development and execution of fisheries policies at the national level. While heads of local governments have the right to issue licenses and permits for onshore and offshore fisheries, the right for onshore fisheries is exercised by mayors, governors or heads of Gu-offices. Whereas permits for onshore fisheries are delegated by mayors or governors, permits for demarcated fisheries are under the jurisdiction of mayors, governors or heads of Gu-offices. Permits for offshore fisheries are under the jurisdiction of the Ministers of Food, Agriculture, Forestry and Fisheries, and mayors or governors only exercise the administrative right using the permit right delegated from the Minister.

Although the National Fisheries Research and Development Institute, fisheries supervision offices (East Sea, West Sea), the National Fisheries Products Quality Inspection Service, the Fisheries HRD Institute and the Korea Maritime Institute are not fisheries administrative organizations, they do play a supporting role within fisheries governance. Especially the National Fisheries Research and Development Institute which has as many as 600 researchers and research associates engaged in research and development activities concerning resource management (e.g., assessment of resources),

fishing ground environments (e.g., analysis of environment), system engineering (e.g., fishing gear and fishing techniques), food safety (e.g, risk management), marine biology health control and assessment of use of seas, assisting in the development and implementation of fishery policies of the central and local governments at local, national and global levels.

The nation's fisheries administrative organization started as the Fisheries Bureau under the Ministry of Commerce and Industry in 1948 and changed to the Fisheries Bureau under the Ministry of Agriculture in 1961 and then to the Fisheries Agency in 1966. After its integration with the Korea Maritime and Port Administration in August 1966, the organization became the Maritime Affairs and Fisheries Office under the newly established Ministry of Maritime Affairs and Fisheries. Following the reorganization of government bodies in 2008, the Ministry of Maritime Affairs and Fisheries was abolished, transferring fisheries administration to the Ministry for Food, Agriculture, Forestry and Fisheries and Maritime Administration at the Ministry of Land, Transport and Maritime Affairs. The Maritime Affairs and Fisheries Office was reorganized and divided into regional maritime affairs and port offices.

Currently, fisheries and maritime administration's functions occur at the level of two ministries - the Ministry for Food, Agriculture, Forestry and Fisheries and the Ministry of Land, Transport and Maritime Affairs. The Ministry for Food, Agriculture, Forestry and Fisheries has various Fisheries Policy Offices (Fisheries Policy Bureau, Fishery Resources Bureau, Distant-Water Fisheries Bureau) under its second vice minister and is generally responsible for the nation's fishery policies including onshore and offshore fisheries, resources management policies, fishery policies (e.g., distribution, cooperatives) and distant-water fishery industry cooperation policies. The Ministry of Land, Transport and Maritime Affairs' Marine Policy Bureau is generally responsible for maritime territory-related policies and marine environmental policies. Unfortunately the dispersed fisheries and maritime policies and the lack of coordination between the two ministries have created barriers for improving fisheries governance.

As a result, fishery-related laws and institutions have lost their consistency and integrity, escalating departmental egotism and triggering conflicts between fisheries governance and maritime governance. The fisheries sector has become a business that leases the seas.

5.2 Forms of decision-making

On the surface, forms of decision-making in Korean fisheries look decentralized and democratic. In reality, decision-making is still influenced by standardized and centralized decision-making. Although decision-making rights (e.g., licenses/permits for onshore fisheries) are partly transferred to local governments, quite a few specific matters must still be approved by the central government.

For instance, the Fisheries Coordination Committee is a decision-making body among stakeholders officially run by the Ministry for Food, Agriculture, Forestry and Fisheries. The establishment and operation of the committee is based on the regulations of the establishment and operation of fisheries coordination committee for East Sea and West Sea sections (Ministry for Food, Agriculture, Forestry and Fisheries Instructions, No. 211). The purpose of these regulations is to mediate fishery disputes quickly and fairly while contributing to the sound development of fisheries. This is done through the installation of fisheries coordination committee for East Sea and West Sea sections as well as mediation procedures regarding fishery disputes in order to effectively perform fishery dispute mediation functions of the Fisheries Coordination Committee set up pursuant to the provisions of Article 86 of the Fisheries Act.

This example above is one of the meaningful changes in fisheries governance. Another is the introduction of self-managed fisheries. The Fisheries Coordination Committee

can provide a platform for discussion and negotiation with active engagement of stakeholders. This will in turn facilitate constructive and creative mitigation and resolution of conflicts. In this process, stakeholders will be able to continuously build communication and negotiation capabilities.

In practice however, the Fisheries Coordination Committee is effectively an extension of centralized decision-making framework and is far from decentralized. As heads of local governments have the right to issue licenses or permits for onshore fisheries, there must be a mechanism to allow voluntary resolution of fishery disputes within or between local governments.

5.3 Inducements and enforcement mechanism to build institution-compliance capability

An effective economic inducement that can help build fishermen's ability to comply with laws and institutions is known as a *cross-compliance mechanism*. This is a system intended to support fishermen who voluntarily abide by rules and standards.

Article 28 (Conclusion of Agreement), paragraphs 1 and 2 of the Fishery Resources Management Act defines cross-compliance conditions and standards, including an enforcement decree which defines enforcement regulations and mechanisms (Article 29 of the Act). The law prescribes that the government (Minister for Food, Agriculture, Forestry and Fisheries) or local governments (mayors or governors) may provide guidance and financial assistance in support of fishermen or fishers' associations to design an agreement on their own (Article 29, paragraph 3).

Self-managed fisheries started as a pilot project in 2001 which is based on a cross-compliance agreement. The project was initiated in recognition of the limitations behind the existing government-led fishery resources management. Criticism was directed towards the mismanaged incorporation of diverse regional fishery characteristics which triggered competitive fishing operations, resulting in overfishing and deterioration of fishery business. Therefore it became necessary to encourage active engagement of fishermen in voluntarily managing their fishing grounds and marine resources. The objective is to establish a sense of ownership, build the foundation for a sustainable fishery production and eventually eradicate illegal fishing.

Since the end of 2010, a total of 863 fishing communities have participated in self-managed fisheries, with community-based fisheries making up the highest share of 51 percent. The total number of participating fishermen was 60 902, which amounts to an average of 70.6 persons per community. The related budget expenses were KRW12 894 million in 2010, which demonstrates a 12.3 percent average annual growth. The budget was mostly used for business expense assistance allocated to good-performing communities. In 2010, this type of budget accounted for about 92 percent or KRW11 845 million. Average net income of these communities has grown from KRW920 million in 2005 to KRW1 183 million in 2009. The average income of participating communities continues to rise, and best practices have begun to emerge, like the Jeonnam Yeosu Installment Savings Community.

Changes were also observed in fishermen behavior. Fishermen increasingly participated in the self-management of fishery resources and actively coped with illegal fishing. A survey done on policy satisfaction of self-managed fisheries showed 83 percent rate of satisfaction in terms of the need for the program and the program's contribution to income growth. The ability of fishermen to overcome fishery disputes through self-coordinated efforts has also increased. Self-management has grown to take various forms across all areas of fishery policy (e.g., voluntary resources management under the TAC system, voluntary handling of illegal fish farms, and practice of environment-friendly aquaculture).

On the other hand, the sluggishness of policy implementation is resulting in reduced interest and participation in self-managed fisheries among fishermen. Only

43 percent of fishing communities are participating in self-managed fisheries (out of 1 993 communities in 2010) and the growth rate of communities has steadily declined since 2005. Moreover, the uniform evaluation scheme, grade-based assistance scheme and support programs centered on good-performing communities have led to more complaints from communities not receiving benefits. In fact, out of 488 communities receiving assistance, 168 communities (34 percent) received assistance more than three times, while 270 communities (35.6 percent) never received assistance between 2002 and 2010. The lack of human resources capable or available for improving business and organizational capabilities within the participating communities and the aging of community leaders serve as serious barriers to self-managed fisheries. The age distribution of community leaders shows that 3.3 percent are in their 30s; 18.2 percent in their 40s; 45.5 percent in their 50s; 27.1 percent in their 60s; and 5.9 percent in their 70s, with people in their 60s or older making up as much as 32 percent.

6. ASSESSMENT OF FISHERIES GOVERNANCE AND SUCCESS/FAILURE FACTORS

6.1 Assessment

6.1.1 *Effectiveness of fisheries governance*

Key actors of onshore fisheries governance are the central government, local governments, onshore fishermen (fishing village cooperatives), and tenures or institutions of onshore fisheries regulating their acts. Although cultures, customs, distribution and characteristics of fishery resources differ from region to region, the central government still oversees laws and institutions concerning onshore fisheries while local governments simply enforce matters delegated to them by the Minister for Food, Agriculture, Forestry and Fisheries.

Onshore fisheries institutions aim to obtain sustainability of onshore fishery resources and the economy of fishing communities suitable for the characteristics of onshore waters and fishery resources, but there is no geographical division between onshore fisheries and offshore fisheries. Under the current onshore fisheries laws and institutions administered by the central government, it is difficult to reflect on regional distribution of resources and specific situations of fishing communities. Especially because local councils do not have legislative power, it is extremely difficult for the heads of local governments to effectively manage fisheries and fishery resources based on regional characteristics. Moreover, awareness of sustainable resource management, sustainable fisheries and the economy of fishing communities has not experienced much change. These issues bring conflict between the current fisheries laws/institutions, and the reality of onshore fisheries, resulting in reduced efficiency and effectiveness of laws, institutions and governance in fisheries.

6.1.2 *Sharing of rights and engagement by fishery communities*

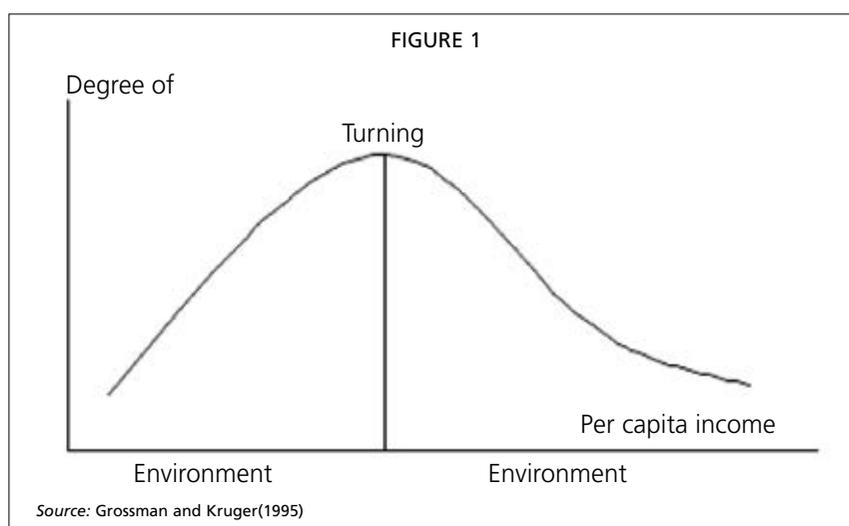
Right-sharing between the central government, local governments and fishermen in onshore fisheries means there is co-management or self-management. Self-managed fisheries implemented since 2001 have substantially increased in quantitative terms; but monitoring, assessment and policy coordination for quality improvement have not been properly implemented. Considering that there are not many self-managed fishing communities that have successfully built self-sufficiency after government support is finished, it seems that government assistance has not been very successful in inducing engagement by community members.

What is most important in right-sharing is its legal accountability. When agreements are not complied with, the government can hold communities accountable by withholding its incentives. In this case, the failure to comply with agreements can be due to two reasons: fishing communities with weak self-management capability, or lax government monitoring and control support programs.

6.2 Major factors that determine success or failure

6.2.1 *Income level*

A number of factors influence success or failure of fisheries governance. Income, politics, institutions, technologies, political and social cultures are important and decisive factors. Among these factors, income is the most important as it drives many social and economic changes. For those who struggle to make ends meet, environmental conservation, compliance with laws and institutions or the accumulation of social capital hold less importance.



The Environmental Kuznets Curve (EKC) and other empirical research are indicative of this phenomenon. The Environmental Kuznets Curve shows the relationship between the rate of environmental degradation and per-capita income growth. This hypothesis shows that environmental degradation gets worse in the early stages of economic growth, but eventually reaches a peak and starts declining as income exceeds a certain level (turning point) (Figure 1).

For this reason, developed countries manage fishery resources better than underdeveloped countries, and coastal waters of Norway or Canada for example are cleaner than those of Congo or India. While different coastal countries are in different situations regarding their fisheries and resources, the correlation between environmental degradation and per-capita income in the long term has been validated by many studies.

As its per-capita income was nearing USD 20,000, Korea has recently begun to have a practical interest in the management of marine biology resources and marine environment (Fishery Resources Management Act established in 2009, Marine Environment Management Act established in 2007). On the one hand, the current stage of industrialization will probably increase environmental degradation and deplete natural resources, but on the other hand economic growth can eventually mitigate environmental problems due to growing awareness in society and new regulatory government policies (Kim Jeong-in, Oh Kyeong-hee, 2005).

6.2.2 *Political culture*

Conflicts and dispute that inevitably occur in fisheries society or economy must be mediated and a uniform order must be maintained. Perceptions and attitudes of members of fishing communities influence their behaviors. Political attitudes, values, sentiments or information collectively held by members of a particular society also influence the way the political process is run. Certain situations or conditions may not be a problem in a tolerant society but may be the cause of conflict in another society.

Therefore, it is important to understand how political attitudes among members of a particular society are distributed in order to understand where the current or future politics will be headed. Such distribution is known as political culture (Kim Sae-gyun *et al.*, 2003).

Political culture is generally comprised of three orientations. The first is a cognitive orientation, or empirical beliefs. It is about people's knowledge about political phenomena. For instance, most of fishermen believe that the central government and local governments exercise an important influence on their fishing and daily activities. These beliefs greatly affect the inter-relationship between the ruler and the ruled. The second is evaluative orientation, or preferences of values. This refers to what individuals can gain from public goals and government actions. The question of 'what the government can do for me' is closely associated with the judgment of what one deems important and valuable in life. For some people, fair maintenance of law and order matters most; for others, communication between the government and economic players on social and economic issues is a priority. The third orientation is affective or emotional orientation, often expressed in one's likes and dislikes on perceived political behavior. For instance, many fishermen do not take pride in the government (fisheries policies) and its political behaviors (e.g., legislative behavior of the National Assembly regarding the fisheries sector) as far as the fisheries sector is concerned.

Political culture influences perceptions of laws, policies and institutions, through the cognitive, evaluative and affective orientations held by assemblymen, public officials, stakeholders, and communities of practice.

6.2.3 Fishing technologies

Fishing vessels used in onshore fisheries originated from sailing vessels which evolved into steel vessels and later into Fiberglass Reinforced Plastics (FRP) vessels with strong motor power. Fishing gear and fishing techniques have also rapidly advanced. Advances in live fish transport and refrigeration technologies have led to substantially added value in fishery products captured in coastal waters. While advances in technologies for fostering fishery resources have been significant, they fail to keep up with the growth of fishing intensity (e.g., through the development of technologies for increasing catches). As a result, onshore resources continue to decline.

Advances in fishing technologies tend to dynamically generate problems in fishery resource management and aggravate conflicts within and between fisheries, thereby restricting the improvement of fisheries institutions and governance. For instance, the current fisheries management institutions fail to embrace new fishing techniques developed by fishermen and thus inevitably generate an imbalance between the reality of fishermen and institutional arrangements written on paper. The discord between reality and institutional arrangement results in continued, and increased, illegal fishing and hampered effectiveness of resource management institutions and onshore fisheries governance.

6.2.4 Social and cultural norms

Social norms are the rules of social life, such as ethical, customary and legal norms. For members of society to live together peacefully, they must follow the rules generally accepted in their society. These rules were developed by religions, prevailing ethics or customary etiquettes at different times in the past. As society progressed and economic life became more complex, it became necessary to have various social norms (e.g., rules for fishing village cooperatives) to maintain a peaceful community life. Social norms like laws and institutions became more important due to the growing need to force compliance of the people.

Cultural elements of onshore fishing communities, such as institutions, roles and norms, have the goal of promoting a sustainable development of onshore fishing communities and are essential to ensure long and continued existence of the society. The social system is a functional unit composed of cultural and social elements that each has an indispensable and positive role in supporting the social system.

Cultural norms in fisheries are inherited and evolve within the phenomena of cultural assimilation, cultural propagation and cultural lag. Generally, non-material culture (e.g., awareness, customs) lags behind material culture (e.g., fishing technology), resulting in delayed adjustment known as cultural lag. Under these conditions, social order (e.g., fisheries order) becomes unstable.

7. IMPROVEMENT DIRECTIONS FOR FISHERIES GOVERNANCE

7.1 Development of evaluation indicators in fisheries governance

It is important to understand and compare the problems with the current governance of fisheries in Korea to a 'good' governance model. For this, it is necessary to develop indicators (e.g., income, voice/accountability, political instability, government effectiveness, regulatory burden, rule of law, awareness) for reviewing and evaluating governance. Quantitative indicators do not produce accurate results but are very useful for several other reasons. Firstly, a database for evaluating onshore fisheries governance can be dynamically built. Secondly, the database can be used to establish causal relationships. Thirdly, governance can be dynamically improved based on the analysis of results.

The World Bank has played a leading role in the development of governance evaluation indicators, (Daniel Kaufmann·Aart Kraay·Pablo Zoido-Lotaton 1999/2002, Daniel Kaufmann·Aart Kraay·Massimo Mastruzzi 2003, Daniel Kaufmann·Aart Kraay 2008), and it seems that the World Bank's indicator development methodology is applicable to Korea in order to systematically review and evaluate its onshore fisheries governance, as well as overall fisheries governance.

7.2 Development of sources of income other than fisheries

Income of fishing households is broadly divided between fishery income and non-fishery income. Korean onshore fishing households are located in the monsoon climate zone and mostly engage in small scale fisheries using small fishing grounds, hence contributing to a small percentage of the overall economy of fishing communities and seashore regions. Fishery income accounts for approximately 60 percent while non-fishery income account for approximately 40 percent, in the income of onshore fishing households. While fishery income can be somewhat increased using onshore fishery resources, there are obviously limitations in boosting fishery income substantially and continuously given the limited capacity of onshore fishing grounds to sustain resources.

One solution could be to develop income sources from non-fishery areas (e.g., eco-tourism in fishing villages). In fact, Korea has plenty of tourist resources to offer in fishing villages, such as fishing resources, historic sites, scenery, and beaches. With the five-day work week system taking root in Korea, access to coastal fishing villages and seas is substantially improving and demand for leisure activities and sightseeing is exponentially rising. As a result, the number of tourists visiting fishing villages is steadily increasing.

Therefore, fisheries laws, institutions and governance need to be dramatically improved to facilitate accommodation of these changes and support the development of non-fishery income sources. If the spread of alternative sources of income, such as tourism, across coastal areas is actively developed, non-fishery income is likely to rise.

Hopefully this will encourage onshore fishing communities to pay better attention to the sustainability of marine resources and to become more engaged in effectively using and managing resources with a sustainable mindset.

7.3 Raising political and social awareness about sustainable development

As onshore fishery resources are increasingly depleting, onshore fishing communities are intent on developing fishing gear and techniques that boost fishing efficiency. Onshore fisheries that focus on non-stationary or stationary fisheries basically use the same fishing gear and techniques regardless of fish species. These, along with fishermen's patterns of behavior to obtain as much production output as possible, lead to overfishing of onshore fishery resources.

Even if selective use of fishing gear and techniques is vital for a sustained development of onshore fisheries, onshore fishermen will have to endure reduced fishery income in the short run. In reality, using environmentally-friendly fishing gear is not easy for fishermen who have to support their families and bear high education costs for their children. It is not difficult to advocate the development and necessity of environmentally-friendly fishing gear and techniques, but making it happen will require stable sources of alternative income or temporary government assistance enabling fishermen to endure a reduced income during the transition period.

In particular, proper development and dissemination of fishing technologies requiring social capital requires awareness among fishermen. At the same time it is important to develop a practical mechanism that can draw political and social consensus; because environmentally-friendly policies require new laws, institutions and a large amount of budget. For instance, it is necessary to coordinate the roles and functions of regional fisheries coordination committees with the decentralization system and promote their status as a decision-making body.

7.4 Geographic division between onshore fishing grounds and offshore fishing grounds

Under the Fisheries Act, onshore fisheries require permits from mayors or governors and involve use of non-motorized fishing vessels, motorized fishing vessels of less than 8 gross tons, or motorized fishing vessels of 8 to 10 gross tons as specified by the presidential decree to ensure safe operations of fishing vessels and coordination of fisheries. Demarcated fisheries in which fishing gear is installed in designated fishery zones and fishing is done using non-motorized fishing vessels, motorized fishing vessels of less than 5 gross tons, or fishing gear; inland aquaculture in which marine animals and plants are cultivated in artificially constructed inland seas; and seed production fisheries in which fish seed is produced in facilities installed in seas, seashores or artificially constructed inland seas are all categorized as mayor/governor permit fisheries (Article 41, paragraph 3 of the Fisheries Act).

When onshore fisheries are defined based on the tonnage of fishing vessels, not based on geographical boundaries, conflicts between small-scale onshore fisheries and large-scale off-shore fisheries are inevitable, and it becomes extremely difficult to define separate objectives and scope of policies. Geographic division of these two types of fisheries will allow for the establishment of better and more effective legal, institutional and governance frameworks, as well as development and enforcement of society and welfare-centered onshore fishery policies and market-centered offshore fishery policies.

7.5 Adjustment of authority for on-shore fishery permits

Under the current Fisheries Act, onshore fisheries must be approved by mayors or governors, and those who obtained the permits must perform within the sphere of jurisdiction of mayors or governors. The problem is that the Minister for Food,

Agriculture, Forestry and Fisheries, mayors and governors all have the joint responsibility for the management of on-shore fishery resources, but the number of permits per mayor/governor, restrictions and conditions for each type of on-shore fisheries are determined by the decree of the Ministry for Food, Agriculture, Forestry and Fisheries, thereby restricting the ability of local government heads in the application of fisheries institutions suitable for their respective regions.

Considering that onshore fishery resources are inseparable from offshore fishery resources, and to minimize conflicts among regions in regard to the operation of fisheries institutions, this type of management of fisheries institutions may be effective, but it conflicts with the very purpose of mayor/government fishery permit system. For instance, local governments can only exercise their permit right within the number of permits set by the central government and provide related reports. However, when conflicts or disputes between onshore fishermen or fisheries occur, local governments have to pass the cases onto the central government because they have no authority. Furthermore, when fishermen have something to complain about, they file complaints with the minister for Food, Agriculture, Forestry and Fisheries, not with their mayors or governors. Management of fisheries institutions within the jurisdiction of mayors or governors therefore needs to be left to the sole discretion of mayors and governors so that they can appropriately operate relevant fisheries institutions for their own regions.

7.6 Reorganization of fisheries and maritime administrative organization

Currently, the Ministry for Food, Agriculture, Forestry and Fisheries controls laws and institutions related to the use and management of fishery resources and fishing grounds, and the Ministry of Land, Transport and Maritime Affairs controls maritime territories, marine environment and shores management. If administrative functions for fisheries and maritime affairs continue to remain dispersed as they are today, it would be inevitable that the fisheries administrative organization is dependent on the maritime administrative organization. This practically turns fisheries administration into a system that leases the seas to fishermen.

The most critical issue of the dispersed fisheries and maritime administrative functions is the fact that although the ocean and fishery resources co-exist, fisheries administration and maritime administration organizations are run separately. In fact, management of shores is essential for the management of coastal fishing grounds (including spawning grounds and habitats) and fishery resources, as the two have a complementary relationship. If fisheries and maritime policies are not integrated; fisheries laws, institutions and governance may be seriously restricted. For instance, although most sand dunes of the sea are spawning grounds or habitats of marine life, tenure rights of sea sand are managed by the Ministry of Land, Transport and Maritime Affairs while marine life is managed by the Ministry for Food, Agriculture, Forestry and Fisheries. Management of shores also shows similar patterns of division.

For resolution of these conflicts among fisheries enterprises and the administration, it seems reasonable to call for the integration of the two organizations.

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Research on a model case of governance of coastal fishery: Self-regulatory management of fisheries in Gusipo Community

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1. INTRODUCTION

In Korea, where the three sides of the territory is surrounded by sea, coastal boat fishing has developed in coastal areas, playing a central role in socio-economic aspects of coastal communities. However, with worsening condition in coastal resources due to overfishing and accompanying depletion thereof, natural disasters, and environmental deterioration, coastal fishing forces are dwindling, and the traditional form and system of centralized administration is found to be inadequate to manage coastal fisheries and reflect the actual conditions of coastal areas. Particularly, in the case of coastal fishery, despite the fact that actual conditions differ by region or kind of fishery, uniform standards of management are being applied to most cases, which means the absence of adequate measures of management that take into account the actual conditions of each region and individual fishing industry.

In addition to such difficulties in resources and management, and with the continuation of the system and administrative conditions that can hardly reflect the conditions of the actual field, forces of coastal fishery have weakened even to the point where a large number of fishermen in coastal areas abandoned fishing.

In other words, existing fishery resources management that is led by the government has limits in reflecting the various characteristics that differ by region and kind of fishery; rather, the existing system induces competitive operation, leading to overfishing, which, in turn, results in the deterioration of the fishery business. From the repetition of such a vicious cycle, it was recognized that securing sustainable fishery is unfeasible under the current system.

In particular, with the current emphasis on the importance of self-regulatory management of shared resources, it was recognized that in addition to the government system, participation of fishermen themselves in the management of coastal fisheries would be more effective also in the case of coastal fishery. Based on such recognition, the South Korean government introduced self-regulatory fishery in 2000. The intent was to induce voluntary participation of fishermen, the main agents who use fishery resources, so that they would create and manage resources as well as banish illegal fishing, and thus build the foundation for sustainable fishery production. As a result, outstanding examples have recently appeared.

Recently, with global emphasis on the new concept of governance, management performed in cooperation between the government and private sectors, the necessity of participation of private sectors as well as the government is being emphasized. In

light of this, self-regulatory management of fisheries in Korea can be regarded as an excellent example.

This research intends to examine an exemplary case of governance of coastal fishery, the case of Gusipo, a self-regulatory coastal fishery community.

2. MODEL CASE OF GOVERNANCE OF COASTAL FISHERY

2.1 Selection Criteria

As a representative case of governance of coastal fishery, self-regulatory fishery can be cited. Self-regulatory fishery was introduced based on the realization that regional characteristics cannot be taken into consideration with the existing government-led management of coastal fishery resources, and accordingly, participation of fishermen themselves, the main agents using fishing grounds and fishery resources, is necessary. Self-regulatory fishery can in this sense be called a movement for a new fishing village that tries to overcome the limitations of government-led management of fishery resources through autonomous management by fishermen themselves of fishing grounds and resources.

This self-regulatory fishery was promoted in earnest with the beginning of a demonstration project in 63 self-regulatory communities in 2001. In 2010, which marked the tenth year of its implementation, the participation increased to 863 communities, expanding full-scale and reaching the stage beyond foundation-building.

TABLE 1
State of Participation in Self-Regulatory Fishery by Year

Classification	'01	'03	'05	'06	'07	'08	'09	'10
Communities(Number of them)	63	122	308	445	579	659	758	863
Year-on-Year Increase Rate (%)	-	54.4	77.0	44.5	30.1	13.8	15.0	13.8

Date: Resources Recovery Division, the Ministry for Food, Agriculture, Forestry and Fisheries, Plan for System Improvement regarding Self-Regulatory Fishery and Project Promotion for 2011.

With a full-fledged expansion of self-regulatory fishery, such success cases as income increased in participating communities began to be seen. With this, the Ministry for Food, Agriculture, Forestry and Fisheries selected 13 communities, including Gusipo

TABLE 2
Success Cases of Self-Regulatory Fishery

Classification	Type of Fishery	Participation Date	Location
Sun-jae Self-Regulatory Community	Bare-Hand Fishing	Oct. 2007	Ongjin-gun, Incheon City
Baekmiri Self-Regulatory Community	Agriculture-Fishery Combined	Jan. 2006 1	Seoshin-myeon, Hwasung-city
Yedang Self-Regulatory Community	Inland Water Fisheries	Jan. 2005 1	Daehung- myeon, Yesan-gun
Jangjado Self-Regulatory Community	Combined Fisheries	Jan. 2005	Okdo-myeon, Gunsan-city
Gusipo Self-Regulatory Community	Vessel Fishing	Jan. 2003 1	Sangha-myeon, Gochang-gun
Tando-bay Self-Regulatory Community	Vessel Fishing (Longline Fishing of Small Octopus)	Jan. 2003 1	Mangwoon-myeon, Mooan-gun
Bojun Self-Regulatory Community of Abalone Fishery	Abalone Cultivation	Jan. 2005 1	Jisan--myeon, Jindo-gun
Jukkeum Self-Regulatory Community	Community Fisheries	Dec. 2005	Hwajung-myeon, Yeosu-city
Aenggang-bay Self-Regulatory Community	Community Fisheries	Aug. 2001	Idong-myeon, Namhae-gun
SSanggeun Self-Regulatory Community	Vessel Fishing	Dec. 2005	Nambu-myeon, Gyeoje-city
Gusanri Self-Regulatory Community	Community Fisheries	Nov. 2003	Pyunghae-eup, Uljin-gun
Jangho Self-Regulatory Community	Community Fisheries	Feb. 2007	Geun-duk-myeon, Samchuk-city
Sagyeri Self-Regulatory Community	Community Fisheries	Jan. 2005 1	Aanduck-myeon, Seoguipo-city

Data: Collection of Success Cases of Self-Regulatory Fisheries, Korea Fisheries Association, 2010.

self-regulatory community, and is utilizing them for promotion and as a field for on-the-spot training and information dissemination.

The reasons for selecting Gusipo self-regulatory community out of all the success cases of coastal fishery governance include the following: Gusipo is engaged in vessel fishing, one of the most vibrant fishing industries; management of fishery resources, in particular, including the observance of closed season, fish size banned from capturing and seed relief, is implemented well; environmental improvement measures of fishing grounds, including the cleaning of fishing grounds and extermination of harmful organisms, are carried out well; and the conflicts among community members are well managed.

2.2 Background to Organization of Self-Regulatory Community in Gusipo

The village of Gusipo, abutting the Gomso Bay, had rich fishery resources due to the effect of freshwater flowing in from the nearby Incheon River, fields, mountain and brook, including blue crab, shiba shrimp, gray mullet, webfoot octopus, etc. But when Youngkwang Nuclear Power Plant was built in 1978, fishery resources in the area decreased drastically.

With the construction of Youngkwang Nuclear Power Plant, the plant purchased the fishing rights to the fishing ground of Gusipo, and the fishermen who lost the right to community fisheries entered the coastal fishing industry for livelihood, which caused overfishing of resources. In other words, with the increased number of fishermen competitively engaging in fishing when fishery resources are limited, illegal fishing became prevalent, which caused depletion of fishery resources. Furthermore, hot waste water flowing out from the nuclear power plant raised the temperature of seawater by 6 to 7 degrees Celsius, which contributed to the decrease of fishery resources including those of blue crab and fish.

Since the end of 1990, fishery resources have diminished rapidly due to changes in the marine environment that were caused by illegal fishing and hot waste water from the nuclear power plant, resulting in the decrease of income of fishing households and even situations in which some left the fishing industry altogether.

The villagers who were faced with many difficulties reached the conclusion that the only way of solving their problems was to introduce self-regulatory fishery and join the self-regulatory community. Since then, they have carried out basic projects for self-regulatory fishery, including cleaning of fishing grounds and coastlines more than twice a month, and started to recover fishery resources through resources management projects, including the establishment and observance of a closed season and fish sizes banned from capture as well as seed release. In addition, through continued consultation with the Youngkwang Nuclear Power Plant, a breakwater of 13.5 kilometers was built by the plant to minimize the damage caused by hot waste water.

Through such efforts, the Gusipo self-regulatory community was selected as a community of excellence” in 2008, “community of abundance and productivity” in 2009 and the “best community” in 2010. Seventy-two members are in operation in this community and each household makes an yearly income of around W27 million, catching webfoot octopus and blue crab in spring, croaker and blue crab in fall and gray mullet, etc. in winter.

TABLE 3

Current State of Gusipo Self-Regulatory Community

Type	No. of Fishing Households	Fishing Population	Number of Participants	Fishing vessel	Number of Rights to Fish	Income of Fishing Household
Vessel Fishing	82	290 prs.	72 prs.	94 boats	149	W27 million

Data : Internal Data of Gusipo Self-Regulatory Community

2.3 Promoted Activities and Results from Gusipo Self-Regulatory Community

2.3.1 Promoted Activities

2.3.1.1 Resources Management

Gusipo self-regulatory community, with a view to maintain a sustainable level of resources, implemented such projects as the establishment of a closed fishing season and banned fish sizes, seed release, creation of spawning grounds, prevention of illegal fishing, etc.

Above all, in the case of the closed fishing season of webfoot octopus, the community established and has been observing the closed season from 25 April to 25 September despite lack of existing regulation in the Fisheries Resources Management Act. As for blue crab, the community established the closed season from 16 June to 30 August, which was stricter than the regulation under Fisheries Resources Management Act, and has been observing it since. In the case of rockfish, although the Fisheries Resources Management Act provides that the size banned from capture is 15 centimeters or smaller, the Gusipo community set the size at 20 centimeters or smaller.

TABLE 4
Establishment of Closed Fishing Season and Fish Size Banned from Capture

Classification	Fishery Resources Management Act	Gusipo	Remarks
Closed Season for Webfoot Octopus	-	April 25~Sept. 25	Newly Inserted
Closed Season for Blue Crab	June 16~Aug. 15	June 16~Aug. 30	15 days lengthened
Rockfish Size Banned from Capture	15 cm or smaller	20 cm or smaller	Tightened the standard by 5cm

Data : Internal Data of Gusipo Self-Regulatory Community

The seed release project is conducted annually in cooperation with the Ministry for Food, Agriculture, and Fisheries, Fisheries Experiment Research Institute, Gochang Gun Office, and Fisheries Cooperative. According to the record of seed release for the past five years, 50 000 of webfoot octopus, 15 tons of hard clam, 300 000 of halibut, 200 000 of live amorclad rockfish, 50 000 of blue crab, 50 000 of Japanese black porgy, and 1 000 000 of prawn were released. In addition, the community makes an effort to create spawning grounds to manage fishery resources; for instance, they put 1 million conch shells in the sea for spawning of webfoot octopus, a major fishery product of the Gusipo Port. That is, compared to the passive management of fishing grounds of the past when management of fishing grounds was dependent on existing natural production or the appropriate management of fishing grounds was not pursued, self-regulatory fishery, through artificial creation of resources by seed release, creation of spawning grounds, and establishment of a positive management system of fishing grounds, has promoted stable increases in production and income.



All members play an important role in preventing illegal fishing. Although penalties for illegal fishing are determined by the regulations of the community, rather than punish according to the regulations, members first seek to enlighten villagers about the consequences of illegal fishing and thus raise awareness.

Because the fishermen in the weir trap fishing were under economic pressure, they were granted to fish for webfoot octopus. The community also unanimously decided to prohibit the use of both shrimp beam trawls and dragnets.



2.3.1.2 Environmental Improvement of Fishing Grounds

Gusipo community, based on the awareness that improvement of the environment of fishing grounds is as important as resources management in securing a sustainable fishing industry, is making efforts for environmental improvement of fishing grounds through collection and disposal of marine wastes and the extermination of harmful organisms. Particularly, in terms of collection and disposal of marine wastes, this community is doing better than any other fishing communities of the nation.

Members of the community gather basically more than twice a month for the collection and disposal of marine wastes. They first collect waste fishing gears dredged while fishing or debris in the collection place in the sea, and when a certain quantity of waste is collected, all the members gather to transport them to the inland collection place and dispose it.



The reason that collection and disposal of waste are carried out well in this community lies in the fact that the fishermen prepared a space (collection place in the sea) where marine wastes, including waste fishing gear that fishermen had collected while fishing, can be easily collected in the collection place in the sea and that they operate an inland collection area where collected wastes can be disposed of. These collection places in the sea and inland was realized after this community continuously explained the necessity of collection and disposal of marine wastes to Gochang Gun Office, filed a complaint, and thereby received support from the Gun Office.

This community also manages the environment of fishing grounds by periodically cleaning up the coastline and placing waste buckets in many places for the use of anglers. In addition, the community annually exterminates more than 100 tons of starfish, a harmful organism, for about a month, from June to July.



2.3.1.3 Other Projects

The fishery harbor of Gusipo had difficulties with bringing boats alongside the pier. However, with the installation of a landing stage, bringing boats to piers and entering and leaving the harbor have become easier. The cost for installing the landing stage was covered by the support fund worth ₩90 million that the community received for being selected as the excellent community of 2009. As the members saw their diligent efforts on self-regulatory fishery paying off, they became more faithful in performing activities related to community-based fishery management and as a result, received a support fund of ₩200 million that was offered to abundance-class community in 2010 as well as ₩300 million offered to the best community in 2011. The support fund they received in 2010 was used to expand the existing facility of the landing stage, and funding received in 2011 will be used for installing a mobile marine pension to be operated as a revenue-making business.

Gusipo community, in addition to resources management and the projects to improve the environment of fishing grounds, held events for external exchanges, including the setting up of sisterhood with Gunsan Branch of Korea Ship Safety Technology Authority in March 2006, and establishing a fishing ground experience program. The members of the community also held internal events, including the organization of a fishing village cooperative, a rally to strengthen unity among young adults, a ship inspection experience event, and publicizing events for self-regulatory fishery, thereby cultivating friendship among the members.



In addition, the community is making efforts for the progress of the local fishing community and positively participating in voluntary services: it has been donating the Hankook Children’s Daily to Sangha Elementary School in Gochang-gun (15 copies a day/ Paying 600 000 Won a year), donated a TV set to the senior citizen center in the region, and annually holds a party in honor of the aged.

2.3.2 Achievements of Operation

Gusipo self-regulatory community has been investing a certain amount of working expenses in projects for resources management and environmental improvement of fishing grounds annually since 2004: a total of 370 million won was invested until 2010. In the year 2008 and 2010, in particular, it was selected as an excellent community and received a support fund, which was spent on installing a landing stage, a facility used to bringing fishing boats alongside the pier, increasing the convenience of community members.

TABLE 5
Current State of Investment of Gusipo Self-Regulatory Community (Unit: 1,000 won)

Classification	2004	2005	2006	2007	2008	2009	2010
Resources Management	• Seed Release: 4 000	• Seed Release: 4 000 • Spawning Grounds: 5 000	• Seed Release: 5 000 • Spawning Grounds: 5 000	• Seed Release: 5 000 • Spawning Grounds: 5 000	• Seed Release: 5 000 • Spawning Grounds: 5 000	• Seed Release: 5 000 • Spawning Grounds: 5 000	• Seed Release: 5 000 • Spawning Grounds: 5 000
Environment of Fishing Grounds	• Cleaning of Fishing Grounds: 1 000	• Cleaning of Fishing Grounds: 1 500	• Cleaning of Fishing Grounds: 2 000	• Cleaning of Fishing Grounds: 3 000	• Cleaning of Fishing Grounds: 5 000	• Cleaning of Fishing Grounds: 5 000	• Cleaning of Fishing Grounds: 5 000
Infrastructure					• Facility used to bring boats alongside the pier: 90 000		• Facility used to bring boats alongside the pier: 200 000
Total	5 000	10 500	12 000	13 000	105 000	15 000	210 000

Data : Internal Data of Gusipo Self-Regulatory Community

Since Gusipo community carried out basic projects for self-regulatory management of fishery, including the creation of spawning grounds of webfoot octopus, observance of the period banned from capture, and cleaning the fishing grounds and coastline more than twice a month, concrete results appeared, including the catching of autumn

webfoot octopus, which used to not be caught, and increased income of individual households. More specifically, in terms of output, it increased from 216 tons in 2006 to 311 tons in 2009, a 44 percent increase compared to 2006; fishery income per household increased from 18 million won in 2006 to 27 million won in 2010, an increase of about 9 million won.

TABLE 6
Results of Self-Regulatory Management of Fisheries

Classification	2006	2007	2008	2009	2010	06/10 Increase rate (%)
Output(ton)	216	236	264	311		44.0
Gross Income (1 million won)	1 296	1 440	1 584	1 800	1 944	50.0
Fishery Income Per Household (1 million won)	18	20	22	25	27	50.0

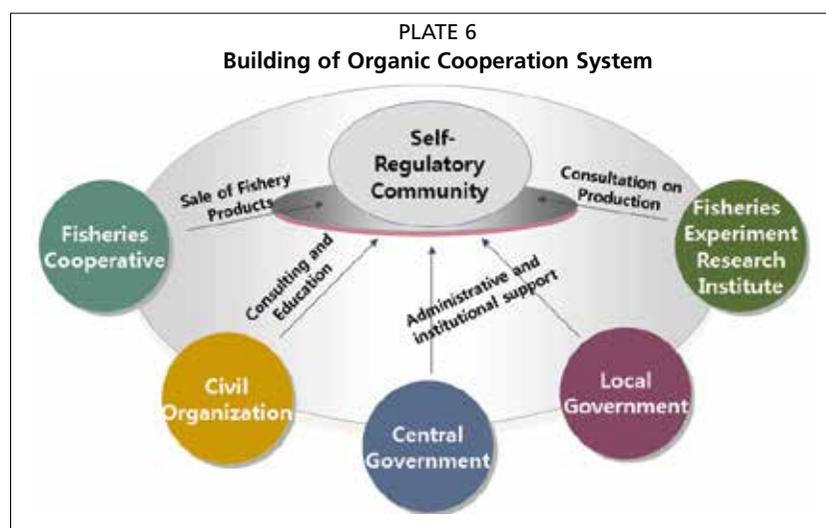
Data: Internal Data of Gusipo Self-Regulatory Community

3. SUCCESS FACTORS

3.1 Building of Organic Cooperation System

For successful promotion of a project, building an organic cooperation system among related bodies is of utmost importance. That is, no matter how enthusiastically the main agent of the project promotes it, it is likely to fail without administrative and institutional support for the project. In the case of fishery resources, in particular, since they have the characteristics of public property, building an organic cooperation system amongst related organizations is all the more necessary.

Gusipo self-regulatory management could achieve success because an organic cooperation system among the central government, local government, private organizations and the self-regulatory community was well established. In other words, Gusipo community carried out basic projects for self-regulatory management of fishery; the central government provided necessary administrative and institutional support; and the part of support that cannot be provided by the central government was met by the local government. Fisheries Experiment Research Institute provided consultation on production and seeds, playing a part in resources management. The fisheries cooperative helped the sale of fishery products, and private organizations including Korea Fisheries Association contributed to the positive participation of community members in self-regulatory fishery through the provision of consulting and education.



3.2 Role of a Leader

The dictionary definition of a leader is a person who takes the initiative and leads people to forge ahead. Hustedde (1991) defined the leader who leads a local community as an individual or a series of groups that nurtures the problem-solving ability of other people and affects or motivates them in a democratic environment in order to bring about socio-economic changes (Lee Sung-Chung Ji-Woong, 2002).

The role of a leader for an enterprise or a community in this modern society is important before everything else. According to the kind of role a leader performs, an enterprise or a community can be developed on a sustainable basis, or on the contrary, fall or be broken.

A world-renown management consultant Stephen R. Covey, who became famous with his book *7 Habits of Highly Effective People* suggested modeling, path finding, aligning and empowering as the four key roles of a leader.

Dr. Covey explained that modeling is “the stage of preparation before departure”, where a leader has to show an example. That is, he emphasized, as there is the hypothesis that 89 percent of what we learn comes from what we see, that a leader should take the initiative and set an example.

The second role of a leader is path finding. In this stage, the leader should get hold of the specific needs of members and start from the need that the members clearly realize.

The third role is aligning. After a goal and direction are decided, concentrating all the energy on achieving the goal is necessary.

Finally, the role of empowering is to provide the members with the opportunity for training to maximize their potential, and to endow those prepared with maximum discretionary power. Dr. Covey said that the most important factor for raising the quality of an organization is trust and emphasized that an organization can accomplish its vision through trust.

In the case of the Gusipo community, there existed a leader who could lead the community in the right way: the chairman of the committee carried out the four roles of a leader faithfully. More specifically, at first, fishery resources were recovered through self-regulatory management, then the goal to raise the income was set.

After setting the goal, the leader took the initiative in the eradication of illegal fishing and collection and disposal of marine wastes. In the beginning, participation of the members, who were steeped in old practice, was low; however, with time, participation increased by one to two persons, and finally all members participated positively.

Next, the leader, by positively taking the demands of members into consideration, raised the participation and satisfaction level of members. For instance, the rules and regulations regarding the closed season and fish size banned from catching were established at the level that could be accommodated by the members through consultation, and the support fund that the community received as an award for being selected as an excellent community was invested in installing the facility used to bring boats alongside the pier, the facility most required by the members.

The rules and regulations regarding resources management and obligations regarding environmental improvement of fishing grounds, which were prepared through consultation with members, were thoroughly fulfilled by all the members, and as a result, the community received the award of encouragement in 2008, a award of abundance in 2009, and the best community award in 2020 — the total support fund reached ₩590 million.

Finally, with a view to secure trust among members, the most important factor in running a community, the account book was opened to the members and thereby removed the room for distrust among them, and appropriate sharing of roles among members made them feel like they owned the community and infused the sense of duty into them.

3.3 Thorough Observance of Rules and Regulations

What affected the recovery of fishery resources in Gusipo Port most were the rules and regulations regarding resources management and the environmental improvement projects of fishing grounds. As mentioned earlier, Gusipo self-regulatory community set stronger standards for closed season and banned fish sizes than those under the relevant law, and obeyed them thoroughly. In addition to this, the community releases fry of webfoot octopus, hard clam, halibut, blue crab, etc., the fish species that are major products of the region, every year and also make efforts to create artificial resources through the creation of spawning grounds for webfoot octopus, etc. As a result, autumn webfoot octopus, which used to not be caught, suddenly became available and the income of individual household rose.

Along with resources management, those projects for improving the environment of fishing grounds, including the collection and disposal of marine waste and extermination of harmful organisms, are conducted periodically, making a fundamental contribution to the recovery of fishery resources. In the case of marine waste, in particular, by installing inland and in-the-sea collection places, all kinds of marine waste and garbage on the coastline as well as waste fishing gear in fishing grounds are collected and disposed of, providing a pleasant environment for villages and tourists.

3.4 Fair Operation of Community

For a successful operation of an organization or a community, trust, friendship and development of the bond of sympathy among members are necessary. To this end, a fair community operation system, which includes transparent operation of community, preparation of measures to solve conflicts, a justifiable policy decision process, etc., should be established. Without such a fair operation system, distrust and conflicts among members will be continued and the community will be disintegrated.

To prevent such incidents, Gusipo community opens the account book to the members in prevention of distrust among members and tries to achieve prior prevention of conflicts between members: it holds general and special meetings and deals with complaints of members and matters to be improved. However, the principle is that bringing up complaints in private gatherings is not permitted: they are to be raised during such official occasions as general or special meetings.

In addition, such occasions where members of the community gather together to socialize with other members are prepared every year to promote a bond between members; fellowship has been strengthened through positive participation in the family events of members. For instance, in September of 2006, the community offered a total of W10 million including W5 million from the fund of the community as well as other donations to support the medical expenses of a child of a community member who suffered from leukemia.

3.5 Change of Perception through Education

The existence of the leader alone is not enough to induce positive participation of the members in self-regulatory fishery. In this context, Gusipo community takes a study tour once or twice a year to see and experience how their counterparts in more advanced communities are practicing community-based self-regulatory management, and that is how Gusipo community changed the perception of its members. In addition to study tours, frequently given opportunities for education, including consulting given by private organizations, has urged the members realize the importance of self-regulatory management of fisheries and put what they learned into practice.

Consequently, Gusipo self-regulatory community was selected as a success case and is currently utilized as a training program for self-regulatory fisheries.

4. CONCLUSION AND IMPLICATIONS

Coastal fisheries have played the role of socio-economic center in fishing villages in Korea. Recently, however, fishermen who were engaged in coastal fisheries went through such difficulties as abandoning fishing due to overfishing and depletion, etc. of coastal resources. Of course, the government had prepared a management system for fishery resources, but with such policies that did not take into consideration diverse characteristics by region and type of fishery, there were limits in securing sustainable fisheries.

Therefore, the government, recognizing the fact that securing sustainable fisheries was impossible with existing policies alone, positively introduced self-regulatory fisheries that directly involved fishermen in the fishery management in 2000. Self-regulatory fishery is a project that supports fishermen, the main agents of using resources, in creating and managing resources as well as eradicating illegal fishing. As a result, excellent cases have appeared recently.

With the recent emphasis on governance, participation of civilians as well as the government is also emphasized. From the viewpoint of governance, self-regulatory fisheries can be regarded as an excellent example.

As described earlier, Gusipo self-regulatory community saw fishery resources rapidly decrease with the construction of Youngkwang Nuclear Power Plant in the neighborhood, and reached the conclusion that for a sustainable fishing industry they had to adopt the self-regulatory management of fisheries and joined the self-regulatory community in 2003. Since then, Gusipo community has recovered fishery resources by faithfully carrying out basic projects for self-regulatory fishery, including the creation of spawning grounds of webfoot octopus and observance of the closed season, cleaning fishing grounds and coastlines twice every month, etc.

Building an organic cooperation system, the role of the leader, thorough observance of rules and regulations, fair operation of community, and change of perception of its members through education can be cited as the reasons why Gusipo self-regulatory community could recover fishery resources in a comparatively short time.

Above all, Gusipo self-regulatory community made efforts for the projects to be implemented effectively by building an organic cooperation system with organizations related to the promotion of projects including the central government, local government, Fisheries Experiment Research Institute, Fisheries Cooperative, civil organizations, etc. Also, with the leader of the community as the center, the whole community fulfilled rules and regulations regarding resources management and environment of fishing grounds; through fair operation of the community, it sought to prevent distrust and conflicts among members. Also, through study tours and diverse kinds of educational opportunities, the perception of members changed.

Implications for desirable governance of coastal fisheries drawn from the example of Gusipo community are as follows.

In order to carry out sustainable fisheries governance, preparations of rules and regulations that take into account the regional conditions should be made and observed for systematic management of fishery resources. To assure this, a leader who can lead the community in the right way should be discovered and nurtured so that all the members of community can manage fishery resources in unity.

In addition, continued education and consultation on the importance of governance of coastal fisheries are necessary. Incentives for those communities where governance is implemented smoothly should be expanded in order to motivate them.

Above all, establishment of an organic cooperation system amongst the government, local government, private organizations will be vital.

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Case study on the conflict settlement process in coastal fisheries

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1. INTRODUCTION

Fisheries with fishing vessels in the Korean EEZ are classified into three categories, coastal fisheries and offshore fisheries. Coastal and offshore fisheries are officially distinguished by the gross tonnage of the fishing boat or whether the fishing boat weights under or over 8 gross tonnages. Coastal fisheries, operated by fishing vessels less than 8 gross tonnage, are granted fishing permits by head of a local government such as city mayor, county chief, and chief of ward district office, while offshore fisheries, operated by fishing vessels of 8 gross tonnage or over, are permitted by the head of central government. There are no official regulations regarding the fishing areas on the coastal side with the exception of the trawl fishing and dragnet fishing.

Coastal fisheries is a policy terminology that is used when fishing takes place in areas generally recognized as the coastal waters. Coastal waters refer to the waters close enough to return to the base fishing port on the same day after fishing. In general, the definition of the coastal waters includes the distance from the coast of 3 nautical miles, but there is no regulatory standard. Even if the water is within three nautical miles from the coast, when fishing takes place in the areas located far from the base fishing port, it is generally recognized that this area be called coastal waters. Coastal fisheries includes Anchovy Drag Net Fishery, Diving Apparatus Fishery, and Offshore Dredge Net Fishery.

Coastal fisheries center around intensive labor with small fishing boat, managed mostly by fisheryhouseholds. Although family labor comprises most of the fishing household labor, due to the younger generation's reluctance to serve in fisheries, spousal labor is the main type of labor in fishing. Most of fishing is family business, influenced by regionalism or kinship factors.

Coastal fisheries, therefore, has strong local characteristics in terms of labor composition, fishing grounds, and the sales of the fish caught. Concerning policy, efforts are made to improve the economic status by organizing associations such as the establishment of "fisheries cooperatives by district" by city and country and the "fishing village cooperatives", lower-level organizations institutionalized by the "Fisheries Cooperatives Act", so as to gain efficiency from the policies by systematically organizing the fishing households.

2. STATUS OF GOVERNANCE OF COASTAL FISHERIES

2.1 Policy Goals on Coastal Fisheries

In 1953, the "Fisheries Act" was enacted along with the "Fisheries Cooperatives Act" in 1963, but it was only after 1967 that the fishery policies were carried out systematically with a clear goal of establishing and implementing the fishery promotion plan, as part of the national economy.

The role of the fishing industry in enhancing the national economy through industrial advancement was to increase the supply of marine products by acquiring foreign currency and foodstuffs. The deep sea fishing industry and the sea farming industry has been responsible for acquiring and earning foreign currency along with the role of inshore fisheries to increase the supply of foods.

In coastal fishing, a policy aimed at reducing excess fishing has been implemented. To solve this problem, the source of labor force in the coastal fishing has been transferred to other industries such as manufacturing, and the policy goal for coastal fisheries has been shifted to privilege the social welfare over industrial growth.

In the 1990s when rapid economic growth was nearing its end, the importance of promoting social welfare was strongly voiced once again, and there was a heightened interest in seeking a balanced development between regions as well as in the incomes between industries. However, lack of youth involvement in the fishing industry, especially in coastal fisheries, the rapid decrease in and aging of the population needed to be addressed. Amid changes in the environment surrounding coastal fisheries, one of the suggestions was to promote fishing village tourism and the self-regulatory management of coastal fisheries with the goal of increasing fishing household income. Self-regulatory management fishery is a new method of managing fishing activities. In order to minimize the restrictions by institutionalization, specific methods are chosen by fishing village cooperatives to voluntarily regulate their fishing activities in using the same fishing grounds and marine resources, so as not only to maintain and enhance the use of resources, but also to enhance productivity, reduce cost, increase profits, and improve working conditions for fishermen.

The development of fishing village tourism was aimed at producing a balanced income between industries by securing a new source of income for coastal fishermen living in fishing villages. In the early days, fishing village tourism produced a negative impact on the coastal fisheries, having no relation to bettering the economy of the fishermen.

2.2 Types and Number of Permitted Coastal fisheries

The fishermen institutionalized the methods of collecting and catching marine resources in coastal fishing grounds. These methods are positive methods in permissive fishery, namely eight types of "fishing permitted by mayor-province governor", 13 types of "fishing permitted by mayor-country governor", and three types of "Ministry-permitted fishery" (anchovy tow net, fishing by diving, dredge), a total of 24 different types of permissive fishery.

Fishing rights fishery is a type of fishing done by acquiring the exclusive right to use specific water zone. The "fixed-net shore fishing" and "community-based fishing" are the two types of fishing rights fishery. The fishing rights of fixed-net shore fishing is mostly owned by individuals whereas the fishing rights of the community-based fishing is owned by fishermen groups (usually fishing village fraternity) residing in fishing villages close to the fishing grounds. Fishermen are entitled to use the fishing grounds as a member of the fraternity. The fish to be caught by the "community-based fishing" are mostly stationery marine animals and plants, including seaweed and shellfish. These species are caught with simple tools, a very inefficient way of catching the marine products. For fishing methods, refer to the following video file <http://tvpot.daum.net/clip/ClipView.do?clipid=7776446>.

The number of permissions of "fishery permitted by mayor and chief of county and ward district" stands at 20 809 and "fishery permitted by special mayor and provincial governor" at 5 368 . as of end of 2008. There are 315 permissions granted for the three types of fishing done on coastal fishing grounds that belong to the fishery requiring

permission from the Ministry. The licenses "fixed-net shore fishing" in fishing rights fishery amounts to a total of 536 with a licensed area of 7 488 ha, while "village fishing" stands at a total of 3 058 with a licensed area of 118 214 ha.

2.3 Management of coastal fisheries

2.3.1 Fishing rights fishery

Fishing rights in the fishing rights fishery are exclusive use rights of a designated area and the regulations on land, civil law applied *mutatis mutandis*. The term of validity is 10 years and an extension of the validity term is possible for another 10 years or less. Fishing rights prohibit rentals, but in the case of fixed type demarked fishery, transfer, split or change in fixed-shore net fishing rights are permitted, and collateral can also be provided. Village fishing rights are licensed to fisherman groups, such as fisheries cooperatives or fishing village cooperatives. The scope of licensed fishing ground is limited to under 7m of water depth.

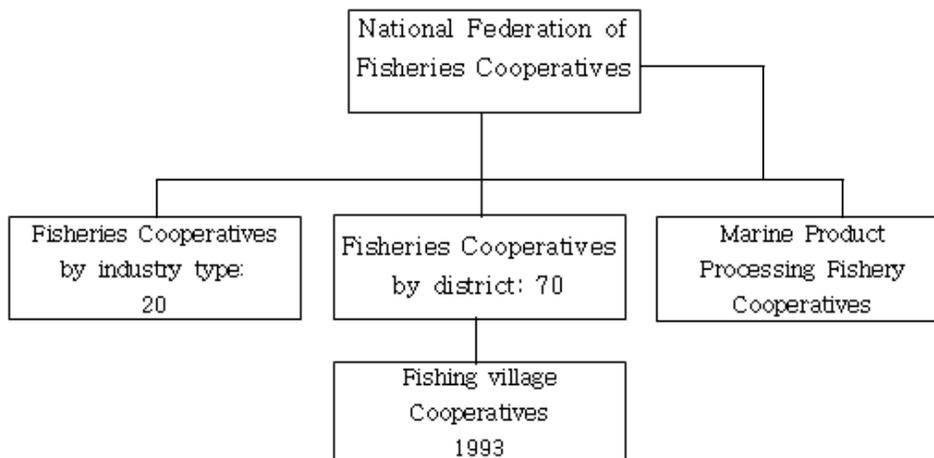
2.3.2 Permit Fishery

Permission license for fishery is given by fishing boat or fishing gear. When fishing boat or gear is purchased or hired, the permission license is transferred. The term of validity for a fishery license is five years, but the term is automatically renewed with the exception of special cases. All inshore fisheries have a fixed number and scope of fishing boats indicated in the permission documents. The engine horsepower or the type and number of tenders is also pre-determined for certain industry types. In coastal fishery, the maximum number of fishing permits by city, county and ward district is stated in the fishery laws and regulations. Out of the "fishery permitted by mayor and county governor", all permit fisheries with the exception of stationary fishery may obtain permission for fishing up to three different types in the case of fishing more than two types of fish with the same boat, accounting for the boat structure and capacity. To protect marine resources, the period, territory and length of prohibiting the haul by fish type are fixed. For fishing with high haul potential such as dragnet fishery and trawl fishery, a separate fishing prohibition area is determined. Also, the "fishery permitted by mayor and provincial governor" is restricted to the waters determined by the mayor and country governor. The size, type, capacity and method of use of the fishing gear that can be used by permissive fishery type are also fixed specifically in the laws and regulations by fishing type.

2.4 Fisherman Groups

The organizational tree of the National Federation of Fisheries Cooperatives set up with accordance of the "Fisheries Cooperatives Law" is as follows.

Number of members: 167 869



Fisheries cooperatives are a corporate body with advisory capacity that oversees economic and financial businesses. If the economic business comprises of group purchase, group sales, use processing and insurance, it is included as one of the joint businesses. The working district of the fishery cooperative by industry type and the marine product processing fishery cooperative are nationwide, and the cooperative members are the managers of each industry. The fishery cooperative by district is set up by city and county. The manager and employees of the fishing industry residing within the district concerned are members of the cooperative. The qualification of becoming a cooperative member is involvement in fishing activities more than 60 days per year. The Fishing Village Cooperative (FVC) is established by fishing village units. Individuals living in the fishing village concerned can apply as a cooperative member of the fishery cooperative by district. Only the fisheries cooperative by district and fishing village cooperative can own a "village fishing right". These cooperatives receive relatively preferential treatment compared to individuals in obtaining licenses such as sea farming fishing rights.

3. CONFLICTS OF GOVERNANCE ON THE COASTAL FISHERIES

3.1 Causes and types of conflicts

The conflicts in fishing governance were brought to attention when the policy regarding the modernization and expansion of the fishing industry that sought efficiency until the end of 1980s was altered after the 1990s to maintain and preserve the local community through the economic development of the fishing villages and seek a balanced growth of income among industries. One type of conflict is that between the coastal fisheries and offshore fisheries. During the process of introducing and settling the local autonomous system since the 1990s, the conflicts that had been alleviated under the control of the central government arose once again with regards to the allocation of fishing grounds used between regions. Conflicts between regions also arose due to the inflexible response of the policies to the changes in marine environment, resource change, technological or economic conditions.

3.2 Methods of mediating conflicts

The causes of conflicts were related to the use and allocation of fishing grounds and marine resources, as well as regulations on maintaining and preserving the marine resources. For matters that will national consequences once mediation takes place, the conflict is mediated through revisions of the laws and regulations concerned.

Fisheries conflict mediation is done by the Fishery Mediation Committee (FMC), an advisory body to the authority concerned, which is established by the Fisheries Act. There are four types of FMCs nationally: the Central Fishery Mediation Committee (CFMC), FMCs by city and provincial government, FMCs by city, county and ward district, and Ad-hoc Joint FMC.

The CFMC advises the Ministry of Food, Agriculture, Forestry and Fisheries on fisheries conflicts between cities and provincial governments. The conflict is between the interested parties working in the same industry or it is between fishermen using the same fishing grounds. In such cases, a private organization, the Korea Fisheries Association is in charge of mediation or the fishermen are to mediate the matter autonomously through a joint fishery management body.

3.3 Cases of recent conflict mediation

3.3.1 Cases of the Ministry of Food, Agriculture, Forestry and Fisheries (MIFAFF)

In the years from 2008 to 2009, the MIFAFF visited fishing villages and held meetings to identify difficulties in fishery to review the improvement of laws and regulations.

The number of problems found was 111 total. As of the end of 2010, 27 conflicts were mediated through revision of relevant laws, 16 began the revision process, while 43 were decided to require future review, and 25 were judged to be difficult to accommodate.

The following two examples among resolved cases were successfully resolved in the coastal fisheries. The first case was to expand the fishing boat size of Stationary Fisheries. With the fishing gear becoming large, there came safety problems with loading fishing gear on the fishing vessels in use. Fishermen, therefore, proposed to increase the size of the fishing vessels from five tons to eight tons, and this proposal was accepted through revisions of the laws and regulations. The other one is related to increasing the fishing boat size of Mobile Fisheries. It was proposed by fishermen that the size of the fishing vessels used in dredge net fishing be expanded due to safety reasons. The laws and regulations were revised to expand the current under-five-ton fishing vessel to under-eight-ton with the condition that a TAC is defined and managed.

A total of 14 cases began the revision process of the laws and regulations, out of which 14 were on coastal fishing, all proposed by the local autonomous administrative bodies.

A total of 43 matters were decided that further review of the law revision is required in the future, out of which 33 were on coastal fisheries. Out of the 33 items, 19 were proposed by the local autonomous administrative body, and 14 proposed by fishermen and fishermen groups. Important cases are described in the following.

Allocation of snow crab fishing grounds between the coastal gill net fishermen and fish pot fishermen in the northern part of Gyeongsang province: Trap fishery that caught red snow crab in the waters up to 1,000m deep as in the past began recently to fish in the snow crab fishing grounds of the Coastal Gillnet Fishery, producing a greater number of accidents catching excessive numbers of snow crabs and damaging the gillnet fishing gear. Consequently, coastal gillnet fishermen proposed to include the prohibition of trap fishing within the waters that were 500m deep by coastal gillnet fishermen. The north Gyeongsang province reflected the opinions of the coastal gill net fishermen and reflected them in revision of laws and regulations, but the trap fishermen brought an administrative suit to the court.

Fishing restrictions on offshore gill net and offshore trap fishing in the northern fishing grounds of the south Jeolla province: The work of offshore gill net fishermen was encumbered by offshore gill net and trap fishermen preoccupying the fishing grounds to catch blue crabs in the fishing area using triple gill nets especially approved for coastal gill net fishermen to catch Chinese white shrimps. It was proposed that fishing of offshore gill net and offshore trap fishing be restricted by designating waters protecting blue crabs in the fishing zone.

Changing the fishing period of snow crabs within the coastal waters of the northern province of Gyeongsang: The fishing period of snow crabs is fixed to be from December 1 to May 31 the following year, but the fishermen in Uljin county begin their work starting on December 15 to enhance the commodity value while fishermen from other regions start their work on December 1, thereby dominating the fishing grounds. The fishermen in the county of Uljin proposed that the start date for fishing be changed from December 1 to December 15 for all fishermen.

Distinction of the fixed number of permissions for coastal fishery between the city of Incheon and Gyeonggi province: Those trying to obtain permission for coastal fisheries must reside within the local autonomous district supervising the fishing waters, but the city of Incheon and Gyeonggi province give permission to fish by integrating the areas. As a result, if conflicts arise between the local autonomous bodies that exist in the management method, the permission moves between the two local autonomous bodies, causing difficulty in management. For this reason, proposed proposition was set forth to revise the laws and regulations so that separate permissions can be granted by the two local autonomous bodies.

Adjustment of fishing ban period of shrimp beam trawl fishery in the South of Gyeongsang province: The shrimp beam trawl fishery in the southern province of Jeolla was banned for two months from July 1 to August 31, whereas the banned period for the southern province of Gyeongsang was 5 months from May 1 to September 30, causing management difficulties. The permission and management of shrimp beam trawl fishery is under the jurisdiction of the mayor and country governor, so the mayor and the country governor should mediate the fishing ban period. However, in the case of the southern province of Gyeongsang, two countries were integrated in managing shrimp beam trawl fishery, causing difficulties in mediation. It was proposed that the fishing ban period be the same as the one in the southern province of Jeolla in the laws and regulations.

3.4 Cases of conflicts mediated by the FMCs by cities and provincial governments

The goal of the FMC is to efficiently mediate fisheries conflicts under its competency. The Committee is composed of less than 20 people: 3 central administrative public officials, less than three city and province administrative public officials, less than three heads of the fisheries associations, less than two fishermen representatives, less than three scholars and researchers, and less than five private experts. Subcommittees consist of less than nine people by mediation targets.

Once requested to mediate a dispute for a fishermen group, a fishery cooperative, or any local autonomous body, the FMC first judges whether the request is under the jurisdiction of the Committee. Then a subcommittee is formed by item, specialists are appointed, and then the mediation takes place. Once a smooth agreement is reached between interested parties, an agreement document is created. If the mediation has impact on other regions or other industry types, or requires law revisions, the case is remitted to the CFMC.

The FMC decides on the mediation proposal and recommend the interested parties to accept it. In the case of non-agreement among interested parties, the Committee makes a proposal reflecting the conflict in full to the administrative organization concerned for mediation. Important cases are described in the following section.

Conflict between anchovy tow net fishers and fixed-net shore fishers: Anchovy tow net fishers changed the fishery method without permission and carried out fishing even during nighttime, causing harm to the fixed shore net fishers. The fixed shore net fishermen demanded that nighttime fishing be prohibited. Although no agreement was reached on the mediation between interested parties, the Fishery Mediation Committee referred the case of prohibiting nighttime fishing by anchovy tow net fishers and newly designating a fishing ban district in the specific waters where fixed-net shore fishers are densely populated to the central administration, and revisions of the laws and regulations concerned followed.

Conflict between pole and line fishery and shrimp beam trawl fishery: The pole and line fishermen made a request to revise the laws so that they could use a shrimp beam fishing gear to catch shrimp from the Korean Eastern Sea, used as bait, but the shrimp beam trawl fishers rejected it, causing conflict. In 2007, an agreement to supply shrimp caught in the Korean Eastern Sea as bait was signed as a result of the mediation by the Korea Fisheries Association, but it was difficult to execute the provisions of the agreement, thus the supply of the bait was not made smoothly. It was once again a case to be mediated by the Fishery Mediation Committee in 2009. Because an amicable agreement was not reached between the two parties concerned, the Fishery Mediation Committee submitted the proposal to the central administration to allow pole and line fishermen to use supplementary fishing gear used to catch bait with the restrictions on the size, type, volume and waters of the fishing gear.

Conflict among regional fishermen on the use of squirt guns by the fishermen catching fish by diving: The current laws prescribe that squirt guns can be used by fishermen who dive to catch Manila clams in cases where the mayor and province governor defines and manages TAC, but in this case regional fishermen oppose the use of squirt guns, citing that it has harmful effects on village fishing. An investigation on the damage causing village fishery regarding the use of squirt guns is under way, and the mediation is in progress.

Conflict over catching method within the waters under the jurisdiction of Jindo country: The method caught formerly by the shrimp beam trawl fishermen within the waters under the jurisdiction of Jindo county are now caught by the nearby gill net fishermen, causing conflict between fishermen. Shrimp beam trawl fishermen and gill net fishermen formed an agreement operation committee, agreeing to allow gill net fishing only in the period between October 20 and December 31.

Conflict between fishery types on catching anchovies within the waters under the jurisdiction of south Chungcheong province: Since the year 2000, the number of anchovy resources grew. To catch the anchovies, abnormalities such as fishing gear modification and illegal fishing took place, intensifying fishing competition among fishermen in the offshore stow net fishing, coastal bag net fishing, and coastal beam trawl fishing. By the fishery type, fishermen are demanding a change of target fish, deregulation on fishing gear restrictions, and changing the period prohibiting the use of fishing gear. The interests of the fishermen differ between fisheries types, making mediation ever more difficult.

3.5 Cases Mediated Autonomously by the Korea Fisheries Association (KFA)

Conflict between regions in the closed fishing period for gill net fishing of snow crabs in the East Sea: The gill net fishing within the jurisdiction of the north Gyeongsang province has a fishing ban from June 1 to October 31, but fishermen tried to extend the period to November 30, an attempt opposed by the gill net fishermen in the nearby Gangwon province. It was agreed to extend the closed fishing period, and accordingly the laws and regulations concerned were revised.

Conflict over the fishing ground between the Ochungdo FVC and fishermen from other regions in the north Jeolla province: The Ochungdo FVC designated and operated the coastal area of three miles as a self-regulatory water surface, but fishing boats from other regions trespassed on their territory and carried out fishing, causing conflict. The south Jeolla province divided the surrounding waters of Ochungdo into six zones, designating and officially announcing them as "water surfaces requiring management as marine resources", thereby mediating the conflict.

Conflict over the fishing ground between the Dohwang FVC and nearby trap fishers in the south of Chungchong province: The Dohwang FVC bans trap fishing within the village fishing grounds, but trap fishing is carried out in other regions using the same waters, causing conflict. It was agreed that trap fishing was not to be carried out within the village fishing grounds of the Dohwang FVC.

Conflict between the coastal fisheries and the anchovy boat seine fishery in the surrounding waters of Dokwoo island: The anchovy boat seine fishery's fishing in the surrounding waters of Dokwoo island of South Jeolla Province did damage to the coastal fisheries in the same area, creating conflict. It was mutually agreed not to set a no-fishing zone for the anchovy boat seine fishery by statutes but to establish a voluntary fishing control line between the concerned parties instead.

Conflicts between fishing industry types regarding herring fishing in the nearby waters of Pohang City of North Gyeongsang Province: Conflicts arose between the coastal purse seine fishery of Pohang city area and the offshore purse seine fishery of

other areas as the herring stock increased. It was mutually agreed that the offshore purse seine fishery would make efforts to minimize the damage to the coastal purse seine fishery.

Conflicts between fishing industry types regarding small octopuses in the area of Gobeung-gun of South Jeolla Province: Conflicts arose between long line fishery and the trap fishery regarding the fishing area for installing fishing gear used to catch small octopuses. It was mutually agreed that the fishing ground for the long line fishery should be limited and allocated to a certain extent, mostly following the trap fishery's recommendation.

Conflicts over fishing ground between the gill net fishery and the long line fishery in the nearby waters of Goseong-gun of Gangwon Province: The fishing ground overlapped between the gill net fishery and the long line fishery in the area of Goseong-gun. An agreement was signed on mutual compromise such as coordinating fishing time for related fisheries.

Conflicts over fishing ground between the coastal fisheries and the offshore trap fishery in the nearby waters of Samcheok city of Gangwon Province: Conflicts arose concerning the fishing ground between the coastal fisheries and the offshore trap fishery as the offshore trap fishery did fishing all year round in the nearby offshore waters of Samcheok city. An agreement was signed to reduce the fishing gear installation for the offshore trap fishery, restraining fishing within the waters of levels below 200 meters.

3.6 Issues arising in the process of conflict mediation

3.6.1 Inadequate system for fishing ground allocation

Conflicts between offshore fishery and coastal fishery: The institutional criteria dividing offshore fishery and coastal fishery is the fishing boat size of eight tons but the fishing ground is not divided, resulting in constant conflicts as all the fisheries excluding the bottom trawl fishery and the trawl fishery belong to both offshore fishery and coastal fishery. It is suggested that conflicts should be institutionally resolved by deciding the lowest limit on boat size for each fisheries type of offshore fishery and setting a fishing limit in coastal fisheries. Through this, responsibility for and authority over the fishing ground and fishery resources need to be clearly defined for each administration phase.

Conflicts between Region: The fishing area permitted by mayor and provincial governor should be refined to the respective jurisdiction concerning mayors and governors, but fishing is carried out irrespective of jurisdiction of local governments due to the lack of institutional arrangements over maritime boundaries of local governments' jurisdictions and also due to the customs of using fishing grounds in the past. As a result, frequent conflicts over fishing grounds arose between local fishermen, but the competent fishing ground that a local government manages to resolve conflicts is not clearly defined. This kind of regional conflict regarding allocation of fishing grounds is arising between cities, counties and fishing villages. In this regard, cross-sectional and denotative boundaries for jurisdictional fishing areas need to be institutionally defined.

Conflicts between fisheries: These conflicts regarding the use of fishing grounds arose among different fishing industry types that catch fish by installing fishing gear over long periods of time. These fishing industry types are mainly gill net fishery, trap fishery and long line fishery. Fishers of these fishing industry types tend to use the fishing gear excessively due to fierce catching competition and to fix fishing gear in order to occupy good fishing ground, resulting in negative situations such as conflicts between fishermen and increasing fishing costs due to damages to fishing gear. Along with TAE (Total Allowable Effort) introduction, efforts through policies are needed so that fishers using the same fishing ground can set up a consultative organization to coordinate and control its use.

3.6.2 *Fisheries management excessively depending on the central government*

Legal systems: Fisheries are managed by the Fisheries Act, Enforcement Decree on Fisheries Act, Enforcement Rule on Fisheries Act and Directive on Fisheries Act. All of these fisheries-related laws and regulations are centrally administrated and uniformly applied to all fisheries across the nation, generating to huge gaps between realities and systems in different regions and fishing industry types. Legal systems need to be simplified and their contents need to be limited to the basics uniformly applicable to the whole nation so that local governments such as cities, provinces and counties need to be allowed to make and manage independent rules in order to make regulations and controls specified to the situations of each region.

Lack of administrative guidance for fishermen: The last tool used to mediate conflict between fishers can be revising or supplementing the legal systems that may involve fishermen having conflicting interests, creating big administrative burdens. Therefore mediation through consultation between fishermen can be the first effort made to resolve conflicts while keeping the current systems. However, it is irresponsible for the related administration to respond to conflicts, saying that it would reflect the outcome of consultation between fishermen to systems regarding the issues that can be resolved only by revising or supplementing related systems. The reason for this is that the administration does not have objective data to convince fishermen about changes in systems, or lacks capabilities to guide fishermen. It is inappropriate to change the systems based on the decisions made by the Mediation Committee on an objective basis.

The current status and direction for improvement of inland fisheries governance in the Republic of Korea

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1. INTRODUCTION

In fisheries, the term “governance” is usually understood as the sum of the legal, social, economic and political arrangements used to manage fisheries (FAO, 2011). It is widely used to cover institutions, instruments and processes. Ranging from short term operational management to long term policy development, and from conventional forms of administration to modern forms of participative decision-making processes.

Fisheries governance establishes the overriding principles and objectives of the sector. It develops the policy and regulatory frameworks. It connects government with civil society, harmonizing individual, sectoral and societal perspectives while maintaining social order and productive socio-ecological systems. It legitimates and balances stakeholder interaction, enforces decisions and regulations, and maintains coherence across legal, spatial and temporal scales. The overall goal of fisheries governance is the use, management and development of sustainable fisheries resources. Fisheries governance includes legally binding rules such as national policies and legislation or international treaties, as well as customary social arrangements and traditional laws.

The institutional framework for fisheries around the globe has significantly changed since the 1950s. This is in part due to the accumulation of experience and the evolution of mentalities and expectations. More environmentally conscious, sustainable and participatory forms of fisheries governance are emerging as a result of the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992.

Fisheries can be divided into marine and inland fisheries. Regarding marine fisheries, it is worth noting several international treaties such as the United Nations Convention on the Law of the Sea which was established in 1994 and the adoption of FAO Code of Conduct for Responsible Fisheries in 1995. Regarding high sea fishing, the United Nations Fish Stocks Agreement and the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas have come into force in 2001 and 2003, respectively. The Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing will also enter into effect in the near future. All international treaties mentioned above are aimed towards sustainable fisheries and emphasize cooperative efforts to eliminate destructive fishing practices while promoting effective fisheries management. In inland fisheries, however, there have not yet been any international agreements. Although there is a lack of international rules dealing with inland fisheries, the fundamental principles of fisheries management such as the ecosystem approach, precautionary approach and elimination of illegal and unregulated fishing, are still very applicable to them.

According to article 2 of the Inland Fisheries Act of the Republic of Korea, the term “inland” is defined as rivers, streams, dams, lakes, wetlands, reservoirs, and other fresh water flow in artificially constructed fresh water areas or into estuaries. “Inland fisheries” are defined as capture of inland aquatic organisms or raising fish through inland fish farming or aquaculture in inland areas. To understand the current status of national inland fisheries, this study analyzes basic data available such as fishing rights, fisheries production, fishing vessels, the number of fishermen and fisheries household income. In addition, an analysis of problem arising in relation to law, administrative institutions and policy principles were carried out. Concluding the review, the direction for possible improvements for better inland fisheries governance is suggested with respect to modification of legal instruments and management system.

2. CURRENT STATUS OF INLAND FISHERIES

The total area of inland waters in the Republic of Korea is approximately 5 900 km², which accounts for 5.93 percent of total land area (Table 1). There are more than 1 200 dams in rivers, with five additional dams currently under construction, occupying approximately half of the total inland water area (Table 2).

TABLE 1
Area of inland waters

Territory area (km ²)	Inland area (km ²)				
	Total	Rivers and streams	Dams, lakes and reservoirs	Waterway	Fishing farms
99 897 (100%)	5 925 (5.93%)	2 837 (2.84%)	1 291 (1.29%)	1 780 (1.78%)	17 (0.02%)

Source: Ministry of Land, Transport and Maritime Affairs (2011)

TABLE 2
Number of dams in rivers

Multi-purpose	Hydroelectric power	Household and industrial needs	Irrigation for agriculture	Flood control	Total
15	16	60	1 114	1	1 208

Source: Korea Water Resources Corporation (2011)

2.1 Inland fishing rights

Inland fisheries have three institutional categories; fishing license,¹ permit,² and registration³ (Table 3). The total number of inland fishing rights increased from 4 955 in 1990 to 8 856 in 2003, with a slight decline thereafter. The number of fishing permits and registration in 2009 has increased by 21 percent, and 128 percent, respectively, compared with 1990, while that of fishing license decreased by one-eighth. This decline was due to previous licenses not being renewed since 1998 when a policy on Clean Water Supply was launched and new cage culture licenses have not been permitted.

Inland capture fisheries vary depending on the characteristics of the given body of water. In terms of fishing licenses, aquaculture in tributary streams, lakes and reservoirs was dominant; while fishing permits were given mostly for catching shellfish, employing gill net, stationary net and longline fishing; and in fishing registration was found most common in cast net, trap and land-based fish farming (Ministry of Maritime Affairs and Fisheries, 2007).

¹ A fishing license is needed to install set net or farming facilities that occupy a certain area within inland water bodies.

² A fishing permit is needed to use fishing gear such as gill net and longline, to catch shellfish or to catch juvenile fish in the wild for breeding purposes.

³ A fishing registration is required for fishing gear or equipment that are not applied to fishing license or permit.

TABLE 3
Trend in inland fishing rights

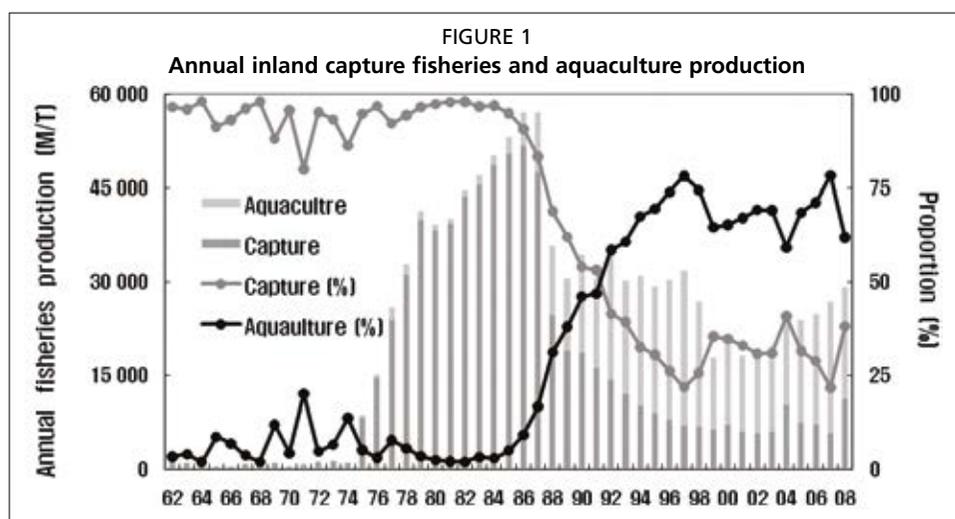
Year	License	Permit	Registration	Total
1990	631	2 811	1 513	4 955
1995	455	3 344	2 411	6 210
2000	228	4 155	2 751	7 134
2001	219	4 889	2 802	7 910
2002	211	4 712	3 275	8 198
2003	199	4 991	3 666	8 856
2004	166	4 973	3 419	8 558
2005	155	4 820	3 542	8 517
2006	146	4 934	3 479	8 559
2007	115	4 882	3 366	8 363
2008	92	4 962	4 847	8 471
2009	82	3 417	3 454	8 383

Source: Ministry for Food, Agriculture, Forestry and Fisheries (2011)

2.2 Inland fisheries production

According to the Food, Agriculture, Forestry and Fisheries Yearbook published by the Ministry for Food, Agriculture, Forestry and Fisheries of the Republic of Korea,⁴ the national average fisheries production, including inland, marine and overseas fisheries and aquaculture, was 2 388 948 tonnes per year over the last 49 years (1962-2010) (Figure 1). The inland capture and aquaculture production contributed 23 418 tonnes, accounting for 0.98 percent of the annual total fisheries production. Over the past half-century inland fisheries, based on the overall trends in production, can be characterized by three stages of development; pioneer, growth in capture fisheries, and declining capture fisheries but growing aquaculture production.

In the pioneer stage (1962-1974), when the needs for promoting inland fisheries were on the rise nationwide, the annual average production of inland fisheries was 964 tonnes and 93 percent of the annual production came from capture fisheries (Figure 1). In the growth stage of inland capture fisheries (1975-1987), the annual average production was 39 381 tonnes, about 41 times greater than previous years. The peak of this productive stage was in 1986. During these years, capture fisheries contributed to 95 percent of the annual production. In the stage of the decline of capture fisheries and the growth of aquaculture production (1988-present), the annual



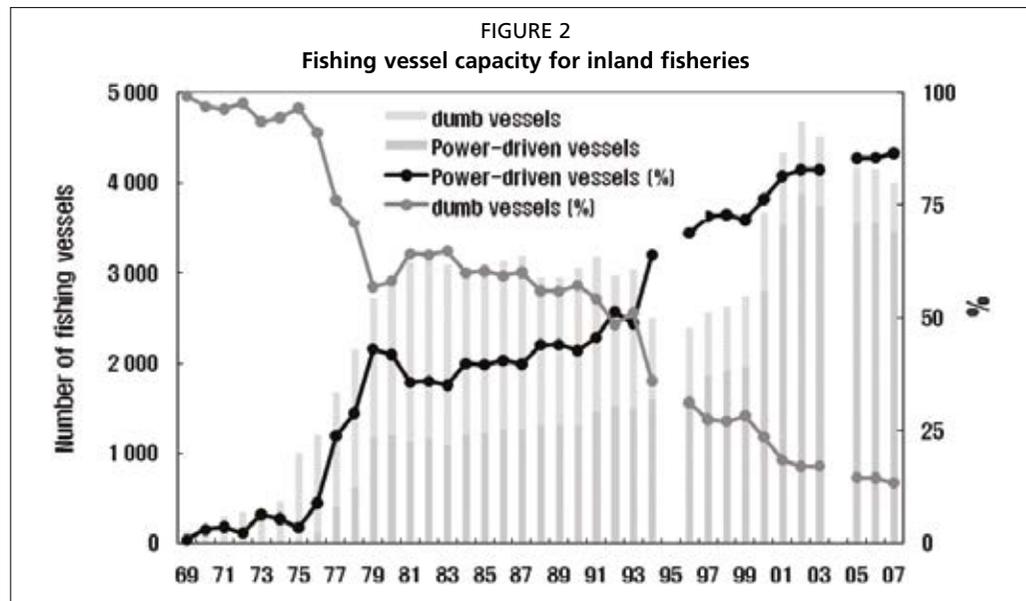
⁴ The title of the yearbook has been changed several times due to the government reform and restructuring

average production of inland fisheries was 27 254 tonnes, marking a decrease of 30 percent compared with that of the growth stage. Meanwhile, aquaculture production has increased steadily, overtaking capture fisheries production in 1992 and contributing to 60 percent of the annual production of inland fisheries in recent years.

2.3 Fishing vessels

In 1969, when information on fishing vessels was first described in the Food, Agriculture, Forestry and Fisheries Yearbook, there were 130 inland fishing vessels of 157 GT⁵ (Figure 2). The number of vessels increased rapidly to 1 035 of 935 GT throughout the 1970s. The number of vessels increased by 17 times and gross tonnes of fishing vessels increased 15 times by 1979 compared with those in 1970. This demonstrates that the annual production of inland fisheries has risen more than one hundred-fold over nine years (Figure 1). The capacity of fishing vessels remained at 3 066 vessels of 2 579 GT through the 1980s. There were 2 786 fishing vessels of 2 100 GT in the 1990s, revealing a decrease of 9 percent in number and 18 percent in gross tonnes compared to the 1980s. This decrease is mainly due to the destruction of obsolete, aged vessels constructed in the 1970s which might have been accelerated by the sharp decline of capture fisheries in the late 1980s. The fishing vessel capacity of the 21st century is 4 187 vessels of 3 494 GT. The growth rate has increased by 50 percent compared with the 1990s, and has quadrupled since the 1970s.

The growth in capacity of fishing vessels for inland fisheries went parallel with the replacement of non-mechanized vessels with mechanized vessels. Among 130 fishing vessels in 1969, there was only one power-driven vessel. In the 1970s when the annual production of inland fisheries grew almost 112 percent per year, the average number of power-driven vessels increased to 352, accounting for 34 percent of the total number of fishing vessels (Figure 2). Thereafter, power-driven vessels have continually increased in number and accounted for 40 percent, 60 percent and 83 percent of the total number of fishing vessels in the 1980s, 1990s and 20 000s, respectively.

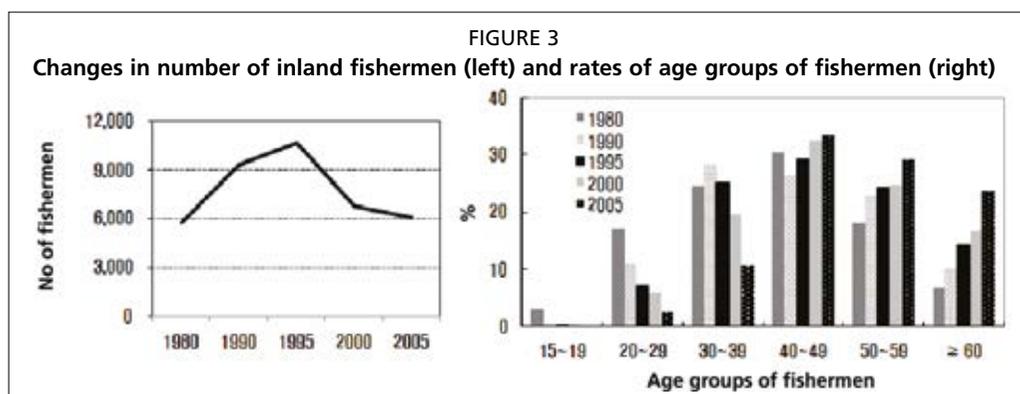


2.4 Inland fisheries households

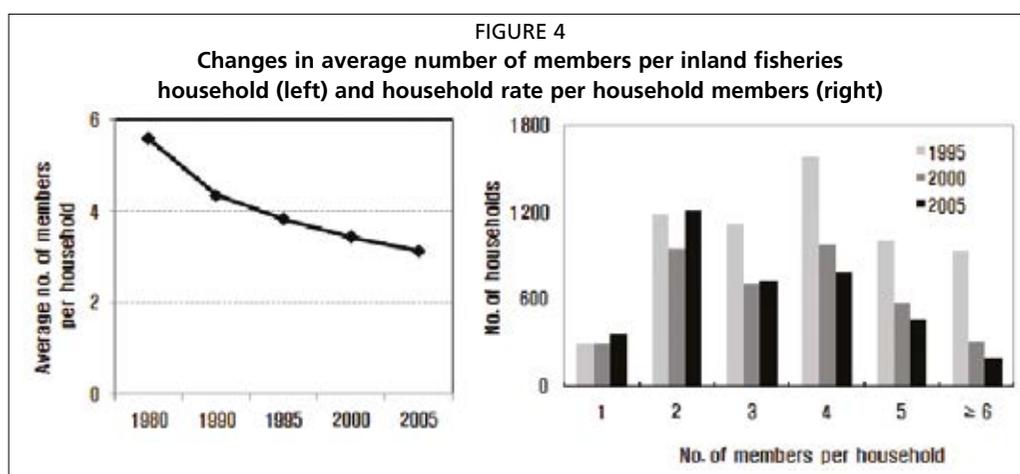
From an economic perspective, fisheries are an economic activity that earns a living with fisheries resources and fishers are the main player using such resources. According to the results of the national fisheries census (www.kosis.kr, May 2011), the number of

⁵ Gross tonnage is a unitless index related to a ship's overall internal volume.

inland fishermen in Korea have decreased by 57 percent, from 10 649 in 1995 to 6 091 in 2005 (Figure 3). The number of fishermen at the age of 40 or more increased from 55 percent in 1980 to 87 percent in 2005, while those between 15 and 29 years decreased from 21 percent in 1980 to 2.7 percent in 2005. In particular, the number of more than 60-year-old fishermen was 3.1 times greater in 2005 (24 percent) than in 1980 (6.8 percent), indicating that inland fishermen are getting older without recruitment of young people for inland fisheries.



The number of households participating in inland fisheries decreased from 6 114 in 1995 to 3 740 in 2005. The average number of members per household was 5.6 in 1980, which gradually dropped to 3.13 in 2005 (Figure 4). The rate of households with more than 3 members was 76 percent in 1995 and decreased to 58 percent in 2005. While households with less than 2 members increased from 24 percent in 1995 to 42 percent in 2005.



According to the results of the national fisheries census (www.kosis.kr, May 2011), the number of full-time inland fishermen increased from 20 percent (757 householders) in 1980 to 24 percent in 2005 (884 householders) (Table 4). With part-time fishermen, the rate for those who make more income from fisheries than their additional income source increased from 36 percent in 1980 to 45 percent in 2005. While for those who make less income from fisheries than additional income sources decreased from 64 percent in 1980 to 56 percent in 2005. In total, 64 percent of inland fisheries households were engaged in capture fisheries by 2005.

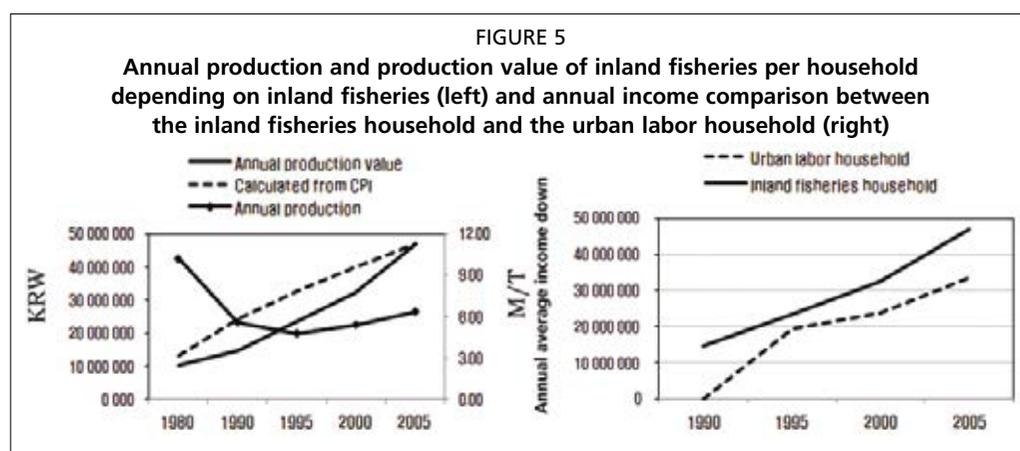
TABLE 4
Number of full-time and part-time inland fisheries households and number of households participating in inland aquaculture and capture fisheries

Year	No. of households	Full-time	Part-time	Part-time A*	Part-time B**	Aquaculture	Capture
1980	3 853	757	3 096	1 122	1 974	-	-
1990	6 148	1 511	4 637	1 973	2 664	-	-
1995	6 114	1 350	4 764	2 063	2 701	-	-
2000	3 799	1 157	2 642	1 238	1 404	1 749	2 050
2005	3 740	884	2 856	1 271	1 585	1 360	2 380

* Making more income from fisheries than additional income source

** Making less income from fisheries than additional income source

If the annual production of inland fisheries, in 1980, 1990, 1995, 2000 and 2005, is divided by the number of households dependent on inland fisheries of the respective year, the estimated annual production of inland fisheries per household comes to 10.18 tonnes in 1980 decreasing to 6.37 tonnes (or 37 percent) by 2005 (Figure 5). The estimated annual production value of inland fisheries per household was 10 287 000 Korean Won (as of May 2011, approximately USD 9 623) which gradually increased by 450 percent from 1980 to 2005. The actual increase, however, in the average annual production value per inland fisheries household, as calculated from the annual consumer price index published by the Statistics Korea (Base: 2005=100), is 15-17 percent. The annual production value per inland fisheries household, referred to as the annual average income of inland fisheries households, was 37 percent higher than that of urban labor household according to the Statistics Korea.



According to the results of the national fisheries census (www.kosis.kr, May 2011), the rate of inland fisheries households that do not sell fisheries products or earn less than 10 million KRW of the sale proceeds of fisheries was 52 percent in 2000 and 55 percent in 2005 (Table 5). The rate of inland fisheries households earning more than 30 million KRW annually, which is comparable to the average annual income for the urban labor households, is about 20 percent both in 2000 and 2005.

TABLE 5
Sale proceeds of fisheries of inland fisheries households (Million KRW)

Year	No. of inland fisheries households	without sale proceeds	With sale proceeds									
			Less than 0.5	0.5 to 1	1 to 5	5 to 10	10 to 20	20 to 30	30 to 50	50 to 100	100 to 200	More than 200
2000	3 799	103	81	237	825	738	689	401	325	232	92	76
2005	3 740	136	222	256	821	614	572	345	317	204	122	131

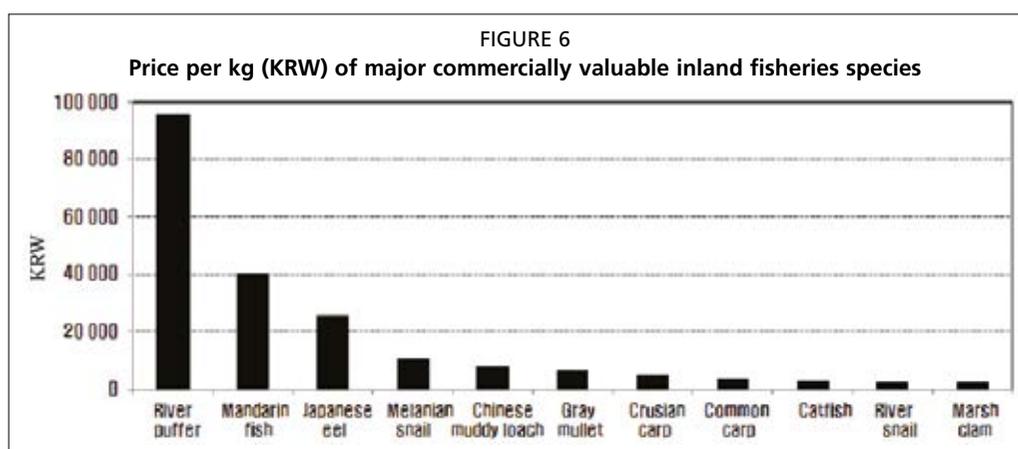
2.5 Major inland fisheries species and import species

It is known that there are approximately 270 fish and mollusk species distributed in inland waters of the Republic of Korea. The national fisheries statistical yearbook deals with 34 species that can be referred to as commercially valuable fish species, including two species introduced from abroad, namely cherry salmon (rainbow trout) and Israel carp (Figure 6). Cherry salmon and Israel carp have been farmed in Korea since 1965 and 1973, respectively, by introducing fertilized eggs from America and juvenile fish from Israel.

Fish species ranking high in inland fisheries production of the 21st century are Japanese eel, cherry salmon and catfish, which combined account for approximately 50 percent of the national annual production of inland fisheries (Table 6). Regarding price per kg, Japanese eel is 25 000 KRW, cherry salmon 6 000 KRW and catfish 3 000 KRW (Figure 6). However, as of 2009, river puffer (138 tonnes) and Mandarin fish (43 tonnes) have been low in the production amount, but high value-added species with an average price per kg of 95 000 and 40 000 KRW. Regarding mollusk species, the production of river snail, Marsh clam and Melanian snail have contributed to 10 percent of the annual production of inland fisheries. The price per kg of river snail and Marsh clam is less than 3 000 KRW while that of Melanian snail 10 000 KRW.

TABLE 6
Highest ranking species in inland fisheries production

1960s	1970s	1980s	1990s	2000s
Japanese eel	Crusian carp	Crusian carp	Israel carp	Japanese eel
Catfish	Chinese muddy loach	Israel carp	Crusian carp	Cherry salmon
Common carp	Common carp	Common carp	Cherry salmon	Catfish
Sweet fish	Catfish	Chinese muddy loach	Japanese eel	Crusian carp
Snakehead	Snakehead	Pale chub	Common carp	Common carp
	Japanese eel	Japanese eel	Catfish	Chinese muddy loach
	Gray Mullet	Catfish	Pale chub	Israel carp
	Israel carp	Snakehead	Snakehead	Gray mullet



In the 21st century, the national average production of inland fisheries was approximately 23 000 tonnes per year while the import amount of inland fisheries has reached more than 35 000 tonnes in recent years (Figure 1, Table 7). According to this data, provided by the Korea International Trade Association (<http://www.kita.net>, 2011), the import amount of inland fisheries is higher than the domestic production of inland fisheries. The most dominant fish species imported are salmon (25.8 percent), Chinese muddy loach (24.5 percent) and Melanian snail (22.9 percent), mainly from USA and China.

TABLE 7
Amount and value of imported inland fish species

Species 구분	2009		2010	
	Amount (kg)	Value (US\$)	Amount (kg)	Value (US\$)
Salmon	11 267 072	67 316 663	9 374 014	68 917 503
Chinese muddy loach	9 237 345	32 438 008	8 814 748	36 046 274
Melanian snail	9 789 657	2 167 178	8 319 170	1 805 344
Japanese eel	287 892	3 157 887	3 235 367	28 219 178
Crusian carp	2 107 021	4 614 445	2 071 271	4 605 644
Common carp	2 382 769	5 104 492	1 965 400	4 045 745
Tilapia	1 381 350	10 515 013	1 524 826	11 546 746
Cherry salmon	815 958	4 301 383	911 085	5 578 754
Juvenile eels	6 927	13 885 021	10 153	53 072 605
Tropical fishes	106 224	3 665 772	63 692	4 107 278
Red carp	296	107 071	269	75 627
Other live aquarium fishes	14 700	247 219	17 208	263 086
Total	37 397 211	147 520 152	36 307 203	218 283 784

Source: The Korea International Trade Association

3. INLAND FISHERIES GOVERNANCE

The governance of inland fisheries in the Republic of Korea reflects socio-economic and environmental changes over time. In the 1960s, issues on efficient use and development of inland waters for fish production and the promotion of inland fisheries as a valuable source of income for local people near inland water were growing in force due to the nationwide construction of dams, artificial lakes and reservoirs. In the 1970s, a wide variety of national policies were implemented to promote the development and utilization of inland fisheries resources. This involved the improvement of existing technology, the development of new technology, and the development of new aquaculture methods, including the introduction of commercially valuable species from abroad. An Inland Fisheries Promotion Act was established in 1975. The 1980s marks a decade of remarkable growth of inland fisheries due to the development of aquaculture technologies centered on the cage culture and of high-value aquaculture species such as Japanese eel, cherry salmon and catfish. However, in the late 1980s, inland capture fisheries depending on natural stock size declined sharply, mainly due to water pollution, overfishing, habitat destruction and mismanagement of fisheries resources. All these causes are the result of human activity during the period of rapid national industrialization and a high concentration of urbanization. Since 1996 when a policy on Clean Water Supply was adopted, restrictions on the development of inland fisheries were imposed and use of inland waters including fisheries activities was controlled by the central and local governments. As a result, the 1990s was the decade of stagnation of inland fisheries while the 21st century is the decade of recovery due to effective management of inland fisheries resources and the increase of aquaculture production.

3.1 Goals and objectives of national policy for inland fisheries

The overall goals of the national policy on inland fisheries are to improve income situation of inland fisheries households and to increase their competitiveness through the invigoration of inland fisheries. More specifically, the objectives of the national policy are to strengthen preservation and management of inland fisheries resources, to establish sound recreational fishing, to promote the inland waterways for leisure and tourism, to secure the competitiveness of inland fisheries household through the promotion of environmentally-friendly and high value-added aquaculture, to promote

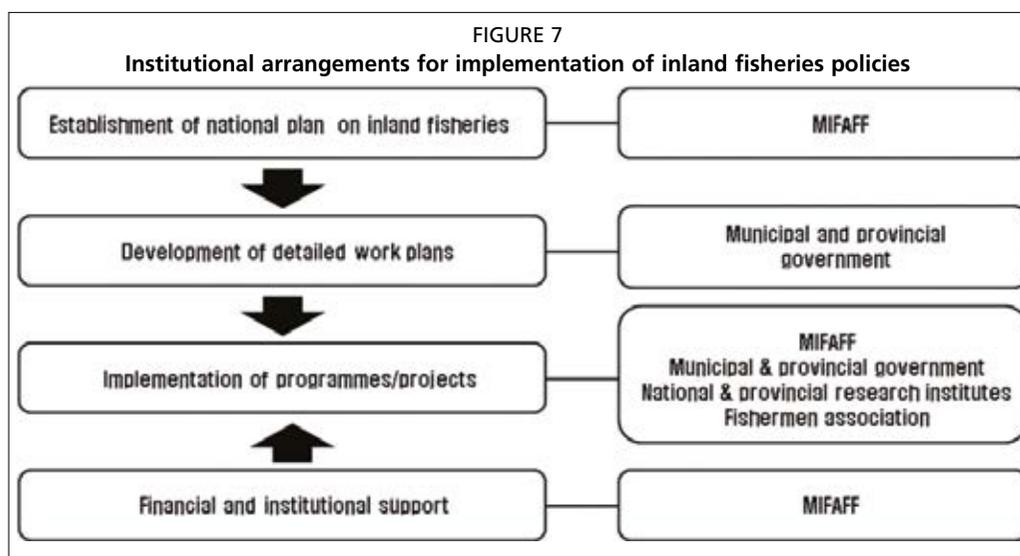
inland fish and fisheries products, and to manage inland fisheries systematically and effectively. The detailed directions for pushing ahead with the national policy are shown below in Table 8.

TABLE 8
Detailed directions for national policy on inland fisheries

Objectives	Detailed directions
Strengthening preservation and management of inland fisheries resources	<ul style="list-style-type: none"> - Stock enhancement through release of hatchery reared fish - Providing artificial spawning facilities for helping native species breeding, as part of inland ranching, in conjunction with 4 Major Rivers Restoration Project - Improvement of fish riders in environmentally-friendly manner and establishment of national management system of fish riders
Establishing sound recreational fishing and promoting inland waterways for leisure and tourism	<ul style="list-style-type: none"> - Introduction of supervision of recreational fishing - Establishment of tourism infrastructure - Regulation improvement for recreational fishing
Securing competitiveness of inland fisheries households through promotion of environmentally-friendly and high value added aquaculture	<ul style="list-style-type: none"> - Expansion of environmentally-friendly rice paddy aquaculture related to agriculture - Modernization of conventional aquaculture facilities for reducing production cost and improving production efficiency - Rearing non-food fish industry such as aquarium fishes - 5 years research project on development of technology for artificial seed production of Japanese eel
Promoting inland fish and fisheries products	<ul style="list-style-type: none"> - Development of inland fisheries processing plants - Consumer market expansion through development of nutritional health supplement made from soft-shelled turtle, catfish, Japanese eel and etc.
Systematic and effective management of inland fisheries	<ul style="list-style-type: none"> - Strengthening competitiveness through aquaculture management bodies or complex - Technical guidance for chemicals used by fish farming - Introduction of fishermen-oriented shelf management

Source: Ministry for Food, Agriculture, Forestry and Fisheries

Institutional arrangements for the implementation of the national policy on inland fisheries began with a National Plan on Inland Fisheries established by the Ministry for Food, Agriculture, Forestry and Fisheries (Figure 7). Local governments at the municipal and provincial levels develop detailed work plans based on the national plan. Administration and research institutes, together with fishermen’s associations, implement national programs and projects based on such plans. The ministry provides financial and administrative support for the implementation of these programs or projects.



3.2 Management system

The beginning of the government's involvement with fisheries issues dates back to 1948 when the Ministry of Agriculture was launched. The fisheries bureau, one of the six bureaus of the ministry, was responsible for overall fisheries management. The bureau was separated from the ministry in 1966 to become the National Fisheries Agency (also called Office of Fisheries). The agency was integrated back into the ministry in 1973, renamed as the Ministry of Agriculture and Fisheries. The ministry changed again by absorbing forestry affairs, becoming the Ministry of Agriculture, Forestry and Fisheries in 1986. In 1996 fisheries was again separated from the Ministry of Agriculture when a Ministry of Maritime Affairs and Fisheries was newly established. After the government reform and restructuring in 2008, the Ministry of Food, Agriculture, Forestry and Fisheries was re-launched in which fisheries policies from the Ministry of Maritime Affairs and Fisheries and promotion policies for food industry from the Ministry of Health and Welfare were absorbed.

The management of inland fisheries is related to the central and local government as well as the fishermen's associations. Within the framework of the Ministry for Food, Agriculture, Forestry and Fisheries, there is an administration and a research institute. Under the Fisheries Resources and Environmental Division of the ministry, only two officers are in charge of inland fisheries at the central government level. They are responsible for developing national institutions for policies on inland fisheries resources, enforcing a variety of programs/projects based on the National Plan on Inland Fisheries and securing budget for the implementation of such programs/projects. The Inland Fisheries Research Institute, of the National Fisheries Research and Development Institute, is an agency that executes national projects on fish stock assessment, water environment monitoring, species conservation, and the development of aquaculture species and related technologies (Table 9).

The municipal and provincial governments are the main agents for inland fisheries management. These local governments have administrations, research institutes and advisory groups. The administrative department should develop and implement the detailed work plans on inland fisheries based on the national plan established by the central government, to grant fishing licenses and permits, to carry out surveillance and crackdown of fishing operation, and implement stock enhancement. Regardless of professionalism and frequent personnel changes, it is difficult to expect that only one officer, who is in charge of such a heavy workload related to inland fisheries within the jurisdiction of the respective local government, performs his or her duties and responsibilities perfectly. There are one municipal and eight provincial research institutes being operated by the local governments (Table 9). They are responsible for carrying out the release of hatchery reared fish as a means of inland fisheries stock enhancement, contributing to the dissemination of juvenile fish of highbred species, the provision of technical guidance, and training of aquaculture fishermen. As advisory groups, each municipality and district has a fisheries committee to deliberate when fishing licenses and permits are granted. However, their contribution to a consultative function is insignificant, mainly due to lack of professionalism.

Inland fishermen with authorized fishing licenses or permits are responsible for organizing the fishing community or fishermen's association. As of 2010, there are 332 fishing communities nationwide, consisting of 6 754 fishermen engaging in inland capture fisheries and aquaculture (Food, Agriculture, Forestry and Fisheries Yearbook, 2011). Assuming that all inland fishermen are actively participating in their fishing community, the mean number of fishermen per fishing community is approximately 20. Although the result of the 2010 fisheries census is not yet available, it is expected that the number of inland fishermen has not increased significantly. Concerning inland aquaculture, there are two incorporated associations; the Japanese Eel Fisheries Cooperative Association and the Inland Aquaculture Association.

TABLE 9
Main responsibilities and staff of research institutes

Nature	Title	Main responsibilities	No. of staff
National	Inland Fisheries Research Institute	<ul style="list-style-type: none"> - Inland ecosystem management and restoration - Development of aquaculture technologies - Species conservation - Environmental monitoring of inland protected areas - Prevention of fish diseases 	18
	Inland Aquaculture Research Center	<ul style="list-style-type: none"> - Development of aquaculture technologies - Aquaculture feed development for fish meal 	15
Provincial	Freshwater Institute of Gyeonggi	Seed production and release of hatchery reared juveniles of common carp, Crusian carp, Mandarin fish, Korean bullhead and sturgeon	25
	Kwangwon-do Inland water Experimental Station	Release of juveniles of Japanese eel	11
	Chungcheongbuk-do Public Official Training Center	Seed production and release of hatchery reared juveniles of native species (common carp and Crusian carp and etc.) and pond smelt	23
	Chungcheongnam-do Inland Water Experimental Station	<ul style="list-style-type: none"> - Development of aquaculture technologies and rare fish species - Seed production and dissemination 	8
	Jellabuk-do Inland Water Experimental Station	Transplant of fertilized eggs and release hatchery reared juveniles of pond smelt	9
	Jellanam-do Inland Water Experimental Station	<ul style="list-style-type: none"> - Transplant of fertilized eggs and release hatchery reared juveniles of pond smelt - Release of juveniles of Japanese eel 	9
	Gyeongsanbuk-do Inland Fish Research Center	<ul style="list-style-type: none"> - Artificial incubation of salmon eggs and release of hatchery reared salmon - Operation of inland fish exhibit hall and invigoration of tourism 	13
	Gyeongsangnam-do Fisheries Resource Research Center	Seed production and release of hatchery reared juveniles of common carp, Crusian carp and etc.	8
Municipal	Samcheok River Development Project	Capture and induced spawning of native species	7
Juridical persons	Cold-water Fish Research Center, Korea Fisheries Resource Agency	<ul style="list-style-type: none"> - Salmon-related international affairs - Salmon enhancement - Development of aquaculture technologies for cold-water fish and provision of related technical guidance 	9
Total			155

3.3 Law and institutions

Inland related institutions can be briefly divided by the use of fisheries resources, the conservation of natural environment, the use and development of surface waters, and water quality protection. There are more than 30 legal instruments related to inland water management, such as the Inland Fisheries Act, the Natural Environment Conservation Act, the Wildlife Protection Act, the Shared Water Bodies' Reclamation Act, the Wetland Protection Act, the Water and Environment Conservation Act, the Drinking Water Management Act and the Rivers and Streams Act. Since the management of national inland waters covers all aspects of the national water sector, including legal and institutional aspects, multiple ministries within different levels of government with different purposes and targets are involved in the management of inland water resources (Table 10).

TABLE 10
Legal instruments and authorized ministries with different purposes and targets for management of inland waters

Categories	Target settled	Ministries	Related legal instruments	Remarks
Biological resources	Fisheries resources	MIFAFF*	Inland Fisheries Act	Fisheries activities
	Wildlife	MOE**	Wildlife Protection Act	Endangered species
Space resources	Leisure and recreating fishing	MIFAFF	Inland Fisheries Act	Restriction on fishing activities and gear of leisure and recreation
		MLTM***	Aqua-leisure Safety Act	
	Use of rivers and streams	MLTM	Rivers and Streams Act	Use permits for rivers and streams
	Use of water reservoirs	MIFAFF	Maintenance Act for Farming and Fishing Village	Occupation permits of reservoirs
Water resources	Water quality	MOE	Water Quality Act of Lakes and Marshes	Management of water quality
			Water and Environment Conservation Act	
	Dams and aggregates (sand)	MLTM	Regulation on Support near Dam Construction Site	Construction and management of dams
Aggregate Extraction Act			Management of aggregate resources	

* Ministry for Food, Agriculture, Forestry and Fisheries

** Ministry of Environment

*** Ministry of Land, Transport and Maritime Affairs

The modern fisheries institutions began with the Fisheries Law which was established in 1908 and abolished in 1911 (Park, 2011). The 1911 Fisheries Ordinance had enforced until 1929 when the Fisheries Ordinance of Korea was established in 1929. It was subsequently replaced by the Fisheries Act in 1953 which still exists today, after several amendments, together with the Fisheries Resource Management Act, of national fisheries institutions. Inland fisheries, managed under the Fisheries Act, have their own legal instrument established under the Inland Fisheries Promotion Act in 1975 which was revised in 2000 as the Inland Fisheries Act.

The Inland Fisheries Act as the fundamental law of inland fisheries, according to the Constitution, sets patent criteria for the capture, development and use of fisheries resources and was established for the purpose of the overall use and management of inland waters though a set of basic principles. It consists of 27 Articles: the establishment of a national plan covering inland fisheries stock enhancement, fisheries production, aquaculture technologies in fish farming, and safety guidance (Article 5); fishing license, permit and registration (Articles 2, 6, 9 and 11); the organization and operation of fishing communities (Article 15); and the protection of inland fisheries resources and restrictions on recreation fishing (Articles 18 and 19). The Fisheries Act and Fisheries Resource Management Act apply in matters which are not prescribed in the Inland Fisheries Act (Article 22).

4. PROBLEMS AND SOLUTIONS FOR INLAND FISHERIES GOVERNANCE

The main cause of problems in inland fisheries governance in Korea is that freshwater is not only used for drinking water and sanitary purposes but also for fisheries, agriculture, industry, transport and many other sectors of economy. Additionally, water management is needed for controlling water levels to prepare for flood and drought relief as well as providing space for recreational fishing and water-leisure activities. It is difficult to manage inland waters effectively because several ministries with different purposes and targets are involved (see Table 10). In other words, it is the lack of holistic governance which fails to commonly regard inland waters as environmental assets that should be protected and conserved as a whole. What is needed is a mediation of different ways incorporating different goals between ministries for the use, development and management of inland waters at a sustainable level. In the short

term, this is unlikely to be resolved and seems to be a common problem in many other countries. Therefore, this review observes problems of inland fisheries governance, with respect to the Ministry for Food, Agriculture, Forestry and Fisheries at its center, in order to point the direction towards improvement.

The overall goal of inland fisheries governance is undoubtedly sustainable fisheries. In order to achieve this, legal and institutional arrangements are first needed to effectively implement policies that are being established based on scientific research. A platform for communication and network-building are essential tools for meditating different concerns between various stakeholders. A clear vision for the future of inland fisheries in an environmentally friendly manner is also necessary. For improving inland fisheries governance, modification of inland fisheries related legal instruments, integrated inland water management, science-based management and stock enhancement, management of invasive alien species, improvement statistical data collection, capacity building of fishermen, introduction of fishing license quota and benefit-received pay principle, and improvement of fisheries infrastructure should be prioritized. This chapter will discuss these elements in more detail.

4.1 Modification of legal instruments: national plan and detailed work plans

According to Article 5 of the Inland Fisheries Act, the government should establish a national plan for the sustainable development of inland fisheries, and the local governments should then form a detailed work plan on inland fisheries based on the national plan. The national plan should include: (1) stock enhancement, protection of inland fisheries resources, and improvement of fisheries productivity; (2) promotion of recreation fishing; (3) development and dissemination of the use of fish and fish products and fish processing technologies; (4) providing guidance for the use of fisheries medicines in fish farming, sanitation techniques and aquaculture technologies. Regarding the fact that several ministries are involved in the management of inland water resources, prior to the development of the national plan, an appropriate consultation process with related ministries (i.e., the Ministry of Environment, the Ministry of Land, Transport and Maritime Affairs, and the Ministry of Culture, Sports and Tourism) is needed to increase the effectiveness of their use and management.

It is necessary that the establishment of the national plan and the detailed work plan for inland fisheries by the central and local government is clearly stipulated in the Inland Fisheries Act. The nature of these plans is currently declaratory but not regulatory. The Inland Fisheries Act should also define what is to be included in the detailed work plan. Taking ecological status and characteristics of water bodies within the jurisdiction of the local government into account, it is recommended that the local government hold a public hearing to gather extensive opinions from local residents and experts, consult with the existing advisory committee or if necessary, a newly organized committee, prior to developing the detailed work plan. The work plan should be approved by the mayors or governors of municipalities and provinces and reported to the minister accordingly. It is also desirable that the work plan is prepared at the level of municipal or provincial government because bodies of water can be located in or overlapping two or more jurisdictions at the lower level of the local government. In addition, it is suggested to build a monitoring and evaluation system to oversee performance activities of municipalities and provinces implementing their work plan.

When the national plan for inland fisheries is established or modified, it should be notified by the minister's decree. In the same sense, when the mayors or governors make the detailed work plan, it should be announced in the official gazette and reported to the Minister of Food, Agriculture, Forestry and Fisheries. In doing so, the national plan and detailed work plans are made accessible to the public.

4.2 Integrated inland water management

The current water management system is based on the jurisdiction of the local government. In reality, however, bodies of water to be managed overlap two or more jurisdictions of local governments. It is suggested that the respective local governments jointly hold a public hearing to gather opinions from local residents and experts on topics and consult with an advisory committee prior to establishing the detailed work plan on inland fisheries. Once the local governments have jointly set the overall goal and direction for implementation for the work plan, each local government will make their own detailed work plan based on the agreement achieved through the joint process mentioned above. Each local government will then implement the plan separately but in a harmonized manner.

If such joint efforts of water management between the local governments functions properly, it can be further expanded to the integrated inland water management based on basins. In Korea, there are four major basins centered by the Han River, Geum River, Nakdong River and Yeongsan River (Figure 8). The Ministry for Food, Agriculture, Forestry and Fisheries, in cooperation with the Ministry of Environment and the Ministry of Land, Transport and Maritime Affairs, designated 117 common water areas, which are being used for multi-purpose convenience in water management. In case it is difficult to cooperatively make the work plan for water bodies occupying two or more local governments, it is considered that the central government (the ministry) plays a certain role. In the Coastal Zone Management Act, the Minister of Land, Transport and Maritime Affairs can make a regional development plan directly according to the legal steps when the major or governor is incapable of making such plan due to two or more districts or boroughs involved.

It is suggested to organize a joint advisory committee, consisting of equal representation from each local government, for the effective implementation of the integrated inland water management and facilitating to reach an agreement between the local governments. Administrative officers, experts (from institutes and academia), fishermen or fishermen's association, representatives of sport fishing association and other stakeholders can be involved as committee members. The joint committee should provide the overall guidelines for water areas under consideration, target areas for the management, the overall goals and objectives for the management policy and other matters. Such guidelines would be submitted to the local governments involved and used for reference in preparing the work plan.



4.3 Science-based management

The government has paid a great effort to protect inland fisheries resources since the late 1980s when a sharp decline in fish stocks was seen due to the development of rivers and streams for multi-purposes, habitat destruction, water pollution and overfishing. A survey was carried out recently to estimate potential productivity of the five big rivers (Han River, Nakdong River, Geum River, Yeongsan River and Seom-jin River) where intensive fishing occurs. However, a criteria or guidelines for fish stock recovery, conservation and management of inland ecosystems based on their carrying capacity have not yet been developed. Fisheries management should consider biological, ecological, environmental, technological, societal, cultural and economic aspects. More specifically, it should be based on carrying capacity of ecosystems, diversity being important to ecosystem functioning, components of linked ecosystems and ecosystem changes with time. A precautionary approach should be applied when sufficient scientific information is not available.

For scientific management to protect inland ecosystems and fisheries resources, climate and weather characteristics of Korea are taken into account. Since most of the average annual precipitation occurs during the summer season or rainy season, water quantity in rivers and streams fluctuates greatly during the year. Water quality becomes worse during the dry season, which corresponds with fish breeding season as well as the farming season in agriculture, which is very water demanding. Therefore, water quality improvements during the dry season are urgently needed. Considering that inland aquaculture production accounts for approximately 60 percent of the national annual production of inland fisheries, a regulation measure for wastewater discharge effluent from fish farms should also be developed.

4.4 Stock enhancement and management of invasive alien species

The national program on hatchery release dealing with salmon and other native inland fish species is being continuously implemented for inland fisheries enhancement. However, with the exception of the Melanian snail, an impact assessment on the program, evaluating issues such as the survival rate from release of hatchery reared juveniles and the actual contribution of hatchery release to stock enhancement, has not yet been carried out. The on-going effort for stock enhancement is not based on scientific background but was rather adopted from abroad or common practice. The development of guidelines for the hatchery release program, containing information on target species in the region, their release body size, amount of hatchery reared juveniles to be released and time to release such juveniles as well as prohibited species that should not be released, is required. Such guidelines should also include follow-up monitoring and impact assessment.

National projects on endangered species restoration and artificial spawning facilities, as part of stock enhancement, are being undertaken. Endangered species restoration project is at a rather preliminary stage in trying to ensure the survival of most critically endangered inland fish species. This project does not yet reach the level where hatchery reared juveniles of such endangered species are released into wild ecosystems.

An artificial spawning facility project was initiated as a case study in 2007 with an impact assessment in 2009. Results of this project demonstrated that fish eggs that are spawned during the breeding season have a high mortality rate from drying out due to lower water levels during the dry season. This also corresponds with the farming season when agricultural water use increases. In this regard, artificial spawning facilities are a very effective means of stock enhancement. Taking ecological characteristics into account, such as species composition and their distribution pattern within a region, it is necessary to develop guidelines for artificial spawning facilities. In order to maximize their effect, the guidelines should contain scientific criteria for requirements prior to and during the installation of artificial spawning facilities and follow-up management.

Instructive guidance for the selection of the most appropriate sites for artificial spawning facilities and the development of related technologies is also needed.

Largemouth bass and bluegill were introduced from abroad for aquaculture in the 1960s and later 1970s, respectively, but did not meet domestic consumer preferences. In the past, they were released for the purpose of stock enhancement, due to the lack of knowledge about invasive alien species, and expanded their distribution with time, due to neglect of management. As time went by, their adverse effects on native ecosystems and species have gradually come to light and they were listed as invasive alien species in 1998. It is urgently necessary to develop guidelines for the prevention, eradication and control measures of invasive alien species that threaten native ecosystems. In addition, it is suggested to take measures to protect and conserve native ecosystems by preventing the unnecessary introduction of foreign fish species and prohibiting artificial release of introduced species.

4.5 Improvement of statistical data collection

Reliable statistical data is essential for making policies towards sustainable inland fisheries and the effective management of inland fisheries resources. In chapter 2, data from different sources was used to describe the current status of national inland fisheries. Due to the lack of a nationally recognized integrated fishery statistic system where information on fishing licenses and permits is published, the fisheries production and fishing capacity are only available in the Food, Agriculture, Forestry and Fisheries Yearbook. It is difficult to fully uncover the amount of inland fisheries production which has been under-reported to avoid tax duty or omitted throughout the fisheries census. Currently, the municipal and provincial local governments do not collect basic statistical data on inland fisheries, except for the number of fishing licenses and permits issued. Therefore, institutional improvement to collect inland fisheries data is required.

4.6 Capacity building of fishermen

It appears difficult to effectively oversee inland fisheries operations that occurs in a small scale over a wide area, in particular regarding limited human resources available at the central and local government levels (as mentioned in section 2 of Chapter 3). Fishing communities, consisting of fishermen and users of inland fisheries resources, are encouraged to participate in stopping illegal fishing and helping to protect and conserve inland fisheries resources. Furthermore, as the main stakeholder of inland fisheries resources, they are encouraged to take the initiative of reducing fishing capacity in overfished areas. Among 332 inland fishing communities as of 2010, only 41 communities are participating in the fishermen-oriented, self-management recommended and supported by the government. The participation rate is low compared to marine fisheries. There are many inland regions where fishing communities have not yet been organized. In addition, shifting the current inland aquaculture fishermen associations towards participatory, self-management is recommended. In particular, aquaculture fisheries are of great importance in national inland fisheries production as well as food safety of farmed fish throughout all stages from production to sale. A form of incentive, such as giving priority when the fisheries development fund is supported by the government or authorizing fishing licenses, can be considered in order to help fishing communities actively participate in self-management of fisheries.

A possibility to encourage cooperation between fishing communities is to let them guide the release of fish or aquatic animals for religious purposes. Furthermore, fishing communities engaging in self-management of fisheries can share their experiences with other fishermen and inform them that self-management contributes to enhancing inland fish stock and to increasing income. Working together with fishing communities and/or local fishermen's associations, it is important to carry out monitoring and surveillance to eliminate illegal fishing operations during the seasons of spawning.

To do so, it is necessary to develop guidelines containing information on allowed and prohibited list of fish and aquatic animal species for release practice, release body size, and amount and the timing to be released. To increase the effectiveness of such cooperation, guidelines which cope differently with different types of illegal fishing are needed.

Fishing communities can also contribute by collecting discarded fishing gear that has sunk to the bottoms of dams and lakes, destroying fish habitats and hampering their spawning activities. This provides fishermen with an opportunity to learn how to keep and discard fishing gear and equipment in an environmentally considerate manner.

4.7 Introduction of fishing license quota

Regarding the recent decline of inland fisheries resources, mainly caused by ecosystem changes over time, water pollution and overfishing, it is recommended that fishing license quota are introduced. These quotas are meant to regulate the fishing intensity by fishing types (gill net, longline fishing, long bag set net and etc.), in accordance with the municipal and provincial jurisdictions. The quota system, which restricts the authorization of fishing licenses and permits in public water areas, also contributes to minimizing conflict between fishermen and public water managers. To develop such a system, related laws and regulations are needed to be modified or revised accordingly.

4.8 Improvement of fisheries infrastructure

The pond aquaculture system with low production efficiency per unit area is widely used in inland aquaculture fisheries and holds great importance in national inland fisheries production. Many aquaculture facilities are decrepit and need to be repaired and modernized. Therefore, it is necessary to expand the distribution of the environmentally sound aquaculture system. For example, the water circulation system is meant to reduce water pollution, improve production efficiency through cost cutting, and strengthen the competitiveness of aquaculture households.

In practice, it is difficult to manage inland aquaculture households because most of them operate in small-scale fish farming. In this regard, it is suggested to establish an aquaculture complex for each of the major aquaculture species, which subsequently will contribute to securing the competitiveness of aquaculture products by reducing the cost of production and information sharing. Most fish products are being sold directly to health food shops to deal with folk remedies, restaurants and fish markets or to dealers or merchants. In cases where fish products are sold to dealers or merchants, fishermen often lack relevant market information and sell their products at prices below the market price. In a long-term, an aquaculture complex would facilitate seed production, raising fish production and the distribution supporting facilities. Making differentiation based on species-specific strategies with each complex having its own locally branded fish species (i.e., Pyeoungchang for cherry salmon, Gochang for Japanese eel) would be of great help in promoting inland fisheries products and their consumption.

On the other hand, it is necessary to take counter-measures to cope with the problems of inbreeding that increases the chances of offspring affected by recessive or deleterious traits in some aquaculture species. In addition, the development of aquaculture technologies for native fish species and the promotion of the industry of aquarium fish need to be taken into account.

5. CONCLUSION

The previous chapters have outlines how national policies to promote and develop inland fisheries in Korea are being implemented nationwide and effecting the national inland fisheries production (Figure 1). However, national policies and programs,

implemented before the concept of sustainable fisheries and the importance of fisheries management, have not fully considered the carrying capacity of ecosystems. As a result, these policies fail to predict and manage the problems arising in fisheries governance, such as habitat destruction, water pollution and ecosystem changes due to rapid national industrialization and development. A sharp decline in the annual production of inland capture fisheries was experienced in the late 1980s. Since then, the government has spent a great deal of effort in protecting and enhancing inland fisheries resources.

Inland freshwater is used not only for drinking water and sanitary purposes but also for fisheries, agriculture, industry, transport and many other sectors of economy as well as for controlling water levels to make preparation for flood and drought. Most of all, to improve problems involved in inland fisheries and to satisfy diversified demand for the use of inland waters, the value and integrity of inland waters should be shared not only with the government departments but also with the general public. In addition, inland fisheries issues should be prioritized among others at the national level.

The national policies for inland fisheries should be based on reliable results from scientific studies and in an integrated management manner, fully taking into account ecological characteristics in the region or water bodies. The national policies and programs, convincing a variety of stakeholders including not only fishermen and fishermen's associations but also the general public who wish to use the inland water environment per se, should be also reasonably and transparently implemented. Participatory systems involving self-management of inland fisheries are strongly encouraged.

Another problem to be dealt with is that of invasive alien species introduced from abroad, such as bluegill and largemouth bass, which threaten native species and disturb native ecosystems.

Finally, regarding free trade agreements and opening of trading market, it is necessary to consolidate the status of inland fisheries products by lowering the cost of production through the modernization of production facilities and infrastructure for domestic fisheries. Also, tightening up on food safety standards is needed in order to secure the competitiveness price of inland fisheries products that are produced domestically against imported low-price products expected to be increased.

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Research on a model case of governance in inland fisheries: *Based on inland fisheries of Yedang reservoir in south Chungcheong province*

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1. INTRODUCTION

As the roles of governance across the society are highlighted at home and abroad, many experts stress that not only the government, but also the private sector, should actively participate in governance. FAO defines governance as a concept that includes policy-making/implementation/process, those subject to policies, and policy means or system. Based on the assumption, inland fisheries governance can be understood as either a process through which the government and fishermen cooperate in order to set up and execute policies for the sustainable development of inland fisheries or the legal, social, economic, and policy adjustment used to manage fisheries resources.

Unlike general marine fisheries, inland fisheries highly emphasize the roles and participation of governance. Inland waters are subject to diverse laws and the regulations of a number of government agencies. Due to lack of administrative staff (central and local) who can establish and implement inland fisheries policies, the roles of and participation by fishermen are required. Isolated inland waters, indiscriminate development, and an increase in the number of exotic fishes are leading the number of local fishes to sharply fall, with an enhancement in access to inland waters causing conflicts between fishermen and the general public. As the roles of inland fisheries are recently re-assessed, inland fisheries are attracting keen attention from policy-makers.

Therefore, for the sustainable growth of inland fisheries, a cooperative system among interested parties should be set up through the establishment of desirable governance. The desirable governance includes equality in the use of fisheries resources, stability in fishing rights, the livelihood and income of fishermen, efficiency in fisheries resources management (decentralization), transparency in decision-making, universal application of laws, and an efficient fisheries management system.

This research is designed to study the activities, performances, and development of governance by analyzing a model case in inland fisheries governance. The model case for this research was limited to inland fisheries on public waters. Inland aquaculture accounts for more than 70 percent of inland fisheries output, but is conducted on private waters. Therefore, the application of the Inland Fisheries Act thereto is very limited, with the participation of governance not being significant. Against this backdrop, inland aquaculture was excluded from this research. Yedang inland fisheries in South Chungcheong Province, where fishing and angling are very active, were selected as a model case in inland fisheries governance. The reason is that, the Yedang inland

fisheries meet the requirements of desirable governance. In the past, the ecological environment in the Yedang reservoir was greatly damaged due to waste dumping and water contamination, thereby reducing fisheries resources and output. In response thereto, the Yedang Inland Fisheries Club, a fishermen group, played a leading role in improving the natural environment and creating fisheries resources, based on governance cooperation including the active support from local governments (South Chungcheong Province and Yesan-gun) and scientific advices from related research institutes. As of now, relying on fishing and angling, the Yedang inland fisheries are contributing to raising the income of fishermen and activating local economy. After reviewing the general characteristics of inland fisheries governance, the status of Yedang inland fisheries as a model case, and the activities of governance, this research will deal with the performances and future development of governance.

2. ANALYSIS OF A MODEL CASE IN INLAND FISHERIES GOVERNANCE

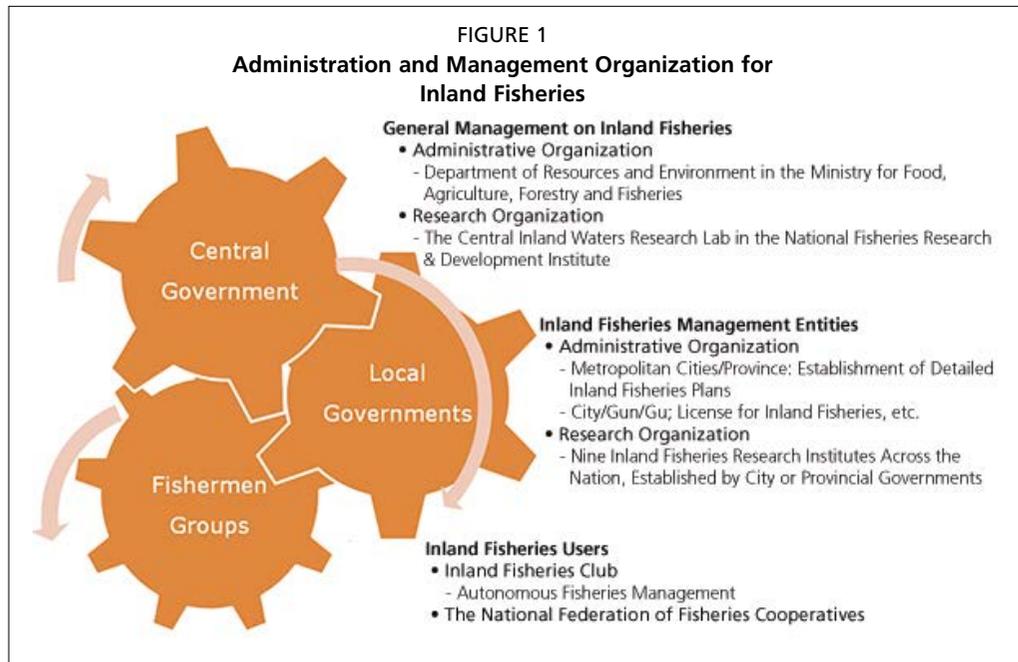
2.1 Nature of Inland Fisheries Governance

2.1.1 Complexity in Use and Management System

A number of ministries take responsibilities for the use and management of inland waters, which are regulated by various laws. Namely, the central administrative agencies that manage inland waters include the Ministry of Environment (Water Quality, Wild Animals & Plants), the Ministry of Land, Transport & Maritime Affairs (Water Amount, Riverside Use, Dam), the Ministry for Food, Agriculture, Forestry & Fisheries (Fishing, Water Leisure), and the Ministry of Culture, Sports, & Tourism (Natural Monument). In accordance with more than 30 laws including the Inland Fisheries Act, the Natural Environment Preservation Act, the River Act, and the Water Quality Preservation Act, the ministries use and control inland waters. The administrative agencies, excluding the Ministry for Food, Agriculture, Forestry, and Fisheries, take responsibilities for reinforcing the regulation of the water environment and collecting/developing river aggregates, functioning as a hurdle in maintaining and promoting inland fisheries. Furthermore, in order for fishermen to conduct inland fisheries, they should obtain the approval of public waters managers, as well as a license or permit pursuant to the Inland Fisheries Act. The complexity in the use and management of inland waters is causing difficulties in establishing and executing comprehensive and efficient inland fisheries policies.

2.1.2 Weakness in Administration

As shown in Figure 1, the administrative system in inland fisheries consists of the central government (the Ministry for Food, Agriculture, Forestry, and Fisheries), local governments (metropolitan city/province, city/gun/gu), and fishermen groups. The central government takes responsibilities for the overall management of inland fisheries, promoting inland fisheries and setting up a basic plan. The metropolitan cities and provinces establish and implement the detailed plans for inland fisheries while cities/guns/gus (substantial managers for inland fisheries) issue a license or permit for inland fisheries. However, such government agencies are showing weakness in setting up and implementing policies for inland fisheries. In the central government, two officials handle inland fisheries, with one or two employees managing inland fisheries in metropolitan cities/provinces. In cities/guns/gus, inland fisheries are controlled by officials belonging to another department. As a result, lack of staff is becoming an issue in inland fisheries management.



Fishermen who get the license for inland fisheries become inland water users that consist of fishermen groups such as inland fisheries club or associations. The number of inland fisheries clubs continuously increased from 259 in 2006, to 286 in 2008, and to 332 in 2010. The number of inland fisheries clubs that actually participate in autonomous fisheries management for systematic resources management is much smaller than that of marine fisheries clubs.

2.1.3 Difficulties in the Creation of Marine Resources

Korea's inland waters have two distinct seasons such as high-water season and low-water season. Changes in water amount in rivers and lakes by season are so great that fisheries resources have difficulties in reproduction. Thoughtless development including construction for making rivers flow in a straight line and collection of aggregates accelerates water contamination, destroying the eco-system and sharply reducing fisheries resources. Furthermore, the rapid dissemination of exotic species such as basses, blue gills, bull frogs, and red-eared turtles reduces the number of local species, collapsing the balance of the eco-system.

On the other hand, the excessive installation of fishing gear and illegal fishing by the public on inland waters also play a significant role in reducing fisheries resources. Easy access to inland waters and the fact that inland waters are open to the public have caused conflicts between fishermen and the public in terms of the use of inland waters.

2.1.4 Re-awareness of the Multi-faceted Roles of Inland Fisheries

Inland fisheries are much smaller than marine fisheries in production size or amount but provide a diversity of fisheries products that cannot be obtained through the sea, making the food life of the public much richer. Through fishing/aquaculture or experience tourism, they also play a pivotal role in activating local economy and leading the nation as a whole to develop in a balanced way. Considering that fingerling releasing contributes to the recovery of the eco-system, the roles of inland fisheries should not be underestimated. In spite of that, fisheries policies based on marine fisheries and the provision of clean water have made the importance of inland fisheries underestimated.

However, as the roles of inland fisheries are re-assessed depending on changes in inland fisheries, inland fisheries are given new opportunities to take another leap forward. Low-carbon & green growth and climate change have heightened the need for the recovery and management of the eco-system. In particular, keen attention has been paid to the composite industry including eco-friendly aquaculture using rice fields and inland waters farming. As the standard of living and the need for leisure are raised, people have more interest in non-food areas such as aquarium fishes, angling, and eco-system experience.

In order to actively respond to changes in inland fisheries, the government reflected inland fisheries development into the 3rd comprehensive plan for fisheries promotion (2010-2014). The basic plan for promoting inland fisheries is also being devised in order to ensure the comprehensive development thereof.

2.2 Selection of a Model Case

The Yedang reservoir in South Chungcheong Province was selected as a model case in inland fisheries because it met the requirements for desirable fisheries governance. As mentioned earlier, the criteria for a desirable fisheries governance include equality in the use of fisheries resources, stability in fishing rights, the livelihood and income of fishermen, efficiency in fisheries resources management (decentralization), transparency in decision-making, universal application of laws, and an efficient fisheries management system.

As of now, fishing and angling are widely conducted on Yedang inland waters. However, in the mid-1990s, the worsening eco-system and the sharp reduction of fisheries resources seriously weakened inland fisheries. In order to overcome such issues, the Yedang inland fisheries club played a leading role in voluntarily enhancing the natural environment, continuously promoting the sustainable preservation of the eco-system & the reasonable management of fisheries resources based on the support from and cooperation with local governments and research institutes.

TABLE 1
Criteria and Information in the Selection of a Model Case

Criteria for Desirable Fisheries Governance	Regional Implementation
Equality in the use of fisheries resources	<ul style="list-style-type: none"> • Participation by all of the members in the Yedang inland fisheries club • Shared use of fishing and angling
Stability in fishing rights	<ul style="list-style-type: none"> • Inland Fisheries Act (the Basic Act) • Articles of association (fisheries club) & autonomous management regulations
Livelihood and income of fishermen	<ul style="list-style-type: none"> • Increase in income of fishermen after participating in autonomous fisheries management. • Contribution to activating the local economy
Efficiency in fisheries resources management	<ul style="list-style-type: none"> • Led by the inland fisheries club • Supported by local governments (South Chungcheong Province, Yesan-gun) and research institutes
Transparency in decision-making	<ul style="list-style-type: none"> • Participation of the inland fisheries club in policy-making and implementation by local governments • Gathering of fishermen's opinions for inland fisheries club projects
Universal application of laws	<ul style="list-style-type: none"> • Fair application of laws to all the fishermen • Management of conflicts based on the articles of association (fisheries club) and autonomous management regulations.
Efficient fisheries management system	<ul style="list-style-type: none"> • Introduction of autonomous fisheries management by inland fisheries club • Establishment of cooperation system among the government, the private sector, and the academia

As of now, in the Yedang reservoir, all the fishermen are using fisheries resources fairly and equally, led by the Yedang inland fisheries club. The use & management of fisheries resources and the maintenance of fishing order are based on the Inland Fisheries Act, to which autonomous management regulations are added.

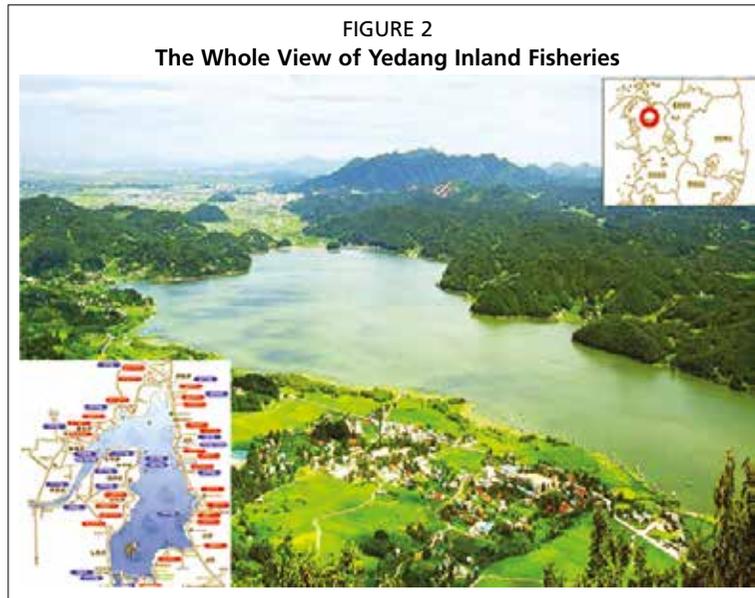
In addition, local governments (South Chungcheong Province, Yesan-gun), research institutes, and the inland fisheries club are cooperating with one another for the proper management of fisheries resources, with decision-making processes among interested parties being implemented in a transparent manner.

Governance activities have been actively conducted including the application of laws and the establishment of an efficient fisheries resources management system. As a result, fishermen taking part in the Yedang inland fisheries are creating more income.

2.3 Analysis of Regions

2.3.1 Status of Yedang Inland Fisheries

The Yedang reservoir was constructed in 1964 in order to secure agricultural water, covering Sinyang-myeon, Gwangsi-myeon, Daeheung-myeon, and Eungbong-myeon in Yesan-gun, South Chungcheong Province. The size of the reservoir is estimated at 1,088ha (about 3.3 million pyong), with the reservoir managed by the Korea Rural Community Corporation (Yesan Office).



For the Yedang reservoir, an inland fisheries club was organized in 1987. Table 2 shows the status of the Yedang inland fisheries club as of the year 2011. The number of club members is 48, who are engaging in fishing or angling (or fishing + angling). For fishing, gill nets, pound nets, fish pots, and longlines are used, of which, fish pots and gill nets are the most widely employed. For tourist angling, there are 27 fishing sites (a total of 270 seats) and one fishing hole near the Yedang reservoir. As basic infrastructure, one fishing club office is installed and used as a fisheries shop and ecosystem education center.

TABLE 2
Status of Yedang Inland Fisheries Club (2011)

Fisheries Club Organization	Number of Fishermen	Fisheries Type	Fishing Type	Basic Facilities
April, 1987 • Participate in autonomous fisheries management in 2004.	48	Fishing, Angling (Fishing: 20 persons, Angling: 1 person, fishing +angling: 26 persons)	Gill Net: 19 cases, Pound Net: 4 cases, Fish Pot: 26 cases; longline: 2 cases; Water fishing site: 27 cases (10 seats per person); Fishing place: 1 case	Office (fisheries shop & exhibition center)

Source: Listening to the members of Yedang Inland Fisheries Club

In order for fishermen to conduct inland fisheries in the Yedang reservoir, they should pay water usage fees every year that is determined through water usage agreement with the Korea Rural Community Corporation (waters manager) every three years. Inland fisheries do not use the Yedang reservoir as a whole and are limited to 400 ha, the minimum area for low-water season (farming season).

By the mid-1990s, inland fisheries in the Yedang reservoir had not been actively executed. The reason is that cage culture for carps, gold fishes, catfishes, and eels were widely implemented, with waste dumping by residents causing serious water contamination. Furthermore, exotic species such as bull frogs and blue gills were widely reproduced, with the supply of agricultural water for the farming season lowering the water level of the reservoir. As a result, fisheries resources including local species sharply reduced. Under these circumstances, the Yedang inland fisheries club has played a leading role in preserving the natural environment, setting up a cooperative governance system among the government, the private sector, and the academia. As concerted efforts to promote inland fisheries were made, the eco-system and fisheries resources in the Yedang reservoir successfully recovered.

2.3.2 The Activities of Governance in Yedang Inland Fisheries Independent Management by Inland Fisheries Club

Since the mid-1990s, the Yedang inland fisheries club has implemented a diversity of autonomous management activities in order to prevent water quality from worsening and to expand fisheries resources. Since the year 1995, it has massively collected wastes near the reservoir, and removing bull frogs (exotic species) in 1998. In 1999, it started artificial release of fingerlings, and since 2000, has installed artificial spawning beds and set a closed season to recover fisheries resources. Since 2003, it has also attracted fishing competitions in order to increase non-fishing income and to activate the local economy.

The Yedang inland fisheries club devised autonomous management regulations in December, 2004 and formed an autonomous management community in order to take part in autonomous fisheries management. The reason why it participated in autonomous management of fisheries can be summarized as follows: First, excessive catching by fishermen and tourist anglers prevented fishermen's income from rising. Second, the conflicts between club members over the use of fisheries resources have deepened. Third, with the introduction of autonomous management fisheries promoted by the government, financial support and systematic resources management were required.

Table 3 summarizes the process of autonomous fisheries management implemented by the Yedang inland fisheries club. As autonomous fisheries management was implemented in 2001 for the first time in Korea, the Yedang inland fisheries club enforced internal resources management, providing necessary information and training to fishermen and helping them understand autonomous fisheries management. In 2004, it participated in autonomous fisheries management the first in Korea. And for the successful establishment of autonomous fisheries management, it visited model autonomous fisheries management sites, setting up a cooperative system with local governments and research institutes. Thereafter, fishermen's attitude towards autonomous fisheries management gradually changed, helping fishermen-centered autonomous fisheries management to be set up and expanding the project to diverse areas.

TABLE 3
Implementation Process of Autonomous Fisheries Management in Yedang Inland Fisheries Club

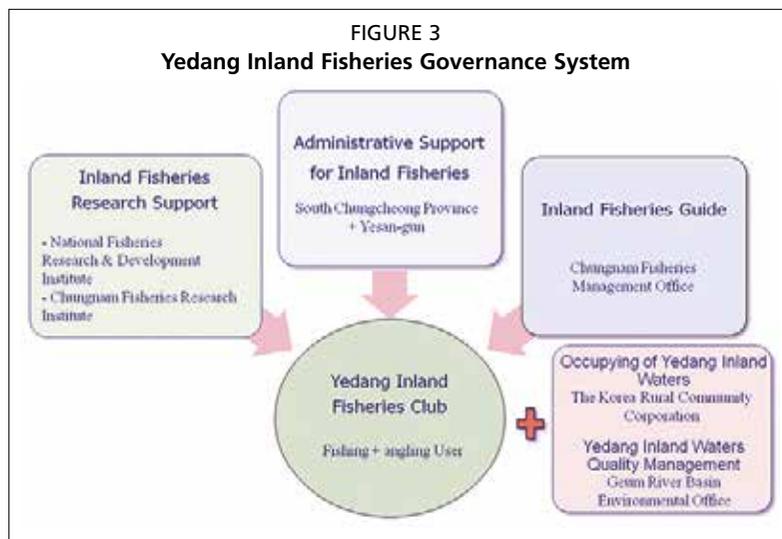
Base Creation	Focus on promotion and training at the initial stage - Promotion and training for understanding & participating in autonomous fisheries management.
↓	
Introduction	Take part in autonomous fisheries management, benchmarking exemplary groups. - Set up a cooperative system with South Chungcheong Province (Fisheries Management Office, Fisheries Research Institute), Yesan-Gun, and the National Fisheries Research and Development Institute. - Learn successful cases in autonomous fisheries management.
↓	
Development	Implement autonomous fisheries management (management of fisheries and fishing resources) - Change fishermen’s attitude, implementing fishermen-centered autonomous fisheries management activities.

Source: Onsite Research

Establishment of Cooperative Governance System

The Yedang inland fisheries were able to take another leap forward, based on the establishment of cooperative governance. Figure 3 shows the organizations that take part in the Yedang inland fisheries governance. The Yedang inland fisheries (fishing and angling) were activated, improving water quality and recovering fisheries resources, because the Yedang inland fisheries club played a leading role in promoting independent fisheries and resources management. Administrative agencies and research institutes also actively supported the initiative, based on cooperative ties with the club.

Local governments (South Chungcheong Province, Yesan-gun) take responsibility for controlling Yedang inland fisheries-related issues and issuing a license or permit, providing financial assistance for releasing local species. The National Fisheries Research & Development Institute (Central Inland Waters Research Lab) and the Chungnam Fisheries Research Institute (Inland Fisheries Development & Test Center) provide scientific assistance to fishermen in terms of fisheries resources research, eco-system management, disease control, resources creation, and fishermen training. Chungnam Fisheries Management Office (Seosan Office) supports the activities of autonomous management community as an advisor. The Korea Rural Community Corporation (Yesan Branch) does not directly participate in the activation of inland fisheries but allows fishermen to use inland waters as a waters manager, helping to clean up fishing areas. The Geum River Basin Environmental Office measures the quality of Yedang inland waters, providing the results to fishermen periodically.



Effective Governance Activities

The activities of Yedang inland fisheries governance consist of improvement in fisheries environment, prevention of illegal fishing, expansion in non-fishing income, and eco-system training. Table 4 shows the specific information.

First, in terms of improvement in fisheries environment, about 5 tons of bull frogs and blue gills a year, exotic species that destroy the eco-system, are eradicated, removing green algae and disseminating 10 tons of red clay a year in order to improve water quality. Installing rest rooms and waste baskets near the fishing place, three paid workers collect wastes. In addition, for the preservation of fisheries environment, the 5/5 campaign has been conducted since the year 2004, encouraging fishermen to clean up nearby areas for 5 minutes before and after fishing.

Second, diverse efforts have been made in order to prevent illegal fishing. The inland fisheries club leads fishermen to take part in internal and external training, putting up a banner for preventing illegal fishing. In addition, the club operates an illegal fishing monitoring group in order to prevent illegal and indiscriminate fishing in advance. The 119 water rescue team was also organized in order to ensure safe fishing.

Third, the Yedang inland fisheries club is actively working to create fisheries resources. The club has released local species such as carps, Korean bullheads, and smelts, bearing related costs. Since 1999, the local government (Yesan-gun) has provided 30 million won worth of financial assistance to the club in order to help fisheries resources be created. In order to prevent the use of agricultural water for a farming season from lowering the water level of reservoir, and thereby reducing spawning areas, the club has installed artificial spawning beds, bearing related costs, since the year 2000, raising natural spawning rates.

Furthermore, the club is setting a closed season and fish size limit in an autonomous manner. From March to April every year and in case the water storage rate in the Yedang reservoir is 40 percent or below, fishing and angling are prevented, encouraging fishermen and tourist anglers to release caught fishes whose size is 15cm or smaller.

TABLE 4
Use of Yedang Inland Fisheries Governance

Classification	Activities
Fisheries Environment Improvement	<ul style="list-style-type: none"> - Eradicate bull frogs and blue gills, species destroying the eco-system. - Remove green algae and distribute red clay in order to enhance water quality - Clean the fishing area (employ three paid-workers): Install rest rooms and waste baskets. - Conduct 5-5 campaign for environmental preservation (clean up nearby areas for 5 minutes before and after fishing)
Prevention of Illegal Fishing	<ul style="list-style-type: none"> - Conduct training and promotion activities: Internal & external training (Fisheries Management Office, Research Institute, etc) - Put up a banner for the prevention of illegal fishing by fishermen and anglers - Set up a 119 water rescue team. - Operate an illegal fishing monitoring group (two persons per group): prevent illegal and indiscriminate fishing in advance.
Creation of Fisheries Resources	<ul style="list-style-type: none"> - Continuously release local fishes. - Set up artificial spawning beds - Set a closed season and fish size limit: prevent fish catching from March to April, or in case the water storage rate is 40% or below; lead fishermen and tourist anglers to release fishes whose size is 15 cm or smaller.
Increase in non-fishing income	<ul style="list-style-type: none"> - Hold national fishing competitions: hosted by Yesan-gun Governor and Food, Agriculture, Forestry, and Fisheries Minister; Yedang Couple Fishing Competition - Commercialization of caught fishes: Develop and market an internal brand for 'Yedang Carp Extract'
Eco-system Training	<ul style="list-style-type: none"> - Operate a Yedang eco-training center: provide eco-system experience and learning opportunities to local students. - Establish a releasing experience center: Lead religious groups to release only local species.

Source: Revised/modified internal data of Yedang Inland Fisheries Club

Fourth, concerted efforts are being made in order to raise non-fishing income. Using fisheries resources recovered through improvement in water quality, national fishing competitions have been held in order to raise the income of fishermen. As of now, fishing competitions hosted by Yesan-gun governor (2003) and Food, Agriculture, Forestry, and Fisheries Minister(2007) and the Yedang Couple Fishing Competition (2006) are held every year. The inland fisheries club internally developed ‘Yedang Carp Extract’ for the stable marketing of caught fishes, which functions as a non-fishing income source.

Fifth, the reinforced eco-system training is being provided to the general public. In the Yedang inland fisheries club building, the ‘Yedang Eco-system Education Center’ was set up in order to help local residents and students learn the eco-system. Recently, the club is planning to construct a releasing experience center. The center is designed to prevent religious groups from indiscriminately releasing fishes including exotic species, which cause imbalance in the eco-system, and to encourage them to release only local species. The center will enable the general public to directly experience the ecological environment.

3. PERFORMANCES AND DEVELOPMENT IN REGIONAL INLAND FISHERIES GOVERNANCE

3.1 Performances

With the implementation of diverse activities in Yedang inland fisheries governance, the fisheries environment has gradually improved, recovering fisheries resources, increasing the income of fishermen, and establishing an autonomous management system.

3.1.1 Fisheries Environment Improvement & Recovery of Fisheries Resources

By the mid-1990s, the water quality in the Yedang reservoir was downgraded to level 4 to 5 due to the inflow of waste water from livestock farming, garbage dumping, and cage culture. In addition, the dissemination of exotic species such as bull frogs and indiscriminate fishing by fishermen and tourist anglers sharply reduced local fisheries resources.



However, as policies for clean water supply were made in 1995, cage culture in the reservoir became impossible. The Yedang inland fisheries club continuously collected wastes, distributing red clay, with the local government (Yesan-gun) implementing diverse projects in order to improve water quality. Thanks to such efforts, the fisheries environment has greatly improved, enhancing the water quality to level 2.

Based on mutual cooperation, the inland fisheries club, the local government, and research institutes have eradicated exotic species, releasing carps, installing artificial spawning beds, preventing illegal fishing, and providing necessary information to fishermen and the public for the maintenance of fishing order. Such systematic fisheries resources management enabled more local fishes with high added value such as carps, Korean bullheads, eels, and smelts to be more effectively caught.

3.1.2 Increase in Income of Fishermen

The improvement in water quality, the recovery of local species, and continuous resources management enabled fishing and angling to be more actively promoted (refer to Figure 5). In particular, as the fishing competition hosted by Yesan-gun governor was held every year from 2003, the Yedang reservoir became widely known across the nation as one of the best fishing spots. About 100 000 tourist anglers a year visit the reservoir, raising the income of fishermen and activating the local economy.

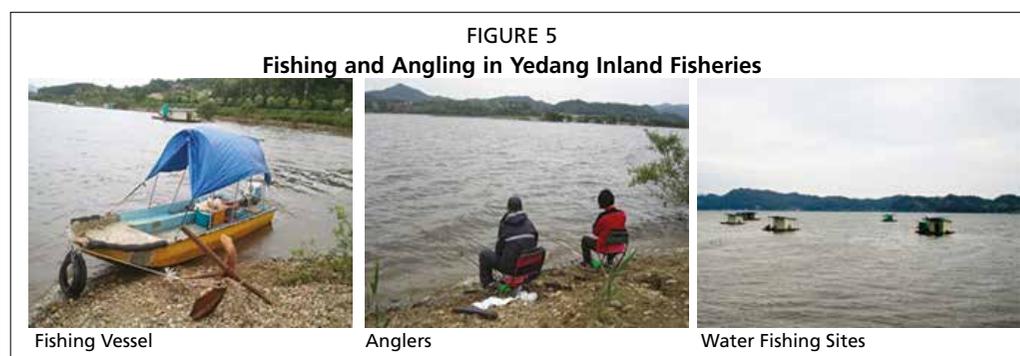


Table 5 shows the trends in investment and income after the Yedang inland fisheries club participated in autonomous fisheries management in 2004. The investment items include water usage fees (for the Korea Rural Community Corporation, a waters manager), club office management fees, fingerling releasing costs, and HR costs for cleaning up fishing areas. Among them, the water usage fees account for the largest portion thereof. Financial sources come from club membership fees and fishing spot entrance fees. The total income refers to the amount that club members earn through fishing and angling.

TABLE 5
Investment and Income in Yedang Inland Fisheries Club

Unit: Million Won

	2004	2006	2007	2008	2009	2010
Club Investment	110	140	160	170	170	230
Club Income	1 200	1 400	1 880	2 110	2 350	2 160
Income per Member	25	30	40	45	50	45

Note: The club investment includes water usage fees for the Korea Rural Community Corporation, office management fees, fingerling releasing fees (10 million won), and HR costs for cleaning up fishing areas (30 million won). In 2010, the land procurement cost for waste collection (80 million won) was added.

Source: Listening to Yedang Inland Fisheries Club Members

On the other hand, the income per club member rose from 25 million won in 2004 to 30 million won in 2006. Since 2007, it has been hovering around 45 ~ 50 million won. The current income per club member is estimated at about twice as much as that in 2004. Furthermore, as many tourists and anglers visited the Yedang reservoir, the income of restaurants, grocery stores and fishing shops has also increased, contributing to the growth of local economy.

3.3.3 Establishment of Autonomous Management System

The biggest achievement of the Yedang inland fisheries governance is the establishment of fishermen-based autonomous management system. The Yedang inland fisheries governance had to go through trial and error before it is systematized based on mutual cooperation. In particular, the participation in autonomous fisheries management and reinforcement in independent resources management sparked strong opposition from fishermen with vested rights, with local governments failing to pay enough attention thereto.

However, the sharp reduction of fisheries resources in the Yedang reservoir led fishermen to feel a sense of crisis, with the continuous training and promotion by the inland fisheries club helping fishermen change their attitude. As the income of fishermen rose thanks to the participation in autonomous fisheries management, they more actively took part in the program. The Yedang inland fisheries club implemented independent fisheries management even before taking part in autonomous fisheries management, thereby helping the autonomous fisheries management to quickly take root in the fishing society. In addition, local governments (South Chungcheong Province & Yesan-gun), the Chungnam Fisheries Management Office, and other research institutes showed keen interest in the initiative, helping the club effectively produce tangible results.

The Yedang inland fisheries club enabled fishermen enjoy rising income, successfully promoting autonomous fisheries management. Above all, helping fishermen gain self-confidence and change their attitude, the club enabled the autonomous management system to be fully established. As a result, the Yedang inland fisheries club was selected as a model community in 2006, the first in its history, beating other inland fisheries clubs. It was chosen as an exemplary community again in 2007 and 2009.

3.2 Development Direction

The Yedang inland fisheries improved the fishing environment, recovering fisheries resources, raising the income of fishermen, and activating the local economy, through the implementation of autonomous fisheries management, the establishment of cooperative governance system, and the enforcement of effective governance activities. However, they are still facing a diversity of issues such as conflicts in inland water use, ecosystem-based fisheries resources management, conflicts between fishermen and tourist anglers, and the identification of new income sources. The Yedang inland fisheries should be further developed as a desirable governance system in the following ways.

3.2.1 Unification in Inland Fisheries Management

Pursuant to the Inland Fisheries Act, in order for fishermen to conduct fishing activities on inland waters, they should get a license or permit from mayors/gun governors/gu mayors, reporting their fishing activities to the authorities. The mayors/gun governors/gu mayors should make an agreement with a waters manager in relation to paying water usage fees. Therefore, both mayors/gun-governors/gu mayors and waters managers take responsibility for the use and management of inland waters. Therefore, even after getting a license or permit, fishermen should conclude a separate agreement with a waters manager in relation to water usage fees. In the Yedang inland fisheries,

fishermen should get an approval of the Korea Rural Community Corporation in terms of waters use before receiving a license or permit from mayors/gun-governors/gu mayors for inland fishing.

And the levying of excessive water usage fees has also expanded the economic burden that fishermen have to bear. For the Yedang reservoir, the Korea Rural Community Corporation, a waters manager, determines yearly water usage fees every three years by assessing the management status of fishermen, which continuously rose from 8 million won, to 25 million won, to 50 million won, and to more than 90 million won in 2010. Such a situation is not limited to the Yedang reservoir, with other regions also experiencing similar circumstances. There are no consistent criteria for water usage fees, which are levied differently depending on a waters manager.

Therefore, a unified system should be established in inland waters management in order to mitigate inconveniences that fishermen have to experience and to effectively control inland waters. Furthermore, water usage fees should also be levied based on consistent criteria. To this end, the Inland Fisheries Act and the Rural Community Development Act need to be revised.

3.2.2 Customized Fisheries Management Considering Eco-system

Inland waters are closed and independently formed, limiting the movement of fisheries resources. Because it has two distinct seasons (high-water season and low-water season), changes in fisheries resources are regarded as great, requiring the continuous management of fisheries resources. In order to efficiently control such inland fisheries resources, the characteristics of the inland eco-system should be identified, assessing fisheries resources through scientific research. Based on such scientific research, the most effective means in creating and regulating fisheries resources including fingerlings release, installation of artificial spawning bed, a closed season, fish size limit, and fishing method restrictions should be chosen and applied.

However, Korea's inland fisheries resources have been controlled without scientific research on the balance of eco-system. In the Yedang reservoir, a diversity of management means such as fingerlings release, the installation of artificial spawning beds, and fishing restrictions are applied for the recovery of fisheries resources, but which are implemented without scientific research and clear objectives in fisheries resources management. Therefore, the release of specific species may cause imbalance in eco-system, lowering efficiency in fisheries resources management.

In order to handle such issues, scientific research should be conducted on Yedang inland waters, accurately assessing the level of fisheries resources. Based on this, objectives in fisheries resources management should be set up, applying the most effective management means. In addition, attracting the inland farming business that the government is recently reviewing, fisheries management, resources management, and usage management need to be conducted in a consolidated manner. In order to effectively implement systematic fisheries resources management for the Yedang inland fisheries, the 'Yedang Inland Fisheries Resources Management Committee' (tentative name) needs to be established. The committee is supposed to set up a comprehensive fisheries resources management plan, implementing systematic fisheries resources management based thereon. The committee consists of local governments (South Chungcheong Province, Yesan-gun), research institutes (The Central Inland Waters Research Lab in the National Fisheries Research & Development Institute), Chungnam Inland Waters Development & Test Center, Chungnam Fisheries Management Office, a waters manager (Korea Rural Community Corporation), experts, and fishermen.

The Inland Fisheries Act, which stipulates the basic matters for inland fisheries, focuses on the usage/management of inland waters and the adjustment of fishing order, partially dealing with the preservation and promotion of some fisheries resources.

Therefore, provisions related to fisheries resources management need to be devised, providing a legal framework for supporting resources management.

3.2.3 Substantiality in Autonomous Fisheries Management

Inland fisheries are conducted in a small scale, being decentralized by region. Furthermore, the local government, an inland fisheries manager, is suffering from lack of dedicated staff, making it harder to systematically control and support inland fisheries. Therefore, the inland fisheries club, an inland fisheries user, should actually control inland fisheries while local governments need to play a supporting role in managing inland fisheries resources. Such role-sharing is regarded as a realistic alternative. To this end, the management capabilities of the inland fisheries club, a fishermen group, should be more actively enhanced. The central government is also actively inducing the inland fisheries club to take part in autonomous fisheries management.

The Yedang inland fisheries club has implemented independent management activities for a long period of time, based on the leadership of club leader and members' cooperation. Therefore, the autonomous fisheries management was able to successfully take root in the fishing society. However, aging fishermen and lack of young workers are recently leading autonomous management activities to lose its momentum. As the income of fishermen rises due to the recovery of fisheries resources, conflicts between fishermen or fishermen and tourist anglers occur in relation to the catching and collection of fisheries resources.

In order for the Yedang inland fisheries club to ensure the effectiveness of autonomous fisheries management, autonomous management activities should be more substantially executed. Specifically, the barrier to entry into the club should be lowered in order to attract young fishermen, raising fishermen's awareness of fisheries resources management through face-to-face training and information exchange with successful clubs, and providing tourists and anglers with the information on the importance of fisheries resources management.

3.2.4 Identification of New Income Sources

A stable source of income should be secured in order to continuously maintain inland fisheries. In the case of the Yedang reservoir, fishing is promoted by improving the fisheries environment and recovering fisheries resources, with the reservoir being widely known as one of the best fishing spots in the nation. However, due to the diversification of leisure activities and the establishment of new fishing places, the number of tourists who visit the Yedang reservoir has not risen.

Therefore, in order for fishermen in the Yedang reservoir to create a stable source of income, profitable projects should be identified in various ways through management consulting, etc. For example, a diversity of dishes that anyone can enjoy can be developed by using caught fishes, as well as carp extracts and steamed dishes. The development of a shared brand for caught fishes, the diversification of fisheries marketing routes, and the installation of direct outlets can also be reviewed. Fishing experience or tourism programs can also be developed in order to attract not only anglers but also general tourists. Lastly, the releasing experience center should be quickly constructed in order to provide places where local species can be released, being positioned as a new tourist spot in the Yedang reservoir.

4. CONCLUSION

The roles of inland fisheries governance are regarded as very important, considering complexity/diversity in inland fisheries management, insufficient administration of inland fisheries, continuous management of fisheries resources, small-sized inland fisheries & decentralization thereof, the access of the public to inland fisheries, and the sharing of fisheries resources between fishermen & anglers.

This research reviewed the activities, performances, and development of governance, focusing on Yedang inland fisheries as a governance case. By the mid-1990s, the Yedang inland fisheries suffered from the degradation of the fisheries environment and the depletion of fisheries resources due to garbage dumping, cage culture, the inflow of waste water from livestock farming, the reproduction of exotic species, and excessive fishing by fishermen and anglers.

In order to resolve such issues, the Yedang inland fisheries club executed autonomous management activities and converted the existing management system into autonomous management fisheries, being supported in various ways through the establishment of the mutual cooperative governance system among the government, the private sector, and academia. Such efforts enabled the Yedang inland fisheries environment to be improved, recovering fisheries resources and producing tangible results such as the rising income of fishermen, the activation of local economy, and the establishment of an autonomous management system.

The Yedang inland fisheries should further develop as a desirable governance in the following ways. First, as of now, inland fisheries are managed both by waters managers and city/gun/gu governments. From now on, the city/gun/gu governments should take sole responsibility for controlling inland fisheries, unifying criteria for levying water usage fees

Second, customized fisheries resource management considering the eco-system should be implemented by proactively conducting scientific resource research. In addition, resources management committee where the government, the private sector, and academia participate needs to be set up in order to systematically promote fisheries resource management.

Third, in order to execute fishermen-based autonomous fisheries management, autonomous management activities should be substantially enhanced, including the expansion of participation by young fishermen, training promotion, interchange and cooperation with successful regions, and the provision of information in fisheries resource management to anglers and tourists.

Fourth, the stable source of income should be secured for the sustainable maintenance of inland fisheries. To this end, it is necessary to review the development of share-brand products and various fish dishes, the installation of direct outlets for fisheries products, the identification of fishing experience and tourism programs, and the early establishment of releasing experience center

On the other hand, inland fisheries have yet to attract enough attention from policy-makers and the general public. However, as the roles thereof are re-assessed, inland fisheries are being regarded as a new growth engine. Specifically speaking, people are paying more attention to the promotion of eco-friendly farming, rice field-based eco-farming & inland farming, the maintenance of inland eco-system & the promotion of seed industry, the aquarium fish industry (non-food area)/fishing, and tourism for eco-system experiences. In order for inland fisheries to take another leap forward as a growth industry, the roles and performances of governance should be assessed with identifying issues, implementing improvement efforts, and thereby forming a desirable governance system.

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The institutional nature and the efficiency of offshore fisheries governance in the Republic of Korea

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Abstract: This research provided strategies and improvement plans for enhancing the efficiency of Korean fisheries governance. First, through the diversification of governance types and minimization of operation resources, the inefficiency of the existing control governance should be handled in a supplementary manner. Second, in order to cope with the complexity and uncertain ecological issues of the fisheries governance regime, the empirical and ecological knowledge that fishermen have should be managed and informative. By doing so, efficient governance should be established. Third, the government, fishermen, and groups should share governance resources and fisheries responsibilities. Fourth, focusing on fisheries-related implementation parties, the government, fishermen, and groups should build mutual confidence regarding governance. Based on such strategies, the following improvement plans can be devised: First, efficiency and availability in governance should be secured. Second, convenience and economic feasibility in fisheries should be maintained. Third, the creation of proper resources zones should be promoted. The maximization of resources zones in fisheries is the ultimate goal in fisheries management, functioning as a criterion for the reasonable use of resources. Lastly, the external effects on fisheries, especially, uneconomical ones, should be minimized.

Keywords: fisheries governance, diversification of governance, ecological knowledge, external effects

1. INTRODUCTION

Due to climate change and other complicated factors, Korean fisheries have recently experienced incomplete governance, causing many issues in function and role. Over the past several years, a diversity of governance regimes have been developed, increasing the efficiency thereof, in order to ensure the sustainable development of fisheries. However, some chronic issues such as overfishing, excessive fishing fleets, and the disappearance of fishing zones have yet to be effectively dealt with. In particular, the depletion of some key species of fishes has required the reform of the existing governance regime, to cope with the inefficiency in fisheries management.

Inefficient fishing management of fisheries cannot fully explain overfishing, which is the major source of excessive fishing fleets or the depletion of resources. The structural issue from inefficient governance is the main cause of excessive fishing fleets, overfishing, and the disappearance of fishing zone. If the governance of fisheries becomes inefficient, the interaction among overfishing, excessive fishing fleets, and the disappearance of fishing zone forms a vicious cycle of chronic issues in fishing. In order

to resolve such an issue, the efficiency of governance should be enhanced. Overfishing is the main source of inefficient governance, with excessive fishing fleets leading to the disappearance of fishing zone. If these are not effectively handled, the increasing number of fishing fleets reduce fishing output, producing uneconomical fishing where production profits are not generated, leading fishing zones to disappear.

As in Korean fisheries, global fisheries have suffered from the inefficient governance regime since the 1990s. The fisheries governance regime consists of an implementation system, tools, and an operation system. The causes of inefficient governance are generated in various forms, one of which is regarded as weakness in implementation system, tools, or structure. Among them, the weakness in the governance regime incurs serious fishing management issues, becoming the source of inefficient governance. For fisheries, chronic issues such as overfishing, excessive fishing fleets, and the disappearance of fishing zone come from the weak governance regime.

In order to ensure the sustainable development of fisheries, institutional and industrial capabilities should be concentrated on the establishment of an efficient governance system. To this end, institutional devices should be placed in order to effectively handle the weakness of the governance regime and enhance the efficiency thereof. In addition, the causes of industrial uncertainties such as climate change and fierce competition among interested parties from limited fisheries resources and the sharing thereof, the main source of inefficient governance, should be identified, strengthening policy responses. By removing inefficient elements in the existing governance system and converting it into a more efficient one, the system should be free from uneconomical fishing, creating an opportunity for fisheries to take another leap forward.[6]

In this regard, this research analyzes the general concepts, types, and true nature of fisheries governance, identifying and studying inefficient issues and plans to raise efficiency based on the diverse functions and capabilities of the current governance.

2. THE INSTITUTIONAL NATURE OF KOREAN FISHERIES GOVERNANCE

2.1 The Legal Framework of Fisheries Governance

In 1908, the Fishing Act, Korean first fishing-related law, was enacted, where fishing requires a license, permit, or report. Stipulating the type of fishing in the law, management and regulatory means were adopted such as a closed season, a closed fishery, a closed area, and fish size limit. Such a system functioned as the institutional framework of fisheries governance. Following the Japanese colonial era, the Fisheries Act, the basic system for fisheries governance, was legislated in 1953, when a legal framework for advanced governance, which controls resources through the protection of fishery resources was established based on a fishing right system and a fishing permit system.

Since it was enacted, the Fisheries Act, the basic law for fisheries governance, has gone through more than 20 revisions including 3 comprehensive ones in order to set up today's governance regime. Based on the Fisheries Act, a number of fisheries-related acts including the Fisheries Act Enforcement Ordinance and Fishery Resources Protection Ordinance were enacted in order to institutionally support governance. However, the basic framework of fisheries has been maintained without big changes, where fishing requires a license, permit, or report, based on a diversity of technical management means.

Recently, in order to respond to a new maritime order, a new EEZ (Exclusive Economic Zone) Act (Subparagraph 5151 of the EEZ Act and Subparagraph 5809 of the Act on Exercising Sovereign Rights over Foreign Fishing in EEZ) was legislated and came into force in 1996. Then, through the revision (1998) of the Fisheries Act,

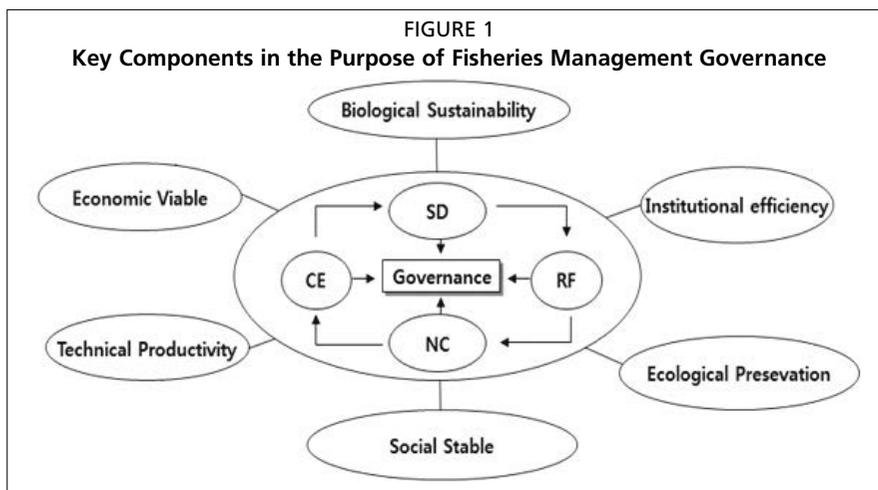
an institutional framework for the introduction of TAC system was set up, which leads to changes in fisheries governance. By revising the Fishery Resources Protection Ordinance, the regulation on TAC setting (Article 27, 2) and the provision (Article 27, 3) on the management thereof were newly added. As a result, the basic framework of Korean traditional fisheries control governance that has been maintained since the Fisheries Act was enacted in 1953 was able to be newly reshaped in the era of a new maritime order. In particular, by enacting the Fishery Resources Management Act (2010), the framework for resources management-based fisheries was re-established, providing an opportunity for the traditional governance regime to gradually develop into a diversity of governances such as autonomous or cooperative governance.[6]

2.2 The Institutional Purpose of Fisheries Governance

The institutional objective of fisheries governance can be found in the basic purpose of the Fisheries Act. The basic purpose thereof (Chapter 1, Article 1) is “to promote the development and democratization of fisheries by creating/preserving fishing resources, comprehensively using/managing the surface of waters, and thereby raising the productivity of the fishing industry.” The objectives of fisheries management governance can be inferred as follows: Namely, the objectives of governance are to raise the productivity of the fishing industry and to maintain the order of fisheries including the preservation of fishery resources such as catch limit, the limit in the number or size of vessels, the limit in fishing gear/method, the limit in fishing ground/season, fishing right setting, collection of fishing taxes, and fingerling releasing.

The institutional purpose of fisheries governance can be more comprehensively summarized as below: It is to maintain/preserve the sustainability in resources use by preventing overfishing or the depletion of resources, and to maintain continuous production in economy, ensure fair distribution, and execute social preservation by preventing excessive investment and overfishing. In order to achieve the objectives of fisheries governance, as shown in Figure 1, necessary systems are established in fisheries-related acts including the Fisheries Act, Fisheries Act Enforcement Ordinance, and Fishery Resources Protection Ordinance, recognizing as key elements of governance biological sustainability, economic viability, social stability, institutional efficiency, technical productivity, and ecological preservation.

The governance systematized by fisheries-related acts secures economic sustainability of fisheries at a minimized cost by maintaining a proper amount of resources, promoting the stability of fishing villages through effective policies. Therefore, whether to implement a balanced approach in biological sustainability, social stability, institutional efficiency, and economic viability determines efficiency in access to the objectives of fisheries governance.

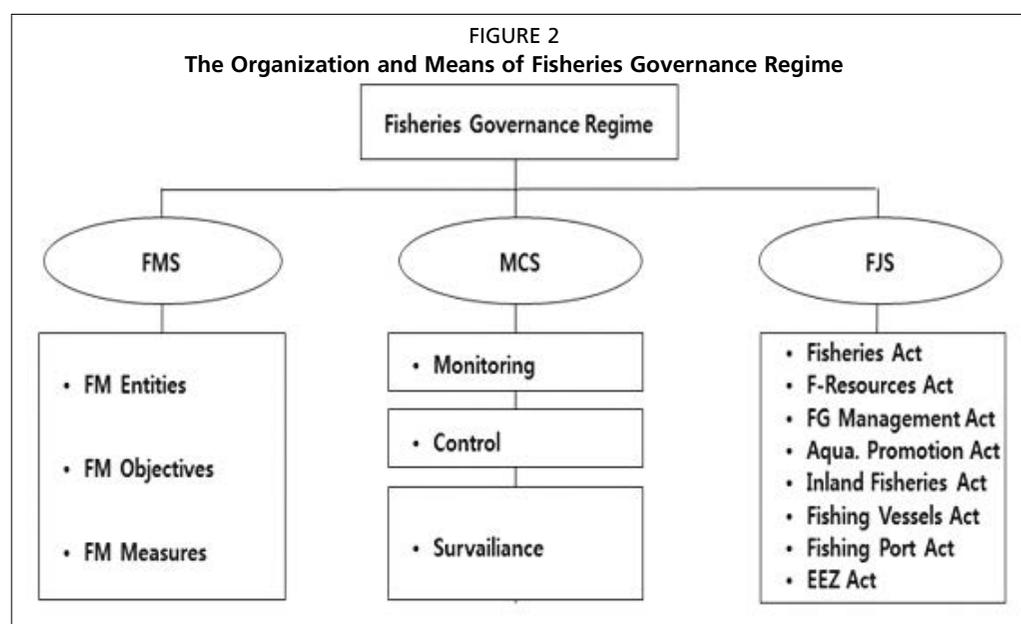


In this regard, the objectives of traditional fisheries governance are realistically designed to systematically ensure the balanced application of such elements. As stated in the Korea-Japan Fisheries Agreement of 1965 that emphasized “the maintenance of maximum sustainable productivity of fishery resources” or “the optimized use of fishery resources,” traditional governance focused on maintaining the maximum sustainable productivity of fishery resources and realizing the optimized use of fishery resources. The Korea-Japan Fisheries Agreement (1998) newly reshaped along with the recent establishment of the EEZ system for fisheries highlighted “the reasonable preservation and optimized use of maritime biological resources” in its preface, including socio-economically optimized use and sustainability in the productivity of biological resources in the objectives of governance. [8]

If the objectives of traditional governance in fisheries are examined in terms of methodology, they put more emphasis on production-oriented economic growth/development than on a balanced approach toward biological sustainability, social stability, institutional efficiency, and economic viability. Such a phenomenon can be easily understood, given that key policies regarding fisheries have focused more on production-oriented commercial approaches than on resources/fisheries management-based ones.

2.3 The Organization and Means of Fisheries Governance Regime

Korean fisheries governance regime is organized based on a fisheries management regime, as shown in Figure 2. Therefore, it consists of a fisheries management system, a fisheries management monitoring system, and a fisheries law system. The fisheries management regime in governance deals with subjects, objects, and means, the basic framework of governance. The subjects and objects can be differentiated by the type of governance but the means show almost no differences, regardless of the type of governance.



The fisheries governance monitoring system consists of monitoring, adjustment/control, and supervision/punishment. The monitoring system is designed to secure diverse information from governance-related systems, connect them properly, and generate/manage useful data for governance policy-making. In particular, the

monitoring system is used to proactively manage the risks in the depletion of fishery resources in order to realize sustainable fisheries, gathering information regarding changes in fishery resources and fishing activities.[8]

The legal system in fisheries governance functions as the backbone of the governance system. Under the legal system, governance means are developed and applied. In the governance regime, the development and application of effective means are regarded as the basic governance operation process and are very important in enhancing the efficiency of governance. Regardless of the type of governance, means are developed and applied in order to resolve given fisheries issues.

With respect to fisheries governance, biological, economic, and ecological means are applied, as well as general fisheries management, considering the objectives of governance. The biological means are usually implemented, based on traditional technical means or input efforts. With respect to the economic means, the objective of governance is given in the economic perspectives of fisheries. Economic elements in relation thereto are implemented as key means. The ecological means are introduced in order to promote the safety of fishes as food and harmony with the natural environment by minimizing ecological effects. With respect thereto, the mandatory use of eco-friendly fishing gear or methods, restrictions on the fishing season, or the temporary prohibition of fishing depending on the degree of environmental contamination is used as key means.

3. TYPES AND MANAGEMENT SYSTEM OF FISHERIES GOVERNANCE

3.1 Traditional Governance of Fisheries and Cooperation Management

The traditional governance of fisheries refers to the government-centered control and adjustment governance. As in most Asian nations, the fisheries control governance has a fisheries management system based on a fishing effort management-centered permit system. Such a fisheries governance regime was set up in order to develop production-based fisheries for the promotion of the fishing industry, playing a pivotal role in developing fisheries for a long period of time. However, recently it showed its limit in resolving fisheries issues and continuously developing fisheries. It is considered to have come from various factors including industrial development and climate change. The limit in governance management resources such as management staff, management information, management authorities, and management facilities and the resulting inefficiency have also been cited as the main causes thereof. [9]

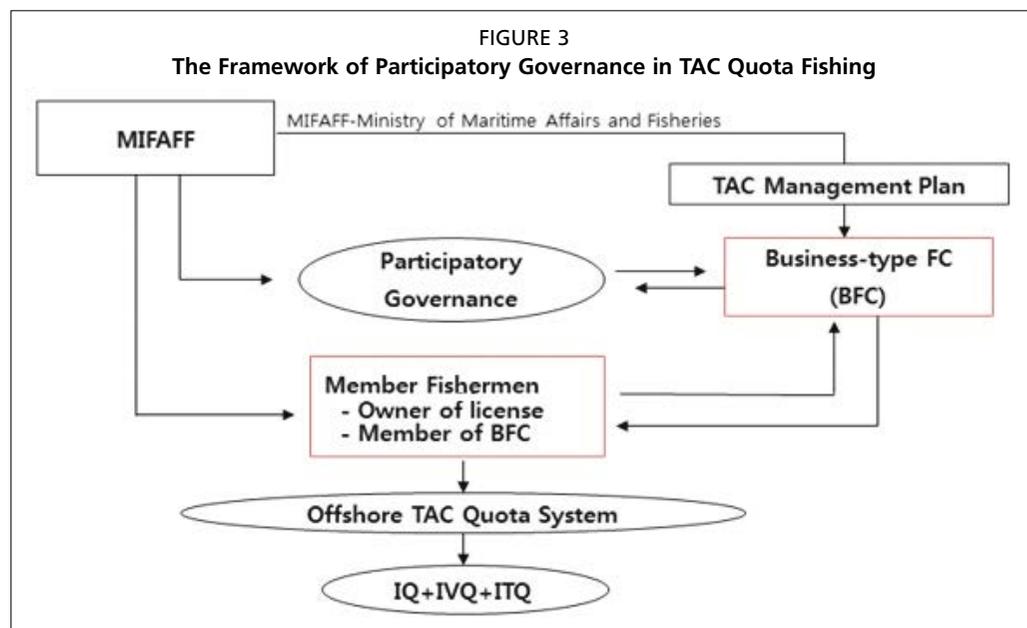
In order to resolve pending issues facing fisheries such as excessive efforts, excessive competition, overfishing, and the disappearance of fishing zone and to continuously promote the development of fisheries, the improvement in fisheries management system that can overcome the limit in governance management resources is required. As an alternative to deal with inefficient governance that comes from imperfect fisheries resources management, participation-based cooperation management has newly emerged.

The participation-based cooperation management refers to fisheries management where the central/local governments, fishing groups or fishermen can share the authorities and responsibilities of governance. It is also defined as a governance regime based on mutual cooperation between the government and fishermen or fishing groups. Generally speaking, it means a type of fisheries management where management resources, responsibilities, and authorities for fisheries management can be shared based on the mutual cooperation among all interested parties regardless of the subjects and objects in fisheries management. Therefore, under the participation-based cooperation management, all the participants in fisheries management take part in governance decision-making, sharing the responsibilities to resolve fisheries issues and ensure sustainable development.

3.2 Participatory Governance in TAC Quota Fishing

As shown in Figure 3, the participatory governance in TAC (Total Allowable Catch) quota fishing is established by combining the existing traditional governance with TAC quota management in a complementary manner. This is differentiated from fisheries except inshore TAC quota fishing. The TAC system is limited to some fisheries and fishes, where the ex post facto management thereof is highly important. Furthermore, the role of governance is very important in overcoming issues in the limit of given management resources.

As shown in Figure 3, the participatory governance regime is set up based on a regional cooperative regime in broad marine ecological perspectives through a TAC quota fishing cooperation management system between the Ministry for Food, Agriculture, Forestry, & Fisheries (MIFAFF) and the Business-type Fisheries Cooperatives (BFC).



The basic direction of participatory governance in Offshore TAC quota fishing is set based on the cooperative system among neighboring nations and broad ecological governance, as well as the calculation of the TAC based on biologically allowable catch. As shown in Figure 3, under the governance, horizontal relations are formed between the government and the Business-type Fisheries Cooperatives (BFC), or groups, centering on the existing control governance. [8]

The MIFAFF and the BFC should devise management regulations, sharing management resources required for participatory governance. Implementing such schemes, they should set up plans to enhance the efficiency in management and raise the income of fishermen at the same time. Therefore, a voluntary adaptation system for governance management resources and the minimization of management costs through efficient governance should be executed in advance. To this end, economic motive for fishermen needs to be provided institutionally.

Under the participatory governance, the roles and functions of the MIFAFF are limited to the establishment of basic TAC quota fishing management plans, the determination of TAC based on the control and management of fishermen, and the supervision of fishing activities of members of the BFC. A governance regime should be established in order to set up the basic objectives of participatory governance (the basic objectives in fishery resources management are differently set depending on the status of fisheries and resources but are basically based on biological sustainability,

social stability, economic viability, and institutional/administrative efficiency) and to systematically respond to the distorted fishing activities of individual fishermen. In order to overcome inefficiency in participatory governance from imperfect management resources, economic motive should be provided to attract the voluntary participation of fishermen. In addition, for the reasonable operation of management costs, the understanding of fishermen should be sought, developing realistic approaches in relation thereto. [8]

Under the participatory governance regime in offshore TAC quota fishing, the BFC set up TAC distribution plans in order to distribute TAC allocated by the government to members, controlling members by devising internal rules for the management of individual quota, and recording/reporting general results regarding the fishing activities of members. In addition, they need to establish a voluntary participation/adaptation system in order to ensure sustainable fishing activities, the basic objective of the participatory governance, and cooperate with management entities in order to promote the efficiency thereof. On the other hand, they should be able to make the best of governance management resources in order to ensure the sustainable development of fisheries and social stability by managing the fishing activities of members voluntarily and reasonably. [9]

Furthermore, the BFC should work hard to enhance the efficiency of the governance regime, ensure the sustainability of fisheries, and enable fisheries to develop stably based on socio-economic value, by using available management resources efficiently.

3.3 Ecological Governance of Fisheries Rebuilding Plan

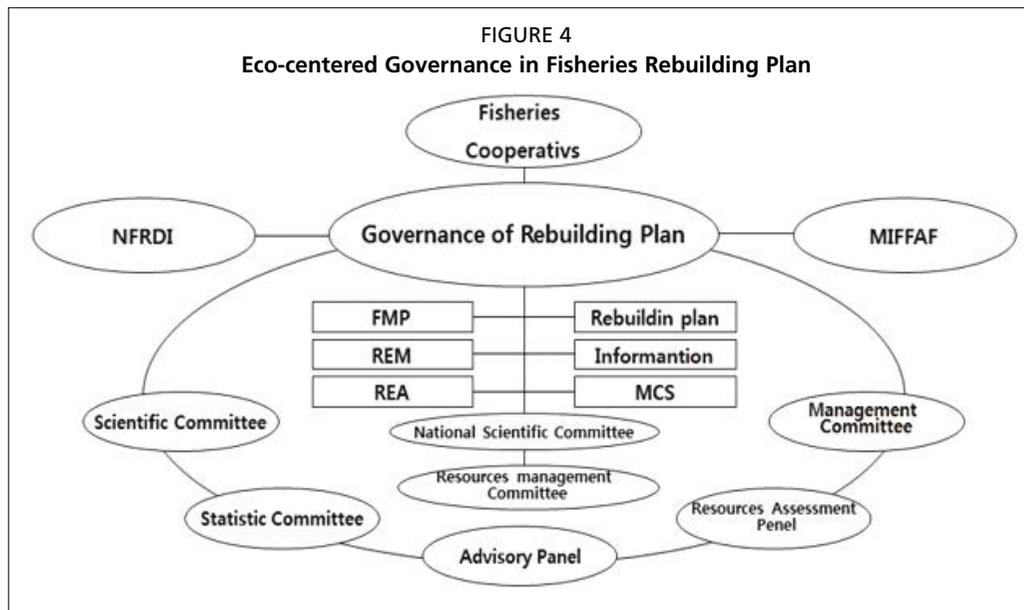
The fisheries rebuilding plan in fisheries refers to a voluntary, ecological (eco-friendly) governance regime where the fishery resources management committee by fish type can be organized to set up a stronger resources and fisheries management system. The regime functions as a dedicated organization in fisheries management implementation that can not only set up and implement fisheries rebuilding plans but also establish and execute general fisheries management plans. It implements general action plans ranging from fisheries management monitoring, the selection of resources&fisheries management means, result assessment, to effect analysis. Then, based on the scientific advices of the National Fisheries Research & Development Institute (NFRDI), voluntary fisheries management plans are set up and implemented, internally assessing implementation results and continuously revising and improving them.

With respect to the monitoring of the fisheries rebuilding plan implementation system, statistics regarding changes in resources and catch are informative, gathering data in geology, humanities, society, and economy on changes in resources recovery. It includes monitoring the implementation of recovery plans for target and related fisheries.

The ecological governance in the fisheries rebuilding plan excludes the unilateral support by the government, emphasizing economic compensation through participation, the need for resources recovery, and the importance of resources and fisheries management in order to activate the participation by fishermen based on cost sharing by beneficiaries. In particular, considering fisheries management circumstances, it also uses timely support measures and differentiated long-term financial support in order to reduce hostility in fisheries management and to promote participation. [7]

Ecological governance also manages fishes recovered after the fisheries rebuilding plan is implemented. With respect to fishes recovered or in the recovery process, eco-centered comprehensive participation and means are used, considering the complicated functions of diverse factors in ecology, biology, socio-economics, and institution. For such fishes, ecological governance-based consolidated management is implemented considering interdisciplinary management and means with respect to which the causes of socio-economic overfishing are fundamentally prevented, taking measures

to increase the productivity of ecological and biological resources. In relation to this, a consolidated management system under voluntary eco-centered governance is very effective, where a number of interested parties including the government and fishermen participate. As shown in Figure 4, such a consolidated management system is regarded as the follow-up management system of the fisheries rebuilding plan where a link to the government is strengthened based on the interaction among fisheries markets, non-government organizations/groups, fishermen, and fishery resources users.



The ecological governance in the fisheries rebuilding plan prepares for distorted & unreasonable results from lack of information regarding resources and the ecological environment, the comprehensiveness of related entities, and broad target areas. Such a follow-up management system also deals with the creation of scientific data of fishermen's ecological knowledge and related information in order to effectively overcome the weaknesses from incomplete information. [7]

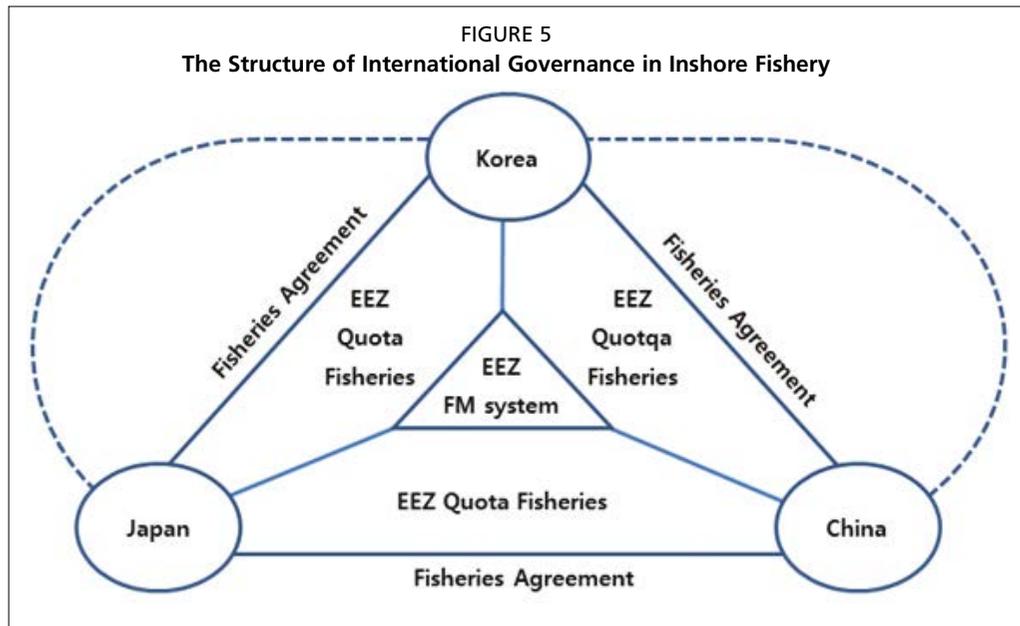
3.4 The International Governance of Fisheries EEZ System

The EEZ fisheries management system among Korea, China, and Japan over the waters around the Korean peninsula caused new changes in Korean fisheries governance. Such changes improved the effects of fisheries management and raised the awareness of the international community about the issue, having effects on global cooperation in fisheries.

With the effectuation of the UN Convention on the Law of the Sea and the conclusion of fisheries agreements among nations, the waters around Korea, China, and Japan that are controlled by each nation are segmented. Considering that fishery resources are migratory, the fishery resources management is not limited to a country and should be dealt with based on cooperation among the three nations. In particular, the current situation in which, the three nations are competitively catching resources that cross EEZ borders and are depleting the resources should be fully considered. For example, hairtail and yellow corvina, which cross the borders between Korea and China, are more excessively caught than other fishes.

Therefore, if cooperation among the three nations in fisheries management is reinforced, fisheries can be more efficiently managed, preventing the depletion of the resources, and thereby, ensuring sustainable fishing through resources recovery in the neighboring nations.

Under the international governance in relation to the resources that cross EEZ borders, Korea, China, and Japan conduct scientific research on fishes, sharing resources and fisheries, and cooperating with one another in fisheries technology and human exchange. Because such efforts should be made based on cooperation among the three nations in fisheries management, the roles of global governance in fisheries should be strengthened. Furthermore, for the global governance to be efficiently managed, smooth fisheries cooperation should be enabled by supplementing the three fisheries agreements between the nations and a future EEZ border establishment agreement. [6]



As of now, China’s EEZ fishing is frequently causing illegal fishing activities including conflicts in fishing between Korean and Chinese fishermen. Under the fisheries governance, massive monitoring efforts are made in order to prevent Chinese vessels from illegally catching fishes. If the efficiency of the global governance for fisheries management between the two nations is enhanced, the monitoring and supervision system agreed by nations can be activated, reducing the costs that Korea has to pay for monitoring and supervision.

The waters around the Korean peninsula including the semi-enclosed sea are not only vulnerable to maritime contamination but also very intensive in fish catching. If the waters are managed based on the policy devised by individual nations, fisheries resources in the waters cannot be used in a sustainable manner. Therefore, by reducing maritime contamination and continuously maintaining the amount of resources through global governance for joint fisheries management among the three nations, a healthy maritime eco-system including species diversity can be maintained. The reduction in fishery resources not only curtails the catch but also destroys species diversity, leading the food chain to collapse. As a result, the number of intermediate and final predators falls sharply, destroying even the maritime eco-system in the long-term perspective.[6]

In order to recover the depleting resources in fisheries, a TAC system, voluntary fisheries management, and technical means are used based on the traditional fishing permit system. The artificial reef and fingerling releasing project is implemented in order to create resources. However, such management means have yet to produce tangible results. Therefore, through the global governance for joint fisheries

management among the three nations, China with a relatively bigger fishing fleet can be led to cooperate in the joint management framework, thereby preventing unilateral overfishing. The scheme can enhance fishing management in Korean fisheries.

4. ENHANCING THE EFFICIENCY OF KOREAN FISHERIES GOVERNANCE

4.1 The Strategy for Enhancing the Efficiency of Fisheries

4.1.1 Basic Requirements for Efficient Governance

The efficient operation of the existing governance regime is very important for the sustainable development of Korean fisheries. The efficient management of fisheries is a very significant element in the institutional operation of fisheries governance. The reason why efficient governance is important is that it links not only to the institutional benefits that fishermen can enjoy but also to social benefits in resources use. It also connects with the creation of fishery resources zones. In case governance management in fisheries fails to meet the requirements for the efficient use of fishery resources, it gives rise to a diversity of fishing issues such as social losses incurred from distorted resources distribution, a failure to optimize fishing zones and resource benefits.

For the efficient governance of fisheries, it is necessary to understand what requirements the good and efficient governance should be equipped with. The efficient and good governance should be armed with diverse requirements. For the existing governance to become more efficient, the differences between the existing governance and the efficient governance need to be identified and removed by implementing necessary policies. Analyzing governance issues and studying/applying the requirements with which the good and efficient governance is equipped, the existing governance should be gradually converted into efficient governance.

4.1.2 Minimization of Obstacles in Efficient Governance

The operation of efficient governance in fisheries is very important but many obstacles should be overcome in order to set up the efficient one. In particular, the complexity, dynamics, multiple objectives, and lack of information that fishermen intrinsically have make it more difficult to operate efficient governance.[6]

The diversity and complexity in fisheries come from the relations between the production structure in the fishing industry and the biological & ecological environment. They are also related to diversity in resource use and complex relations among users. The dynamics of fisheries stems from biological features that fishery resources own, becoming the source of bio-economic issues incurred by time variable in resource changes.

The issue over multiple objectives comes from the socio-economic features of fishery resources that are deemed to be shared and the reliance of fisheries on the natural environment. It also links to production structures where a diversity of fishes is mutually intertwined with a number of fisheries. With respect thereto, fisheries are defined in terms of their biological, social, economic, and institutional nature. The element plays a pivotal role in determining the type of the fisheries system, having the greatest effect on the issue over the inefficiency of governance.

Lastly, the lack of information comes from the aforementioned three factors. In relation to fisheries, scientific information for accurate decision-making is always far from satisfactory. The fundamental issue in fisheries has a grave effect on inefficiency and failure in fisheries management. As climate change and eco-centered fishery management are recently emerging as key issues, the biggest hurdle in the approach is lack of information and knowledge regarding eco-centered and comprehensive fisheries.

The four hurdles including diversity, complexity, dynamics, and multiple objectives in the development of efficient governance become the basic issues for the enhancement of efficiency of Korean fisheries governance. The four hurdles have always become the

source of issues regardless of the type of fisheries management system, governance, and policy, lowering the efficiency of governance. Therefore, the efficiency of governance depends on how to remove or minimize the four types of obstacles. In order for the existing governance to be converted into more efficient governance, plans to remove or minimize such hurdles should be devised, requiring the following strategies to enhance the efficiency of governance.

4.1.3 Strategies for Enhancing the Efficiency of Fisheries Governance

The strategies for enhancing the efficiency of fisheries governance can be classified into the following four types. First, it is processed in order to supplement the existing inefficient governance. The functions of cooperation and participation are added to the existing traditional control governance. Namely, in order to overcome the issue over the inefficiency of the existing control governance, hybrid governance is set up, which includes reinforcement in the participation by and roles of fishermen, management cost minimization, the cost sharing of fishermen based on the principle of co-sharing by beneficiaries, and market principle/authorities-based fisheries management such as ITQ.

Second, the complicated fisheries governance regime and uncertain ecological factors lead to lack of fishery information, raising the level of uncertainty. In order to resolve such issues, the empirical and ecological knowledge on fisheries that fishermen own is managed and informative, thereby enhancing the efficiency of governance.

Third, the government, fishermen, and groups should share governance resources and the responsibilities of fisheries. With respect to the existing control governance, management resources are limited but the need for the resources has ever increased. Therefore, such an alternative was devised in order to handle the issue.[6]

Lastly, mutual confidence among fishermen, groups, and the government should be built in terms of fisheries governance. In particular, in the case of Korean fisheries, most fishes are migratory, whose status can be greatly changed depending on the ecological environment and the fishing activities of neighboring nations. As a result, uncertainties are regarded as relatively high, with respect to fisheries that should be controlled. Therefore, including cooperation among neighboring nations, the government, fishermen, and groups should raise confidence in relation to fishing-related uncertainties that are incurred naturally, thereby overcoming the aforementioned issues.

4.2 Enhancing the Efficiency of Fisheries Governance

The plans for enhancing the efficiency of fisheries governance can be classified into the following four types. First, the availability in governance should be secured. Second, economic feasibility should be maintained in relation to fisheries. Third, fishing zones should be properly generated. Fourth, the external effects on fisheries should be minimized.

4.2.1 Fisheries Management and Easier Access to Governance

Fisheries control diverse types of commercial multi-species fisheries in a comprehensive manner. With respect to diverse fisheries and species, resources and fisheries management is implemented simultaneously. Therefore, easier access to governance should be ensured in order to enhance efficiency in fisheries management. In particular, most species for fisheries are pelagic fishes that are affected by uncertain environmental elements other than fisheries. TAC quota fishing requires information system-based fisheries management where the overall statistics on catch and limitation in time play a pivotal role. Furthermore, fisheries cover the waters in the east, west, and south as a whole, implementing a broad ecological fisheries management system. Most of the fisheries-related issues come from limitation in governance operation resources.

Therefore, the efficiency of fisheries governance relies on availability in fisheries management. Likewise, the fisheries governance system should be processed in an accurate and speedy manner, covering diverse species and fisheries. In order for such a system to be efficiently operated, easier access to governance based on convenience in fisheries management system must be secured.

4.2.2 Maintenance of Economic Feasibility in Fisheries of Governance

Fisheries governance should consider economic growth/development, as well as the continuity of resources. Efficiency in governance is emphasized in order to achieve multiple objectives in socio-economics, institution, and biology. The maintenance of economic feasibility in fishery is also regarded as one of the key factors in enhancing the efficiency of governance. However, efficiency in governance cannot always guarantee the maintenance of economic growth and development. Therefore, convenience in fishing should be maintained in order to achieve economic objectives of fishermen, controlling governance in a balanced way to maintain the economic feasibility of production activities. In fisheries governance, convenience in fishing refers to convenience related to fishing activities of fishermen, which should be properly controlled in order to prevent complex management means and various measures from negatively affecting fishing plans and implementation. For sustainable fishing, convenience in fishing in relation to the use of fishing rights should always be guaranteed institutionally.

Fisheries governance should guarantee a proper size of fishing in order to maintain the economic feasibility of fishing. The proper amount of catch by fishermen is basically determined by the size of fishing investment but actually by a diversity of factors such as the size of resources and efforts. Therefore, governance should be able to properly control fishing that fails to reach a proper amount of catch by target fisheries and species.

In fisheries, a catch is in principle determined by the size of resources, one of the input factors in production activities. In order to maintain balance in production function with other factors, the size of resources functions as a key element in achieving the economic goals of fishing. Therefore, governance should enable fishing opportunities to be distributed to fishermen to ensure a proper amount of catch by maintaining a proper amount of resources. Even though an optimized amount of catch is not reached, a minimum catch should be able to be adjusted and secured through effort adjustment policies or other supplementary measures.

4.2.3 Establishment of Proper Resources Areas

Through a permit system, fisheries governance should enable authorized fishermen to exercise their exclusive right to use resources that they can catch. The reason why authorized fishermen are helped in exercising the exclusive right to use resources within the scope of a given catch is that resources zones are determined by the type of exclusive ownership of fishes and market prices thereof.

Fisheries governance determines how commercial fishing uses fisheries resources. By doing so, proper market value should be guaranteed in order to enable resources zones to be created in relation to caught fishes. Therefore, considering the characteristics of inshore commercial fishing, the resources zones in relation to the target fishing should be created properly, which functions as a key criterion for enhancing the efficiency of governance. As a result, the creation of proper resources zones for raising the efficiency of governance, a major goal in fisheries management, functions as a criterion for the reasonable use of resources. Therefore, maximizing resources areas in fisheries governance signifies efficient resources distribution for maximizing social benefits.

4.2.4 Minimization of External Effects

With respect to production activities in fisheries, a diversity of external economy is incurred, depending on the biological and socio-economic features of target resources and the complexity of production activities. Such an external economy comes from the conflicting use of the ecological environment of fishing resources and fisheries. It also stems from the conflicting relations among diverse types of business internally or relations with different types of industries externally.

If the fisheries governance regime is not efficient, conflicting relations among diverse types of business or conflicting relations among fishermen in the same fishing industry are incurred in various ways depending on the features of fisheries resources that are deemed to be shared or characteristics of other fisheries resources. As in the development and use of most natural resources, conflicting relations among governance participants generate negative external effects in economy, which reduce profits, incurring costs and losses in resources management and lowering production value.

Under the fisheries governance regime, exclusive fishing rights are allocated, through which, fishing activities are conducted. Therefore, various external effects are incurred depending on the operation of the rights. The effective allocation of quota refers to the minimization of possible external effects. In other words, as the size of external effects is differentiated depending on target business or species, a governance regime should be established, considering such factors. For example, in case many fishermen catch fishes exceeding quota or conduct other illegal fishing activities because the economic features of fishermen to whom quota is allocated are not considered, the resulting losses of the fishing industry as a whole can be regarded as a type of cost-incurring external effects. In case most of the existing fishermen are not given quota due to economic features in quota distribution, the resulting social costs can also be thought of as external effects in quota distribution.

If the fisheries governance regime is inefficient, negative external effects in the development and use of fisheries resources are incurred. Because the allocation of quota provides exclusive rights to use fishing resources and enables caught fishes to be personally owned, high external effects in economy are incurred, requiring the establishment of effective governance that can minimize such effects.

5. CONCLUSION: SIGNIFICANCE IN POLICY

As the importance of governance is recently highlighted in the development of global fisheries, many experts are paying keen attention to the establishment of efficient governance. Korea has also developed a fisheries management system and means and devised a diversity of regulations in order to ensure good and efficient governance in fisheries. However, issues in inefficient governance are still in existence. The causes of inefficient governance can be differentiated, depending on perspectives, with lack of governance operation resources and limitation in government-controlled governance being cited as the main causes thereof. Therefore, good and efficient governance should either get away from government-controlled governance based on operation resources or expand its operation resources. If the operation resources cannot be expanded realistically, those resources should be minimized through voluntary, participatory, or market governance.

Good and efficient governance in Korean fisheries can attract high quality investment and staff, enabling the fishing industry to be continuously developed by properly controlling fishing fleets in relation to resources. In order for fisheries to continuously grow as a profitable industry, it should overcome the limit in function of the traditional governance, strengthening its functions that can respond to changes in the international fisheries order and industrial environment.

In order to resolve the issue over the inefficiency of governance, cooperative and participatory governance is operated, and starting to produce tangible results. Under the participatory governance regime, the government and fishermen groups maintain mutual cooperation, getting away from conflicting relations and playing their own roles. Therefore, the previous government-centered top-down control governance is converted into participatory governance, a bottom-up cooperation and management system. Because related parties including the government and fishermen share the responsibilities and authorities for fisheries management planning and implementation, the efficiency of fisheries governance can be raised, at the same time expanding economic resources zones.

This research provided strategies and improvement plans for enhancing the efficiency of fisheries governance. First, through the diversification of governance types and minimization of operation resources, the inefficiency of the existing control governance should be handled in a supplementary manner. Second, in order to cope with the complexity and uncertain ecological issues of the fisheries governance regime, the empirical and ecological knowledge that fishermen have should be managed and informative. By doing so, efficient governance should be established. Third, the government, fishermen, and groups should share governance resources and fisheries responsibilities. Fourth, focusing on fisheries-related implementation parties, the government, fishermen, and groups should build mutual confidence regarding governance.

Based on such strategies, the following improvement plans can be devised: First, efficiency and availability in governance should be secured. To this end, the governance regime should be simplified, establishing a system where the status of resources & fisheries and statistics on a catch can be identified in an accurate and speedy manner. Second, convenience and economic feasibility in fisheries should be maintained. To this end, a proper amount of quota that can reach the average level should be distributed. Even though an economically optimized quota is not reached, a minimum quota should be guaranteed through catch effort adjustment policies and other supplementary measures. Third, the creation of proper resources zones should be promoted. The maximization of resources zones in fisheries is the ultimate goal in fisheries management, functioning as a criterion for the reasonable use of resources. Lastly, the external effects on fisheries, especially, uneconomical ones, should be minimized.

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A study on the best practice of offshore fisheries governance: Red snow crab trap fisheries in Gyeongsangbuk-do

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1. INTRODUCTION

This study observes an offshore fisheries best practice and discusses governance accomplishments and improvement directions of offshore fisheries in Korea. The Food and Agriculture Organization of the United Nations (FAO) defines governance as the development, implementation or process of policies; those people charged with the policies; and manners or systems of policies. When it comes to offshore fisheries, however, it would be desirable to approach governance in the context of various laws and institutional arrangements for the management of fishery resources and roles and compliance among stakeholders, i.e. fishermen.

In this regard, this study focuses on red snow crab fisheries among offshore fisheries where well-established resources management is generating desirable results. From among red snow crab fisheries, this study chose the Red Snow Crab Trap Fisheries Association of the Gyeongsangbuk-do region as the best practice.

Red snow crab, caught in the eastern coast of Korea using mostly traps, is one of the most high-valued crab species loved by Korean consumers. Fishing methods are predominantly offshore trap fisheries. Geographically, red snow crabs are harvested off the coast of Gyeongsangbuk-do and Gangwon-do only. Red snow crab fishing is a relatively new fishery, started in early 1908 and statistically recorded from 1993. Even so, red snow crabs was selected as one of Total Allowable Catch (TAC) target species when the allocation system was introduced in Korea in 1999. Red snow crab fisheries in Gyeongsangbuk-do is a rare offshore fishery case where self-managed fisheries are implemented and a diversity of governance schemes are in place, including private collaboration with Japan.

In this study, the characteristics of red snow crab resources and the current state of red snow crab fisheries are first looked into to analyze red snow crab fisheries in Gyeongsangbuk-do. In addition, Korea's TAC system, TAC on red snow crabs, self-managed fisheries of the Gyeongsangbuk-do Red Snow Crab Trap Association and activities conducted by the Korea-Japan Red Snow Crab Fishery Leaders Council are observed to explain red snow crab fisheries governance.

Based on the resources, fisheries, institutions and voluntary activities of the association, governance-related achievements of the Gyeongbuk Red Snow Crab Association are measured and recommendations for better governance are made. While the FAO provides a diversity of governance schemes, this study primarily describes those aspects suitable for the best practice selected in this study.

2. CURRENT STATE AND BEST PRACTICE OF RED SNOW CRAB FISHERIES

2.1 Nature of red snow crab fisheries governance and selection of best practice

2.1.1 *Nature of red snow crab fisheries governance*

Red snow crab fisheries governance is characterized by the Total Allowable Catch-based management (TAC), self-managed fisheries through councils, and cooperation between Korea and Japan at the national and sector levels. First, red snow crab fisheries are managed based on TAC in Korea. The central government, local governments and red snow crab fisheries associations take part in the process of determining and allocating TAC. Second, the individual quota system has been adopted so that red snow crab fishing operations can be managed by the fishermen's organization known as the Gyeongbuk Red Snow Crab Trap Association, not by free competition. Third, as the red snow crab fisheries are performed in the intermediate water zone between Korean and Japan, Korean fishermen compete with their Japanese counterparts, thereby putting red snow crab fisheries under cross-national resources management governance. Due to the nature of red snow crab fisheries governance as described so far, the red snow crab fisheries is characterized by a diversity of governance dimensions and activities. .

2.1.2 *Selection of best practice*

Red snow crab fisheries in Gyeongsangbuk-do presents a desirable fisheries governance in terms of equality in the use of fishery resources, ensuring income for fishermen, efficiency in fishery resources management (decentralization), transparency of decision-making, universal application of laws and effective fisheries management schemes. Despite the many governance characteristics in red snow crab fisheries as mentioned above, remarkable exemplary outcomes are produced from this fisheries. First, red snow crab fisheries is one of the fisheries where the fishery system changed from the permit system to the TAC system and where resources are well managed at the same time. Second, voluntary management of fishery resources is facilitated by a fishermen's association called the Gyeongbuk Red Snow Crab Trap Association, and international fishery cooperation and income generation programs are well established. Finally, disputes arising from competitive use of fishing grounds between Korean and Japanese fishermen are properly settled through the Korea-Japan Red Snow Crab Fishery Leaders Council. In view of these conditions mentioned so far, red snow crab fisheries among a number of offshore fisheries have been selected as the best practice fisheries segment and the Gyeongbuk Red Snow Crab Trap Association has been selected as the best practice group in this study.

2.2 Current state of red snow crab fisheries

2.2.1 *Current state of red snow crab fisheries*

Types and characteristics of red snow crabs

It is known that three species of snow crab live in the waters of Korea. They are *Chionoecetes opilio*, *Chionoecetes japonicus* and *Chionoecetes* sp. Snow crabs live in cold waters mainly off the east coast of Korea and west coast of Japan. Snow crab hatcheries are normally found at depth 100-200 m, and mortality of crabs is high as they are vulnerable to predators while they are in their molting stages. Snow crabs grow through repeated molting. Female crabs undergo ten times of molting and male crabs continue to molt and grow throughout their lives and are generally larger than female crabs. Snow crabs eat benthic organisms such as seaweed, crustacean (such as shrimps, crabs, copepods and brachycera) and mollusks.

Production of red snow crabs

Korea's red snow crab fisheries began in the early 1980s when fishermen from the Gyeongbuk region engaged in offshore trap fisheries visited Japan to learn operations

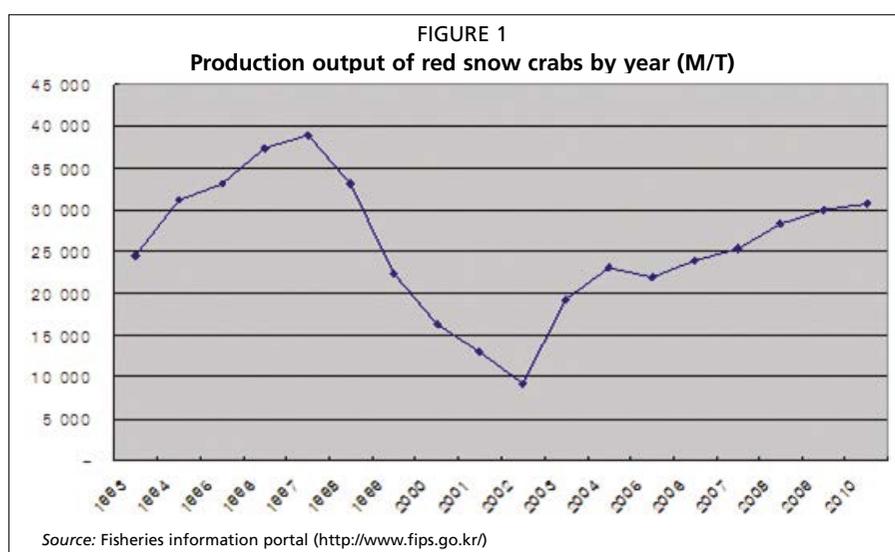
of red snow crab fishing. For this reason, early statistics on red snow crab output are almost nonexistent, and official statistics began to be recorded from 1993. After the statistics were compiled, the output reached a peak at 38 896 tons in 1997 and began declining until it fell to 9 166 tons in 2002 before turning steadily upward. As of 2010, the output recovered to the 1994 level at 30 749 tons (see Table 1 and Figure 1). By production value, production merely amounted to KRW 10.9 billion in 1993 but grew approximately six times to KRW 62.8 billion by 2006. In 2010, production of red snow crabs amounted to KRW 41.6 billion. Such an increase in the production value is highly attributed to price increases: Red snow crab price was below KRW 1 000 per kilogram until 2000. It exceeded KRW 1 000 per kilogram from 2001 and once recorded KRW 2 600 per kilogram in 2006 (see Table 1 and Figure 2).

By red snow crab fisheries segment, other trap fisheries (offshore trap fisheries) make up the largest share, and coastal gill net fisheries, coastal trap fisheries and offshore gill net fisheries comprise the remaining segments (see Table 2).

TABLE 1
Production of red snow crabs by year

Unit: M/T, KRW thousand, KRW/kg

Year	Output	Value	Unit Price
1993	24 440	10 948 731	448
1994	31 063	14 206 226	457
1995	33 155	15 031 447	453
1996	37 362	17 535 400	469
1997	38 896	18 593 951	478
1998	33 146	18 291 316	552
1999	22 366	11 349 073	507
2000	16 281	12 155 060	747
2001	12 973	15 486 926	1 194
2002	9 166	11 620 380	1 268
2003	19 262	37 623 334	1 953
2004	23 113	45 706 766	1 978
2005	21 926	44 844 549	2 045
2006	23 890	62 799 695	2 629
2007	25 388	46 810 911	1 844
2008	28 293	42 738 475	1 511
2009	29 993	44 263 760	1 476
2010	30 749	41 636 975	1 354



In terms of the share of output by region, Gyeongsangbuk-do currently holds more than 50 percent, but it is lower than the 60 percent share the region enjoyed during the early to mid-2000s.

TABLE 2
Production value of red snow crabs by segment

Unit: M/T

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total	24 440	31 063	33 155	37 362	38 896	33 146	22 366	16 281	12 973
Other traps	24 436	31 056	33 147	37 362	38 890	33 133	22 003	16 161	12 761
Coastal gill net	1	0	0	0	0	2	27	4	15
Coastal trap	0	3	0	0	0	0	313	99	18
Offshore gill net	0	0	0	0	0	0	0	11	168
Others	3	4	8	0	6	11	23	6	11
	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total	9 166	19 262	23 113	21 926	23 890	25 388	28 293	29 993	30 749
Other traps	8 980	19 136	22 938	21 669	23 822	25 311	28 138	29 793	30 294
Coastal gill net	38	11	61	74	42	25	54	125	122
Coastal trap	8	34	20	0	2	34	77	63	320
Offshore gill net	139	78	64	174	16	15	23	12	13
Others	1	3	30	9	8	3	1	0	0

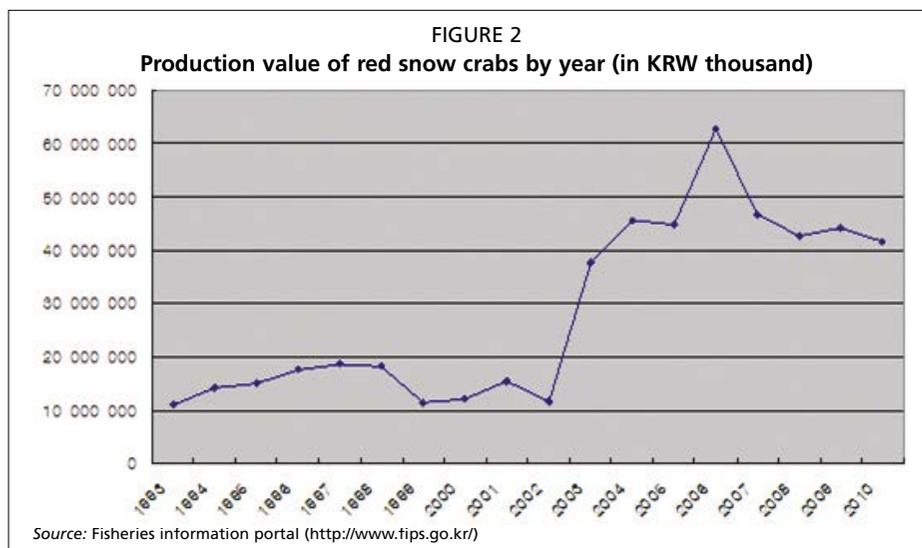
Source: Fisheries information portal (<http://www.fips.go.kr/>)

TABLE 3
Production value of red snow crabs by segment

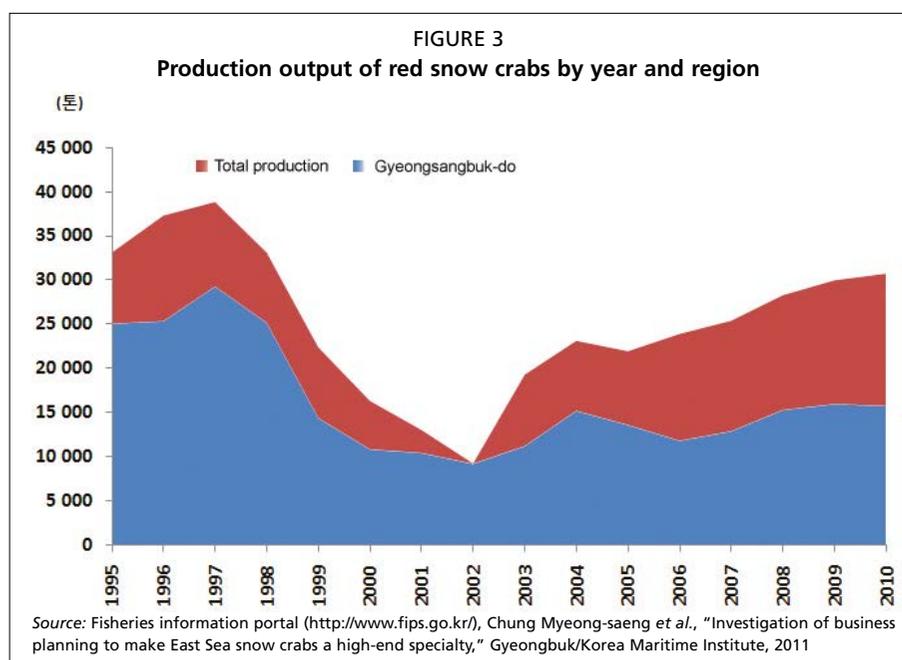
Unit : KRW thousand

	1993	1994	1995	1996	1997	1998
Total	10 948 731	14 206 226	15 031 447	17 535 400	18 593 951	18 291 316
Other traps	10 922 829	14 194 287	15 016 591	17 532 751	18 574 230	18 231 498
Coastal gill net	15 749	1 753	4 854	0	0	7 228
Coastal trap	0	6 909	0	0	0	8 494
Offshore gill net	8 149	0	0	0	0	0
Others	2 004	3 277	10 002	2 649	19 721	44 096
	1999	2000	2001	2002	2003	2004
Total	11 349 073	12 155 060	15 486 926	11 620 380	37 623 334	45 706 766
Other traps	10 989 031	11 726 100	14 731 053	10 702 564	37 134 453	44 992 523
Coastal gill net	161 451	15 571	49 229	177 901	63 570	221 766
Coastal trap	153 620	290 545	83 833	84 937	108 271	65 341
Offshore gill net	0	110 306	577 996	642 846	294 706	264 983
Others	44 971	12 538	44 815	12 132	22 334	162 153
	2005	2006	2007	2008	2009	2010
Total	44 844 549	62 799 695	46 810 911	42 738 475	44 263 760	41 636 975
Other traps	43 595 523	62 546 865	46 168 547	42 021 791	43 213 924	40 339 391
Coastal gill net	342 481	167 524	187 769	247 471	594 114	555 460
Coastal trap	0	10 929	334 886	338 897	387 624	691 535
Offshore gill net	857 316	57 734	100 976	126 635	65 654	50 589
Others	49 229	16 643	18 733	3 681	2 444	0

Source: Fisheries information portal (<http://www.fips.go.kr/>)



Red snow crabs are caught in traps, fishing permits are issued by the ministerial level, and the type of fisheries is offshore trap fisheries. Currently, red snow crab fishing vessels are distributed in Gyeongsangbuk-do and Gangwon-do, with the



number of vessels totaling 30 and vessel tonnage totaling 2 466 tons. However, only 20 vessels are registered with Gyeongsangbuk-do as red snow crab vessels.

TABLE 4
TAC-allocated red snow crab vessels

Total		Number of Vessels		Gross Tonnage	
Number of Vessels	Gross Tonnage	Gangwon	Gyeongbuk	Gangwon	Gyeongbu
40	2 466	21	19	1 051	1 415

2.2.2 *Use of red snow crabs*

Sale

Red snow crabs are mostly sold through non-affiliated channels. In 2005, except for about 38 percent of red snow crabs sold through affiliated channels, the majority of sale was made through non-affiliated channels. This can be attributed to the fact that most red snow crab catches are sold for processing.

TABLE 5
Sale of red snow crabs

	1995	2000	2005	2009	2010	Average Annual Growth Rate
Production Output (A)	33 155	16 281	21 926	29 993	30 749	^A 0.5
Affiliated Sales Volume (B)	8	704	8,476	1,181	885	36.9
Ratio of Affiliated Sales (B/A)	0.02	4.3	38.7	3.9	2.9	

Unit: M/T, %

Source: Fisheries information portal (<http://www.fips.go.kr/>)

Processing

Korea's red snow crab processing industry began in 1980 when the red snow crab fisheries started. Production is mostly done in Gyeongsangbuk-do and Gangwon-do. In Gyeongsangbuk-do where the best practice is located, approximately 11 processing companies are in operation. About 800 people work in these companies, with each company employing about 70-80 workers. Processing facilities are primarily low-level processing facilities with crab meat processing line, freezing line and ice-manufacturing test rooms comprising major facilities. Another characteristic of red snow crab processing is that about 45 percent of processors also engage in red snow crab fisheries. Processed food made from red snow crabs include high-level processed foods, such as crab soy sauce, crab meat porridge and snow crab soup, and some health products and feed products are also produced using by-products of red snow crabs. In 2010, output of processed red snow crabs was about 5 000 tons, of which 70 percent was exported to countries like Japan and 30 percent was consumed within Korea.

2.2.3 *Red snow crab fisheries governance*

Korea's TAC system

Before discussing red snow crab fisheries governance, one must understand how the Korea's TAC system works. It is because red snow crab fisheries were put under the TAC scheme from its early introduction stage.

Korea introduced TAC primarily for the following three reasons. First, as the United Nations Convention on the Law of the Sea (UNCLOS) took effect on November 16, 1994, the jurisdiction of Coastal States over fishery resources was extended from their territorial seas to 200-nautical mile exclusive economic zones, and Coastal States had to set allowable catches to conserve marine living resources. The convention took effect in 1996 in Korea, Japan and China, and the Exclusive Economic Zone Act was subsequently enacted. Accordingly, the three countries have the obligation to enhance management of resources within the EEZ under Article 61 (Conservation of Living Resources) and Article 62 (Exploitation of Living Resources) of the UNCLOS. In particular, Article 61 of the Act provides that Coastal States shall determine allowable catches and implement proper conservation and management measures, and Article 62 provides that a State has discretionary powers for determining its harvesting capacity within its EEZ and the allocation of surpluses to other States. Therefore, Korea had to adopt the internationally followed TAC system as a member of the UNCLOS.

TABLE 6
UNCLOS and the EEZ Act for Korea, Japan and China

	UNCLOS		EEZ Act	
	Ratification	Effective	Promulgation	Enforcement
Korea	Jan. 29, 1996	Feb. 28, 1996	Aug. 8, 1996	Sep. 10, 1996
Japan	Jun. 20, 1996	Jul. 20, 1996	Jun. 14, 1996	Jul. 20, 1996
China	Jun. 7, 1996	Jul. 7, 1996	Jun. 26, 1998	Jun. 26, 1998

Second, Korea needed to supplement its traditional fisheries management systems. Korea's traditional fisheries management systems were based on permits and technical restrictions, such as fishing effort limitations, closed seasons, no-fishing zones and prohibited size. Under the permit-based management mechanism, however, it was difficult to adjust excessive fishing effort. Moreover, the prevailing illegal or overfishing were escalating depletion of fishery resources, and the shrinking fishing grounds caused by increased marine pollution and land reclamation were leading to reduced fishing productivity.

Third, as the bilateral Fisheries Agreement between Korea, Japan and China reshaped fisheries order in the Northeast Asian region, leading to the reduction of fishing grounds, there was a need to strengthen resources management in Korea's exclusive economic zone. The three countries declared EEZ right after the UNCLOS and the EEZ Act took effect, but could not determine EEZ boundaries because the EEZ between the three countries was less than 400 nautical miles. As such, there were concerns that international disputes may be sparked unless measures are taken to address imminent fishery issues and the three countries finally reached bilateral fisheries agreements in 1999 through 2001.

TABLE 7
Fisheries Agreements between Korea, Japan and China and key contents

	Date Entered	Effective	Key Contents
Korea-Japan	Nov. 1998	Jan. 1999	- Reciprocal fishing within EEZ and equal catch rights - Flag state control in the intermediate zone
Korea-China	Aug. 2000 (Initial in 1998)	Jun. 2001	- Reciprocal fishing within EEZ - Flag state control in the provisional zone - Incorporate transitional zones into EEZ in 2005
China-Japan	Nov. 1997	2000	- Reciprocal fishing within EEZ and equal catch rights - Flag state control in the provisional zone

In the wake of the Fisheries Agreements, Korea, Japan and China sought a new way to jointly manage fisheries, and that was the TAC system. Legal governance for introducing TAC was already available through the amendments to the Fisheries Act (December 1995) and the Fishery Resources Protectorate (December 1996). Institutional arrangements for the actual implementation of the TAC system were completely set up with the establishment of the Regulations on the Management of Total Allowable Catches (April 1998). Today, the Fishery Resources Management Act provides a legal framework for TAC governance.

TAC in Korea was implemented in earnest in 2001 after table-top exercises and pilot projects. A table-top exercise was conducted on mackerel purse seine fisheries in September through October (for 45 days), 1998, and pilot projects using mackerel, horse mackerel, sardine, red snow crab and cero were undertaken between 1999 and 2000. The target species were mostly those that are caught by foreign fishing vessels with high economic value and easy total allowable catch setting.

TAC on red snow crab fisheries

Total allowable catch for red snow crabs was introduced in 1999 when the pilot TAC program was implemented. In terms of regional quota allocated over the past four years between Gyeongsangbuk-do and Gangwon-do where the majority of red snow crabs are harvested, Gyeongsangbuk-do accounts for slightly over 50 percent. During the pilot project period, the TAC was set to about 40 000 tons. The allocation declined to 22 000 tons in 2003 and then slightly recovered to 31 000 tons in recent years. TAC allocation is dependent on the Allowable Biological Catch (ABC), which is provided by the National Fisheries Research & Development Institute based on its annual assessment of marine resources. The reason why red snow crab was chosen as the early TAC target species is that there were concerns that the Korean-Japanese Fisheries Agreement may trigger disputes among neighboring countries and that there was a growing need to manage resources as the resources showed a declining trend 20 years after Korean fishermen brought into Korea the red snow crab fishery methods they had learned in Japan.

TABLE 8
Red snow crab TAC allocation by region

Unit: M/T, %								
	2007		2008		2009		2010	
Total	25 000	100	27 700	100	29 000	100	30 000	100
Gangwon-do	12 500	50	12 500	49.5	13 760	47.4	14 700	49
Gyeongsangbuk-do	12 500	50	14 000	50.5	15 240	52.6	15 300	51

Source: Implementation plan to set and manage 2011 Total Allowable Catch, 2010, Ministry for Food, Agriculture, Forestry and Fisheries.

TABLE 9
Red snow crab TAC consumed by year

Unit: kg, M/T, %					
	CPUE	ABC	TAC	Consumed Quantity	Consumption Ratio
1999		-	39 000	25 249	65.0
2000		15 000 ~ 34 000	39 000	30 362	77.8
2001		15 000 ~ 34 000	28 000	19 319	69.0
2002		13 000 ~ 25 000	28 000	17 996	64.4
2003		16 500 ~ 22 000	22 000	20 328	92.4
2004		14 000 ~ 21 000	22 000	22 745	103.4
2005		16 000 ~ 21 000	22 000	21 813	99.1
2006	15.7	20 000 ~ 23 000	24 500	23 828	97.3
2007	16.3	23 000 ~ 25 000	25 000	25 090	100.4
2008	18.3	25 000 ~ 29 000	27 700	27 467	99.2
2009	18.4	26 000 ~ 29 000	29 000	28 845	99.5
2010	19.3	26 000 ~ 31 000	31 000	19 000	64.2 (based on October)

Source: Deliberation on setting and managing Total Allowable Catch, Ministry of Maritime Affairs and Fisheries and Ministry for Food, Agriculture, Forestry and Fisheries, each year.

TABLE 10
Resources assessment result for estimating red snow crab TAC

Unit : kg, M/T, %				
Parameters	Estimations			Remark
	2008	2009	2010	
Natural Mortality Coefficient (M)	0.2 ~ 0.35/year	0.2 ~ 0.35/year	0.2 ~ 0.35/year	
Size at First Maturity	Female: 50 mm Male: 110 mm	Female: 50 mm Male: 110 mm	Female: 50 mm Male: 110 mm	Carapace width (CW)
Catch	30 000 tons	32 000 tons	30,000 tons	Estimate in September 2010
CPUE	18.3 tons/vessel	18.4 tons/vessel	19.3 tons/vessel	Catch per unit effort
Size Composition	94.31 mm	95.42 mm	98.25 mm	Year-on-year growth
Initial Stock (B0)	136 394	221 139	-	Stock at the beginning of fishing season
ABC	26 000 ~ 29,000 tons	29 000 ~ 31,000 tons	~ 32 000 tons	4 stages

Source: Implementation plan to set and manage 2011 Total Allowable Catch, 2010, Ministry for Food, Agriculture, Forestry and Fisheries.

Governance with Japan

Red snow crabs are mostly caught in the intermediate zone off the East Sea. Disputes with Japan are thus the biggest problems. Japan has consistently pointed out issues of resources management, rotational use of fishing grounds and cleaning of fishing grounds regarding red snow crab resources including snow crabs at the Korea-Japan Joint Fisheries Committee (hereinafter referred to as “the joint fisheries committee”) convened every year. The Korean government and the Japanese government agreed to pursue private-sector cooperation in the rotational use and cleaning of fishing grounds and emphasized faithful fulfillment of items of agreement. Another issue is that both countries use traps to catch red snow crabs in the same fishing grounds. Currently, there are five committees related to fisheries cooperation between the two sides, namely Joint Fisheries Committee, Fisheries Subcommittee, Manager-level Working Session, Marine Living Resources Experts Subcommittee and Working-level Fisheries Guidance and Monitoring Council, which are all concerned with red snow crab fisheries.

In the meantime, there are seven Korea-Japan private fisheries cooperation councils, including Korea-Japan Private Fisheries Council, Korea-Japan Private Fishermen’s Association Council, Korea-Japan Snow Crab Fishermen’s Council, Korea-Japan Red Snow Crab Fishery Leaders Council, Korea-Japan Purse Seine Fishery Leaders Council, Korea-Japan Joint Fishing Vessel Accident Settlement Committee and Korea-Japan Working-level Session of the Joint Fishing Vessel Accident Settlement Committee. Among these, Korea-Japan Red Snow Crab Fishery Leaders Council can be considered as a major international cooperative governance related to red snow crab fisheries.

Management of resources for the intermediate zone of the East Sea is regulated by each country’s law under the flag state control. In Korea, not only is red snow crab subject to TAC like other snow crabs, it is also subject to closed season, size of fishing gear, size limitation and other resources management regulations. Japan does not apply TAC to red snow crabs but employs escape mechanisms in crab traps and resources recovery plans.

2.2.4 Gyeongbuk Red Snow Crab Trap Association governance

About the association

The Gyeongbuk Red Snow Crab Trap Association is currently made up of 20 members and chaired by Lee Jae-gil. The association started as a social gathering formed by trap fishermen who saw Japanese use traps to catch red snow crabs and brought the method into Korea in the early 1980s. When TAC was introduced and the Korean-Japanese Fisheries Agreement took effect in 1999, the fishermen recognized that it would be difficult for a small social group to deal with the government as well as with Japan and decided to set up a corporation with 27 members on March 16, 2001. Member qualification was limited to those fishermen engaged in offshore trap fisheries, licensed by the ministerial level, and who used fishing vessels larger than 60 tons. The company is currently based in 623-81 Hupo-ri, Hupo-myeon, Uljin-gun and has several employees working for the association’s affairs at its central office.

Implementation of self-managed fisheries

The association became Korea’s first offshore fisheries organization to implement self-managed fishery practices in 2001. Self-managed fisheries were implemented in Korea in 2000 and the self-managed fisheries activities performed by the association include determining closed seasons ahead of government regulations, imposing restrictions on catch per trip, retrieving discarded fishing gear during the harvest banning period

(closed season), introduction of foreign crewmen from 2001, harvesting red snow crabs as live snow crabs from 2007, holding red snow crab festivals and conducting red snow crab research.

Operation of Korea-Japan fisheries councils

The association played a leading role in formulating fisheries councils between Korean and Japanese fishermen as international governance activities. The Korea-Japan Red Snow Crab Fishery Leaders Council was established in 2003, and a hotline linking Korea Fisheries Association to Japan Fisheries Association was set up as a means to settle fisheries disputes between the two countries.

3. GOVERNANCE ACHIEVEMENTS OF RED SNOW CRAB FISHERIES IN GYEONGBUK-DO AND IMPROVEMENT DIRECTIONS

3.1 Achievements

3.1.1 Establishment of fishery resources management scheme

The Gyeongbuk Red Snow Crab Trap Association is one of the cases where the fisheries sector took a leading role in adopting the TAC system from its introduction stage. Adoption of the TAC system, one of the most important fisheries management governance schemes at the national level, was advocated by the fisheries sector, and a national pilot program was soon implemented. In setting the allocations, the fisheries sector even stated views that the allocation must be reduced considering the resources situations.

As mentioned earlier, the association introduced a closed season and established a regime to well observe legal regulations on resources management. For instance, the association increased trap mesh size from 125 mm to 130 mm; well observes the allocation as shown in the TAC consumption ratio table; well observes the government-imposed closed season (July 10 through August 24); and observes yet another closed season (July 1 through August 31) it voluntarily imposed. As a result, the association was able to establish a mechanism to maintain sustainable red snow crab resources even if its fishing grounds shrank in the wake of the Korean-Japanese Fisheries Agreement. Especially, the association contributed to eliminating mistrust among members by allocating TAC quota based on each vessel's operational capacity. It actively takes part in cleaning fishing grounds using self-imposed regulations on closed season and size limitations that are stricter than the regulations imposed by the Fishery Resources Management Act with growing awareness of the importance of conservation of red snow crab resources. The association is also credited with increased fish population and economic value by preventing over-exploitation of resources.

3.1.2 Establishment of self-management

As Korea's first offshore fishery community that organized self-management, the association performs voluntary resources management activities and income generation programs. Major outcomes from these resources management efforts include compliance with laws and self-imposed stricter regulations. Besides these efforts, the association also undertook a program to collect abandoned or discarded fishing gear to conserve resources. Discarded fishing gears are collected during fishing operations year-round or as needed during the closed seasons.

TABLE 11

Discarded fishing gear collected by the Gyeongbuk Red Snow Crab Trap Association during operation seasons

Year	No. of Discarded Fishing Gear	Discarded Ropes (kg)	No. of Used Batteries
2007	4 382	5 480	10 000
2008	5 589	1 350	8 300
2009	6 710	1 220	8 400
2010	3 674	4 573	9 200

Source: Gyeongbuk Red Snow Crab Trap Association.

TABLE 12

Discarded fishing gear collected by the Gyeongbuk Red Snow Crab Trap Association during closed seasons

Year	Collected Fishing Gear	Recycled	Remark
2007	30 000		Association's own program
2008	17 460		Association's own program
2009	36 000	2 000	Led by the Korea Fisheries Association
2010	82 690	34 923	Led by the Korea Fisheries Association

Unit: kg

Source: Gyeongbuk Red Snow Crab Trap Association.

In the past, various waste materials such as discarded trap nets or used batteries generated from fishing operations were thrown into the sea, but with a growing awareness of fishing ground management, used or discarded fishing gear or batteries are retrieved and disposed of on land. As operational expenses increase, reusable part of used fishing gear like “crab attractors” is separated from the gear for reuse. This is due to the growing awareness of preservation of fishing ground environment and fishing gear savings.

Another self-managed fisheries program is red snow crab festivals. The red snow crab festival Gyeongsangbuk-do held in 2008 with its own budget helped improve the image of red snow crabs, increase income of fishermen and revitalize the local economy. In 2010, the red snow crab festival was held together with the Korea-Japan Red Snow Crab Symposium, which provided an opportunity to publicize a new form of citizen-led festival events and the need for research and product development of red snow crabs.

FIGURE 4

Used nets and batteries collected by the Gyeongbuk Red Snow Crab Trap Association

Source: Gyeongbuk Red Snow Crab Trap Association



Other important self-managed activities led by the association in collaboration with other research organizations such as the National Fisheries Research & Development Institute, Dokdo Fisheries Research Institute and POSTECH include research studies on red snow crab trap escape rings and water temperatures of habitats. The association's effort to settle fishery disputes with Japan through both fishery leaders council is another positive outcome of self-managed fisheries governance. Japan was demanding stricter resources management in the intermediate water zone but the Korean government was sticking to the Coastal State sovereign rights over its resources. This raised concerns that disputes with Japanese fishermen may arise.



Under these situations, the Gyeongbuk association proposed to create a council with Japanese fishery leaders. A council was created in 2003, opening dialogue channels to Japanese fishermen and substantially contributing to dispute settlement. Issues that were not negotiated at the intergovernmental level for state reasons were easily communicated, understood and settled at the council. This is a good example that shows the importance of privately-led collaborative governance.

3.2 Improvement Directions

3.2.1 *Enhancement of resources management*

Red snow crabs living in the East Sea waters are expensive and well-liked by both Koreans and Japanese. Stock of this sedentary species can easily decline if excessive fishing effort is made. Especially, red snow crab fisheries employ high fishing pressure methods and proper management of resources is therefore needed to support sustained fishing. Currently, both Korea and Japan impose closed seasons and size limitations under their respective laws using different procedures and methods. While both countries manage resources under the jurisdiction of flag states, they nevertheless need to keep pace with each other when it comes to the ways of managing closed seasons, size limitations and size of fishing gear in order to boost efficiency in the management of red snow crab resources. To this end, it is necessary to establish a scientific resources assessment scheme concerning red snow crabs and develop national resources management governance, such as resources recovery plans. In addition, the fisheries sector needs to increase its effort to retrieve discarded fishing nets or fishing gear and develop improved fishing tools to prevent the loss of used traps.

3.2.2 *Improvement of the TAC system based on the market economy principles*

More than ten years have passed since the total allowable catch of red snow crab was introduced. Individual Transferable Quota (ITQ) is known as a more effective resources management system than the TAC system from both resources and economic perspectives. Advantages of the ITQ system have already been demonstrated in a number of papers and reports. Production of red snow crab trap fisheries amounts to as much as KRW 1.0 billion per vessel. Expenses are also high considering that the fisheries take place in fishing grounds far from the shore. Hence, profitability is not very high. At present, economies of scale are difficult to be achieved with some 40 red snow crab fishing vessels operating around the east coast. Therefore, it seems necessary to take a more forward-looking approach and adopt ITQ so that this fisheries segment can manage its resources and achieve economies of scale. Especially when considering there are many fishery producers who are also engaged in fishery processing, introduction of the ITQ system is urgently needed.

3.2.3 *Dissemination of self-managed fisheries across the east coast*

The best practice in this study is limited to the Gyeongbuk Red Snow Crab Trap Association. However, red snow crab trap vessels that use the same fishing grounds as the association are located in Gangwon-do and Gyeongsangbuk-do. Big synergy, therefore, will be created when the association's reach or self-managed fisheries embrace both regions. Therefore, it is recommended that a self-managed fishery community embracing the entire east coast be set up and perform domestic and international activities.

3.2.4 *Promotion of Korea-Japan red snow crab fisheries councils*

Red snow crab resources can be a source of international disputes because the same fishing grounds are used not only by Korean vessels but also by Japanese vessels. This possibility increases due to the Korea-Japanese Fisheries Agreement. At present, these disputes are addressed by the Korea-Japan Red Snow Crab Fishery Leaders Council but this governance is not enough to resolve all issues, because various stakeholders are involved, including fishery leaders, ship owners, processors and crew members. Therefore, the existing fishery leaders council needs to be renamed as the Korea-Japan Red Snow Crab Fisheries Council and involve ship owners, crew members and red snow crab processors, besides fishery leaders. When various interest groups are engaged, the "fairness" objective of fisheries governance can be achieved.

Presently, Korea's private councils from different fisheries segments find it difficult to present a unified stance due to the lack of an overarching organization that coordinates different cross-segmental interests when they discuss use or management of the intermediate zone with Japanese fishermen's associations. As a result, Koreans often lose negotiating power during the Korean-Japanese fisheries negotiations. Creation of the "Korea-Japan Private Fisheries Council (tentatively 'titled)" can be considered as another important bilateral governance effort to coordinate different interests among different fisheries segments and different councils.

4. CONCLUSIONS

The Gyeongbuk Red Snow Crab Trap Association was selected as a best practice of offshore fisheries governance in this study, because it has produced most exemplary results in the context of resources management, international cooperation and self-management. As seen in this best practice, over-exploitation of resources is prevented and sustainable fisheries are achieved through the various fisheries governance measures and activities. Some people may say this was possible because the fisheries are done in particular regions, on particular species and by a small group of fishermen.

Even if conditions are favorable, nothing would be possible without the government's official governance and efforts of stakeholders regulated by such governance. The best practice is the result of joint efforts among the leaders of the association, Uljin-gun of Gyeongsangbuk-do and the central government. The exemplary cases examined in this study can become world-class examples if the additional elements of governance suggested in this study are implemented.

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Case study on dispute and conflicts settlement in offshore fisheries

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1. INTRODUCTION

After enacting the Fisheries Act in 1953 fishing areas in offshore have been established but because of changes in fishing environments there have been conflicts in the areas with fishing restrictions. Competition with Chinese and Japanese fishermen along with a rapid decline in fisheries resources, South Korea has started a vessel reduction program since 1994. South Korea implemented the special buyback program for offshore fishing vessels because in the second half of the 1990s, new fisheries agreements with Japan and China substantially reduced the fishing areas. Nevertheless, it was pointed out that the current regulations on fishing areas could not ensure sustainability and balance in fisheries. Current restrictions of fishing areas must be modified to account for the changing fishing environment in order to stabilize management of fisheries and resolve the disputes regarding fishing gears. From November of 2002 to May of 2003, the South Korean government consulted a possible change of the current fishing areas with the stakeholders and established a Civilian Fishing Area Coordination Committee (CFACC) to coordinate fishery conflicts including area demarcation.

2. ISSUES IN FISHING AREA COORDINATION AND THE CIVILIAN FISHING AREA COORDINATION COMMITTEE

2.1 Issues regarding fishing area coordination

The following table shows the benefits and disadvantages of fishing area re-adjustment.

TABLE 1

Summary of Fishing Area Coordination

Fishing gears	Issues	
Large Powered Danish Seine Fishery, Large Powered Pair Trawl Fishery	Request	Fishing operations in the east of E128° (Large Powered Danish Seine Fishery and Large Powered Pair Trawl Fishery in Busan) <ul style="list-style-type: none"> • Problems arise in fisheries business due to reduced fishing area. • Coastal fisheries will not be negatively affected by the squid capture because the large scale fisheries will be allowed to catch certain amount of fish set at a TAC scheme.
	Opposition	Opposition to allowing fishing operations (Fishermen in the eastern coastal area) <ul style="list-style-type: none"> • Fishing industry in the eastern coast will collapse due to steep price decrease in squid and resources. Depletion of squid capture may result in fishing gear conflicts with other fisheries.
Large Powered Danish Seine Fishery	Request	Due to poor income, fishing operations should be allowed in the waters from the water boundary between Ulsan City and Gyeongsangbuk-do to E127°. (Large Powered Danish Seine Fishery in Busan)
	Opposition	The fishing ground is too small to allow additional vessel to fish and fishery disputes may arise with coastal fishermen. (West Southern Sea Danish Seine Fishery in the eastern coast and Jeju-do)

(... continued)

Fishing gears	Issues	
West Southern Sea Danish Seine Fishery	Request	Due to illegal fishing activities in the fishing prohibited area at night and in bad weather, fishing-prohibited area around the Jeju-do should be expanded. (Fishermen in the Jeju-do)
	Opposition	Opposition to additional reduction due to already reduced fishing area by the bilateral fishery agreement with China and Japan (West Southern Sea Danish Seine Fishery)
Anchovy Drag Net Fishery	Request	Establishment of a new joint fishing area in which the fishing vessels from the first, the second and the third anchovy boats area are allowed to fish. (The First Anchovy Drag Net Fishery in Gyeongsangnam-do) <ul style="list-style-type: none"> Reduction of fishing grounds due to expansion of aquaculture and resource change Prevention of illegal fishing from the establishment of a new fishing ground
	Opposition	Collapse of anchovy drag net fisheries due to the increase of the catch by the new fishing vessels from the Gyeongsangnam-do (The Second Anchovy Drag Net Fishery, Jeollanam-do and Jeollabuk-do)
Large Powered Purse Seine Fishery	Request	Reduction of fishing area prohibited from using light from the current 7 400 m from the coast to 5 000 m (Large Powered Purse Seine Fishery)
	Opposition	Expansion of prohibited area (Fishermen from Jeju-do, Jeolla-do and Chungchung-do) Prevention of fishery disputes with coastal squid gigging fishermen Prevention of fingerlings by-catch and protection of fisheries resources Protection of spawning and nursery grounds near the Taeahn Peninsula
Offshore Stow Net Fishery	Request	To prevent frequent fisheries conflicts with coastal fishermen and protect spawning and nursery grounds, fishing in the coastal areas near Taeahn Peninsula and Jeju-do should be banned. (Coastal fishermen from Chungnam-do and Jeju-do)
Offshore Trap Fishery	Opposition	Reduced fishing grounds by fishery agreement with China and stagnation in the fishery (Offshore Stow Net Fishery)
	Request	Due to the loss of fishing ground in the area near Yantz River in China, fishing operation in the West Special Area should be allowed. (Offshore Trap Fishery in Gyeongsangnam-do)
Diving Apparatus Fishery	Opposition	Entry by another fishery may cause overfishing of blue crabs and fishery disputes. (Fishermen in Incheon City)
	Request	Fishing operation in the West Sea Special Area should be allowed to effectively utilize the resources. (Diving Apparatus Fishery in Chungchungnam-do) A joint fishing operation area for the fourth and fifth region should be established (divers in the coastal area of Jeollabuk-do) because through the agreement by the fishermen from both regions to resolve conflicts. (Divers in Chungchungnam-do and Jeollanam-do)
	Opposition	Special Area should be banned to prevent excessive fishing competition and fishery disputes. (Incheon City) Jeollabuk-do fishing area, the fifth area for divers, should be excluded from joint fishing area and managed on a community based regulations to protect fisheries resources. (Jeollabuk-do)
Small Powered Purse Seine Fishery	Request	Fishing prohibition area against using lights should be reduced for safety of fishing vessels and protection of fish freshness when they operate beyond 6 nautical miles from the coast. (Small Powered Purse Seine Fishery in Gyeongsangbuk-do)
	Opposition	It may cause overfishing of squid, anchovy, etc. and fisheries disputes. (Coastal fishermen in Gangwon-do)

2.2 Establishment of the Civilian Fishing Area Coordination Committee and the Sub-committees

The committee consists of 34 persons representing central and local governments, academia, fisheries associations, and fishing industries. The committee collects the opinions from stakeholders on the requests for coordination of fishery disputes through local governments, reviews the requests, and decides whether it refers to a relevant sub-committee or send back the request for further consideration. It also reviews the report of a sub-committee which may include agreement and/or disagreement in the sub-committee and makes a conclusion.

TABLE 2
Composition of Committee members

	Total	Officials	Academia	Experts	Industries
Numbers	34	12	2	4	16

Five sub-committees were established by issues for instance, operation in the east of E128°, adjustment of fishing area for anchovy drag net fishery. The sub-committees are composed of 9 to 15 persons from representatives from relevant fishing industries, officials from local governments and experts recommended from local governments. The coordinator of the sub-committees is the Director General of Fishery Resources in the Ministry of Maritime Affairs and Fisheries (MIFAFF) or Director of Fishery Policy in the MIFAFF. The sub-committees discuss the issue forwarded by the committee and make a report to the committee which may include the fishing area adjustment and consequent fishery resources management plan.

TABLE 3
Composition of sub-committees members by issues

Sub-committees	Total	Officials	Academia	Experts	Industries	
					Request	Opposition
Fishing Operation in the East of E128°	15	4	1	1	4	5
Fishing Area of Anchovy Drag Net Fishery	11	3	0	2	3	3
Fishing Area surrounding Jeju-do	12	4	0	1	3	4
Fishing Area of Small Powered Purse Seine Fishery	9	3	0	1	2	3
Fishing Area in the West Sea Special Area	12	4	0	1	4	3

2.3 Coordination mechanism of the committee and sub-committees

A number of meetings were held to adjust fishing areas. The committee held a meeting twice and sub-committees three through six times in 2003. In total, 505 people participated in the meetings, and among them were 324 members, 114 non-members, and 69 MIFAFF officials.

TABLE 4
Meeting participants in committee and sub-committees

Committee and sub-committees	Orders	Dates	Place	No. of participants			
				Total	Member	Audience	MIFAFF
Committee	1	31 July	MIFAFF	35	30	-	5
	2	11 Dec.	Korea Deep Sea Fisheries Association	45	30	15	3
Fishing Operation in the East of E128°	1	7 Aug.	Ulsan MIFAFF Office	48	16	29	3
	2	29 Aug.	Pohang MIFAFF Office	20	17	-	3
	3	25 Sep.	Gyeongju, Gyung-sangnam-do	38	17	18	3
	4	14 Oct.	Donghae Fishery Research Institute	28	15	10	3
	5	24 Oct.	Ulsan MIFAFF Office	9	8	-	1
	6	6 Nov.	MIFAFF	19	16	-	3
Fishing Area of Anchovy Drag Net Fishery	1	11 Aug	Yeosu MIFAFF Office	34	12	19	3
	2	28 Aug	Fishery Patrol Vessels Management Office in Busan	14	11	-	3
	3	7 Sep.	Masan MIFAFF Office	14	11	-	3
	4	29 Sep.	Fishery Patrol Vessels Management Office in Busan	14	11	-	3
	5	16 Oct.	Gurye, Jeollanam-do	14	11	-	3
	6	7 Nov.	MIFAFF	13	10	-	3
Fishing Area surrounding Jeju-do	1	12 Aug.	Yeosu MIFAFF Office	28	13	12	3
	2	2 Sep.	Mokpo Fishery Research Institute	18	15	-	3
	3	20 Oct.	Jeollanam-do Office	16	13	-	3
Fishing Area of Small Powered Purse Seine Fishery	1	8 Aug.	Youngduk Fishery Technology Management Station	21	9	9	3
	2	27 Aug.	DongHae MIFAFF Office	12	9	-	3
	3	15 Oct.	Ulsan Fingerlings Production Station	12	9	-	3
Fishing Area in the West Sea Special Area	1	14 Aug.	Incheon MIFAFF Office	17	12	2	3
	2	30 Sep.	Masan MIFAFF Office	18	15	-	3
	3	22 Oct.	Incheon MIFAFF Office	17	14	-	3
Total				504	324	114	69

2.3.1 Sub-committee on Fishing Operation in the East of E128°

The sub-committee held 6 meetings. The total number of attendees was 162. However they did not make a visible progress even though they discussed on the compensation scheme for those affected by the fishing permit for trawl fisheries in the east of E128° including the amount of compensation and setting a TAC. The fishermen from the Large Powered Trawl Fishery insisted that the agenda should include the joint fishing operation between squid giggling vessel and trawl which has been operated against law while fishermen in the eastern coast of Korea stuck with the existing positions that joint fishing operation is illegal and the expansion of the trawl fishery to the East of E128° will negatively affect gillnet fishery and trap fishery. The result of meeting the sub-committee was reported to the committee without much progress.

3.3.2 Sub-committee on Fishing Area of Anchovy Drag Net Fishery

The Sub-committee on Fishing Area of Anchovy Drag Net Fishery held 6 meetings with a total of 103 attendees. The fishermen from Jeollanam-do opposed the establishment of a joint fishing area and took a collective action with 60 fishing vessels in Yeosu port before the meeting to express their opposition. On the other hand, fishermen from Gyeongsangnam-do emphasized that establishing a joint fishing area is a response to the changing fishery conditions and it is necessary to manage anchovy resources management, supply and demand, consumption and maintenance of proper level of fish price.

Fishermen from the Anchovy Drag Net Fishery in Gyeongsangnam-do proposed fisheries development fund, raising 10 billion Won, in support for the fisheries development in Jeollanam-do and continuation of the buy-back program, introduction of TAC system for anchovy fishery and installment of Vessel Monitoring System (VMS), on the condition that the integration of waters nearby Jeollanam-do and Gyeongsangnam-do. Despite such an effort, the sub-committee could not reach an agreement on the integration of fishing areas and the result was reported to the committee.

Meanwhile fishery disputes surrounding the use of fishing grounds near Ulsan City has been a long standing issue between fishermen in the coastal area of Ulsan City and the fishermen from Gyeongsangnam-do in the Anchovy Drag Net Fishery. They had tried to resolve the matter but faced stalemate in negotiation. However the creation of the sub-committee made them start negotiation again and the consensus on the issue was reached relatively easily compared with other disputes mediations due to a long history of the negotiations. They agreed to set up a voluntary fishing restriction area, the area within 250 m to 500 m from the Fixed Type Demarcated Fishery fishing ground in Ulsan City. And for this purpose they agreed to make a Voluntary Management Arrangement between anchovy fishing industry in Gyeongsangnam-do and fishing industry in Ulsan City. The Arrangement also includes dispute coordination and compensation scheme.

2.3.3 Sub-committee on Jeju-do Fishing Area

The sub-committee held 3 meetings with total 62 people attending. Regarding the Offshore Stow Net Fishery near Jeju-do, the proposed establishment of fishing prohibition area near Jeju was agreed to maintain current voluntary arrangement between fishing industries as a temporary measure. The establishment of fishing ban area nearby Chungcheongnam-do was concluded to be revised by Chungcheongnam-do in consultation with the coastal and offshore fishermen.

There was no progress on the reduction of light prohibition area requested by the Large Powered Puree seine Fishery.

2.3.4 *Sub-committee on Fishing Area in the West Sea Special Area*

The sub-committee held 3 meetings with a total of 52 attendees. The Offshore Trap Fishery from Gyeongsangnam-do insisted on permitting fishing in the water while gillnet and stow net fishermen opposed it on the grounds that the water had too many fishing vessels, which might cause overfishing of blue crabs.

Whether diving fishery should be allowed in the West Sea of Korea or not was discussed. It was agreed that the issue will be discussed after the resource survey and consultation between interested parties. Meanwhile, it was agreed that whether fishing by Offshore Trap Fishery should be allowed or not should be discussed in the Committee after the fishing conditions of bottom trawl fishery within its fishing area are set.

2.3.5 *Sub-committee on Small Powered Purse Seine Fishery*

The sub-committee held 3 meetings with a total of 52 attendees. The meetings among fishermen from Gyeongsangbuk-do in the Small Powered Purse Seine Fishery and Gangwon-do in the coastal fisheries promoted the understanding of mutual positions and existing difficulties in their fisheries. In the second meeting, they agreed to ban the use of light within 5 nautical miles from the coast of Gangwon-do, and 3 nautical miles from the coast of Gyeongsangbuk-do in principal, from the current 6 to 9 nautical miles. However, there was an exception for Youngil Bay of Gyungsangbuk-do where it was set at 6 nautical miles. Moreover, they agreed to set up a voluntary consultant body to implement the agreements and restrict the brightness of the bulbs on small purse seiners to less than or equal to 210 kilowatts on a voluntary basis in order to minimize the impact on coastal fisheries.

2.3.6 *Meeting among chairpersons of sub-committees*

The chairpersons of the sub-committees met once in order to exchange their opinions on issues discussed in the sub-committee meetings and to propose future directions to resolve these issues.

3.4 Meeting of the committee

The meetings of the committee were held twice. 35 persons attended the first meeting and 45 persons in the second meeting. The first meeting discussed the necessity of fishing area readjustment and coordination and operative matters of the committee. In the second meeting, the committee endorsed fishing area readjustment proposed by the sub-committees and recommended the government to take necessary measures to coordinate fishing areas.

Points agreed upon in the second committee meeting are as follows:

- Fishing ban area designation will be determined by the Voluntary Management Arrangement between anchovy fishing industry in Gyeongsangnam-do and fishing industry in Ulsan City. The area within 250 m to 500 m from the Fixed Type Demarcated Fishery fishing ground in Ulsan City will be designated as a voluntary fishing restriction area. The arrangement which includes voluntary restriction area, coordination of disputes and compensations will be effective as of 1 November 2003.
- Light-prohibited area for the small purse seine in the coastal water of the East Sea will be partially reduced.
 - Adjustment of the fishing banning area from “within 6 to 9 nm from the coast” to “within 5 nm from the coast below Jungdongjin, Gangwon-do and 4 nm from the coast above Jungdongjin.
 - Reduction of 1 nm in the Gyeongsangbuk-do coast.
 - Restriction of the brightness of the bulbs in the Small Powered Purse Seine

Fishery to less than or equal to 210 kw on a voluntary basis in order to minimize the impact on coastal fisheries including the Fixed Type Demarcated Fishery.

- Regarding the designation of fishing ban area for the Offshore Stow Net Fishery near Jeju-do, it was agreed that the existing “agreement of fishery disputes” between both parties, which prohibits fishing operation from 20:00 to 04:00 at night from June to October and within 8 nm from the Jeju-do coast, will be strictly enforced.
- Current fishing area in the Offshore Stow Net Fishery fishing ban area in the part of Chungcheongnam-do coast (area 164) will be maintained. If disputes arise, Chungcheongnam-do will take over as mediator.
- Fishing ban area for the Offshore Trap Fishery within 1.5 nm from the Jeju-do coast will be established.
- As regards to the request of light prohibited area expansion in Chujado, Jeju-do and Geomundo Gyeongsangnam-do by the Large Powered Purse Seine Fishery, it was agreed to maintain existing regulation that prohibits light use in the waters within 7 400 m from the coast.
- Medium or large sized bottom trawl fishing banning area to Marado, Jeju-do will be expanded from 1 nm to 3 nm from the Marado lighthouse, a base point.
- Whether a diving fishery will be allowed in the West Sea Special Area or not will be discussed after the resource survey is conducted and consultation between interested parties on self-regulation of the fishery takes place.
- Regarding the designation of joint fishing area for the fourth and fifth diving fisheries in the Jeollabuk-do waters, it was agreed that current fishing area will be maintained due to the consideration of imbalance with other diving fisheries.

The Committee could not reach an agreement on the following matters:

- Fishing operation in the east of E128 requested by the Large Powered Danish Seine Fishery and Large Powered Pair Trawl Fishery in Busan was not resolved. The Committee encouraged further discussions at an appropriate time such as finalization of WTO DDA negotiations.
- Designation of joint fishing area for the Anchovy Drag Net Fishery in Jeollanam-do and Gyeongsangnam-do was not agreed. But they agreed to set up a consultation body to further discuss mutual interests. Recognizing excess fishing capacity in the First Anchovy Drag Net Fishery (Gyeongsangnam-do), the Committee agreed to recommend substantial reduction of the number of fishing vessels to the government. Recognizing that it is desirable to discuss mutual interests such as recovery of mutual trust and promoting anchovy consumption, the Committee agreed to establish a consultant body that consists of both industries.
- Regarding fishing operation in the West Special Area requested by the Offshore Trap Fishery in Gyeongsangnam-do, the Committee recommended the concerned parties to continue to discuss the matter, recognizing the lack of consultations with the Bottom Trawl Fisheries in Incheon City.

3. ANALYSIS OF CAUSES OF CONFLICTS

3.1 Causes of conflicts

3.1.1 *Lack of institutions to resolve fisheries conflicts*

Article 43 of the Fisheries Act provides that when granting a permit for fishery business, an administrative authority shall place restrictions or conditions on the areas of operations, fishing gear and methods, the size and marking of fishing gear, etc. according to the type of fishing business and the size of fishing vessels. Moreover, the fishing areas of coastal or offshore fisheries will be fixed from the time of the issuance

of permit. Fishing vessels of the offshore fisheries had been in operation in the Yellow Sea, East China Sea, and East Sea before the effectuation of the EEZ, although fishing in the East Sea was restricted in accordance with the 1965 S. Korea-Japan Fishery Agreement. However, the EEZ regime, which transformed the fishing order in the waters surrounding Korean peninsula, greatly reduced fishing areas. Therefore, Large Powered Danish Seine Fishery is requesting the government to allow fishing in the east of E128, which has been prohibited since the 1965 Korea-Japan Agreement. It is also requesting for fishing permits in the West Sea Special Area as an alternative fishing ground following the loss of blue crab fishing ground in the coastal area near Yangtze River in China. Furthermore, worsening profitability due to the decreased resources in the main fishing grounds for the offshore fisheries sparked demands for the expansion of fishing area towards coastal waters to secure abundant fishing grounds as an alternative.

Article 61 of Fisheries Act states that administrative authorities may enforce measures such as restriction or prohibition on the operating areas of fishery businesses and if necessary for the control of fisheries, sanitary control, the maintenance of order in distribution and coordination with respect to fisheries-related matters. Paragraph 3 of Article 62 of the Fisheries Act states that if it is deemed necessary for coordination in fisheries, the Minister for Food, Agriculture, Forestry and Fisheries or the Mayor/Do Governor may, notwithstanding any restrictions in the areas of operation under the Fisheries Act or the Fishery Resources Management Act, permit or restrict such operations by prescribing the areas and period of operations, the number of vessels operated and other conditions. However, Paragraph 1 of the Article 62 states that such a fishing area adjustment shall be determined by the Presidential Decree. The Decree states that such an adjustment shall be decided on through consultation between the parties concerned. Because the consultation between the parties concerned is a precondition to resolve a dispute, any dispute cannot be resolved without an agreement among stakeholders. Therefore, it is necessary to revise the Presidential Decree in order for the Minister or Mayor/Do Governor to have an actual power to adjust fishing areas disputed for the proper management of fisheries on the national level.

3.1.2 No demarcation between coastal and offshore fisheries

The terms “coastal area” and “offshore area” are commonly used in the field of fisheries but they are not defined with respect to their geographical scope in the fishery-related laws and regulations. Moreover, there exist no criteria in the Local Autonomy Act to demarcate the two areas. Consequently the boundary between coastal and offshore fishing areas is unclear, which has caused many problems in planning and implementing the fishery policies and coordinating jurisdictional disputes amongst local autonomies.

Under the Fisheries Act, fisheries are classified into coastal fisheries, offshore fisheries, and deep sea fisheries. Under the Act, the main criterion for distinguishing coastal fisheries from offshore fisheries is the tonnage of the vessel; in general a vessel of equal to or over 8 tonnages is considered an offshore fishing vessel, and a vessel of less than 8 tonnages, a coastal fishing vessel. There is, however, no regulation on the fishing area boundary which is designated for a fishery to exclusively use a specific fishing ground. It is not always a violation if a fishing vessel with a coastal fishery permit operates in the offshore area or vice versa. This kind of duplication between coastal and offshore fishing areas causes conflicts and disputes amongst fisheries, which remains a hurdle in adopting a new fishery management system under the EEZ regime.

It is necessary to reinforce the fishery management systems such as zoning of fishing areas in order for South Korea as a responsible fishing state to adapt to a new fishing order under the EEZ regime and to put in place advanced management systems.

3.1.3 *Issues with regards to functions of the dispute settlement body*

To settle fisheries disputes in a prompt and fair way and contribute to the development of sustainable fishery, East Sea Fishery Disputes Coordination Committee (ESFDCC) and West Sea Disputes Coordination Committee (WSFDCC) were established in June 2010. When a fishery dispute occurs, the settlement between parties concerned through compromises is encouraged before referring to a committee. Any dispute that could not be resolved between the parties will be referred to a committee, which, in turn, will deliberate them and advise relevant authorities to take appropriate measures.

The functions of the committees include: (1) mediating fishery disputes, such as fishing gear conflicts, conflicts between fisheries with fishing vessels and fisheries with license or reporting fisheries, fishing boundary disputes amongst local governments, (2) educating and managing public relations aspects of fishery disputes, (3) making policy suggestions to relevant authorities regarding preventing and settling fishery disputes, and (4) coordinating all issues considered by the chairperson of a committee relevant to fishery dispute mediation. The committee could, however, only make a recommendation for parties in dispute. If they do not choose to accept its recommendations, the committee cannot compel them to enforce its recommendations. In sum, the committee is a fishery dispute settlement advisory body facilitating compromises amongst parties in dispute.

3.2 Factors in fishery dispute mediation

3.2.1 *Positive factors*

Communication and cooperation amongst stakeholders

Fishery disputes arise more often due to the changes in the fishery environment than due to violation of fishery related laws such as Fisheries Act or Fishery Resources Management Act. Since fishing areas for specific fisheries were established in the beginning of 1950s, they have been affected by fishery resources changes, in particular fishing area reduction resulted from introduction of EEZ regime. Many types of fisheries share fishing grounds, which may result in disputes amongst fisheries. The dispute settlement between coastal fishermen and an Anchovy Drag Net Fishery in Ulsan City is an exemplary case in fishery dispute settlement. The establishment of a communication mechanism, the Sub-committee on Fishing Area of Anchovy Drag Net Fishery, has contributed to resolving the dispute by enhancing mutual understanding of the issue and interests.

The fisheries that could not resolve disputes claim that their fishing area established in the 1950s was disadvantageous to their business, but was later improved by changes in the fishing environments; they refuse admission of any other fishery enterprise into their fishing area. Such refusal was the main obstacle in the conflict resolution process. There exist no institutional arrangements to provide incentives that would facilitate the mediation of disputes. For policy purposes, it is necessary for the government to establish institutional arrangements that provide incentives to promote communication and cooperation amongst stakeholders.

Negotiations based on consensus

Consensus is defined as the state of agreement without any formal objection at the time of decision-making by the Chairperson in a meeting. It is differentiated from unanimous agreement. The consensus method was introduced by the UN Security Council and the General Assembly in the late 1960s in order to avoid conflicts over controversial issues that were agreed in general but had divergences in details. The decisions made by the Civilian Fishing Area Coordination Committee meetings were based on a consensus, not unanimous agreement, and it can be argued that such method facilitated the settlement of disputes. It could be said that consensus over the fisheries

disputes has been achieved through continuous consultations among stakeholders over an extended period, which weakened objections through mutual compromises and cooperation.

3.2.2 Negative Factors

Lack of understanding on conflicts and disputes

Most of disputes arose from the changes in fishing environments, such as increase in fishery resources and reduction of fishing areas. They could be resulted from a lack of coordination in fishing areas. There is a general understanding that the fishing areas established in the beginning of the 1950s should be readjusted not only because of the changes in fishery resources but also the introduction of EEZ system surrounding the Korean Peninsula. The fisheries industry, however, has not seen meaningful compromises in recent years, while recognizing the necessity of fishing area readjustment. In cases where the rationale of opposing adjustment of fishing areas was unsound, a party insisted that all fishermen in fisheries involved, took part in the negotiation process. In recent years, fishery industries have gradually shrunk due to the rapid reduction of the number of fisheries laborers, and thus the government of South Korea must realize that fishery restructuring is of a great importance. It is vital to identify the environmental factors that inevitably led to the conflicts amongst various stakeholders surrounding fishing areas, understand and respect each other, and seek ways of harmonious coexistence and cooperation.

Lack of institutional coordinating functions

While the composition of fishery resources has transformed drastically due to the changes in the ocean environment, South Korea has maintained fishing areas established in the 1950s. Since 1994, the South Korean government has implemented the vessel buy-back program in order to adjust the number of fishing vessels in commensuration with the fishery resources in the coastal and offshore waters. The Fisheries Act lacks functions which coordinate fishing areas in a flexible way that reflects the changing fisheries environment. If the period of a fishing permit expires and a new permit is provided, the effectiveness of the new permit has no relevance to the past record of a vessel. The Act provides that fishing area of a vessel shall be designated at the time of issuance of a permit. Nevertheless, the authority concerned does not adjust fishing area when a new permit is issued, interpreting that the new fishing area would be the same with the area prescribed in the former permit.

In this light, we need to resolve the issue of fishing area adjustment through introducing a new program such as a uniform renewal of fishing permits in order to equalize the permit period of all fishing vessels. Furthermore, article 61 of Fisheries Act stipulates that administrative authority may restrict or prohibit fishing areas to coordinate fishing activities, but this provision is applicable only after an agreement is reached between the parties concerned. Thus relevant regulation should be revised in order for an authority to readjust fishing boundary of a fishery, and if necessary for an effective fisheries management, restrict or prohibit fishing activities, regardless of agreements among stakeholders concerned.

Lack of legal competency of fishery coordination committees

In accordance with the Fisheries Act, fishery coordination committees exist to deliberate adjustment and compensation measures in fisheries industry and advise fishery matters. The MIFAFF operates the Central Fishery Coordination Committee (CFCC), and local governments operate their own coordination committees. The CFCC functions as an advisory body which deliberates the matters delivered to them by the minister of the MIFAFF. It also deliberates the decisions of Civilian Fishing

Area Coordination Committee. In this way, the CFCC plays a central role in settling fishery disputes. The CFCC, however, may only make recommendations for dispute mediation. It does not have the power to enforce its recommendations. In contrast, article 67 of Fisheries Act in Japan allows the Fishing Area Coordination Committee to make bounding decisions regarding fishery dispute mediation. The Fisheries Act in South Korea needs to be modified to introduce compulsory enforcement mechanisms in fisheries disputes.

4. CONCLUSION

Since the establishment of fishing areas in the offshore waters in 1953, the Korean government has made an effort to resolve fishery conflicts and disputes, taking into consideration environmental changes such as changes of fishery resources and introduction of the EEZ regime. The main disputes regarding fishing area include fishing in the east of E128° requested by the Large Powered Danish Seine Fishery and the Large Powered Pair Trawl Fishery in Busan, fishing prohibition area expansion for the Southwestern Area Bottom Trawl Fishery, establishment of a joint fishing area in Anchovy Drag Net Fisheries, reduction of light ban area for the Large Purse Seine Fishery, fishing prohibition of Offshore Stow Net Fishery in the waters near Taean Peninsula and Jeju-do, and fishing area expansion in the West Sea Special Area by the Offshore Trap Fishery.

The Civilian Fishing Area Coordination Committee and five sub-committees were created in an effort to resolve these disputes. The committee held two meetings and each sub-committee, convened three to six times in 2003. In total, 505 people attended the meetings, among which were 324 members, 114 non-members, and 69 MIFAFF officials.

The current institution lacks necessary functions to resolve disputes amongst stakeholders. There exist no legal mechanisms in place to delimit coastal fishing areas from offshore fishing areas, which renders dispute resolution more difficult. In cases where a dispute was resolved through civilian committees, communication and cooperation amongst stakeholders has been smooth and a decision making in consultative bodies was based on consensus. On the other hand, lack of mutual understanding of a dispute, lack of institutional coordination functions, and the weak legal competence of CFCC under the Fisheries Act have prevented effective resolution of fisheries disputes.

To conclude, it is necessary to strengthen the current legal system to resolve fishery disputes regarding fishing area readjustment. The main task in the future will be to delimit fishing areas for coastal fisheries and offshore fisheries, and strengthen the legal power of coordinating bodies including the CFCC under the Fisheries Act.

The effectiveness of the deep-sea fisheries governance in the Republic of Korea

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1. INTRODUCTION

The Korean deep-sea fishing industry grew rapidly from the 1960s until early 1990s, expanding fishing grounds to all parts of the world. However, since the United Nations Convention on the Law of the Sea came into effect in 1994, the Korean deep-sea fishing saw a reduction in its production volume with the decline of overseas fishery grounds. As a response to efforts to restructure the deep-sea fishing industry and the government trying to secure overseas fisheries, the production volume has stopped its decline, but it will be difficult to expand as rapidly as before.

To adjust to the changes in the demand and supply of fishery products, the Korean government is placing more emphasis on expanding the production base of the ocean industry by securing overseas fishing areas and exploring overseas fish farms as a way to secure overseas marine resources. Korea, through revisions of the "Ocean Industry Development Act" in 2008, is seeking to make the ocean industry more sophisticated by including 'ocean fishery-related projects' comprising transport, distribution and a processing industry outside Korean waters in addition to the existing ocean fishing industry.

Accordingly, the decision-making process for changing and improving various policies and regulations in the ocean industry is becoming rather complicated with multiple layers and more transparency. In other words, factors influencing the decision-making policy related to the ocean industry of Korea do not only include overseas factors such as international laws and regulations for international organizations, but domestic factors such as the ocean industry circle and related private organizations, making the process of decision-making to achieve policy goals more complicated.

The concept of governance started from a theoretical approach on corporate governance in the 1980s and departed from the issue of ownership, management, inspection and responsibility and was reinterpreted from the policy decision-making system of the government as it was introduced to the reform of the western society's public sector after having spread to the World Bank and OECD countries in the 1990s. In recent days, the scope of application of governance was expanded to the government, the local community and social capital. The perspectives on governance theorize the unclear boundaries of public and private sector activities and raises important questions such as the power, decision-making and interaction between organizations. The governance perspective also emphasizes how various actors and institutions can use the resources and technologies to contribute to the complicated policy-making procedures or how the role of the government is changing in the process.

It is not easy to define governance in a word, but when it is applied in the public sector, it can be defined as a form of 'public decision-making'. This means that it can be said to be a form of decision-making process that resolves the problem and makes

parties involved responsible by getting stakeholders - state organs, regional autonomous groups, citizen groups, citizens, functional groups - within an institutionalized policy community involved in the policy-making process even if decision-making is not carried out unilaterally or vertically by bureaucrats as in the past. Such a perspective was expanded to the concept defined by the UNDP and OECD. The concept of 'Global Governance' was proposed to be the "cooperative management or joint control in a global scale" by The Commission on Global Governance.

This study focuses on the 'ocean industry' field from the 'fisheries governance' defined as the relationship between stakeholders, especially on fishing right and fishing stocks. It examined the decision-making process and structure and its effectiveness. In this study, rule, process and structure resolving the conflicting interests in the process of decision-making, implementation and execution of the decisions on the fishing right and fishing stocks of the ocean businesses by the government were defined and used. However, in the "Ocean Industry Development Act", 'ocean industry' consists of 'ocean fishing' and 'ocean fishing-related businesses', but in this study, for convenience's sake, the target of review was restricted to the 'ocean fishing' field. 'Ocean fishing-related businesses' was excluded since the definition of the industry and the scope of the businesses was not specified. Based on the study of the 'overseas fisheries' governance' under the same concept, the objective lay in producing the implications of the improvements.

2. OVERVIEW OF THE DEEP SEA FISHING INDUSTRY

2.1 Status of Deep Sea Fishing Industry

2.1.1 Status of Korean Overseas Deep Sea Fishery

Korean deep-sea fishing vessels went overseas a long time ago and grew rapidly until the early 1990s, catching nearly 1 million tons of fish. However, the United Nations Convention on the Law of the Sea was signed in 1994 with a total of 125 countries ratified until now. With the number of countries that promulgated within the 200-nautical mile zone growing to 125, the fishing grounds of Korean deep-sea fishery are declining continuously.

The number of Korean deep sea fishing vessels catching fish in 20 countries throughout the world as of 2009 is 362, catching a total of 611 000 tons of fish. Out of the oceans, the Pacific Ocean where tuna accounts for most of the fish takes up 75.4 percent of the total deep-sea fishery production with 461 000 tons. A total of 103 000 tons of fish is caught in the Atlantic Ocean and 16 000 tons in the Indian Ocean, about 16.9 percent and 2.7 percent of the total haul, respectively. Some fish are caught in the Antarctic Ocean as well.

TABLE 1
Fishing Status of Korean Deep-Sea Fishing Vessels by Ocean

Ocean	Charges for fishing (2008)		Catch (M/T) (2009)	No. of vessels (2009)	No. of countries present (2009)	Status of fishing agreement signed (2009)
	USD thousand	Hundred million won				
Atlantic	11 674	126	103 185 (16.9%)	128	9	Mauritania, France
Indian	2 747	30	16 800 (2.7%)	34	2	Iran
Pacific	51 971	561	461 285 (75.4%)	200	9	Russia, Japan, China, Tuvalu, Cook Island, Solomon Islands, Kiribati, Australia, PNG, Ecuador
Antarctic	279	3	30 680 (5.0%)	-	-	
Total	66 671	720	611 950 (100.0%)	362	20	13 countries

Source: Statistical Year Book of Korea Overseas Fisheries (2009, 2010).

Fisheries agreements have been concluded between Korea and a total of 13 countries, including Mauretania, Russia, China, Japan and the Solomon Islands, so as to secure fisheries by ocean. Private businesses also paid charges to fish in the coastal nation's waters each year, amounting to a total of USD\$66 million. The charges were calculated based on the portion of fish caught in each ocean. Fisheries agreements were concluded with the coastal nations in the relevant waters.

Meanwhile, the trend of Korean fishing vessels by vessel type and the fisheries haul overseas shows us that, as of 2009, 153 tuna long liners caught 43 307 tons, 29 tuna purse seine vessels caught 283 380 tons, 101 trawl vessels caught 174 380 tons. In the years since 2000, the unique trait of the vessel type was the fact that the number of vessels including tuna long liners, squid jigging, North Pacific trawl vessels and trawl vessels declined consistently over the past decade with the only exception being the tuna purse seine vessels, which maintained or even partly increased its number.

TABLE 2

Haul Trend by Fishery Vessel Type

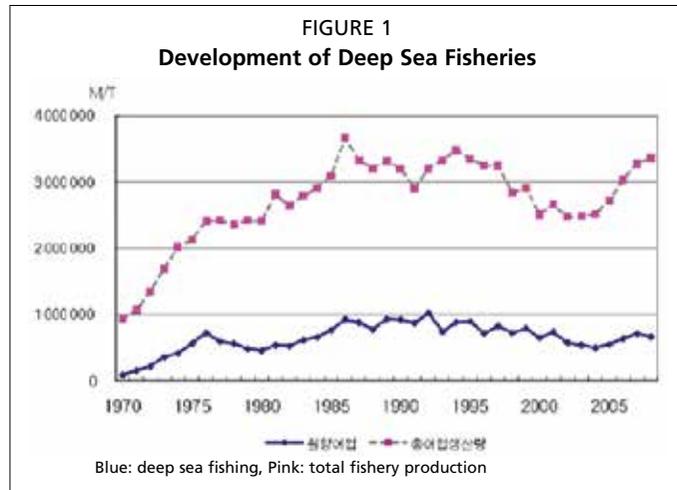
Vessel Type	2000		2005		2008		2009	
	No. of vessels	M/T						
Tuna long liner	197	58 387	177	49 619	158	37 922	153	43 907
Tuna Purse Seine	26	170 025	28	210 777	29	249 137	29	283 380
Squid jigging	88	159 726	31	28 144	30	109 186	31	43 342
Stick-held dip net fishing for Pacific Saury	4	24 803	1	40 509	1	30 212	1	22 001
North Pacific Trawl	33	87 830	7	26 726	6	28 819	5	36 524
Hokkaido Trawl	-	-	-	-	-	-	-	-
Trawl	155	133 100	123	187 929	114	201 842	101	174 380
Shrimp trawl	8	14	1	-	-	-	-	-
Bottom longline	-	15 682	7	5 070	3	6 021	3	5 998
Other	24	1 700	35	3 322	20	3 043	23	2 418
Total	535	651 267	410	552 096	380	666 182	362	611 950

Source: Statistical Year Book of Korea Overseas Fisheries, each year

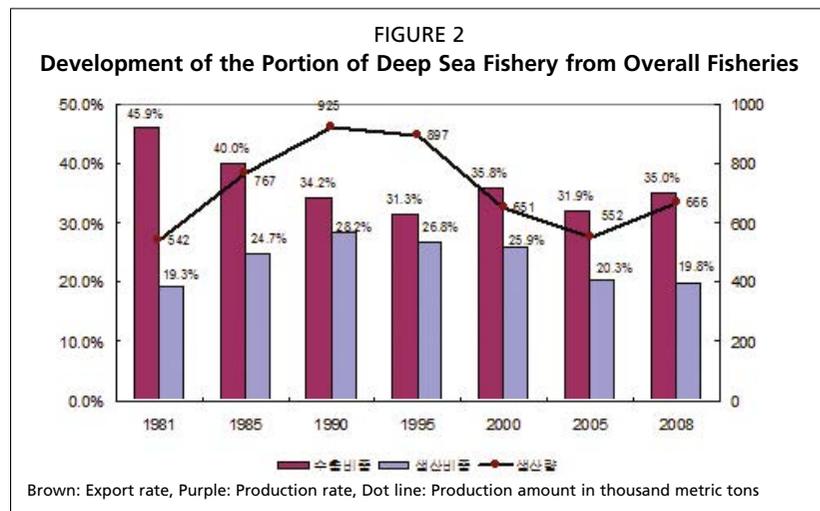
2.1.2 Production Trend of Deep Sea Fishery

The quantity of fish caught in the ocean by Korean fishing vessels increased radically starting from early 1970s thanks to the entry of fishing vessels by type and sea in overseas fishing areas, exceeding over 1 million tons in 1992. However, as the UN Convention on Law of the Sea including the Exclusive Economic Zone (EEZ) declaration expanded to each coastal nation, the deep sea fishery volume continuously declined, remaining at a 611 000 M/T level in 2009.

Meanwhile, the total fishery production in Korea has been declining consistently since it hit 3.65 million tons in 1986 as a result of fishery stock depletion in coastal waters. However, starting from the mid-2000s, it has been on the rise again thanks to consistent fishery stock management, recovery policy outcome and the production increase of the fishing farms. Consequently, deep sea fishing production volume consisted of 19.3 percent of the total fishery production volume in 1981, growing to 28.2 percent in 1990 and dropping again in 2008 to 19.8 percent.



As such, the proportion of ocean fishery in the Korean fishing industry reduced in terms of production volume and increased a little in terms of export starting from year 2000. The dramatic change allows us to estimate that a significant qualitative change in the overseas fisheries' governance occurred in the 1980s, 1990s and in the 2000s.

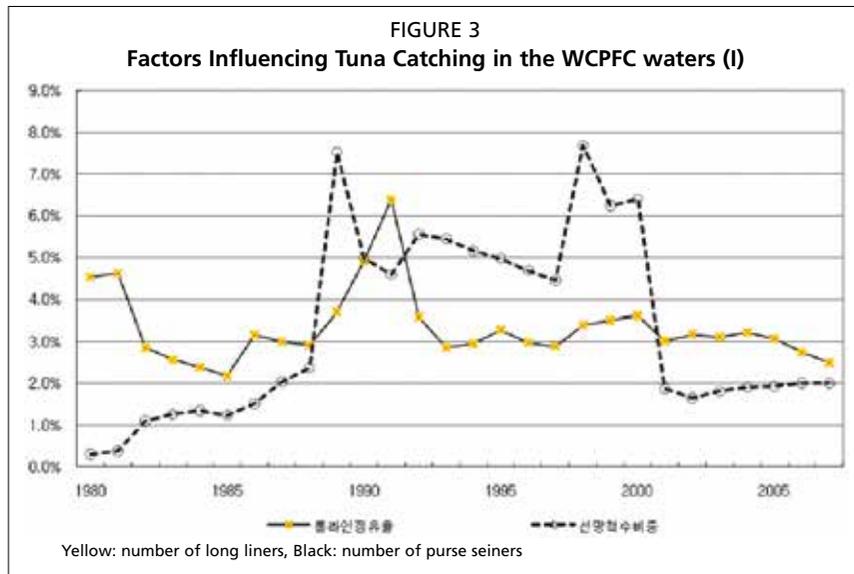


2.2 Tuna Fishing Structure in the West and Central Pacific Ocean

The most representative use of 'fishing right' and 'fishing stocks' in deep sea fishery field can be checked in the tuna fishing. As of 2009, 75 percent of the deep sea fishing production is caught in the Pacific. The rules on 'fishing right' and 'use of fishery resources' on the tuna caught in the waters under the jurisdiction of the WCPFC.

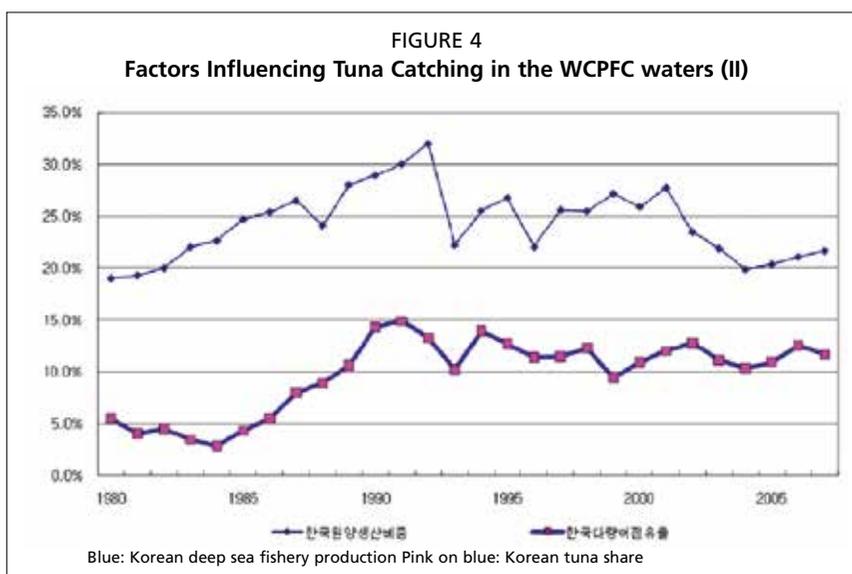
To secure such tuna stocks, tuna fishing businesses in each country carry out fishing activities complying with the regulations within their countries, international standards in the relevant waters, and requests made by the coastal countries. The structural factors influencing the fishing activity of Korean fishing vessels in the West and Central Pacific tuna fishing grounds are the following: structural factors of the Korean deep sea fishing industry, international fishing conditions, and the competitive or cooperative relationship between fishing vessels participating in the actual fishing activity.

First of all, Korean deep sea fishing vessels fishing in the restricted waters of the South Pacific are under the influence of structural factors that exist within Korea.



The relative importance of the deep sea fishing industry concerning Korean fishery production volume has been on the decline since 1992, so it is difficult to say that it has a decision-making structure advantageous to the deep sea fishery industry in Korea. On the contrary, the decision-making governance of the Korean deep sea fishing industry is estimated to become aggravated with the passage of time. As shown in Figure 4, the importance of Korean fishing vessels compared to those of other nations is lessening in the 2000s.

As the number of national flag carriers among purse seine vessels used for catching tuna is reducing, showing that the structure for securing tuna stocks puts Korea at a competitive disadvantage compared to competitors. Under such conditions, the tuna catching volume in the South Pacific by Korean national flag carriers has gradually been declining since mid-1990s. However, it is worthwhile to notice that the tuna catching volume of Korean fishing vessels is improving a little amid the relative disadvantageous position of vessels since 2005.



Actually, the tuna catching volume within the waters of WCPFC as of 2007 recorded a total of 240 million tons, out of which Korean national flag carriers caught 278 000 tons, comprising 11.6 percent of the total volume. In other words, 29 Korean

national flag carriers that obtained fishing rights approval went out fishing. The volume of fish stocks caught by either obtaining the right of entry into the fishing grounds of coastal nations within the boundaries of the waters or fishing in open waters was 11.6 percent of the total fish caught within the waters. Consequently, processes such as obtaining approval for fishing rights in Korea, carrying out cooperative activities and reaching an agreement were necessary to secure the entrance rights to the fishing lot so as to produce such fishing outcomes. To make the operation possible, there should be compliance with the rules such as fishing in restricted waters and fishing duration in accordance with the guidelines presented by the regional marine product body within the relevant water zone.

3. STATUS OF GOVERNANCE OF DEEP SEA FISHING INDUSTRY

3.1 Policy Goals and Policy Tools

Until the early 1990s, the Korean deep sea fishing industry made advancements by carrying out fishing operations in waters all over the world, but since then it has reduced continuously. To pursue the sustainable development of deep sea fishing, the Korean government has identified the tasks as the following. The following tasks have been identified focusing on deep sea fishery, excluding the import and export of fisheries under the responsibility of the Fisheries Policy Division at the Ministry for Food, Agriculture, Forestry and Fisheries.

- Build stable overseas production system
- Strengthen deep sea fishing industry competitiveness
- Build base for securing overseas fishery stocks
- Strengthen support system for overseas fishery investment

The detailed tasks and policy tools used to accomplish the policy goals of each area are as follows:

3.1.1 Build Stable Overseas Production System

The deep sea fishing industry has been contributing consistently to the effort of securing a stable supply of food stocks to the Korean people, 20 percent of the Korean fishery production and 35 percent of the export. However, with the stronger international regulations, the fishing grounds have been diminished, leading to the decrease of overseas fishing production. Consequently, the Korean government is concentrating its efforts to build a stable production system so as to secure over 700 000 tons of fish haul through flexible reaction to international regulations, revitalization of overseas investment and industry sophistication.

For this, the government is carrying out specific projects including revisions of the deep sea fishery approval guidelines, strengthening of support to secure fishing grounds, stronger management of IUU fishery and fish, restructuring of some industry types that are vulnerable to market opening, and improvement of the management environment so as to maximize additional values. To reach the goal of building a stable overseas production system, the following policy tools are set up as specific projects.

TABLE 3
Policy Tools to Build Stable Overseas Production System

Policy Goal	Detailed Task		Policy Tool
	Detailed Plan	Content	
Build stable overseas production system	Revision of the deep sea fishery approval guidelines	Obtain new approval for waters under jurisdiction of the local fishery management body(Expand scope of approval for fishing agreement with foreign country and for developing new fishing grounds)	Change of approval right standards
		Develop standards of converting national flag carriers of third country (permit fishing method different from existing national flag carrier)	
		Develop standards for restricting approval (in the arena of stock management, excessive competition)	
		Mediation of dispute in the industry regarding approval and approval restrictions and building 'dispute mediation system' for prevention of dispute	Dispute mediation system (Operate deep sea fishery mediation council)
	Strengthening support to secure overseas fishing grounds	Continue to develop overseas fishing grounds by phase including stock survey (public-private led by private sector)	Policy change and solidifying
		Change of stock survey in overseas fishing grounds and expand scope (expand up to overseas fish farming)	
	Stronger IUU fishing and fish management	Designate unloading port in Korea for foreign vessels for management of IUU fish entering Korea	Designate in accordance with "Deep Sea Fishery Law"
		Provide support for issuing fish catching, processing certificate for deep sea fishing in response to the EU's IUU eradication action.	Regulation #28 of the MFAFF (2009-)
	Restructuring of some industry types vulnerable to market opening	Use the Korea-US FTA shutdown support fund as the money to reduce the number of vessels	FTA Implementation Support Committee (deliberation), budget support

Source: "The Third Comprehensive Measures for Fisheries Promotion (2010~2014)", Ministry of Food, Agriculture, Forestry and Fisheries, March 2010.

3.1.2 Strengthen Competitiveness of Deep Sea Fishing Industry

The international regulations are becoming stronger with increased uncertainties in management such as quota and stock volume decline. Consequently, investment in the deep sea fishery industry is spreading, leading to the industry becoming more deteriorated and small. The Korean government is developing policies to strengthen the competitiveness of deep sea fisheries so as to secure a sustainable profit structure and to increase production and export in a stable manner.

To achieve the policy goal of solidifying the competitive edge of the deep sea fishing industry, the Korean government is carrying out detailed projects such as development of new plans for deep sea fishing vessels, supply of low-carbon high-efficiency fishing

TABLE 4
Policy Tool to Strengthen Competitiveness of Deep Sea Fishing Industry

Policy Goal	Detailed Tasks		Policy Tool
	Detailed Plan	Content	
Strengthen competitive edge of deep sea fishing industry	New plan for fishing vessel	Plan to add 38 vessels until 2016	Budget (cull fund) support
		Form alliance including technology transfer with Russian vessel shipyard	
	Develop and supply low-carbon high-efficient fishing vessel & gear	LED fishing lamp replacement	Support from government and local budget
		Write and distribute low-carbon fishing manual	Fishing training
	Introduction of boarding foreign marine engineer	Expand scope of boarding foreign sailors	Encourage labor-management agreement, revise the law of the ship's members
		Ease regulations on boarding legal marine engineers by vessel tone	
Revise statistics related to deep sea fishing industry	Expand investigation of statistics to overall deep sea fishery industry	Budget injection	

Source: "The Third Comprehensive Measures for Fisheries Promotion (2010~2014)", Ministry of Food, Agriculture, Forestry and Fisheries, March 2010.

vessel and fishing gear, the introduction of boarding foreign marine engineers on the deep sea fishing vessel, and revision of statistics related to the deep sea fishing industry. Policy tools for this, including expansion of budget support, providing fishing training to private businesses, strategic alliance, law revisions, and encouraging labor and management agreements must be actively used.

3.1.3 Build Base for Securing Overseas Fish Stocks

Since the UN Convention on the Law of the Sea went into effect in 1994, regulations on fishing acts were reinforced, leading to more intense competition between countries. As a result, the development of a cooperative relationship with the fishing country to secure stable conditions to fish in restricted waters in response to the policies to secure fishery stocks by coastal states has become an important issue.

TABLE 5
Policy Tools for Building Base for Securing Overseas Fishery Stocks

Policy Goal	Detailed Tasks		Policy Tool
	Detailed Plan	Content	
Build base for overseas fishery stocks	Stronger fishery cooperation	Set up and reinforce cooperative system between Korea and Russia, Korea and PNA 9 nations	Build cooperative system
	Revitalize public development support project in the fishery field	Set up and reinforce cooperative system between public and private sectors	Build cooperative system
		Explore and support cooperation demand	Use ODA
	Financial support to revitalize overseas projects	Secure integrated budget to strengthen voluntary diplomacy (observer expense support, fusion and combining type overseas fishery project)	Establish international cooperative fund
		Provide expanded support for investing in the fishery facilities by zone	Fishery development fund
		Introduce advanced financial system to explore new growth force	Establish Authority for Investing in the Agricultural, Fishery Products (tentative name)
	Build stable base for securing overseas fishery stocks+	Establish organization specializing in the fishing exchanges with coastal states	Set up International Fishing Exchange Center
		Joint-production of overseas fishery stocks	Further exemption of customs tax

Source: "The Third Comprehensive Measures for Fisheries Promotion (2010-2014)", Ministry of Food, Agriculture, Forestry and Fisheries, March 2010

The government solidified its fishery cooperation efforts between Korea-Russia and Korea-PNA so as to secure a stable source of overseas fishery stocks, while seeking improvement of relations with coastal states by revitalizing public development aid in the fishery field. In addition, various policies are under examination to revitalize entry into the overseas fishery markets. Efforts to newly introduce governance to secure overseas fishery stocks are under way.

3.1.4 Strengthen System to Support Overseas Stocks Investment

Along with the above-mentioned efforts, the Korean government is actively pursuing globalization of the Korean deep sea fishing industry through a stronger support system to invest in overseas fisheries from the deep sea fishery perspective. In other words, direct overseas investment along with the policy to actively support entry into overseas markets with high profitability and growth is in planning. The demand is anticipated to increase in developing countries including China and Southeast Asian countries with economic growth. Thus, it is important to nurture the deep sea fishery industry as a growth motor in terms of policy.

Under such an environment, the Korean government is providing support for investing in overseas fisheries by making the following actions: development of the support system to allow entry into the overseas deep sea fishing industry, nurturing

deep sea fishing industry-related companies, setting up a system to raise a public-private joint fund and attract private funds, training of global human resources and building networks, and the development and supply of an overseas fishery business model. For details, refer to the following table.

TABLE 6
Policy Tools to Strengthen the Support System for Overseas Fisheries Investment

Policy Goal	Detailed Tasks		Policy Tool
	Detailed Plan	Business content	
Strengthen support for investing in overseas fishery	Operation of ocean industry entry support system	Organize and expand functions of the Deep Sea Market Entry Support Center	Expand Budget injection
	Nurture ocean industry-related company	Establish a company responsible for collecting, transporting, selling and marketing haul	Financial assistance
	Support overseas market entry using public-private joint fund	Systematize fund for developing overseas foods	Legalization
		Set up fund for investment finances and for making up for the loss	Attract private investment
	Train global resources	Operation of on-site training center. Improve adjustment to local market for overseas fishery investment	Build and operate budget for training center by zone
		Expand the system of honorary fishery official	Expand budget injection
	Develop and supply overseas fishery business model	Explore demand and set up entry strategy for overseas fishery investment business	Expand consulting business
		On-site investigation and feasibility review of business with high potential	Run overseas investment deliberation council

Source: "The Third Comprehensive Measures for Fisheries Promotion (2010~2014)", Ministry of Food, Agriculture, Forestry and Fisheries, March 2010.

3.2 Status of Governance of the Deep Sea Fishing Industry

3.2.1 Decision-making Structure

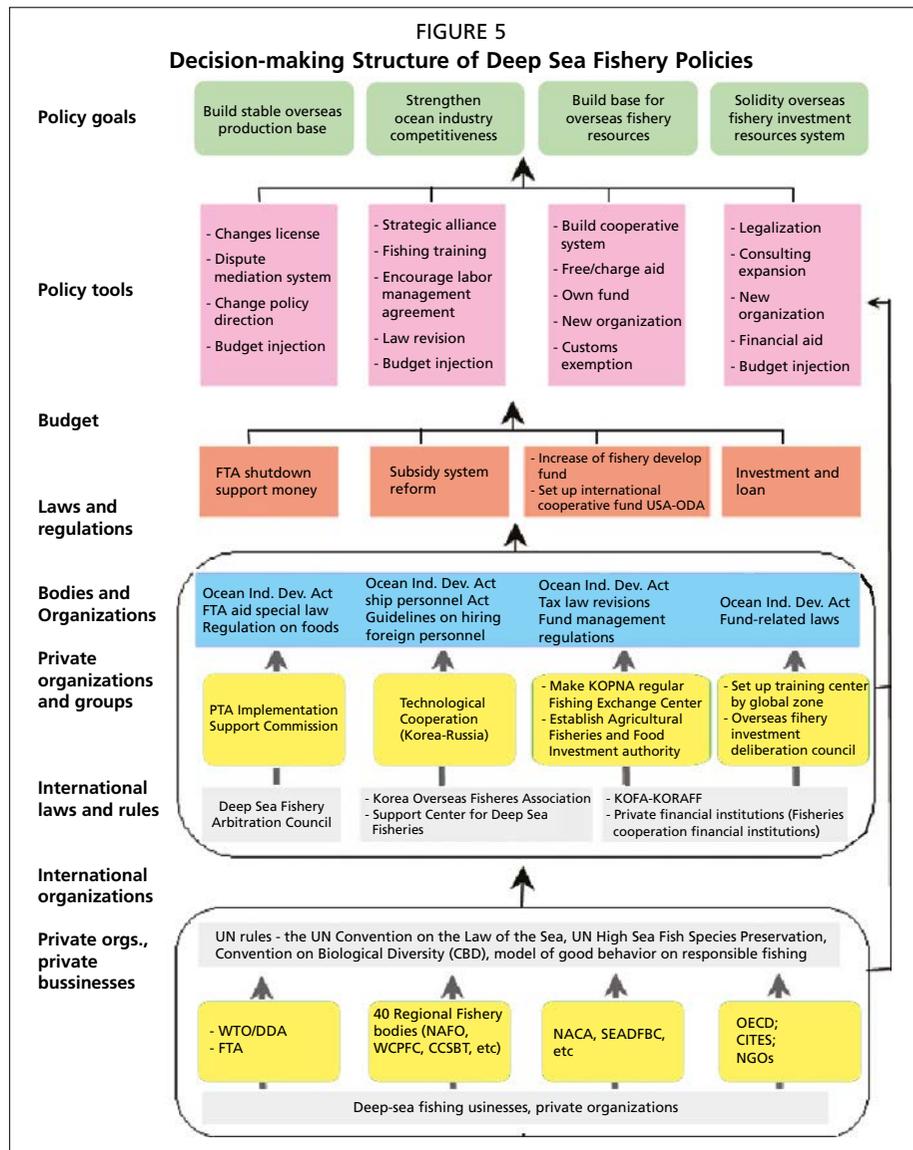
In this section, the decision-making structure required to establish and execute the deep sea fishery policies, as reviewed before, is discussed. The Korean deep sea fishing industry has a decision-making and implementation system with an official body and organization working collectively to develop and execute policies using policy goals and tools as stated above, and a decision-making and implementation system with a cooperative organization and agreement of public-private organization. In short, the policy management system of Korean deep sea fishery can be divided into external and internal regulations systems.

First, examples of external regulatory systems that influence the policy and industrial process of the performance of Korean deep sea fishery policy include the "UN Convention on the Law of the Sea", First, the external regulation systems (1994) giving impact to the policy, industrial process and performance of the Korean deep sea fishing industry are "Convention on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks "(December 1982), "FAO Code of Conduct and Technical Guidelines for Responsible Fisheries" and "IPOA-IUU International Plan of Action to prevent". Such an international code of conduct acts as one of the governance measures greatly impacting industrial activities recommending or coercing early implementation of actions through local fishery organization on the local level. In addition, multilateral and bilateral agreements based on free trade principles such as WTO/DDA and FTA agreements are important variables influencing the industrial activities and performance of the deep sea fishing industry.

Second, Korean discipline systems such as laws and systems, various committee organizations and bodies, and private organizations participated in the policy-making process of the deep sea fishing industry and influence industry performance. The organizations and bodies included in the policy-making process are varied such as

the ‘FTA Implementation Support Committee’ and ‘Overseas Fishery Investment Deliberations Committee’, even if we restrict the organizations to the policies of the industry specified in the "Third Fishery Promotion Comprehensive Measures". The KOPNA (a consultative body for high-level fishery officials between Korea and eight PNA countries) set up by the Korean government to seek cooperative relations with foreign coastal states has grown to exert a certain influence on the Korean deep sea industry policies.

Korea Overseas Fisheries Association, a private organization, is working to actively reflect the interests of the private sector of the industry onto the government policies, taking part as part of governance. The Association plays an important role as a principle party in proposing ‘deep sea fishing’ approval correctly, allowing fishing in overseas waters, and in securing the entrance right of fishing in new overseas fishing grounds. The Association also participates directly in the effort of providing supplies using the government subsidy and negotiating for the right to fish in a certain territory, contributing to the securing of fishing grounds for Korean national flag carriers in overseas waters. Furthermore, the Association’s ‘Center for Supporting Deep Sea Fishery Entry’ and ‘Overseas Fishery Investment Support’ has helped the Association become the leader in the private sector as well as a bridge for Korean companies to go overseas. The Korea-Africa Fisheries Forum (KORAFF) established recently under



the supervision of the Korea Maritime Institute provides an international cooperation base through a network built by global area, becoming a private organization that has the potential to influence the production activities and performance of the deep sea fishing industry.

The “Ocean Industry Development Act” is a law regulating and supporting the industrial activities of the industry from the Korean law and system perspective, thus the logical revisions are acting as important regulatory tools to improve the industrial performance. Other laws such as “Ship Personnel Act” and other relevant laws have impact on the production process and performance of the deep sea fishing industry. Figure 6 describes such decision-making structure in a diagram.

3.2.2 Policy Decision-making Process

The direction of the decision-making on the deep sea fishing industry is mainly twofold. One is the decision on whether international rules discussed in international organizations such as the UN or the WTO are accommodated in the Korean laws and systems. The other is the decision-making process required to carry out policies for developing the Korean deep sea fishing industry. There are two main directions of decisions made related to Korean vessels.

There are stakeholders involved in each step of the decision-making process, influencing the two different directions of policy development processes. The ‘stakeholders’ concerning the ‘fishing right’ and the ‘use of fishery stocks’ can be classified into the following groups:

- Korean government, coastal state government
- International organization (world organization, local fishery body)
- Businesses that obtained fishing right approval in Korea, foreign (competitive) business
- Korea Overseas Fisheries Association
- Private organizations and NGO in the deep sea industry fields (various forums, etc.)
- Government-related institutions (National Fisheries R&D Institute, KMI, etc.)

Out of the above stakeholder groups, the international organization proactively supports the accommodation of international rules focusing on the ‘preservation and management of sustainable fishery stocks’, while ‘the Korean government’ concentrates on implementing policies to accomplish ‘development of fishery industry, ‘the coastal state government’, ‘Overseas Fishery Association’, ‘private business’ and ‘private organization’. The two decision-making processes adopted by the Korean government nowadays are described as follows.

Achievement of goals of deep sea fishery policies (policy development and execution)

Korea Overseas Fisheries Association (fishing business) → Participate in various committee (consultative meetings) → Refer to suggestions by research institute → Execute policy (law revision) → Fishing activity (acquisition/change license)

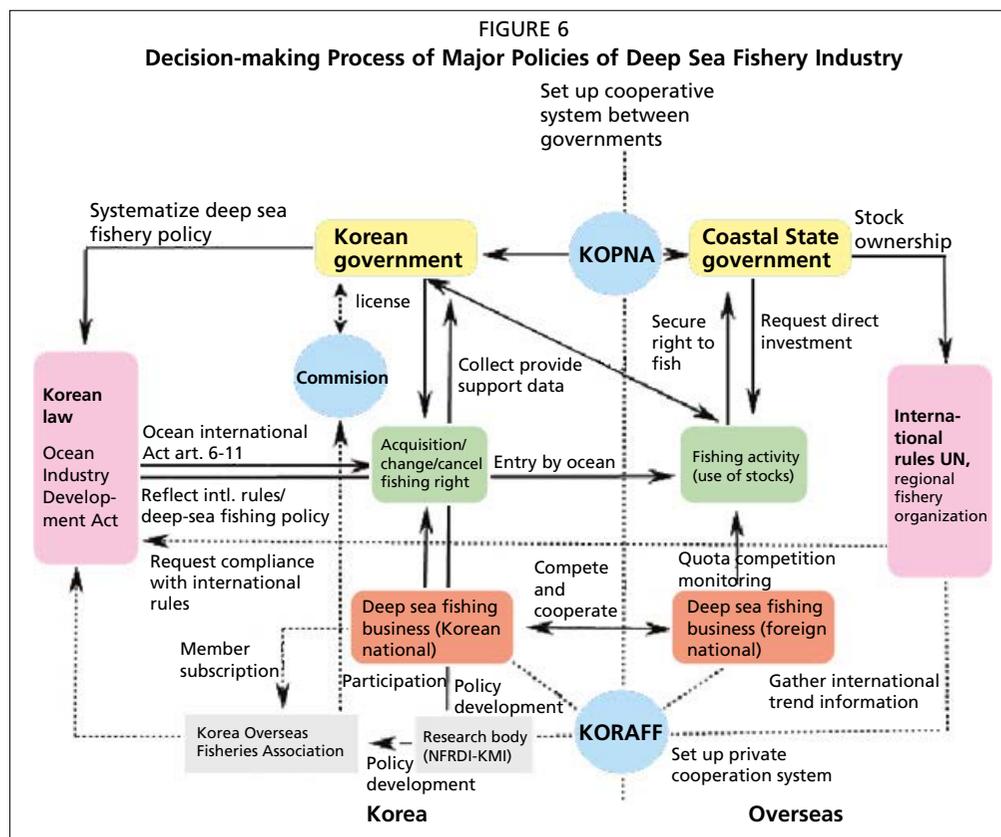
Make active use of KOPNA, government’s independent cooperative project and KORAFF, the private sector’s independent cooperative project.

Compliance with international rules

International organization (local fishery body) → Propose international rule (participate and discuss at meetings) → Acceptance (law revision) and application to Korean laws and regulations → Application of international rules when using national flag carrier stocks

However, specify the regulations accommodating international rules in the Ocean Industry Development Act (Article 7, articles 13~15)

The above decision-making process is illustrated in the following Figure 6.



4. EVALUATION ON EFFECTIVENESS OF DEEP SEA FISHERY GOVERNANCE

4.1 Evaluation Model

4.1.1 Good Governance

Value judgement criteria are needed to evaluate structures and processes for deep sea fishery governance. For this, a concept called “good” governance is used. If value judgment evaluation is applied to governance, governance can be classified as ‘good’ and ‘not good’. Governance that is regarded as ‘fruitless or uneven’ or ‘not good’ needs to be improved or to be resolved.

TABLE 7
Principles of ‘good’ governance

Category	Principles of good governance	Remarks
UNDP's examples	•Legitimacy and Voice	aim for participation and consensus of all interested parties
	•Direction	strategic vision, comprehensive long-term vision
	•Performance and Responsiveness	effectiveness and efficiency of systems and processes for all interested parties
	•Accountability	accountability, transparency: participation of interested parties ensues accountability
	•Fairness	fairness, equal opportunities
FAO's examples (in fishery)	•Vision (Guaranteeing livelihood and income of fishermen)	guaranteeing stable fishing rights, social and economic development
	•Access to fishery resources	equal fishing rights and access rights
	•Decision-making process	transparency, openness, publicness, participation of interested parties
	•Legal application	constitutionalism, accountability, rules and procedures, clearness, consistency, efficient conflict solving process
	•fishery management system	service fulfilling interested parties' needs, modest service costs, simple and clear process

Since the late 1980s, the World Bank has actually introduced the concept of good governance to explain and address the issue of weakness in public sector operation and management in many countries. The World Bank views governance as a power to be exercised to manage economic and social resources for a country's growth, and suggests that the power should be managed by a small and responsible government in order to induce 'good' governance.

However these 'governance' criteria can bring about defenseless results due to another 'market failure. In this regard,' UNDP proposed a concept which is more expanded and developed than the 'good' governance. In these governance criteria, 'legality', 'good vision', 'responsibility', 'fairness', etc. are included as shown in Table 7.

4.1.2 Operational Evaluation Model

In order to evaluate the governance of the deep sea fishing industry, 'index of governance' and related 'effectiveness' index should be defined and calculated in a measurable way. However since the theoretical model evaluating with this 'good' governance criteria actually has limitations in making an empirical analysis, an 'operational evaluation mode' that measures and evaluates governance based on 'the level of contribution to effects' is reviewed in this study. For developing an operational evaluation model, I proved effectiveness of governance in the WCPFC zone whose information on 'fishing rights' and 'specific fishery stocks' can be explicitly accessed. Therefore all of the index in the operational model refers to the index in the WCPFC zone except for some domestic variables.

First, 'effectiveness' of governance in the deep sea fishing industry is measured according to 'deep sea fishery production growth rate', which is a final target variable for policies on deep sea fishing industry. In other words, if the above four objectives for policies on deep sea fishery are achieved, deep sea fishery production will increase as much. The structural factor influencing this effectiveness of the deep sea fishing industry is divided into internal governance factor (II_D) and external governance factor (II_W). For this, an empirical model can be made as shown in Expression (1).

And for the sake of operational convenience, I formed the internal governance factor with deep sea fishery production proportion compared to the total production of Korea's overall fisheries, and the absolute growth rate of the number of licensed fishing vessels as shown in Expression(2). For example, the proportion of deep sea fisheries production means relative decision-making dominance over Korea's overall fisheries. The internal governance factor such as internal decision-making and systems supporting private sectors is found to have much deteriorated considering the fact that production proportion of deep sea fishery has decreased.

As indicated in Expression (3), the external governance factor was identified as the external governance index since the relatively higher number of Korean vessels deployed within the fishing waters shows their capability to adhere to the international standards within those fishing waters. The number of Long Liners and Purse Seiners was set as an important external governance index especially because most of the fishing vessels in Western and Central Pacific fishing waters are Long Liners and Purse Seiners for tuna fishing. The growth rate of tuna catching by other international vessels and the catch amount by Korean vessels within the waters are included respectively in the control variable. This was done to control indices for common stock change within the waters, as well as relative technology and management ability of Korean vessels.

In other words, relative input coefficients are used to show the levels of stock management and Korean vessels' compliance with international standards within the related waters. Relative calculating coefficients are used as an explanatory variable to control each vessel's capability. The following operational model summarizes these relations in a formula.

$$\dot{Q}_K = f(\Pi_D, \Pi_W) \text{ ----- Expression (1)}$$

단, Π_D = internal governance factor, Π_W external governance factor

$$\Pi_D = g_D(GOV_K^O, \dot{N}_K^P, \dot{N}_K^L, \text{etc.}) \text{ ----- Expression (2)}$$

단, GOV_K^O = Production of Korea's deep sea fisheries / Production of Korea's overall fisheries

\dot{N}_K^P = Absolute growth rate of the number of licensed Purse Seiners

\dot{N}_K^L = Absolute growth rate of the number of licensed Long Liners

$$\Pi_W = g_W(\dot{Q}_W, GOV_K^L, GOV_K^P, Share_K^O, \text{etc.}) \text{ ----- Expression (3)}$$

단, \dot{Q}_W = (in WCPFC zone) Growth rate of tuna catch amount by World's fishing vessels

GOV_K^L = The number of Long Liners in Korea/number of Long Liners in the world

GOV_K^P = Number of Purse Seiners in Korea /Number of Purse Seiners in the world

$Share_K^O$ = Korea's Tuna Catch amount (in WCPFC zone)/World's Tuna Catch amount (in WCPFC zone)

In this study, an empirical analysis was made using the following operational model after combining Expressions (1), (2), (3).

$$\dot{Q}_K = f(GOV_K^O, \dot{N}_K^P, \dot{N}_K^L; \dot{Q}_W, GOV_K^L, GOV_K^P, Share_K^O; \text{etc.}) = \text{-Expression (4)}$$

4.2 Result of Empirical Analysis

The following is the result of multiple regression analysis made using the empirical model of above-mentioned Expression (4). The industrial performance within the WCPFC zone by Korea's deep sea fishery is calculated from the growth rate (\dot{Q}_K) of tuna catch amount within the zone by Korean vessels and used as a dependent variable for the regression analysis on the explanatory variable of Expression (4). Data between 1980 and 2007 was used for the analysis.

Results of the operational model analysis turned out to be relatively satisfactory as R2 value was 0.66, D/W value 2.80 and F value 4.17. According to the results, industrial performance (\dot{Q}_K) of Korea's deep sea fishery within the WCPFC zone has significant relationships with common stock amount level (\dot{Q}_W) in the world and with capability variable ($Share_K^O$) of Korean vessels as an individual company. Licensing procedures in Korea and the growth rate of tuna fishing vessels (\dot{N}_K^L, \dot{N}_K^P), one of structural variables, have a highly significant relationship with the industrial performance within the waters.

TABLE 8
Analysis on Korean Vessels' Tuna Fishing Activities within the WCPFC Waters and Governance Impacts

	\dot{Q}_R	\dot{Q}_R	Remarks
CONSTANT	7.08 (1.73)*	-30.33 (0.95)	
\dot{Q}_W	-	0.69 (1.72)*	
$Share_K^Q$	-	2.77 (2.05)*	
GOV_K^P	-	-3.13 (1.4)	
GOV_K^L	-	-12.68 (2.47)**	
\dot{N}_K^L	0.89 (3.47)***	0.94 (3.35)***	
\dot{N}_K^P	0.19 (2.12)**	0.28 (3.02)**	
GOV_K^Q	-	2.36 (1.64) +	
R2	0.43	0.66	
Durbin-Watson	2.45	2.80	
F	6.36	4.17	

Note: + level of significance 10%–15%, * level of significance less than 10%, ** level of significance less than 5% , *** level of significance less than 1%

As a result of regression analysis on residuals from these variables by using governance indexes, all relative ratio variables (GOV_K^P , GOV_K^L) of input vessels showed negative relations with the industrial performance. Especially in the case of Long Liners, the relative ratio variable showed meaningful negative relations. The results can imply that the higher the number of a country's vessels within the waters compared to other countries fishing in the waters, the stronger the requirement to observe international standards, making negative impacts on the industrial performance, i.e. the growth rate of catch amount.

Considering that the number of Korean vessels such as Purse Seiners in the Pacific water tends to be stagnant or decreasing, it is suggested that the pressure on Korea for complying with international standards from other countries fishing in the waters and international organizations was not high compared to other countries. However, this result has limitations because it is assumed simply based on the number of vessels fishing in the waters and it does not reflect coercion of standards and discussions in coastal states and international organizations. Rather, it suggests the need to improve external governance since the variable of catch amount share by Korean vessels within the waters has close relations not only with management capability of deep sea fishing companies but also with strengthening cooperation with international organizations and coastal states.

A mere increase in the number of vessels is not a solution considering that the relative ratio variable (GOV_K^P , GOV_K^L) and absolute growth rate variable (\dot{N}_K^L , \dot{N}_K^P) for the number of input vessels have opposing impacts on the dependent variable (\dot{Q}_R) of industrial performance. Strengthening vessel power through modernization is evaluated as a more aggressive way to improve industrial performance and to satisfy international standards.

5. SUMMARY AND IMPLICATIONS

Problems that can be raised in relation to the current governance structure of the deep sea fishing industry can be summarized as follows considering the above-mentioned

results of the theoretical and empirical analyses. First, the governance in the deep sea fishing industry has limitations to become 'good' governance because the definition of interested group in the Ocean Industry Development Act is not clear and binding force on licensee businesses is relatively weak. For example, the definition of 'deep sea fishery businesses' includes comprehensive businesses ranging from deep sea fishing to related overseas fishery, fishery processing and distribution (article 2 of the Ocean Industry Development Act) but actually it is not easy to secure governance to rally interests among overseas businesses. Furthermore, 'joint venture fishing' involving foreign nationals is engaging economic activities under completely different governance because it is regulated by related country's laws and regulations. Therefore in the case of this 'joint venture fishing', there are almost no variables to control industrial performance.

Second, there is a problem on whether vision for fishery policies is set up in a desirable way, which is one of the typical factors for fishery governance. This is because the well-established vision can guarantee effectiveness of governance. Currently Korea's vision (based on "Comprehensive Measures for Fishery Promotion" for deep sea fishery policies is mainly focused on 'securing overseas fisheries and resources'. Therefore, many people point out that the structure and procedures of 'deep sea fishery governance' to achieve objectives of these policies heavily depend on quantitative performance criteria. These policies have limitations to be implemented in a consistent way without a new breakthrough because excessive implementation of these policy objectives can lead to increasing conflicts with 'international standards'.

Third, the importance of the deep sea fishing industry in Korea has constantly lessened since the late 1990's. This trend can lead to the formation of 'not good' governance making negative impacts on the overall systems of the fishing industry. Under these circumstances, people tend to focus on 'quantitative' industrial performance indices.

The above-mentioned problems are derived from the current status of Korea's deep sea fishery governance and analysis results. Solutions for the problems should be carried out as follows. First, the relationship of various interested parties in the deep sea fishing industry should be defined in a transparent and operative way by revising the Ocean Industry Development Act. Consistent measures for companies in which foreign nationals have more than 50 percent stakes are urgently needed. In other words, a broad governance system for this should be developed. In addition, a different approach needs to be designed for 'foreign' businesses around the world because it is exceptionally difficult and unrealistic to rally foreign businesses. For example, it is recommendable that independent relationship of interests can be built according to regional characteristics by establishing regional networks.

Second, the vision that has been presented as deep sea policies needs to change. Focus needs to shift from quantitative industrial growth to fostering global and competitive companies. Establishing a long-term governance to utilize resources is needed instead of a short-term governance to secure resources because resource utilization and fishing rights can be fulfilled at a point where international standards and domestic policies on deep sea fishery meet.

Third, a shift needs to be made to strategies for quality enhancement of values in order to keep away from governance distortion due to quantitative shrinking in Korea's deep sea fishing industry. Also, a new development direction for deep sea fishery needs to be pursued through developing the overseas farming sector.

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Model case for deep-sea fisheries governance: Concluding agreement between the Republic of Korea and the Russian Federation for the prevention of IUU fishing

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1. INTRODUCTION

Illegal, unreported and unrestricted (IUU) fishing in an exclusive economic zone (EEZ) or on the high seas has undeniably adverse effects on the conservation and management of fishery resources and the marine ecosystem. It also threatens the economic survival of legally-operating fishermen. The negative effects of IUU fishing can be particularly attributed to increases in the EEZs of individual countries as well as to international fishing activities. While market demand for marine products is increasing, available resources are decreasing. Therefore, control of IUU fishing is very necessary in order to better manage available fish stocks.

The international community has recently strengthened cooperation for the conservation and management of fishery resources while calling on regional fisheries management organizations (RFMO) and related countries to regulate IUU fishing. In addition, it has regulated fishing operations, managed resources and restricted the import and export of illegal fish catches in accordance with the FAO's Code of Conduct for Responsible Fisheries and International Plans of Action to Prevent, Deter, and Eliminate IUU Fishing (IPOA-IUU).

Articles 29 and 30 of the IPOA-IUU (2001) in particular require flag states to make information about their vessels available to the FAO as well as other countries and relevant regional or international organizations in the light of the 1993 FAO Compliance Agreement. They also require each state and regional or international organization to nominate and publicize initial formal contact points in order to facilitate cooperation and the exchange of information regarding IUU fishing. These agreements also recommends that flag states consider entering into agreements or arrangements with other states and otherwise cooperate with the enforcement of applicable laws and conservation and management measures or provisions adopted at a national, regional or global level.

Considering these requirements and recommendations, the Korean Government formally signed an agreement with Russia at the 19th Korean-Russian Fisheries Committee in Seoul in December 2009 to prevent IUU fishing. The successful conclusion of the Korean-Russian IUU Fishing Prevention Agreement can be credited to the process by which policy goals and means were clearly set clearly and to the efforts that were made to resolve conflicts among the stakeholders.

In this regard, this report has selected the process of concluding the Korean-Russian agreement to prevent IUU fishing as a model case for deep-sea fisheries governance

and presents legal, institutional, administrative, socio-cultural, communicative (with stakeholders) and environmental guidelines based on an analysis of the case and its accomplishments.

2. KOREA-RUSSIA FISHERY COOPERATION & IUU FISHING

2.1 Current State of Korea-Russia Fishery Cooperation

2.1.1 *Current State of Fishery Cooperation and Access between Korea and Russia*

In accordance with the Korea-Russia Fisheries Agreement, which went into effect in October 1991, Korea has held a Fisheries Committee meeting every year (with 19 meetings held so far) to discuss and cooperate on the assignment of government quotas and on the terms of access for fishing. Cooperation between the two countries focuses on allowing each other to enter the other's waters for fishing; setting up and operating a Korean-Russian Fisheries Committee; cooperating for fisheries research; and promoting joint ventures in fishing, fish farming and processing.

The Russian EEZ is the only fishing ground on which Korean Alaskan pollock trawlers can operate, and Korean fishermen started operating in the Russian EEZ as a result of the conclusion of the Korea-Russian Fisheries Agreement of 1991. In accordance with this agreement, the total allowable catch (TAC) quota for Korea in Russian waters is maintained at 60 000 tons as of 2009, having fallen from its 1993 peak of 150 000 tons until 2007.

TABLE 1
Fishing Quotas in Russian Waters by Year (In thousand tons)

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000
Quota	100	1,544	77	77	74	74	67	56	54
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009
Quota	61	59	51	32	38	39	34	55	60

* Fish species allowed for fishing (8): Alaska Pollock, cod, pacific saury, squid, ray, herring, blowfish, flatfish

Looking into the performance of Korean deep-sea fishing vessels in 2009 shows that their largest catch was Alaska Pollock at 28,186 tons, followed by pacific saury, squid and cod in that order. In 2010, access to Russian waters for fishing was granted to Korean vessels for Alaska pollock, cod, squid, Pacific saury and flatfish. The TAC in Russian waters for the four industries in 2009 was 55 473 tons, of which about 93 percent was taken. Most of the quotas for Alaska Pollock, cod and flatfish were taken.

TABLE 2
Consumptions of 2009 Inter-Governmental Quotas in Russian Waters (In tons)

Fishes	Waters	Type of business	No. of vessels in operation	Quota	Catches
Total		4		55 473	51 784
Alaska pollock	Northwest Bering Sea	Mid-water trawling	7	39 000	38 996
Cod				119	118
Herring				736	104
Cod	Northwest Bering Sea	Longline fishing	2	2 575	2 574
Ray				800	799
Flatfish				300	0
Pacific saury	South Kurils	Stick-hold nets	16	7 393	5 237
Squid	Maritime Province	Jigging	50	4 500	3 946
Blowfish				50	10

TABLE 3
Fisheries Agreement with Russia and Current State of Access for Fishing

Date of signing (effective on)	2009 operation results (in vessels/tons)	Access conditions for 2010 (in tons)	Gist of the Agreement
Sep. 16, 1991 (Oct. 22, 1991)	Alaska pollock: 5/28 186 Squid: 38/2 780 Pacific saury: 15/4 528 Cod: 2/2 688 Ray: 2/800 Flatfish: 2/300 Herring: 5/45 Blowfish: 38/2.4	Alaska pollock: 20 500 Squid: 4 500 Pacific saury: 2 650 Cod: 5 000 Ray: 800 Flatfish: 300 Herring: 250 Blowfish: 50	<ul style="list-style-type: none"> • Allow access into the other country's waters. Set up Korea-Russia Fisheries Committee. • 9 fisheries cooperation initiatives including fishery research • Promote joint ventures in fishing, farming and processing • Coordinate requests in case of 6-month notice • Discuss investments in a marine product processing plant and a shipyard • Hold negotiations for an agreement (draft) to prevent illegal trade

In addition, a total of 13 companies entered into joint ventures with Russia, most of which catch Alaskan Pollock and ship them to Korea. In most of the ventures, the Korean partners own about 50 percent of the equity.

To celebrate the 20th anniversary of the establishment of diplomatic relations and the conclusion of the Fisheries Agreement, Korea and Russia set 2010 as the Korean-Russian Friendship Year for Fishery Cooperation and agreed to strengthen exchanges and cooperation in fishery fields. The key points of their agreement were to increase exchanges in the fishery fields, and included measures to promote the entrance of Korean companies into fishing vessel buildings and seafood processing industries in the Russian Far East and to promote joint public-private investments to invest and enter into the fishery industry of the Maritime Province (Primorsky Krai).

2.1.2 Current State of Russian Crab Landing in Korea

Korea's total import of live crabs totaled 60 328 tons across approximately eight years (from 2003 to 2008), of which 94 percent came from Russia. The dollar value of these imports from Russia amounted to USD 242 625 000, accounting for 93 percent of the total import value of live crabs and showing that Korea imported most of its live crabs from Russia.

The majority of the live crabs from Russia were caught by IUU fishing boats without a TAC share allocated by the Russian government. The importation of live crabs into Korea started in 1999 and continued for ten years until 2008. The landed tonnage of live crabs ranged from 6 000 to 8 000 tons a year, which is double or triple Korea's estimated domestic production of about 3 000 tons.

TABLE 4
Russian Snow Crab Imports by Year (In thousand dollars, tons)

Year	Import Quantity			Import Amount		
	Total	Russia	%	Total	Russia	%
2003	8,322	8,288	99	31,527	31,265	99
2004	9,120	9,060	99	36,289	36,015	99
2005	7,455	7,407	99	31,148	30,952	99
2006	8,278	8,213	99	33,782	33,586	99
2007	9,724	9,401	97	42,888	41,340	96
2008	7,047	6,007	85	33,627	29,053	86
2009	6,885	6,560	97	29,702	28,070	95
2010	3,497	1,999	57	23,213	12,344	53
Grand Total	60,328	56,935	94	262,176	242,625	93

Source: Trade statistics of the Korea Customs Service, 2010.

The ratio of Russian live crabs to the total monthly import volume was higher than 95 percent in 2009 but dropped to 63 percent in March and 75 percent in April of 2010. It then recorded 24 percent in November 2010 and 17 percent in December 2010.

There were no imports of Russian live crabs in August, September or October of 2010, and imports in November and December amounted to no more than 55 tons and 63 tons, respectively. For the four months since the Korea-Russia Agreement to prevent IUU fishing went into effect in July 2010, no import whatsoever of live crabs was found. Although 174 tons were imported in July 2010, they are believed to have been shipped before July 2010.

TABLE 5
Monthly Imports of Russian Live Crabs between 2009 and 2010 (In tons)

Month	2009			2010		
	Total (A)	Russia (C)	C/A	Total (B)	Russia (D)	D/B
1	485	479	99%	303	273	90%
2	515	499	97%	134	128	96%
3	617	542	88%	269	169	63%
4	605	573	95%	498	373	75%
5	952	947	99%	600	554	92%
6	590	590	100%	234	209	89%
7	748	743	99%	352	174	49%
8	751	751	100%	236	-	0%
9	390	361	93%	71	-	0%
10	412	363	88%	198	-	0%
11	378	328	87%	229	55	24%
12	443	384	87%	372	63	17%
Grand Total	6 885	6 560 (95%)	95%	3 497	1 999	57%

Source: Import statistics of the Korea Customs Service.

2.2 IUU Operations by Russian Vessels and Conclusion of Agreement

2.2.1 IUU Fishing Operations for Russian Crabs

The results of a 2007 field investigation showed that an estimated total of 80 to 100 fishing vessels catch snow crabs and king crabs in Russia and land them in the eastern ports of Korea, mostly without a TAC share from the Russian Government. Russian snow crabs coming to Korea were mostly caught in the Western Sakhalin, Eastern Sakhalin, Shantar and Magadan areas, while king crab fishing boats operated in the waters near the Kamchatka Peninsula. Russian IUU crab fishing boats started operating near Vladivostok and the Maritime Province, but as the Russian Government tightened control on IUU fishing activities, they moved northward. The investigation shows that they were fishing near Sakhalin and Kamchatka in 2007.

Looking into the routes through which live crabs were carried into Korea, this study finds that after unloading live crabs in a port along the East Coast, Russian fishing boats departed to catch crabs and sailed back to land their catch again in the port. It was found that they took about 20 to 332 days to come from the Russian waters where they operated to a port on the East Coast of Korea.

TABLE 6
Current State of the Operations of Russian Vessels Landing Crabs in Korea

Category	Details	Remarks
Live Crabs	<Crabs> - Past: Operated near Vladivostok and the Maritime Province - Recent: Western Sakhalin, Eastern Sakhalin, Shantar, Magadan <King Crabs> - Seas near Kamchatka ※ Control by the Russian authorities forced IUU fishing boats to move to distant fishing grounds.	- Estimated to be about 80-100 vessels a year ※ Estimates of the time it takes a Russian boat to land its catch in an eastern port, leave and come back to land crabs again - Western Sakhalin: About 20 days - Kamchatka: 30 days - Eastern Sakhalin: About 32 days
Matter of Attention	- As they moved to and operated in distant waters, the death rate of landed crabs as well as the cost of landing the crabs went up.	

Source: Results of a field investigation in 2007.

In Korea, summer and fall are closed seasons for crabs. In Russia, however, it is found that fishermen hauled in crab near Eastern Sakhalin in the summer, while they operated near Western Sakhalin in the winter. This indicates that they operated throughout almost the entire year. Consequently, live crabs were taken into Korea through its eastern ports almost year-round and, as it turned out, more crabs were shipped in during the winter because it is a high-demand season in the Korean fish food culture.

2.2.2 Process of Reaching the Korea-Russia IUU Fishing Prevention Agreement

Russian IUU fishing vessels could be problematic because 80 to 100 Russian vessels fished crabs without the Russian Government's TAC share (the TAC system is being enforced in Russia) and landed them in Korea, mainly in the ports along the East Coast. To eliminate Russian IUU fishing boats, the Russian Government requested Korea for cooperation at the summit meeting of the 2003 APEC forum in Bangkok. Since then, both countries had held Korean-Russian Fisheries Committee meetings to discuss and agree on the assignment of government fishing quotas and the conditions of accessing their waters for fishing. Parallel efforts had been made to reconcile the different views of the departments of the Korean Government.

Korea and Russia finally signed the Korea-Russia IUU Fishing Prevention Agreement at their nineteenth Korean-Russian Committee Meeting in December 2009, and Korea secured a quota of 45 000 tons for Alaska Pollock. This served as momentum for building a reciprocal relationship linking Russia's interests in an IUU fishing prevention agreement to Korea's interests in pollock fishing quotas.

TABLE 7

Progress of the Efforts to Reach Agreement between Korea and Russia

Date	Key Activities
Oct. 2003	- Russia mentioned a need for signing an agreement to prevent illegal exports of Russian marine products (Korea-Russia summit meeting during the APEC forum in Bangkok).
Nov. 2003	- Both countries agreed to sign a "hygiene agreement" and to work together to improve the safety of marine products and prevent illegal exports (13th Korea-Russia Fisheries Committee Meeting).
Sep. 2004	- Selected a joint declaration. Agreed to allow stable operations in the Russian seas for Korean fishing vessels; assure the hygiene of marine products; and cooperate for the prevention of illegal exports (Korea-Russia Summit Meeting in Moscow).
Feb. 2007	- Russia drafted and sent an agreement to prevent illegal trade (in English).
Aug. 2007	- Korea sent its revised version to Russia.
May-Jul. 2007	- Korea held working-level meetings to draft an agreement and sent another revised version (draft) to Russia.
Dec. 2007	- Item of understanding at the 17th Korea-Russia Fisheries Committee meeting (Agenda Item 9) - Both governments further reviewed the illegal trade prevention draft.
Sep. 2008	- Agreed to reach an IUU fishing prevention agreement at the Korea-Russia Summit Meeting.
May 2009	- The agreement was narrowed down to 13 articles but failed to be brought to completion.
Dec. 2009	- Signed the IUU fishing prevention agreement (to take effect in the second half of 2010).

Source: Analysis of the internal data of the MOFAFF Distant-Water Policy Division.

3. FISHERIES GOVERNANCE FOR KOREA-RUSSIA IUU FISHING PREVENTION - CASE STUDY

3.1 Policies and Governance System

3.1.1 Policy Goals and Means

Policy goals related to Korean and Russian IUU fishing are to secure a status as a major fishery country; play a leading role in the international efforts to prevent IUU fishing activities; and comply with FAO's IPOA-IUU (2001) calling for international cooperation by signing a bilateral agreement to prevent IUU fishing. As means to accomplish these goals, the Government commissioned a specialized research center

for research; entered into inter-governmental negotiations; improved the systems and processes of related organizations; and held public hearings and presentations to share information with stakeholders. It has pursued these efforts with consistency.

TABLE 8
Policy Goals and Means

Category		Details	Remarks
Policy Goals		<ul style="list-style-type: none"> - To seek a leading role in international efforts to prevent IUU fishing - To sign a bilateral agreement - To strengthen cooperation between two countries to root out IUU fishing 	Seek a leading role in international efforts to prevent IUU fishing
Policy Means	Research	- Analyze the impact of a Korea-Russia agreement to prevent IUU fishing	Professional research center (2007)
	Inter-governmental negotiations	- Continuous negotiations with Russia to reach agreement to prevent, deter and restrict IUU fishing between Korea and Russia	Korea-Russia Fisheries Committee, working-level meeting
	System improvement	<ul style="list-style-type: none"> - Compare and analyze similar cases in agreements with other countries - Integrated notification of compliance with the IUU prevention agreement between Korean Government and Russian Federal Government 	Year 2010
	Information sharing	<ul style="list-style-type: none"> - Provide information about trends in the discussions of FAO, RFMO, EC, etc. to prevent IUU fishing - Start providing information in 2003 about trends in intergovernmental discussions to reach agreement 	Related organizations and stakeholders
	Hearings & presentations	- Held about 30 hearings and presentations inviting stakeholders	Field-oriented

3.1.2 Governance System and Institutions Administrative Organizations

The Administrative organizations concerned with Korea-Russia IUU fishing include the Ministry of Food, Agriculture, Forestry and Fisheries (MOFAFF); the Ministry of Land, Transport and Maritime Affairs (MLTM); the Korea Customs Service (KCS), and the Ministry of Justice (MOJ). The MOFAFF handles everything about fisheries cooperation between Korea and Russia. The Ministry also carries out work related to international fishery conventions and international/regional fisheries management organizations, in addition to the inspections of imported marine products - which is

TABLE 9
Administrative Organizations Concerned with Korea-Russia IUU Fishing

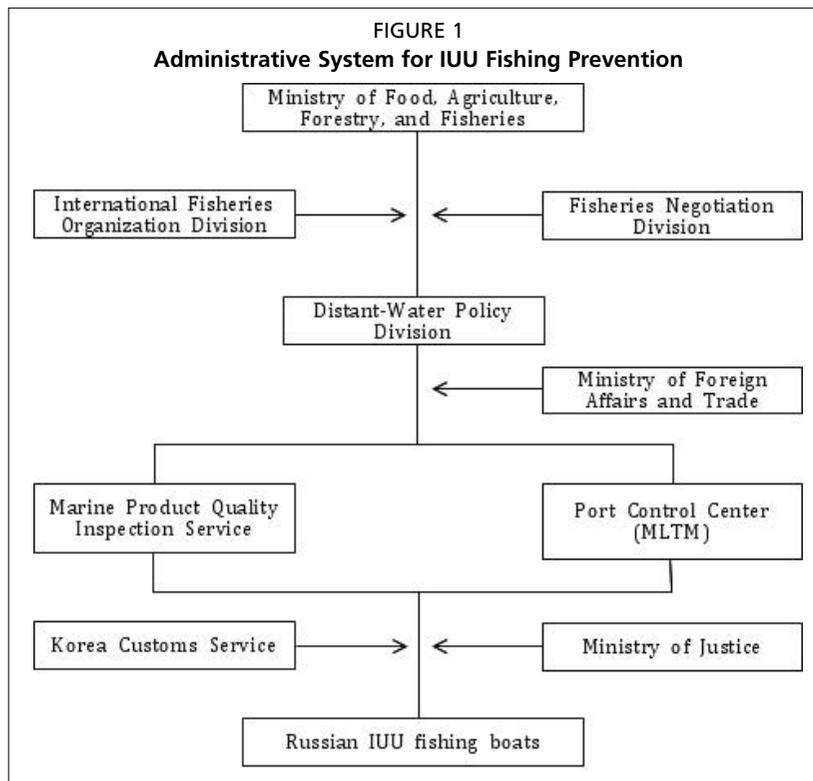
Central Gov. Dept.	Responsible	Work Scope
MOFAFF	Distant-Water Policy Division	<ul style="list-style-type: none"> - Korea-Russia fishing cooperation - Guide to deep-sea fishing production/safe operations
	International Fisheries Organization Division	<ul style="list-style-type: none"> - Work for international fisheries organizations (22) - Fishery-related work of international organizations - Fishery-related international conventions (31)
	Fisheries Negotiation Division	<ul style="list-style-type: none"> - Fisheries coordination cooperation with adjacent coastal states - Foreigners' fishing activities within the EEZ
	NFIS	- Inspection of imported marine products
MLTM	Port control centers	- Ensure safety and smooth traffic over the seas by establishing a safety management system for safe vessel operations and eliminating all potential risks and obstacles over the seas
	Local port offices (port authorities)	<ul style="list-style-type: none"> - Maintain safety and order in marine traffic within the harbor limit - Port entry/departure declarations stipulated in the Harbor Act are intended to collect fees for the use of the harbor facilities.
MOFAT	International Conventions	- Overall management of treaties and agreements with other countries
KCS	Customs offices	- Levy/collect tariffs and clear imported goods reasonably as well as obtain tariff revenue
MOJ	Immigration Offices	- Manage the entry/departure of nationals and foreigners

conducted by the National Fisheries Products Quality Inspection Service (NFIS) - and the coordination of fishing issues with adjacent coastal states.

The MLTM deals with matters related to vessels and ports, with port control centers controlling vessel movements to ensure safe vessel operations as well as safety and smooth traffic over the seas, while the KCS is responsible for the customs clearance of exports and imports, and the MOJ is for immigration control. Lastly, there is a governmental department overseeing international or bilateral agreements or conventions: Ministry of Foreign Affairs and Trade (MOFAT).

Administrative System

A look into the administrative system for Korea-Russia IUU fishing prevention reveals that the Distant-Water Policy Division of the MOFAFF plays a central role in managing and controlling Russian IUU vessels, enlisting the help of the International Fisheries Organization Division and the Fisheries Negotiation Division and going through the National Fisheries Products Quality Inspection Service and MLTM's port control centers. The Korea Customs Service and the Ministry of Justice in particular have helped resolving issues involving the catches and crew of IUU fishing ships, while the MOFAT has helped in the process of preparing and concluding the agreement.



Private Organizations

Private organizations in Korea concerned with Russian IUU fishing can be divided largely into three groups: first, Korea Overseas Fisheries Association, an organization for developing marine resources in deep seas and overseas areas; second, fisheries cooperatives located along the East Coast of Korea, Crab Gillnet Ship-owners' Association and Self-Governed Snow-Crab Gillnet Fishers' Community; and lastly, importer groups involved in the importation of Russian live crabs, live-crab distributors, live crab sellers and repair service providers servicing Russian fishing vessels.

TABLE 10
Private Organizations Concerned with Russian IUU Fishing

Classification		Name	Description
Deep-sea fishery organization	Organization for developing deep-sea/overseas fishery resources	Korea Overseas Fisheries Association	- Organization for seeking the mutual interests of deep-sea fishing companies and the development of overseas fishery resources
Korean snow-crab producers	Snow crab producers' organizations	Fisheries cooperatives on the East Coast	- Gangu, Hupo, Jukbyeon, Samcheok fisheries co-ops, etc.
		Crab Gillnet Shipowners' Association	- Association of shipowners fishing snow crabs with gill nets
		Self-Governed Snow-Crab Gillnet Fishers' Community	- Self-governed community of snow-crab gillnet fishers operating off the East Coast
Related to Russian snow crabs	Live crab importer organization	National Federation of Live Crab Distributors	- Organization of distributors on the East Sea importing Russian crabs
	Live crab distributors		- Russian live crab distributors in the East Coast region
	Live crab sellers	-	- Russian snow crab restaurants nationwide
	Ship repair yards		- Repair service providers in Busan - Servicing Russian IUU vessels

Legal system regulating IUU fishing activities

There are diverse laws and regulations governing IUU fishing, including direct or indirect laws, notifications and guidelines. To name a law, the Ocean Industry Development Act is in effect. In terms of notifications, there are many, including the Integrated Notification of Compliance with the Agreement between Republic of Korea and Russian Federal Government to Prevent IUU Fishing and the Notification of Compliance with the Fishing Restrictions of International Fisheries Organizations.

Lastly, there are guidelines for importing/exporting tuna. Although they are not directly related to the Korea-Russia IUU Fishing Prevention Agreement, they are related to the IUU fishing prevention efforts promoted by the RFMO.

TABLE 11
Legal System Concerned with IUU Fishing

Classification	Name of Legislation or Notification	Enactment/ Notification No.
Law	Ocean Industry Development Act, Enforcement Decree, Enforcement Rule	Mar. 2007 (Law)
	Act on the Exercise of Sovereign Rights on Foreigners' Fishing, etc. within the Exclusive Economic Zone, Enforcement Decree, Enforcement Rule	Aug. 1996 (Law)
Notification	Notification of Compliance with the Fishing Restrictions of International Fisheries Organizations.	2002-35
	Notification of the Levy, Collection, and Refund of Public Auction Fees for Marine Products	2008-6
	Notification of Western and Central Pacific Fisheries Commission (WCPFC) Boarding and Inspection Procedures	2008-24
	Guideline for Declaring, Inspecting, and Certifying Imports of Deep-Sea Fish Catches	2008-49
	Notification of Compliance with Low-Water Fishing on High Seas	2009-27
	Notification of Compliance with the ICCAT Bluefin Tuna Catch Document Program	2009-50
	Integrated Notification of Compliance with the Agreement between Republic of Korea and Russian Federal Government to Prevent IUU Fishing	2010-63
Guideline	Guideline for Export and Import Certification of Southern Yellowfin Tuna	1997-70
	Guideline for Export and Import Certification of Southern Bluefin Tuna	2004-8
	Guideline for Export and Import Certification of Swordfish	2005-48

3.2 Model Case Selection, Pending Issues and Causes of Conflicts

3.2.1 Selection Criteria

By contributing to FAO-promoted efforts to eliminate IUU fishing, the conclusion of the Korea-Russia IUU Fishing Prevention Agreement earned the signatories the status of a responsible fishery country. It also helped Russia better manage fishery resources in its EEZ and Korea promote its national interests by taking advantage

of the opportunity to increase its Alaska pollock quota. Furthermore, stakeholders were given equal opportunities to participate in the process, and information was made available in a transparent manner, providing an opportunity for Korean coastal fishermen to switch to the mindset of rooting out illegal fishing. These findings convince me that the process of reaching the agreement meets the selection criteria for a model case.

TABLE 12

Model Case Selection Criteria

Category	Selection Criteria
Status of a responsible fishery country	<ul style="list-style-type: none"> - Contributed to the elimination of IUU fishing as promoted by FAO. - First to conclude a bilateral agreement to prevent IUU fishing
Contribution to resource management	<ul style="list-style-type: none"> - Contributed to the reasonable management of resources within the Russian EEZ by sharing information of IUU fishing vessels.
Protection of Korean fishers	<ul style="list-style-type: none"> - Provided an opportunity to relieve crab-pot and gill-net fishers on the East Coast of the difficulties that they were facing, for example, falling prices of Korean snow crabs. - Possible to prevent imported Russian live crabs from being disguised as Korean-produced
Contribution to national interests	<ul style="list-style-type: none"> - Contributed to the promotion of national interests by taking the opportunity to increase the quota of Alaska pollocks.
Transparency	<ul style="list-style-type: none"> - Provided information (from FAO, RFMO, EC) about IUU fishing prevention. - Provided information of trends in intergovernmental discussions, starting in 2003.
Equal participation	<ul style="list-style-type: none"> - Recognized an organization of stakeholders (live crab distributors) and its representation in various dialogues. - Provided consumers and fishermen with equal opportunities to participate.
Opportunity for fishermen to change mindset	<ul style="list-style-type: none"> - Contributed to raising the awareness of Korean coastal fishermen about the importance of eliminating illegal fishing. - Provided motivation to participate aggressively in the management of domestic snow crabs.

3.2 Analysis of Pending Issues

Pending issues with the Korea-Russia IUU Fishing Prevention Agreement can be examined from three perspectives: policy, institutions and decision-making. First, from a policy perspective, there was not a clear-cut need for signing an agreement because IUU fishing boats operating in the Russia EEZ were Russia's domestic problem, and the importation of live crabs was being made through legal procedures. Besides, there were no two countries that had signed an agreement to prevent IUU fishing, which was one of the reasons why the local governments concerned and importers opposed the agreement.

Second, from an institutional perspective, there was no law or regulation in Korea that required a Russian boat to present a "cargo customs declaration (CCD)" certified by a Russian customs office when entering a Korean port. To be able to allow a Russian ship to enter a port only if it had a cargo customs declaration (onboard cargo declaration) issued by a Russian customs office, the port entry "declaration system"

TABLE 13

Analysis of Pending Issues

Perspectives	Issues
Policy	<ul style="list-style-type: none"> - IUU fishing in the Russian EEZ was Russia's problem; besides, the live crab import process was legal; therefore, there was no strong need to pursue a negotiation. - So far, there had been no bilateral agreement to prevent IUU fishing. - The importation of Russian live crabs helped the local economies of Donghae City and Busan City, whose local governments opposed it.
Institutions	<ul style="list-style-type: none"> - There was no institutional measure regarding the provision of the information of Russian IUU fishing vessels to Russia. - There was no law in Korea that required a Russian vessel to present a "CCD" certified by a Russian customs office when entering a Korean port. - There was an issue with live crabs from the perspective of the Aquatic Animal Disease Control Act. - Need to improve the inspection regulations of the port state
Decision Making	<ul style="list-style-type: none"> - Difficult to make decision as it is linked to Russia's pollock quota. - The issue was resolved by an agreement between the Korean and Russian heads of state (in 2003).

needed to be changed to a “permit system.” In addition, a legislation was required to empower the port control authorities to order a ship without a CCD to leave the port.

Lastly, it was difficult to make a decision as the issue was linked to Russia’s pollock quota, making it difficult to push the conclusion of the agreement forward.

3.2.3 *Analysis of the Sources of Conflicts among Stakeholders*

Stakeholders in the Korea-Russia IUU fishing prevention agreement include the departments of the central government, affected local governments, live crab importers, and fishermen on the East Coast. Of these, the local governments and live crab importers opposed the agreement for fear of economic losses.

On the other hand, East Coast gill-net fishermen expressed approval in that the agreement would pave the way for preventing damages such as falling prices of Korean snow crabs due to illegally-caught and imported Russian crabs disguised as Korean-produced.

TABLE 14
Analysis of the Causes of Conflicts among Stakeholders

Classification		Causes of conflicts	For/against
Central government	MOFAFF	- Difficult to make policy decisions, due to the different needs of fishermen and live crab importers, complicated further by the issue of access to the Russia seas	-
	MOFAT	- Relations with Russia	
	MLTM	- Port control center operations	
	National Maritime Police Agency	- Security and safety over the seas	
	National Police Agency	- Control on illegal immigrants	
	NFIS	- Incoming inspection of Russian live crabs	
Local government	Donghae City	- Concern about the local economy - Estimated loss of about KRW 290 ~ 435 billion (2007 report)	Against
	Busan City	- Concern that repair yards servicing Russian fishing vessels might suffer - Estimated loss of about KRW 14.5~29 billion (2007 report)	Against
Live crab importers	Live crab distributors	- About 80 distributors in and around Donghae City (2007) - Difficult to run business, with about 600 working in the field	Against
East-Coast fishers	Fishery co-ops, Association, Self-Governed Community, Federation of Fishery Employers	- East-Coast gill-net fishermen, with about 600 vessels	In favor

4. ACCOMPLISHMENTS AND GUIDELINES

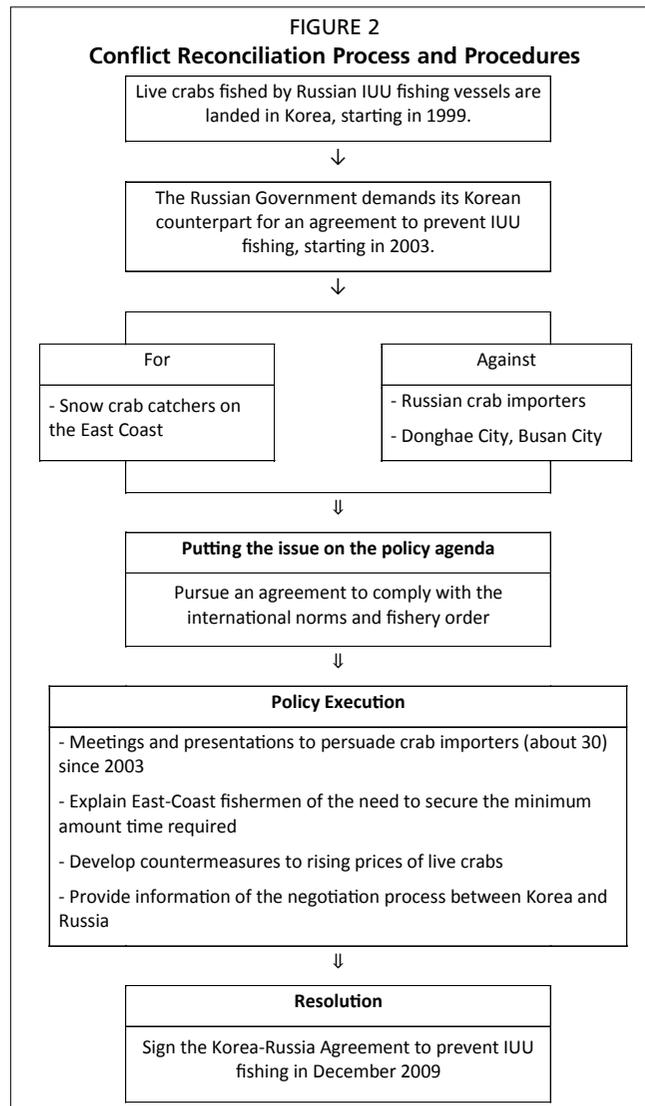
4.1 Conflict Resolution and Operation Results

4.1.1 *Conflict Resolution*

As Russian IUU fishing vessels started carrying live crabs to Korea in 1999, the Russian Government demanded Korea in 2003 to reach an agreement to prevent IUU fishing. Upon this, stakeholders including local governments, the fishing industry and individual fishers each came out for or against it, bringing conflicts around the issue of signing a bilateral agreement to the surface.

To seek a leading role in international efforts to prevent IUU fishing and comply with the international fishing order and international standards, the Korean Government put the IUU prevention agreement case on its agenda. Before making any decision and enforcing any policy, the government made efforts to resolve conflicts among the stakeholders, holding about 30 hearings and presentations since 2003 in which they tried to persuade crab importers and explained of the need for obtaining the least time required for East Coast fishers.

The Government also developed an action plan for potential live crab price increases based on the results of research conducted by a specialized research center and shared information about the process and progress of negotiations between Korea and Russia. Through these efforts to resolve conflicts, it successfully concluded a Korea-Russia agreement to prevent IUU fishing in December 2009. The efforts to persuade the stakeholders and draw out understanding as well as to develop countermeasures through the process mentioned earlier played an important role in removing the sources of conflicts.



4.1.2 Principles of Conflict Resolution

To reach an agreement to prevent IUU fishing activities between Korea and Russia, the Government continued to coordinate the positions of the related departments and agencies on the basis of the Equality principle and reconciled differences by gathering the views of the stakeholders through field presentation. Also, it maximized the effectiveness of conflict resolution through field-oriented presentations and secured information transparency by providing the information of the progress of negotiations. Gathering the individual views of live crab importers through their organization, the Government guaranteed free access and emphasized legal responsibility by stressing the needs of preventing the importation of illegal catches and importing legal live crabs.

To resolve conflicts, it had made continuous efforts for about seven years, gathering and reflecting the opinions of civil organizations and consumers.

TABLE 15
Conflict Resolution Principles

Principle	Details	Remarks
Equality	<ul style="list-style-type: none"> - Continuous coordination of the views of the related government departments on an equal footing - Coordinate the views of people in favor of and against the agreement on an equal footing and hold presentations for them. 	- Field presentations and feedback gathering (30 times over 7 years)
Efficiency	<ul style="list-style-type: none"> - Seek to maximize efficiency in approaches to resolve conflicts through field-oriented presentations. 	- Field-oriented reconciliation of conflicts
Transparency	<ul style="list-style-type: none"> - The government authorities ensure transparency by providing information of the progress of negotiations with Russia. 	- Improve stakeholders' understanding
Free access	<ul style="list-style-type: none"> - Recognize the voluntary association of live crab importers and reconcile views continuously. 	- Gather individual opinions through the organization.
Legal responsibility	<ul style="list-style-type: none"> - Explanation about the fish catches of IUU vessels in light of the international laws - Issue of legal protection for investments to fund fishing by Russian IUU vessels 	- Emphasize the needs for legal crab imports
Continuity	<ul style="list-style-type: none"> - Gather views from groups for and against the agreement and give explanations. 	- Continuous discussions for 7 years
Citizens' participation	<ul style="list-style-type: none"> - Gather views from citizens' groups and consumers 	- Reflect the issue of consumer prices of live crabs

4.1.3 Accomplishments

At home, the conflict resolution process described above brought about such results as a new mindset for fishermen; contribution to fishermen's income stability; contribution to the restoration of domestic crab stocks; and the prevention of disturbances in the coastal ecosystem. Internationally, it contributed to the maintenance of the international order in fishery and the management of resources within the Russia EEZ. The Korea-Russia Agreement was concluded through efforts to gather opinions to a sufficient extent and to secure the transparency of information. To follow up on the agreement, the Integrated Notification of Compliance with the IUU Fishing Prevention Agreement between the Republic of Korea and Russian Federal Government was announced in July 2010.

TABLE 16
Achievements of the Conflict Resolution Process

Classification	Details
Domestic	<ul style="list-style-type: none"> - Gave an opportunity for Korean fishermen operating in the coastal waters to switch to the mindset of illegal fishing prevention. - Served as a turning point to establish the domestic fishery order against IUU fishing. - Contributed to the prevention of IUU fishing by Korean deep-sea fishing vessels in foreign waters as well as fishery dispute prevention.
	<ul style="list-style-type: none"> - Contributed to securing the fishing income of snow-crab gill-net fishers on the East Coast. - Changed consumers' perception that East-Coast crabs are imported crabs. - Contributed to the stabilization of domestic snow crab prices by preventing Russian live crabs from being disguised as Korean crabs. - Prevented Russian IUU fishing vessels stealing fish traps in the coastal seas on their way home.
	<ul style="list-style-type: none"> - Effect of preventing Russian female snow crabs from being distributed in Korean markets (it's illegal in Korea). - Contributed to preventing Korean fishers catching female snow crabs illegally and thus restoring snow crab stocks
	<ul style="list-style-type: none"> - Contributed to protecting the coastal ecosystem from being disturbed by Russian IUU fishing vessels throwing away un-merchandisable live crabs/king crabs before going home

(continued...)

Classification		Details
International	Contribution to the international fishery order	<ul style="list-style-type: none"> - Secured the status of a responsible fishery country by eradicating IUU fishing activities. - Korea and Russia are the first in the world to reach a bilateral agreement to prevent IUU fishing.
	Contribution to managing resources in Russian EEZ	<ul style="list-style-type: none"> - Contributed to the reasonable management of crab stocks within the Russian EEZ by sharing information of IUU fishing vessels.
Conflict Reconciliation	Sufficient opinion gathering	<ul style="list-style-type: none"> - About 30 field-oriented public hearings and presentations over about 10 years
	Information transparency	<ul style="list-style-type: none"> - Provided the information from FAO, RFMO and EC about IUU fishing prevention. - Continuously provided information of intergovernmental discussions to reach the agreement.
	Post management	<ul style="list-style-type: none"> - Continuously provide information to the stakeholders even after the Notification of the Agreement was announced.
Institutions	Legal system to follow up	<ul style="list-style-type: none"> - Integrated Notification of Compliance with the IUU Fishing Prevention Agreement between Republic of Korea and Russian Federal Government (July 2010)

4.2 Conflict Reconciliation Guidelines

Based on the conflict resolution process on the road to the Korea-Russia IUU Fishing Prevention Agreement as well as its accomplishments reviewed so far, the following can be proposed as guidelines for reconciling conflicts.

First, in terms of the legal system, it is considered to be necessary to clarify policies to pursue, review the related areas of the legal system and seek advice and research of experts in the relevant area. Second, from an administrative perspective, it is necessary to give concrete shape and structure to discussion between the central government and private organizations. It is recommended to decide which of the approaches is more efficient, top-down or bottom-up, and to establish an administrative system that fits the chosen approach.

Third, from a socio-economic perspective, I see the needs for documenting the benefits of the Agreement on the local economy and distributing them through experts or in the form of a document. When it comes to communication with stakeholders, it

TABLE 17
Proposed Guidelines Based on the Analysis of the Case

Perspective	Guidelines
Legal system	<ul style="list-style-type: none"> - Give concrete shape to the purposes and needs of pursuing a policy. - Clarify the final state of the desired legal system. - Continue to have discussions with related departments. - Review the domestic legal system sufficiently. - Request experts for research, if necessary.
Administrative	<ul style="list-style-type: none"> - Give concrete shape to the discussion system with the central government, local governments, related organizations and other stakeholders. - Set up a secretariat or task force and provide administrative support in a systematic way. - Select a top-down or bottom-up approach and establish an administrative system accordingly.
Socio-economic	<ul style="list-style-type: none"> - Explain sufficiently about the effects that negotiations will have on the local economy. - Explain of economic benefits through experts. - Prepare and distribute documentations of the impacts on the fishery industry and villages.
Communication with stakeholders	<ul style="list-style-type: none"> - Confirm the scope of stakeholders in detail. - Provide sufficient information of negotiations to stakeholders. - Encourage stakeholders to organize a group. - Provide sufficient information of the direction of international discussions. - Explain of the impact of negotiations on the management of snow crab stocks. - Hold separate presentations to share the progress after the agreement.
Environmental	<ul style="list-style-type: none"> - Develop negotiation strategies taking the positions of Korean stakeholders into consideration. - Proceed with negotiations taking international trends into consideration. - Consider the decisions made through political negotiations between the heads of state. - Select meeting places for negotiations based on the reciprocity principle with the partner country.

is important to ensure transparency in the process of providing information and to hold a sufficient number of presentations. Lastly, from an environmental perspective, it is deemed necessary to choose negotiation strategies considering the positions of stakeholders and to pursue negotiations considering the direction of international discussions.

5. CONCLUSION

In this report, I analyzed the process of concluding the Korea-Russia IUU Fishing Prevention Agreement as a model case for deep-sea fisheries governance. To make this analysis, I looked into cooperation for fisheries between Korea and Russia, the current state of live crabs landed in Korea through IUU fishing and Russia's position on the issue. I also analyzed a series of processes executed to achieve the final goal, which is the conclusion of a bilateral agreement to prevent IUU fishing - such as researches, intergovernmental negotiations, institutional improvements, public hearings and presentations. The root cause of conflicts was that the Russian Government demanded Korea for an agreement and that, subsequent to this, stakeholders including the local governments, industries and fishermen raised their voices for or against it. This brought conflicts around the Korea-Russia agreement to the surface.

It is very meaningful that the government achieved many results through efforts to resolve conflicts among those who approved and those who opposed: helping fishermen change their mindset; contributing to stabilizing fishermen's income and restoring Korean snow crab stocks; and preventing the coastal ecosystem from being disturbed. In addition to these domestic achievements, on the international front, the process contributed to the management of fish resources within the Russian EEZ. There were many things closely linked together in this case: FAO IUU prevention efforts, Russia's IUU fishing issue, Korean importers of Russian live crabs, their local governments, and Korean snow-crab gill-net fishermen. These issues were resolved through reasonable reconciliations, so I hope that this case will be used as a reference for other similar cases.

Current status of and improvement plans for aquaculture governance in the Republic of Korea

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1. INTRODUCTION

It has been over 100 years since marine aquaculture was first adopted in Korea. Since the early 1960s, aquaculture business has expanded production volumes beyond market demands thanks to the government-led development and spread of aquaculture technologies. Due to the recent shift in the government's fisheries policies toward aquaculture, the production volume of the agriculture industry has gradually increased. In order to cope with the declining catch volume of the fishing sector and the emergence of a food crisis, the focus of attention has been placed on the development of aquaculture.

The aquaculture industry, however, faces numerous challenges: including red tide and fish diseases due to environmental changes; catch volume uncertainties; marine pollution from coastal area development; dwindling fish farm productivity as a result of worsening fish farm conditions; weakening self-sufficiency of fishing communities; declining price competitiveness for domestic fisheries products; and threatened survival of the fishing industry in the wake of free trade.

For the future development of aquaculture, improved aquaculture governance is essential in order to develop aquaculture technologies which address these constraints; overhaul aquaculture-related laws and institutions; reasonably revise fisheries policies and relevant administrative organizations; and resolve conflicts among stakeholders.

2. AQUACULTURE BUSINESS OVERVIEW

2.1 Aquaculture Business

2.1.1 Definition of aquaculture

Article 2 of the Fisheries Act defines aquaculture as “activities of raising and gathering aquatic animals or plants in artificial ways, and activities of using fishing vessels and gear, or installing facilities granted pursuant to such purposes.” Aquaculture, in short, is a mode of production where aquatic species are produced and bred/grown in certain waters to be used for food or other purposes. More specifically, it refers to a mode of production where the life and environment of cultured aquatic organisms are proactively managed and their propagation and growth facilitated efficiently for aquatic species production, cultivation, collection, processing, and sales.

2.1.2 Concept of aquaculture business

Aquaculture business is divided into marine aquaculture and inland aquaculture. The former, in particular, refers to the sea cultivation of various marine animals and plants within a certain range of waters with a relatively low water level. It is usually done in the waters from the coast up to a depth of 50-60 meters including tidelands.

In a legal sense, aquaculture business is defined as follows: Article 2, Paragraph 2 of the Fisheries Act states, “The term ‘fisheries’ mean business of catching, gathering, or cultivating marine animals or plants.” Article 8, Paragraph 1 of the Fisheries Act also defines aquaculture business as: “(a) a sort of license-required fishing business; and (b) cultivation of target marine products in certain waters through demarcation or other artificial facilities.”

Marine aquaculture serves to ensure the sustainable use of natural resources, as it prevents excessive fishing in the coastal waters and collects resources proliferated by injecting fish seeds and providing the right environment for cultivation. In this regard, the biggest challenge for marine aquaculture would be the development of fish seed production technology and cultivation method that utilizes natural production power to the fullest; the very combination of these two elements is aquaculture technology.

2.1.3 Scope of aquaculture business

In general, shallow sea is defined as sea areas from the shore to a depth of 200 meters. The scope of these areas, however, is equivalent to the continental shelf which is considered the farthest limit of continental extension. So it would be fair to say that shallow sea refers to the entire sea areas leading up to the continental shelf.

In reality, not the entire shallow sea has value or is leveraged as fishing grounds; only some parts of what is called shallow sea are worth as fishing grounds. The shallow-sea areas beyond a depth of 50-60 meters have little inflow of river water and scarcely provide nutrients for marine animals and plants which make it virtually impossible to raise or grow cultured marine organisms. The cultivation of some marine organisms might be made possible in waters around 150-200 meters in depth, but given low economic efficiency it is difficult to pursue aquaculture business in these areas. Keeping this in mind, the scope of shallow-sea fish farms should not be confined to their current scope but be further expanded considering the future development of aquaculture technologies and fish farm needs. There is also a need for marine aquaculture policies to be set up on this basis. Shallow sea provides crucial fishing grounds for aquaculture business as well as other types of coastal fishing. Therefore the overall conditions should be scientifically clarified to ensure that the small fishing grounds can be efficiently leveraged.

2.1.4 Types of aquaculture

Marine aquaculture is aimed at preventing excessive fishing in the coastal waters and harvesting products by raising fingerlings and providing the right environment for cultivation. The types of marine aquaculture vary significantly according to the types of fisheries resources available, scope of fish farms, characteristics of sea areas, subjects of aquaculture, types of aquaculture technology and aquaculture business structures. As indicated in Table 2-1, the most common forms of marine aquaculture are cultivation of seaweeds and cultivation of shellfish. Regarding methods, floor-based, spreading-based and longline-based aquaculture are most widely used. Other modes of marine aquaculture include fish farming, feed farming and complete aquaculture.

Korean aquaculture business initially began with seaweed aquaculture, which evolved into shellfish aquaculture and finally developed towards fish farming. The modes of shellfish aquaculture have also shifted from rock-based through branch-based to longline-based. Fish seed gathering methods have changed from natural gathering to natural seed collection to artificial fish seed production. The modes of fishing ground utilization have also evolved from extensive to intensive.

TABLE 2-1
Regulations on the types and methods of aquaculture (2004)

Aquaculture types	Aquaculture methods (aquaculture technology)	Aquaculture methods (further segmented)
1. Cultivation of seaweeds	1) Longline-based aquaculture (1) Spreading-based aquaculture (2) Rope-based aquaculture 2) Floor-based aquaculture (1) Rock-based aquaculture (2) Shallow-sea aquaculture	(a) Pillared net spreading (b) Floating net spreading
2. Cultivation of shellfish	1) Longline-based aquaculture (1) Simplified longline-based aquaculture (2) Rope-based aquaculture 2) Floor-based aquaculture (1) Spray-based aquaculture (2) Rock-based aquaculture (3) Submersible aquaculture 3) Cage-based aquaculture	(a) Tideland aquaculture (b) Shallow-sea aquaculture (a) Tideland aquaculture (b) Shallow-sea aquaculture (a) Tideland aquaculture (b) Shallow-sea aquaculture
3. Fish farming	1) Cage-based aquaculture: Cage-based aquaculture 2) Embankment-based aquaculture: Embankment-based aquaculture 3) Longline-based aquaculture: Rope hanging-based aquaculture 4) Floor-based aquaculture: Spray-based aquaculture	(a) Tideland aquaculture (b) Shallow-sea aquaculture
4. Combined cultivation	1) Longline-based aquaculture (1) Spreading-based aquaculture (2) Rope-based aquaculture 2) Floor-based aquaculture (1) Spray-based aquaculture (2) Spray-based and rock-based aquaculture 3) Combined aquaculture (1) Spreading-based and spray-based aquaculture (2) Rope-based shallow-sea rock-based aquaculture	
5. Community fisheries and Cooperative cultivation	Demarcate water surfaces with a certain range of depth, beyond the limitations of fishing ground depth in community fisheries, and cultivate marine organisms based on cooperation among fishermen residing in certain areas	
6. Open-sea cultivation	Demarcate certain waters in open sea to cultivate marine organisms by installing necessary facilities underwater or on the water surface or taking other measures	

2.1.5 Current status of aquaculture

Production volume by type

Korea's marine aquaculture production has grown approximately 11 percent annually over the last five years. The production volume of marine aquaculture has exceeded one million tons per year since 2005, successfully meeting domestic demands for marine products and providing the main source of aquatic products.

TABLE 2-1
Marine aquaculture production trends (Unit: Ton, %)

Year	Fish	Shellfish	Seaweeds	Crustaceans, etc.	Total	Proportion in total fishery production (%)
1962	-	12 655 (67.6)	6 054 (32.4)	-	18 709 (100)	4.1
1965	-	61 059 (82.9)	12 616 (17.1)	-	73 675 (100)	11.5
1970	22 (0.0)	74 687 (62.7)	44 312 (37.2)	190 (0.2)	119 211 (100)	12.7
1975	-	189 514 (53.9)	161 797 (46.0)	85 (0.0)	351 396 (100)	16.5
1980	38 (0.0)	282 560 (52.3)	257 880 (47.7)	86 (0.0)	540 564 (100)	22.4
1985	1 413 (0.2)	369 035 (46.9)	397 461 (50.5)	19 662 (2.5)	787 571 (100)	25.4
1990	2 656 (0.3)	325 603 (42.1)	411 869 (53.3)	32 603 (4.2)	772 731 (100)	24.3
1995	8 360 (0.8)	312 252 (31.3)	649 099 (65.1)	26 740 (2.7)	996 451 (100)	30.0
2000	25 986 (4.0)	222 608 (34.1)	389 732 (59.6)	15 047 (2.3)	653 373 (100)	26.0
2005	81 437 (7.8)	326 255 (31.3)	621 156 (59.7)	12 226 (1.2)	1 041 074 (100)	38.3
2008	99 006 (7.2)	343 704 (24.9)	921 024 (66.7)	17 269 (1.2)	1 381 003 (100)	
2010	80 110 (5.9)	355 699 (26.2)	901 672 (66.5)	17 519 (1.4)	1 355 000 (100)	

Over the years the Korean aquaculture business has undergone countless changes. With the proliferation of aquaculture technologies, the focus of aquaculture business has shifted from the conventional varieties of seaweeds and oyster to more expensive products such as bastard halibut, and abalone, which have similar characteristics to livestock business in that they are artificially supplied and converted to protein. Fish, in particular, has seen a dramatic increase in production volume since 2003, thereby driving the growth of aquaculture production as a whole. Around the same time Shellfish production started to expand as the cultivation of abalone began in earnest. The production of seaweeds continues to rise as cultivation of kelp is now additionally used as feed for abalone.

Although the success of the Korean aquaculture business is impressive, beneath such dramatic growth lie several problems. With the increasing use of fish feeds, self-pollution due to fish feed sediments and excrements is on the rise; traditionally cultured fish species are experiencing reduced productivity due to overcrowding, continued cultivation over an extended period of time, environmental changes caused by coastal development and global warming, and an increasing number of deaths. In addition to these environmental and ecological problems, other challenges are also emerging on the market side; such as growing import of cultured marine products and fierce competition in overseas markets. For the sustainable development of aquaculture business from either an environmental or economic perspective, finding solutions to these problems is urgently required.

For this reason, the Korean government has currently suspended the issuance of new licenses for aquaculture business. It is also showing signs of shifting its focus of aquaculture policies from boosting production to promoting sustainable growth in consideration of the maritime environment.

Licenses for marine aquaculture business

Licenses granted for marine aquaculture in Korea as of the end of 2009 are summarized in Table 2-2, with no significant change observed over the last few years. The total area of cultivation sites is 139 000 ha. Seaweeds take up the largest share of cultivation areas, followed by shellfish and fish in proportion to production volume.

TABLE 2-2
Licenses for marine aquaculture business (December 31, 2009)

Kind	# of licenses	Area (ha)	Kind	# of licenses	Area (ha)
Total	9 709	139 871			
Fish, etc.	1 419	8 733	Shellfish	5 637	49 538
Fish	568	1 965	Oyster	1 247	8 037
Shrimp	48	565	Bloody clam	832	7 865
Sea squirt	521	1 921	Manila clam	602	6 276
Sea cucumber	50	422	Cockle	219	3 181
Styela clava	153	598	Venus clam	127	1 216
Others	79	3 262	Ark shell	875	10 010
Seaweeds	2 653	81 601	Hard clam	25	385
Laver	939	57 240	Mussel	175	779
Sea mustard	432	5 288	Scallop	101	920
Kelp	661	8 785	Abalone	1 125	6 589
Green algae	93	3 634	Pearl oyster	29	99
Hizikia fusiforme	407	5 380	Hen clam	9	274
Gulf weed	41	387	Surf clam	1	12
Others	80	908	Others	274	3 895

Source: Ministry for Food, Agriculture, Forestry and Fisheries, 2009.

2.2 Concept of aquaculture governance

The concept of governance has been defined in a variety of ways. The World Bank defines governance as a form of political system that encompasses the process where authority is exercised for a country's management of economic and social resources for development and the capacity of the government to effectively design, formulate and implement policies and perform wide-ranging functions. The United Nations Development Programme (UNDP) states, "Governance is the exercise of political, economic and administrative authority to manage a nation's various affairs at all levels."

The Organization for Economic Cooperation and Development (OECD) defines governance as "the use of political authority and exercise of control in a society in relation to the management of its resources of social and economic development." The Commission on Global Governance explains, "Governance is different from government: It includes the meanings of government (management), management and operation, and self-government of global society; it is the sum of many ways individuals and institutions, public and private, manage their common affairs through which conflicting or diverse interests may be accommodated and co-operative action taken." This refers to the platform for smooth coordination of activities that does not necessarily depend on public authority. The Commission also goes on to define global governance as "cooperative management or joint government on a global scale."

Taking the aforementioned definitions into consideration, governance should be understood herein as a management process to achieve the goals and objectives of a certain system which involves close interaction between subordinate systems to ensure desirable existence.

Approaches to governance are made primarily from structural and process viewpoints. Structural governance is broadly divided into class-centric governance, market-centric governance, network-centric governance and community-centric governance. From a process perspective, governance can be categorized into the processes of direction setting and coordination.¹⁾ There are a variety of wide-ranging

approaches to governance, but this paper takes the definition of governance as a management process to achieve the goals and objectives of a certain system. In this sense, the system's organization, its linkage to relevant laws and institutions and its decision-making process may be considered crucial elements of governance.

Therefore, aquaculture governance should be understood as a process where the government and the aquaculture industry cooperate with each other to formulate and execute fisheries policies for the continued development of aquaculture. This could include a process of legal, social, economic and policy coordination for managing the aquaculture industry. Such aquaculture governance aims to ensure the fair and stable provision of fishing licenses, responsible management of fishing resources, transparent and engaging decision making, universal application of laws and reliable implementation of government policies. The purpose of this paper is to examine the concept of aquaculture governance and the current status of aquaculture in Korea. In doing so, we will analyze individual factors of aquaculture governance, identify problems and suggest potential improvements.

The Food and Agriculture Organization (FAO) defines governance as a concept covering: (i) the activity or process of governing; (ii) those people charged with the duty of governing; and (iii) the manner, method and system by which a particular society is governed. In other words, it is defined as coordination and control encompassing the formulation, execution or process of policies, subjects of policies, and policy means or system.

Therefore, laws and regulations as the basis of policy formulation or means of policy execution should include not only national laws and international treaties, but also customary laws and participatory processes. The term "governance" is widely used to cover institutions, instruments and processes ranging from short-term operational management to long-term policy development and planning. It also includes policy as high-level governance and management as medium- to low-level governance with international, national and local dimensions. In this sense, aquaculture governance is understood as a process where the government and the aquaculture industry cooperate with each other to formulate and execute fisheries policies for the continued development of aquaculture. This process involves legal, social, economic and policy coordination for managing the aquaculture industry.

3. CURRENT STATUS OF AND PROBLEMS WITH AQUACULTURE GOVERNANCE

3.1 Current status of aquaculture business

3.1.1 Organization

Korean organizations for aquaculture governance include the Fisheries Policy Office of the Ministry for Food, Agriculture, Forestry and Fisheries (MIFAFF) on the government side and the National Federation of Fisheries Cooperatives (NFFC), the Aquaculture Business Association (ABA) and the Korea Federation of Advanced Fishermen (KFAF) in the private sector. The government organization for aquaculture governance implements policies for aquaculture. Laws and regulations directly correlated with aquaculture business include the Fisheries Act, the Fish Farming Development Act, the Fishing Ground Management Act and the Fishing License and Fishing Ground Management Rules. Private institutions include fisheries cooperatives by district and business type, with the Fisheries Cooperatives Act and its enforcement decrees and rules as relevant laws. The implementation of policies and institutions on production, processing, distribution and international cooperation is underway on the basis of these organizations and laws. In the next section, the current status of and problems with these systems will be examined.

Administrative organizations for aquaculture business

Korea's aquaculture administration is governed by the Fisheries Policy Office of the Ministry for Food, Agriculture, Forestry and Fisheries (MIFAFF), which implements overall national policies on aquaculture business. Licenses and permits for aquaculture business, however, are granted and rescinded by the heads of local governments. The National Fisheries Research and Development Institute (NFRDI), the National Fisheries Products Quality Inspection Service (NFIS) and the Korea Maritime Institute (KMI) are not fisheries administration organizations but do support technology and policy development under the fisheries governance system. The NFRDI, in particular, is undertaking fishing ground environmental survey/analysis as well as research and technology development on food safety, marine animal/plant disease prevention and aquaculture business. It also supports the development and implementation of fisheries policies by central and local governments on the local, national and global level.

The Fisheries Bureau of the Ministry of Commerce and Industry was created in 1948 as Korea's national organization for fisheries administration. The Bureau was transferred to the Ministry of Agriculture and Forestry in 1961 and became an independent organization, known as the Fisheries Administration, in 1966. With the launch of the Ministry of Maritime Affairs and Fisheries (MMAF) in August 1996, the organization was merged with the Maritime and Port Administration and became the Maritime Affairs and Fisheries Administration. Since the MMAF was abolished as part of government reorganization in 2008, responsibilities for fisheries administration were handed over to the MIFAFF and those for marine administration to the Ministry of Land, Transportation and Maritime Affairs (MLTM). The Maritime Affairs and Fisheries Administration was consequently renamed the Regional Maritime Affairs and Fisheries Office.

Responsibilities for fishery and maritime administration are currently shared by two government agencies. The MIFAFF oversees national fisheries policies, while the MLTM's Maritime Policy Bureau handles marine territory and environmental policies. The current division of fishery and maritime policies and the lack of official coordination between the two ministries hinder effectiveness and efficiency of fishery and aquaculture governance. This serves as a constraint on the potential for building a better system for aquaculture governance.

Fisher's organizations

Fishing village cooperatives

A fishing village may be defined as "a place where fisheries production and the living of fishers are made at the same time or a place that has the right natural conditions for fisheries production where fishermen form a village." As fishing is a resource-based industry, fishing villages created in places with the right natural and marine-geographic conditions are bound to have natural and communal characteristics. Fishing village cooperatives are aimed at pursuing joint projects to enhance the production power and living quality of their members and improving their economic and social standings (Article 1 of the Enforcement Decree of the Act). They may be registered as cooperatives with the approval of the head of the Fisheries Administration (Article 3, Paragraph 2 of the Enforcement Decree of the Act). After Korea's liberation from Japanese colonial rule, the enactment of the Fisheries Cooperatives Act in 1966 served as an opportunity to reorganize the structure of fishing communities. The Act disbanded fishing cooperatives and marine cooperatives, which had existed since the colonial era. The National Federation of Fisheries Cooperatives and district fishing cooperatives (later renamed "district fisheries cooperatives") were created instead, which formed fishing village cooperatives in coastal villages. This provided the platform for current fishing

organizations and the legal basis for the creation of fishing village cooperatives. The majority of fishermen engage in agriculture in addition to fishing. Nonetheless most fishing households remain impoverished, if employed fishers are taken into account.

Under the current legal system only fishermen, in principle, are supposed to engage in fishing as a business. But because fishing grounds are increasingly privatized under the capitalistic economic system, the inflow of capital from adjacent cities drives destitute fishermen to seek employment in the licensed fishing business or with fishing vessel owners. To help prevent this situation and protect destitute fishermen, fishing licenses are preferentially granted to fishing village cooperatives or district fisheries cooperatives.

Marine products caught by fishermen should be officially distributed via the consignment sales centers of fisheries cooperatives. In reality, however, a great deal of marine products is distributed privately through the market or merchants, causing losses to the fishers themselves in the long run.

Fisheries cooperatives

Article 1 of the Fisheries Cooperatives Act states that a fisheries cooperative is a group created to promote cooperative organizations between fishermen and fisheries product manufacturers, improve their economic and social standings and boost the production power of the fisheries industry to ensure the balanced development of the national economy. Fisheries cooperatives consist of district fisheries cooperatives, business type-specific fisheries cooperatives, fisheries product manufacturers' fisheries cooperatives, and the National Federation of Fisheries Cooperatives (Article 2 of the Act). Members of district fisheries cooperatives may form fishing village cooperatives by administrative district and economic zone (Article 16, Paragraph 2 of the Act).

Fisheries cooperatives and fishing village cooperatives are the institutional backbone of fishing organizations. The latter, in particular, is the lowest subgroup of systems and organizations created following the Fisheries Cooperatives Act to divide and reorganize existing fishing communities by economic zone. Except for deep-sea fishery, inshore fishery and other types of business requiring massive capital, most fishing activities such as catching, sales and distribution are closely associated with fishing village cooperatives.

3.2 Fishing Ground Utilization Rights and Fishing Licenses

Korean laws and regulations related to aquaculture business are stipulated in the following Acts:

(a) Fisheries Act; (b) Fishing Ground Management Act (YEAR); (c) Fish Farming Development Act (YEAR); and (d) Fishing License and Fishing Ground Management Rules (YEAR). The most fundamental regulation among them is the Fisheries Act, which outlines matters concerning licenses, including the very basic legal requirements for aquaculture business in a traditional sense, and the limitation and promotion of these licenses. Next are the Fish Farming Development Act and the Fishing Ground Management Act. Enacted and promulgated as of January 14th 2001, the Fish Farming Development Act is structured around two major initiatives: (a) formulation of "fish farming development plans" centering on aquaculture business; and (b) implementation of "fisheries resources development projects." Another relevant legislation is the Fishing Ground Management Act, which was promulgated on January 28, 2001. The two enactments are closely correlated with the development of aquaculture business, governing matters concerning the reasonable use, development and management of fish farms and other aquaculture businesses.

The final regulation worth mentioning here is the Fishing License and Fishing Ground Management Rules. It serves as a guideline for the government's aquaculture

policies and aims to minimize problems arising in the course of enforcing the aforementioned laws while promoting their successful fulfillment.

3.2.1 Fisheries Act

The Fisheries Act was enacted in 1953, largely applying the fishing right system from the Korean Fishing Business Ordinance. The Act was revised in 1963 to allow the free provision of fishing licenses as collateral and abolish the provision that prohibited the concentration of fishing licenses to single individuals. (The Act originally stipulated that the transfer and provision of fishing licenses as collateral shall require the permission of administrative authorities.) The 1963 revision reinforced the characteristics of fishing licenses as real rights and provided urban capital an opportunity to dominate coastal fishing grounds.

The 1971 revision of the Act put the characteristics of fishing licenses as real rights in check by introducing a renewal system for fishing licenses which could previously be extended on an unlimited basis. Fishing licenses could previously be transferred only with the approval of administrative authorities, but with the 1963 revision the free provision of fishing licenses as collateral was allowed. The 1971 revision, however, stipulated that neither the transfer of fishing licenses nor their provision as collateral shall be made until one year passes after acquisition.

The 1972 revision of the Act removed the third paragraph of Article 29, a provision added in the 1971 revision: "Fishing licenses shall not be taken as collateral within one year following acquisition." It also partially restored the fishing license renewal system to an extension/renewal system (10-year extension and renewal). The joint fishing licenses owned by fisheries cooperatives were shifted from the rights of individual fishermen, to the rights of fishing according to regulations set by joint fishing managers and approved by provincial governors. The revision also allowed fisheries cooperatives, which were previously prevented from acquiring any fishing licenses except joint fishing licenses, to gain other licenses than joint fishing licenses.

The December 1995 revision replaced the existing classification of aquaculture business (i.e. Type 1 aquaculture business and Type 2 aquaculture business) with the new classification of: cultivation of seaweeds, cultivation of shellfish, fish farming, combined cultivation, community fisheries and cooperative cultivation. The approval from a mayor, county governor or district governor, which was previously required for fishing village cooperatives or others to stipulate rules needed for fishing ground management or other purposes, was replaced with the report. The authority to grant fishing licenses was transferred from metropolitan mayors and provincial governors to mayors, county governors and district governors.

The revision made on April 15, 1999 made it possible to exclude those poorly managing their fishing grounds or being subject to administrative disposition for violation of laws and regulations from fishing license priorities. The revision also protected the property rights of fishermen by removing the provision that requires those getting to possess fishing grounds larger than the base area owing to the merger or succession of corporations to dispose the surplus areas in two years.

The January 2000 revision of the Act specified that fishing village cooperatives or district fisheries cooperatives may utilize parts of licensed/permitted fishing grounds as fishing places. It also stated that those compensated for fishing business losses owing to the execution of public projects may be excluded from fishing license priorities. The period required to transfer, split or modify fishing licenses was shortened from three years from registration to one year following initiation of fishing business.

The fishing license system has the following characteristics:

Property rights

Fishing licenses are structured around the economic activities of collecting, capturing and/or cultivating marine animals or plants in certain waters. The goal and profits of fishing licenses are ultimately economic gains, and thus fishing licenses constitute a sort of property rights. In principle, property rights may be freely transferred or be offered as collateral, but fishing licenses are private rights with strong public characteristics. Therefore, there are strong restrictions on the transfer or provision of fishing licenses as collateral; lending a fishing license to a third party is strictly prohibited.

Real rights are exclusive – or absolute in a sense – rights governing objects. In this regard, fishing licenses may be regarded as real rights as they constitute legally binding absolute rights to enjoy gains by operating certain types of fishing business exclusively in certain waters. Additionally they serve to protect these gains against the general public. Clarifying this is Article 24, Paragraph 2 of the Fisheries Act which states, in accordance with Article 185 of the Civil Law, that fishing licenses shall be deemed real rights and that land-related provisions shall apply *mutatis mutandis*.

As real rights, fishing licenses are direct and exclusive control rights over objects. Like other real rights, they have the powers of priority effect and ownership-based claim. Priority effect means that any conflicting fishing license should prove ineffective in a fishing ground where a preceding fishing license on the same subject is already in place. Mortgage rights have a hierarchical order by time of establishment; those established earlier should prevail.

License priorities

The license priority system puts higher priority on applicants meeting predefined legal requirements even when the number of applicants exceeds the quota. Therefore, regulations on license priorities and prohibitions constitute restriction acts, not discretionary powers. In principle, no supplementary clause can be attached to restriction acts. License priorities are broadly divided into general priority and special priority. Firstly, general priority is set on the basis of individual fishermen's experiences, working conditions, management levels and participation by local fishermen. Secondly, cooperatives founded by fishermen who live in the given areas enjoy social priority over general priority holders when the need for joint management is recognized for the common interest of local fishermen. When the number of fishing license applications exceeds the allowable quota, license winners need to be selected on the basis of certain criteria. For this reason, the Fisheries Act (1953) gave highest priority to existing fishermen. If joint fishing management was required, top priority for fishing licenses was placed on corporations founded by fishermen who had their addresses in the applicable areas. These corporations were aimed at boosting the incomes of local fishermen. The priority provision was a new system that was nonexistent in the Korean Fishing Business Ordinance and was institutionalized upon the enactment of the Fisheries Act in 1953. Changes in fishing license priorities after the enactment of the Fisheries Act are summarized in Table 3-3.

TABLE 3-3
Timeline: Change in fishing license priorities

Year of enactment	Description	Implications of enactment/revision
Enactment(March 19, 1953)	Gave priority to experienced fishermen and collective fishing business managers	Entailed potential problems such as disruption of aquaculture license administration and fishing ground order
Revision (1971)	<ul style="list-style-type: none"> Abolished the fishing license extension system Gave license priority to existing fishing license holders upon granting new licenses for lapsed fishing grounds 	Sought to reinforce fishing ground management and enhance fishing ground utilization efficiency
Revision (1975)	<ul style="list-style-type: none"> Granted licenses to fishing village cooperatives as top priority 	Strengthened social functions of fishing license
Revision (1990)	<ul style="list-style-type: none"> Gave priority to those having specialized knowledge in aquaculture business (e.g. fisheries technicians) 	Promoted sophisticated fishing ground utilization and improved fishermen's technology acceptance
Revision (1995)	<ul style="list-style-type: none"> Shifted priority in cooperative cultivation (by descending order of fishing village cooperatives, destitute fishermen's cooperatives as corporations, and district fisheries cooperatives) 	Dealt efficiently with diversifying aquaculture methods and varieties

Duration of fishing license

The duration of fishing licenses is closely associated with the management of aquaculture business and the property value of fishing licenses. The duration of these licenses should be long enough to stabilize fishing business management and enhance the property value of the licenses. At the same time, however, it needs to be adequately limited and coordinated to ensure reasonable utilization of shared waters. Due to the fact that the value of fishing grounds changes by catch volume and can be totally lost if left unmanaged.

The duration of fishing licenses is 10 years from the date when they are granted. If the waters on which a mayor or provincial governor seeks to develop a fishing ground utilization and development plan in accordance with Article 4, Paragraph 1 of the Fisheries Act are those where fishing activities are restricted or prohibited under the provisions of other laws or regulations; the duration of fishing licenses on these waters should be less than 10 years. If the duration of fishing licenses is more than 10 years, however, their details cannot be modified. Recognizing a renewed license means recognizing a new license, eliminating the legal continuity between the old and new licenses. This consequently changes the order of mortgage on fishing licenses and other factors, having negative impacts on fisheries policies and the property value of fishing licenses. For this reason, the Fisheries Act states that the extension of fishing licenses should be allowed at the request of fishing license holders within the range of 10 years from the date when the licenses is to expire. If multiple applications are made for license extension, the total period of extension allowed should not exceed 10 years. When the duration of fishing licenses is extended, the licenses during the extension period should be the same as the original ones.

TABLE 3-4
Change in fishing license duration

Division Time of enactment	Description	Implications of enactment/revision
Enactment (March 19, 1953)	Set license duration at 10 years or less and allowed extension	Improved property value of fishing licenses and sustainability of fishing business management
Revision (1971)	Fixed license duration at 10 years and abolished extension system	Promoted new entrants
Revision (1975)	Revived fishing license extension system	Strengthened social functions of fishing licenses
Revision (1990)	Changed license duration to 5-10 years	Ensured effective utilization of fishing licenses
Revision (1995)	Restored license duration to 10 years, with the total period of extension being less than 10 years	Struck a balance between efficient fishing ground utilization and managerial stability

While the characteristics of fishing licenses having power-rights over fishing grounds has remained largely unchanged over time, the concepts of public goods and private property rights have changed dramatically. These trends provide significant implications for the potential directions of future improvements to the fishing license system in Korea's aquaculture business landscape.

3.2.2 *Fishing Ground Management Act*

The Fishing Ground Management Act was enacted into Law No. 6257 on January 18, 2001 and partially amended on March 31, 2010. It was formulated as a special law to handle matters related to fishing management, including fish farms, in a more efficient manner.

Below is the outline of the Act: (a) The Minister for Food, Agriculture, Forestry and Fisheries shall establish a basic plan for the development of fish farming every five years to foster and develop such fish farming; a metropolitan mayor/provincial governor or a mayor/county governor/district governor shall prepare an implementation plan according to the regional circumstances in line with the basic plan. [Articles 3 and 4] (b) A metropolitan mayor/provincial governor or a mayor/county governor/district governor may take adequate measures necessary for the management of fishing grounds in granting a fishing license or permit and shall designate certain waters as fishing ground management areas. [Articles 5 and 7] (c) A metropolitan mayor/provincial governor or a mayor/county governor/district governor shall introduce a fishing license and permit renewal system, which cancels existing fishing licenses or permits on fishing grounds under his/her jurisdiction and grants new fishing licenses/permits, to align the effective period of fishing licenses, etc. by sea area. [Article 8] (d) A metropolitan mayor/provincial governor or a mayor/county governor/district governor shall introduce a fishing ground relaxation system, where the operation of fishing grounds with aggravated environmental pollution and undermined productivity is suspended for a certain period of time in consultation with fishermen; for fishing grounds undergoing no fishing ground relaxation, new fishing licenses shall be granted two years after the termination of fishing licenses. [Article 18] (e) A metropolitan mayor/provincial governor or a mayor/county governor/district governor shall pursue fishing ground purification and reorganization operations, such as the collection of sediments in fishing grounds in line with fishing ground purification and reorganization plans, to prevent potential damage that the fishing grounds may face due to environmental pollution. [Articles 14 and 15]

What is noteworthy here with regard to aquaculture business is the provisions of (c), which allows administrative agencies to coordinate fishing licenses or permits in accordance with the basic fishing ground management plan. For some sea areas, this also means aligning the duration of fishing licenses by business type to ensure proactive management of fishing grounds and restructuring of aquaculture business. The most basic matters concerning aquaculture business are governed by the Fisheries Act. Article 8 of the Act defines aquaculture business as a license-required form of fishing business, dividing it into the following five types: (a) cultivation of seaweeds; (b) cultivation of shellfish; (c) fish farming; (d) combined cultivation; and (e) cooperative cultivation. The government further segmented these five aquaculture business types by aquaculture method and technology, as described in Table 3-1.

The Fisheries Act initially gave the rights to handle fishing licenses to provincial governors, but the Act was revised in 1995 to hand these rights over to the heads of local governments such as mayors and county governors (Article 8, Paragraph 1 of the Fisheries Act), further facilitating the participation of fish farmers in aquaculture business. In preparation against potential problems, such as over issuing of aquaculture licenses and devastation of fishing grounds, Article 4 of the Act has a limiting provision

that administrative organizations should handle fishing licenses, including those for aquaculture business, within the range of fishing ground utilization and development plans set forth by metropolitan mayors and provincial governors.

Article 4 (Plan for Use and Development of Fishing Grounds)

- (1) The head of a city (special autonomous province), county or district shall prepare a plan for the use and development of fishing grounds to use and develop the waters within his/her jurisdiction comprehensively.
- (2) The head of a city, county or district shall obtain the approval of a metropolitan mayor or provincial governor if he/she is to prepare a development plan.
- (3) The head of a city, county or district shall, in preparing the development plan, conduct a basic survey of the waters to be developed, considering the social and economic conditions, and shall conduct a special basic survey in compliance with the basic guidelines prescribed by the Minister of Maritime Affairs and Fisheries and follow the detailed guidelines prescribed by the metropolitan mayor or provincial governor considering local conditions and peculiarities.
- (4) If there is any other Act or subordinate statute that restricts or prohibits fishery activities on the waters for which the development plan is to be prepared, the head of a city, county or district shall either obtain an approval of, or consult with, the head of the administrative agency concerned in advance.
- (5) The head of a city, county or district shall, who intends to establish the development plan, shall go through the deliberation thereon by the Fisheries Coordination Committee under Article 88.

3.2.3 Fish Farming Development Act

The Fish Farming Development Act was enacted in 2002 to further promote aquaculture business and provide a stronger basis for fisheries production in response to increasingly worsening conditions facing Korea's fisheries industry. Such promotion and strengthening of the aquaculture sector was done by, among others, the enactment of the UN Convention on the Law of the Sea, the conclusion of fisheries agreements with foreign countries and the opening of the marine product market.

Articles 50-56 of the Fisheries Act discuss the establishment of basic plans for the development of fish farming, the outline of which is as follows:

- (1) The Minister for Food, Agriculture, Forestry and Fisheries shall establish a basic plan for the development of fish farming every five years to foster and develop such fish farming.
- (2) A basic plan shall include the following matters: 1. Basic direction-setting for policies for fish farming; 2. Matters relating to the development of fishing grounds to cultivate marine organisms; 3. Matters relating to the development and dissemination of techniques necessary to cultivate marine organisms; 4. Matters relating to the improvement of fishing ground environments; and 5. Other matters relating to the fostering and development of fish farming.
- (3) The establishment of a basic plan shall be subject to deliberation by the Central Fisheries Mediation Committee under Article 88.

Article 51 of the Act stipulates:

- “(1) The metropolitan mayor or provincial governor shall establish an implementation plan for the development of fish farming according to the regional circumstances every year in line with a basic plan.
- (2) An implementation plan shall include the following matters:

1. Matters relating to the enlargement of fishing grounds necessary to cultivate marine organisms and the promotion of productivity thereof;
 2. Matters relating to the dissemination and guidance of techniques necessary to cultivate marine organisms;
 3. Matters relating to the designation of fish farming development zones;
 4. Matters relating to the purification and maintenance of fishing grounds necessary to cultivate marine organisms; and
 5. Other matters which the metropolitan mayor or provincial governor deems necessary to foster and develop fish farming.
- (3) The establishment of an implementation plan shall be subject to deliberation by the competent metropolitan/provincial fisheries mediation committee under Article 88.”

3.3 Problems with aquaculture governance

On the basis of discussions made in the above sections, problems with Korea’s fishing license system for aquaculture business can be summarized as follows: Firstly, the size of fishing grounds per fishery household has remained very minimal. Fish farms disposed of for promoting the economic activities of local fishers and boosting their incomes are used primarily by fishing village cooperatives (68 percent; based on the number of licenses). While individual/collaborative fishing licenses, fisheries cooperative licenses and destitute fishermen’s cooperatives take up only 18 percent, 14 percent and 1 percent each. Secondly, fish farms are largely run by existing owners due to the permanence of fish farm licenses (i.e. license period of 10 years and subsequent extension of 10 years or less) and limitations on the entry of new fish farmers. This is attributable to an increase in idle fish farms and reduced productivity amid society aging, resulting in social losses and inefficient fish farm utilization. Finally, the decision-making process on fishing license is extremely uniform. The decision-making process for aquaculture business seems to be decentralized on the surface, but in reality takes the form of a uniform, centralized decision-making system. Local governments have the right to give or revoke licenses and permits, while specific matters still need to be approved by the central government.

4. IMPROVEMENT PLANS FOR AQUACULTURE GOVERNANCE

4.1 Coordination of authority on fishing license for aquaculture business

The Fisheries Act previously stipulated that fishing licenses for aquaculture business be handled by metropolitan mayors and provincial governors. The revised Act in 1995, however, delegated this authority to the heads of local governments (e.g. mayors and county governors), facilitating the participation of fish farmers in aquaculture business. In preparation against potential problems such as over issuing of aquaculture licenses and devastation of fishing grounds, a limiting provision was provided that administrative organizations should handle fishing licenses, including those for aquaculture business, within the range of fishing ground utilization and development plans set forth by metropolitan mayors and provincial governors.

Therefore, the heads of local governments such as mayors and county governors can hardly manage the fishing licenses in a way tailored to their local characteristics if these rights are handled under the umbrella of fishing ground utilization and development plans set forth by mayors and provincial governors. Additionally, local characteristics should be taken fully into consideration in the management of fishing licenses under the responsibility of mayors and county governors.

4.2 Improvements in fishing ground utilization system

As the proportion of aquaculture business in the fisheries sector is growing daily, the fishing ground utilization system for aquaculture business should be reexamined.

Improvements are needed to be made on its legal characteristics such as private property rights, real rights, possibilities of assignment such as transfer/split of rights, restrictions on security rights and possibilities of lease. A fishing license system facilitating smooth entry and exit of fish farmers should be established to ensure the efficient use of fish farms. In order to enhance the usability of fish farms, it is essential to break away from the conventional fishing ground utilization centering on coastal fishermen and fishing organizations, and to provide a new fishing ground utilization system that allows smooth entry of actual (all) users.

In order to address these problems with the fishing license system, the following institutional improvements are required:

Firstly, aquaculture business-related laws and regulations should be formulated and enforced in a centralized manner as an institutional platform for promoting the industrialization of aquaculture business. Secondly, the property rights and transaction characteristics of the fishing license system should be further reinforced to resolve problems with the fishing ground utilization system. The reasons for license disqualification should be loosened to allow the entry of actual users. It is also important to overhaul the priority of the existing fishing license system, which is currently limited to certain individuals. Active consultation with local governments is required to loosen provisions on the mandatory extension of effective periods. Thirdly, it is essential to come up with a system to facilitate the entry and exit of fish farmers. Finally, networks among those involved in aquaculture governance should be created. Network activities are often coordinated by mutual contracts rather than by formal systems with official authorities. Network constituents also supplement and support each other's activities. Relationships formed by these networks are more official than those created by contracts and entail stronger bonds among their components.

The bonds between networks give rise to greater networks among more aquaculture governance organizations. Proactive coordination activities are also made among a greater number of organizations. A network organization, after all, does not absorb all horizontal and vertical functions needed for governance but is run more efficiently through linkage and cooperation with external factors. The world is transforming itself into an information society, which can be defined as "network society" with remarkably developed networks. In the era of network, intangible assets such as technology and know-how determine the success or failure of individuals or organizations. Network knowledge such as the expanded scope or use of networks—beyond the introduction of more sophisticated hardware and software—thus emerges as a source of power. Knowledge experts all across the world who are creating, improving and proliferating new information on a continued basis are connected via one open network to gain enormous amounts of information and acquire new knowledge. Therefore, what is crucial in this era of information is to gain from the utilization and integration of networks.

5. CONCLUSION

This paper has sought to examine the concept of aquaculture governance and the current status of aquaculture in Korea, analyze individual factors of aquaculture governance and suggest problems and potential improvements for the industry. Aquaculture governance is understood as a process where the government and the aquaculture industry cooperate with each other to formulate and execute fisheries policies for the continued development of aquaculture or a process of legal, social, economic and policy coordination for managing the aquaculture industry.

The current status of aquaculture governance in Korea involves Korean organizations for aquaculture governance, including the Fisheries Policy Office of the Ministry for Food, Agriculture, Forestry and Fisheries (MIFAFF) on the government side and the National Federation of Fisheries Cooperatives (NFFC), the Aquaculture Business

Association (ABA) and the Korea Federation of Advanced Fishermen (KFAF) in the private sector. The government organization for aquaculture governance implements policies for aquaculture (fish farming); laws and regulations directly correlated with aquaculture business include the Fisheries Act, the Fish Farming Development Act, the Fishing Ground Management Act and the Fishing License and Fishing Ground Management Rules. Private institutions include fisheries cooperatives by district and business type, with the Fisheries Cooperatives Act and its enforcement decrees and rules as relevant laws. The implementation of policies and institutions on production, processing, distribution and international cooperation is underway on the basis of these organizations and laws. This paper has examined the current status of and problems with these systems.

Problems with Korea's fishing license system for aquaculture business have been summarized as follows: First, the size of fishing grounds per fishery household practically remains very minimal. Fish farms disposed of for promoting the economic activities of local fishers and boosting their incomes are used primarily by fishing village cooperatives (68 percent; based on the number of licenses), while individual/collaborative fishing licenses, fisheries cooperative licenses and destitute fishermen's cooperatives take up only 18 percent, 14 percent and 1 percent each. Second, fish farms are largely run by existing owners owing to the permanence of fish farm licenses (i.e. license period of 10 years and subsequent extension of 10 years or less) and limitations on the entry of new fish farmers. This is attributable to an increase in idle fish farms and reduced productivity amid society aging, resulting in social losses and inefficient fish farm utilization. Third, the decision-making process on fishing licenses is extremely uniform. The decision-making process for aquaculture business seems to be decentralized on the surface but actually takes the form of uniform, centralized decision-making system. Local governments have the rights to give or rescind licenses/permits, while specific matters still need to be approved by the central government.

Potential improvement plans are as follows: First, the authority on fishing licenses for aquaculture business needs to be coordinated. Second, the fishing ground utilization system for aquaculture business should be reexamined. In other words, Improvements are needed on its legal characteristics as private property rights, such as real rights, possibilities of assignment such as transfer/split of rights, restrictions on security rights and possibilities of lease. Also, a fishing license system facilitating smooth entry and exit of fish farmers should be put in place to ensure the efficient use of fish farms. In order to enhance the usability of fish farms, it is essential to break away from the conventional fishing ground utilization centering on coastal fishermen and fishing organizations and to provide a new fishing ground utilization system that allows smooth entry of actual users.

In order to address these problems with the fishing license system, the following institutional improvements are required: First, aquaculture business-related laws and regulations should be formulated and enforced in a centralized manner as an institutional platform for promoting the industrialization of aquaculture business. Second, the property right and transaction characteristics of the fishing license system should be further reinforced to resolve problems with the fishing ground utilization system. The reasons for license disqualification should be loosened to allow the entry of actual users; it is also important to overhaul the priority of the existing fishing license system, which is currently limited to certain individuals. Active consultation with local governments is required to loosen provisions on the mandatory extension of effective periods. Third, it is essential to come up with a system to facilitate the entry and exit of fish farmers. Fourth, networks among those involved in aquaculture governance should be created. Network activities are often coordinated by mutual contracts rather than by formal systems with official authority. Network constituents

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A case of fisheries governance in aquaculture: *Development of laver varieties in Haenam, the Republic of Korea*

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1. INTRODUCTION

Selecting an exemplary case of fisheries governance begins from understanding what good governance entails. Until the mid-20th century, governance was generally understood simply the act or method of governing (Oxford dictionary, Wikipedia). The entity responsible for governance was the government, and governance was a series of management and administration tasks handled by the government. Due to failures of governance in the post-Cold War era through the turn of the 20th century, the concept of governance in the academia has changed from direct ruling to cooperative governance. Governance has come to refer to the management of issues by civil society, rather than a unilateral ruling by a government.

Accordingly, international organizations began developing a new understanding and definition for governance. For instance, the World Bank defined governance as “the exercise of political authority in management of economic and social resources for development (1992)”, and the Organization for Economic Cooperation and Development (OECD) defined it as “a harmony of diverse management methods of common issues by individuals, organizations, public and private sectors (1995).” The United Nations Development Program (UNDP) viewed governance as “the exercise of political, economic, administrative rights to manage national issues at all levels” and “a neutral concept that includes mechanism, institutions and processes that clarify the rights of citizens and interested parties, exercise their legal rights and obligation, and adjust their conflicting interests (1997).” The UN Center for Human Settlements (UNCHS) defined urban governance as “methods of planning and managing common issues of individuals and (public and private) organizations” and “a continuous process that leads to conflicts or mutually beneficial cooperation activities.” Therefore, urban governance is understood as executed by the government, private sector, civil society, and both unofficial and illegal sectors (Park, Hee-Jeong, 2001).

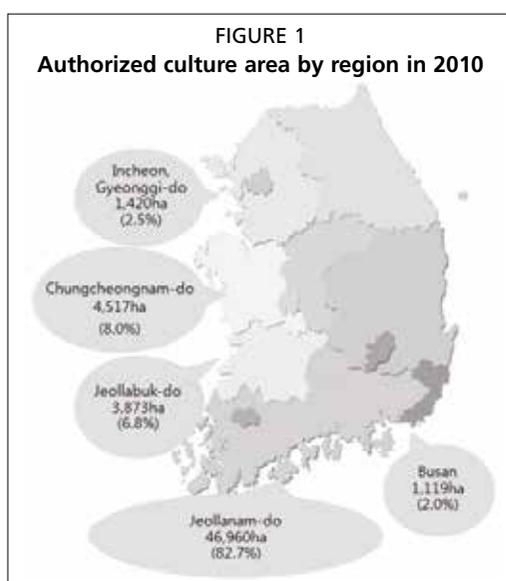
Prior to selecting exemplary cases of fisheries governance, the principles and characteristics of good governance have to be first determined. The UNDP, UNCHS, UN High Commissioner for Human Rights, United Nations Children’s Fund (UNICEF), and World Health Organization (WHO) met in New York in 2001 to discuss the standards of good governance and stated that equity, effectiveness, accountability, participation, and security are the core features of good governance. The Urban Governance Initiative (TUGI) laid out the principles of good governance more specifically along with the assessment indicators for each principle: participation, rule by law, transparency, responsiveness, consensus orientation, equity, effectiveness, and strategic vision.

Subsequently, the UN Food and Agriculture Organization (FAO) proposed the principles of fisheries governance as security of livelihood and income, access to fisheries resources, security of fishing rights, transparent and fair process of decision making, universal application of law, and efficient fisheries management system. This study has selected an exemplary case of fisheries governance in Korean sea farming, based on the aforementioned principles, main characteristics and assessment criteria of good governance that have been discussed and agreed by international organizations.

2. ANALYSIS ON FISHERIES GOVERNANCE CASE IN AQUACULTURE

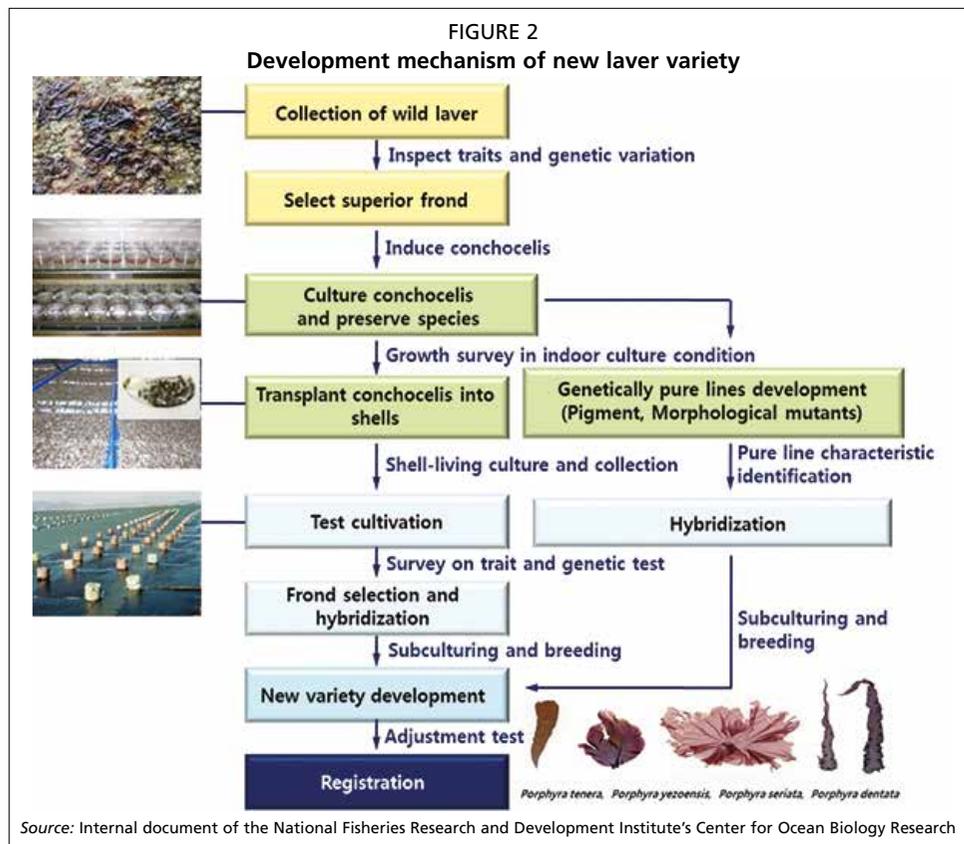
2.1 Case selection

Laver harvest is the fourth largest harvest in Korean marine farm production, following brown seaweed, oyster, and sea tangle. In 2010, Korea produced 236 000 tons of laver, which is 17.4 percent of the total aquaculture produce of 1 355 000 tons. Laver became the first sea farming item to be exported in excess of US\$100 million. Laver is mostly produced in Jeollanam-do with 55 949 000 bundles (one bundle \approx 260g = 100 dried laver pieces) in 2010, which was 58.9 percent of the national harvest of 94 951 000. The province is home to 4 099 aqua-farmers, or 88.5 percent of the national statistics of 4 630, and 523 001 farming facility fences, or 77.4 percent of the national total of 675 714. The province has a laver culture area of 46 960 ha, which is 82.7 percent of South Korea's total area of 57 118 ha.



Laver is an important source of income for fishermen in Jeollanam-do. Because laver has to go through multiple processes before it is ready as commercial products, seaweed production contributes to job creation in ancillary industries. For the laver fishermen depending on coastal harvests for their livelihoods, laver is an indispensable source of income.

Since 2002, Korean laver fishermen have had conflicts with Union Internationale Pour la Protection des Obtentions Vegetales (UPOV), an international organization established in 1961 to protect new varieties of plants in 1961 with 69 member countries as of April 2011. Korea became the organization's 50th member on January 7 2002. Under the International Convention for the Protection of New Varieties of Plants of 1991, all member nations are obligated to follow the organization's regulations with respect to all plants produced within their lands and seas within a decade from their entry. Accordingly, the Korean government designated all varieties excluding seaweeds and five agricultural products to be protected as of 2011, and laver and other seaweed products were included in plant variety protection on January 2012. New varieties are being developed to be under the plant variety protection program.



Until 2007, neither the Korean government nor the fishermen themselves had little financial interest in seaweed variety protection. As a result, Korea did not have the necessary policies and institutions in place to respond to the UPOV Convention. For instance, some of Korean laver has been cultured from the seeds imported from Japan. When the Convention becomes effective for seaweed varieties, Korea may have to pay royalties to the Japanese government.

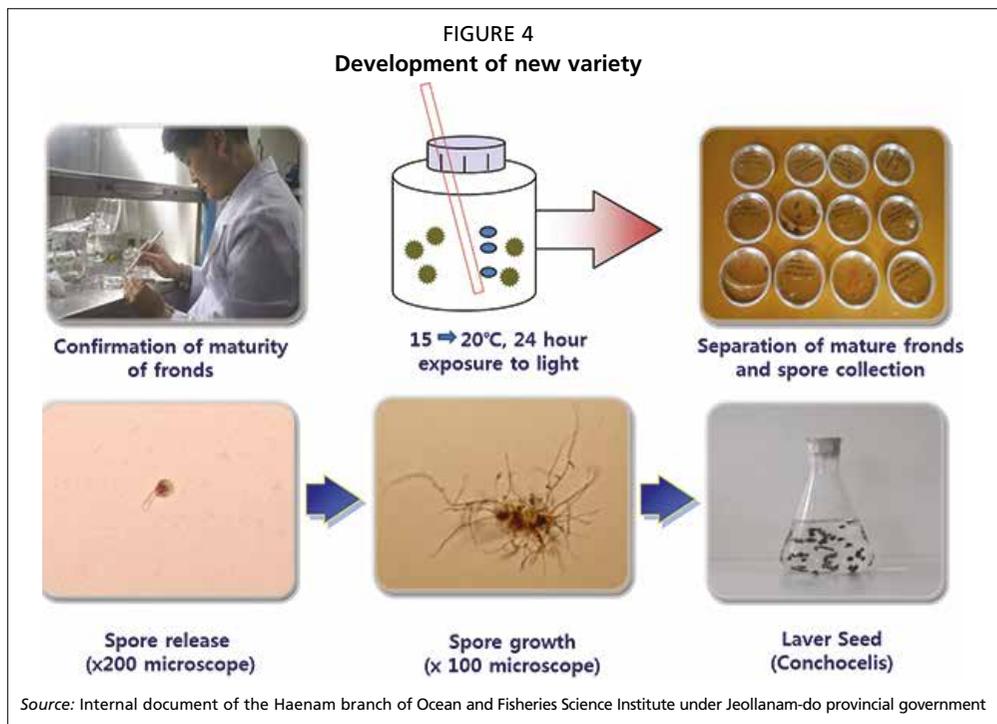
Royalty here refers to a certain rate of payment made by nursery companies who raise purchased seeds to breeders. Therefore, when a Korean nursery company imports seeds from a foreign breeder, the nursery company is obliged to pay royalties to the foreign breeder. The rate of royalty is determined based on a contract between the two. Not that the laver farmer pays royalties to the foreign breeder directly, but the former is burdened with higher costs of seed purchases because of royalty. Since 2007, the media and academia have raised worries about royalty payment, which would inevitably burden mostly small-scale, subsistent aqua-farmers. They strongly requested the government to protect new varieties of sea plants or seaweeds. Emphasizing the severity of the situation, a professor at that time wrote: "There is no domestic variety of seaweed, and in two to three years, disputes surrounding seaweed seed royalties would never stop rising." (Kookje Daily, February 20, 2007) The concern of the media, universities and civil society was known to seaweed farmers; aware of the expected royalty payment, they demanded for the government, local governments, and the academia and research institutes to come up with viable solutions.

The Korean government came to respond to the request of seaweed farmers and established legal, institutional and administrative procedures regarding seaweed variety protection in preparation for the UPOV Convention. Such a move was made in alliance and cooperation with the National Fisheries Research and Development Institute (NFRDI), its provincial institutions, government-supported research institutions, academia and interested groups with the aim to protect livelihood of seaweed farmers.



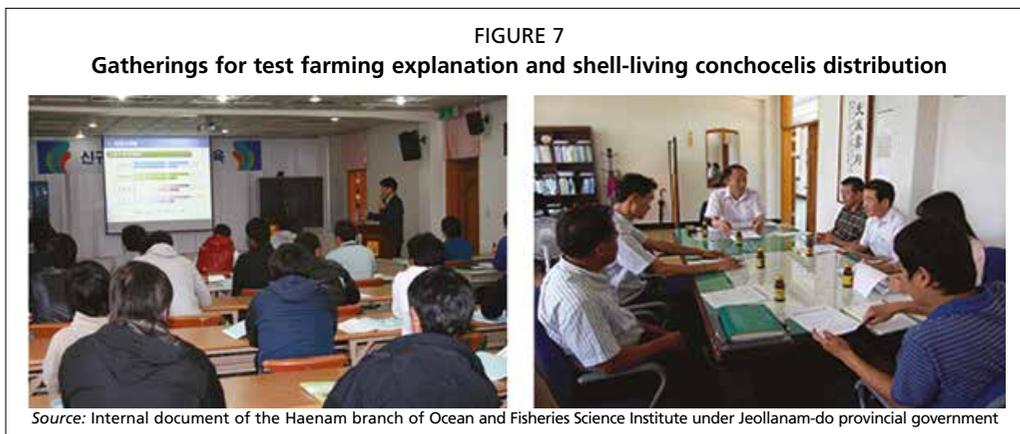
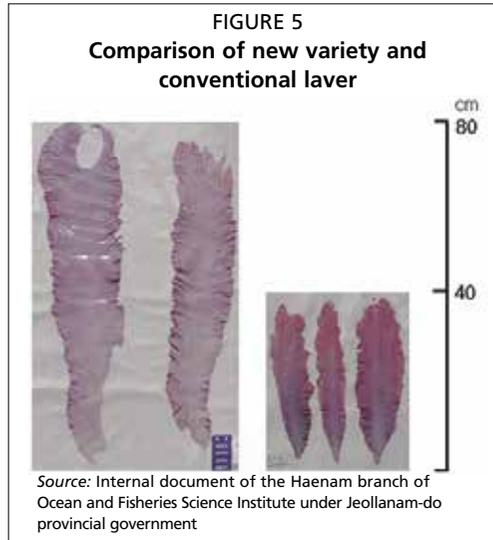
A set of evaluation criteria and regulations on marine plant variety protection have been formulated (NFRDI for Seaweed Research Center, 2011, Korea Maritime Institute, 2009, 2010).

After 2007, when the government started to show interest in building social infrastructure for the development of new plant varieties, the Haenam branch of Ocean and Fisheries Science Institute under Jeollanam-do provincial government independently launched on the development of new laver varieties with local laver farmers in order to increase their income and save on royalty payments to foreign breeders. In the course, the laver farmers brought superior breed fronds to the Haenam branch, and the researchers of the branch visited the fishing farms or wild environment to collect good fronds to breed seeds.



As a result of active collaboration, the Haenam branch developed a new laver variety of excellent quality in 2009, which empowers laver farmers to respond to the UPOV Convention to be effective in 2012. The new variety is twice longer on average, 70 to 80 cm long, compared to the length of conventional laver varieties of 30 to 40 cm. The new variety grows 15 days faster in comparison with the average laver, of which harvest requires 60 days. It can be harvested 8 to 11 times a year (for average laver, only four times a year). The new kind shows blackish green or blackish red color and has a strong resistance to laver disease.

In particular, the owners of three farming beds, Songji Eoran, Hwasan Joongma, Hwangsan Sanso, in Haenam, the first test place for 2009, provided part of their farms (45 farming fences). On a regular basis, the Haenam branch and the farmers had town hall meetings and various gatherings, a good example of healthy participation (consensus orientation and involvement of fishermen) and accountability (transparency and responsiveness), which are core principles of good fisheries governance.



The Haenam branch increased the harvest of the new variety from 45 farming fences in 2009 to 6 125 in 2010, and distributed them to 91 laver farmers in 7 counties who wanted test farming. The branch also participated in the Naming Ceremony of New



Laver Variety (March 2010), Biotechnology Industry DNA Exhibition (June 17-19, 2010), and Korea Food EXPO 2010 (November 18-21, 2010) to promote the excellence of the new variety.

The case of inventing the new variety of laver in Haenam is a testament to good fisheries governance. In the course of resolving issues regarding plant variety protection under the UPOV Convention through cooperation of the government organization and laver farmers, the norms of good governance defined by the FAO have been ensured, such as livelihood and income protection, easy access to marine resources, ensuring fishing rights through productivity enhancement, transparent and fair decision making, universal application of law and an efficient fisheries management system (division of authority and clarity). Therefore, this paper selected Haenam's new laver variety as an exemplary case of good fisheries governance in aquaculture.

2.2 Cases analysis

2.2.1 Current status of laver culture in Haenam

The size and production of the laver culture industry

As of 2010, Haenam is home to 1 240 laver farms, or 30.3 percent of 4 099 in Jeollanam-do. Haenam has 99 853 fences, or 19.1 percent of the total 523 001 fences in the Jeollanam province. The area of the farming bed in Haenam is 7 680 ha, 16.8 percent of the total 45 767 ha in the province. Haenam produces 12 169 thousand bundles of dried laver, 21.7 percent of 55 949 produced in the province, and Haenam's production amounts to 48.5 billion won (44.8 million dollars), which was the highest in the recent four years.

TABLE 1
Yearly laver farming in Haenam

Year	Fishing households	Aquaculture farm		Facilities		Production			
		No.	Area (ha)	Facility (fence)	per ha (fence)	Quantity (thousand bundles)	Amount (mil. won)	per fence (bundle)	price per bundle (won)
2010	1 240	55	7 680	99 853	13	12 169	48 500	121	3 985
2009	1 231	57	7 746	100 692	13	11 939	39 436	118	3 075
2008	1 231	58	7 746	85 213	11	14 132	44 376	165	2 920
2007	1 435	59	7 720	83 055	11	10 919	36 619	131	3 350

Source: Internal document of Haenam county, Production calculated in dried laver

The production of non-dried laver has been on the rise since 2009, which is also attributable to the distribution of the new variety. The new variety grows faster in time and double in size, and fetches 60 000 to 100 000 won per 60 kg, far higher than the conventional laver of 60 000 to 90 000 won.

TABLE 2

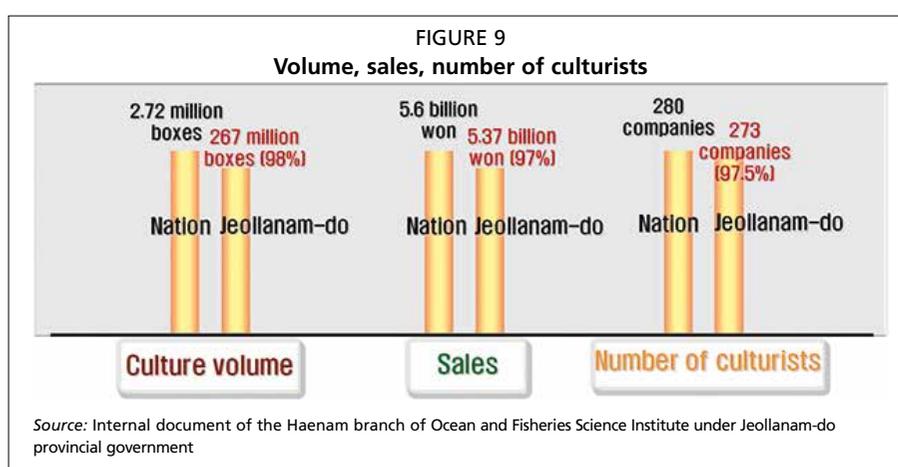
Yearly non-dried laver production quantity and amount in Haenam (Unit: ton, thousand won)

Item	2007		2008		2009		2010		2011	
	Quantity	Amount								
Total	39 161	26 204 500	52 480	31 567 778	42 709	26 679 161	44 253	36 063 501	57 508	40 289 413

Source: Internal document of Haenam county

The status of the laver seed farming industry

Across the nation, there are five to six laver seed multipliers and about 280 culturists and collectors working in the seed industry as of 2008. Most of seed multipliers, culturists and collectors are in Jeollanam-do, accounting for over 97 percent of total volume, sales and number of seed culture beds. Haenam has 2 seed multipliers and 52 culturists.



The laver seed multiplication has so far depended on five to six individuals who have extensive experience. Those multipliers have been reliant on wild collection or the varieties brought in from Japan, rather than developing breeds through cross-fertilization or mutation. That is why it is hard to grasp where those seed sorts were multiplied. Most multiplication facilities are self-made or makeshift, and seed supply is insecure, small-scale and has a high risk of losing genetic resources. Currently, about 15 seeds are supplied in Korea and demand for domestic laver *conchocelis* does not exceed 20 kilograms, which is 160 million won (approximately US\$148 000) in sales (20 kg × 80 000 won/10 g).

As of 2008, there are 280 culturists who farm conchospores and collectors who rear conchospores on the net. Most of them do both culturing and collecting, and they produce some 2.7 million boxes with sales of 5.6 billion won (approximately 5.2 million dollars). The culture facilities are mostly temporary or wooden, and thus in poor conditions. Despite these poor circumstances, the aqua-farmers and the Haenam branch of Ocean and Fisheries Science Institute under Jeollanam-do provincial government worked jointly to successfully develop a new variety. The new variety development is expected to have a positive effect on the restructuring of the Korean seed industry in the long term, as the volume of *conchocelis* of the new variety stood at 1.571 kilograms in 2010, which accounts for the high 8 percent of the total domestic production of laver *conchocelis* of 20 kilograms.

2.2.2 Fisheries governance in the Ccase region

The government organization and its role for the seed industry

The government organization related to the breeding industry and variety protection is broadly classified as the central government and local government entities. At the

central government level, the Aquaculture Industry Division at the Fisheries Resources Bureau of the Fisheries Policy Office of the Ministry for Food, Agriculture, Forestry and Fisheries oversees, plans and manages the whole seaweed industry including laver. At the local government level, the Fisheries Office under the National Fisheries Research and Development Institution was transferred to local governments in 2009, and its role has been assumed by local government agencies with slightly different names (Fisheries Management Office, Fisheries Technology Office, etc.).

Jeollanam-do Ocean and Fisheries Science Institute's main office and branches, Gyeongsangnam-do Fisheries Resources Research Institute, Gyeongsangbuk-do Fisheries Resources Research Institute's Freshwater Fish Research Center, Jeollabuk-do Fisheries Resources Experiment Research Institute, Jeju Fisheries Research Institute play their roles for the seaweed industry. Particularly, these research institutes focus on on-site practice-based education to distribute and offer useful guidances. Meanwhile, seaweed seed cultivation and development is studied at the Center for Seaweed Biology Research under NFRDI, which was established to develop and preserve seaweed genetic resources, and develop culture techniques in 2004. Pukyong National University and Chonnam National University also support such research activities.

What is encouraging in developing the new laver variety in Haenam is the fact that the local fishermen and the Haenam branch of Ocean and Fisheries Science Institute under Jeollanam-do provincial government worked together to develop the variety. Behind the achievement, many factors exist: constant efforts to identify and resolve issues at the Ministry for Food, Agriculture, Forestry and Fisheries, R&D projects of NFRDI including in Seaweed Research Center, its support for the industry, promotion of the media, and collaboration among public servants of fisheries related government agencies, seed producers and aqua-farmers.

Government support for variety protection

As of 2009, Korea has 368 aqua-farmers who live on seaweed seed culture. Yet, to this date, there has been no case where a private aqua-farmer developed a new variety. As the scheduled date for the UPOV Convention to go into effect comes near, most agricultural and forestry species are under variety protection, and new varieties have been developed by individual plant breeders. The story is different in the seaweed industry; the industry lags far behind other industries in terms of breeding.

To develop, preserve and distribute seaweed seeds, the government provided 800 million won annually to the Center for Seaweed Biology Research from 2008 and supported efforts to build seaweed variety registration and protection mechanism. From 2008 to 2010, Center for Seaweed Biology Research and Jeju Fisheries Research Institute received one billion won each annually and executed a superior seed distribution project. The project was designed to collect and manage genetic resources of seaweeds, and comprehensively oversee the whole industry from breeding to variety registration and distribution regulation. The government played the public sector role in managing genetic resources. That is, the government assumes the responsibility for genetic resources preservation and management, variety protection and distribution regulation; the private sector develops, produces and sells seeds.

TABLE 3
Roles and responsibilities in breeding of agricultural and seaweed products

Roles	Seaweeds	Agricultural produce
Genetic resources preservation and management	<ul style="list-style-type: none"> • NFRDI Center for Seaweed Biology Research 	<ul style="list-style-type: none"> • Genebank under Rural Development Administration (Korea Forest Service)
Breeding	<ul style="list-style-type: none"> • Public: Center for Seaweed Biology Research, Universities, etc. • Private: None 	<ul style="list-style-type: none"> • Public: Rural Development Administration (Korea Forest Service, Universities, Atomic Energy Research Institute, etc.) • Private: Seed companies, individual breeders
Variety verification and registration number	<ul style="list-style-type: none"> • NFRDI 	<ul style="list-style-type: none"> • Korea Seed and Variety Service
Seed production and supply	<ul style="list-style-type: none"> • City/county fisheries management office, fisheries technology office 	<ul style="list-style-type: none"> • Others: private companies
Distribution regulation	<ul style="list-style-type: none"> • NFRDI 	<ul style="list-style-type: none"> • Korea Seed and Variety Service

Source: NFRDI Center for Seaweed Biology Research, Dec. 2008

Law and institutions regarding variety protection

The Seed Industry Act of Korea was enacted and declared on December 6, 1995, and went into force starting on December 31, 1997, following two years of preparation period. Before the Act was enforced, plant varieties were not protected under a specific law but they were patented under the Patent Act. Yet, numerous challenges were met as a result of a lack of awareness about the plant patent mechanism and a uniform application of patents to both general inventions and plant varieties. Meanwhile, Korea signed the Trade Related Aspects of Intellectual Property Rights (TRIPs) of the World Trade Organization and was obliged to protect new plant varieties. Eventually, the Korean government established the Seed Industry Act with the objectives of complying with the WTO TRIPs, ensuring seed sovereignty, and enhancing global competitiveness of the domestic seed industry.

In 1999, planning to join UPOV in 2002, Korea revised provisions on variety protection to reflect the UPOV Convention. The reason why Korea decided to become a member of UPOV was that a need to adopt the variety protection mechanism rose. As global competition became inevitable with the liberalization of feed import in 1997 and M&As of domestic feed companies by multinationals, logically, the government had to develop the domestic seed industry and raise agricultural and fisheries productivity. Furthermore, the WTO TRIPs required its member nations to protect new plant seeds as intellectual property, and UPOV membership grew with the international variety protection infrastructure getting stronger.

The expected effects of Korea's entry into UPOV are: an increase in productivity of agricultural and fisheries products as new variety protection is promoted; easier access to genetic resources, breeding technology and information from foreign organizations; and enhanced competitiveness following active exchange of seeds with countries with advanced technology. The UPOV Convention 1991 regulates its members to expand the list of variety protection to include all plants; Korea is also gradually expanding the list, considering the competitiveness of each crop and its likely impact on the agricultural and fisheries industry. In the first year of implementation, the nation started with 27 crops including rice, cabbage and apple, and in 2009 all agricultural products became subject to variety protection with several exceptions. For seaweeds, of which research and development of new varieties are at a later stage of development compared to the agricultural product, the longest possible grace period has been applied and seaweeds are expected to be under variety protection starting in January 2012 (Kim, Bong-tae, 2009).

3. PERFORMANCE AND FUTURE DIRECTIONS OF FISHERIES GOVERNANCE

3.1 Performance

3.1.1 *Stable income source for aqua-farmers through new variety development*

The new variety produced in 2011 in Haenam, Jeollanam-do has been planted at 6 125 aquafarming fences of 91 farms in seven counties, Haenam, Wando, Jindo, Sinan, Goheung, Jangheung, Gangjin. The Haenam branch estimates that income generated from the new variety would reach 5.48 billion won (approximately US\$5 million). The formula used for the calculation is as follows:

$$6\ 125\ \text{fences} \times 8\ \text{times harvest} \times 1.6\ \text{sacks} \times 70\ 000\ \text{won} = 5.48\ \text{billion won}$$

- number of fences at 91 aquaculture farms: 6 125 fences
- average harvest: 8 times
- productivity compared to one sack of conventional laver: 1.6 sacks (1 sack = 60 kg)
- price of new variety per sack: 70 000 won

Based on the above calculation, the average income of farms that produced with the new variety is 60.21 million won, 1.85 times higher than 32.49 million won, the average income of laver farms in Haenam. If converted into income per gram of seed, the new variety generated about 112 million won of income per gram. The total new seeds raised in Haenam amounted to 1 571 grams in 2011. The price of new laver seeds is 50 000 won per gram, which is far higher than the conventional laver seed price of 8 000 to 10 000 won per gram. The Haenam branch made an estimate that new laver variety production for 2012 was projected to be 10.29 billion won, meaning that within two years of its invention, its share rose to 4.5 percent in the 230.6 billion won laver aquaculture market in Korea.

Therefore, the development of the new variety contributed to income growth of all Korean laver farmers, which is anticipated to be of assistance in building a stable laver culture industry itself.

Easy and continued access to fisheries resources

As the local government holds intellectual property of the new variety, new seeds could be provided to farmers at a lower price than prices that would have been offered by a private company. The beneficiaries expect to have easy and continued access to the domestically developed new variety. Additionally, since laver and seaweeds absorb organic matter in the water and purify the environment, the new variety development project can rehabilitate the ocean's ecosystem, which is being destroyed by oceanic pollution and global warming, and by reducing carbon dioxide emissions, it will contribute to the preservation of oceanic resources and the ecosystem.

Stable livelihood secured through enhancement of productivity

The new variety is twice longer on average with a 70 to 80 cm length, compared to the length of conventional laver varieties. It grows 15 days faster in comparison with the average laver, of which harvest requires 60 days. The new kind shows blackish green or blackish red color and has a strong resistance to laver disease. As such, increased productivity allows farmers to have more farming fences in the same culture bed area, contributing to income growth. In particular, the price of new laver variety fetches 60 000 to 100 000 won per sack (60 kg), giving the laver farmers greater profitability than the conventional kinds sold at 60 000 to 90 000 won. What should not be overlooked, however, is a case where farmers continue to increase their production without controlling output, oversupply, and threaten their own livelihood.

Transparent decision making and problem solving even before tensions arise

After Korea joined UPOV in January 2002, the government was quick to designate agricultural products to be protected, while it did not come up with any measures to protect seaweeds until 2007. Since 2007, the academia, research centers, aqua-farmers raised concerns about the impact of the UPOV Convention through the media and broadcasts, and demanded the government to formulate a seaweed variety protection system and find measures against royalty payment. As seaweed variety protection emerged as a hot issue in the Korean aquaculture industry in the run up to the enforcement of UPOV, the central and local government, the aquaculture industry, research institutions, universities, and the media strengthened cooperation to resolve the issue.

TABLE 4
Concerns raised and tensions resolved regarding seaweed variety protection and royalty payment

Newspaper	Date	Title	Summary
Eomin News	Feb. 23, 2007	• "Emergency" in seaweed seed use	• Government should secure budget and organizational resources • Evaluation and registration institution launched on making variety protection criteria
	Mar. 2, 2007	• Be prepared for a seed war	• Fatal damage on seaweed culture is expected • All-out efforts should be made to come up with measures
	Mar 19, 2007	• Royalties to be imposed on laver varieties (<i>porphyra tenera</i> and <i>porphyra yezoensis</i>)	• Variety protection was analyzed
	Apr. 23, 2007	• Plant protection law to be transferred to the Ministry of Maritime Affairs	• The seaweed sector of Seed Industry Act was entrusted to the Minister of Maritime Affairs
Kookje Daily	Aug. 16, 2007	• Criterion on evaluation of new seaweed variety to be created	• Evaluation criteria in line with international standards began to be made
	Dec. 6, 2007	• Seaweed variety protection to be enforced in 2012	• Seaweed sector is to be postponed until 2012 • Budget has to be expanded for new variety development
Fishermen Newspaper	Jul. 28, 2008	• Laver seed cultivation meeting held	• The Haenam branch is prepared for UPOV
	Oct. 13, 2008	• A seed war lurking in seaweed industry	• Variety protection system is expected to expand to seaweed from 2012 • Government said it is unlikely to pay royalties because laver and brown seaweed will be locally developed
Korea Fisheries Economy Newspaper	Feb. 14, 2009	• Variety protection system to be effective for seaweeds in 2012	• Alternative measures were suggested for variety protection of seaweeds
	Feb. 14, 2009	• Urgent need to designate a seaweed seed research institute	• Urgency to have a seaweed seed research center was raised
	Jul. 24, 2009	• Adoption of seaweed variety protection and future measures	• Task force for variety evaluation has to be created and relevant organization expanded
	Sep. 11, 2009	• Need to protect seaweed variety	• Strategies for the Center for Seaweed Biology Research were suggested
	Dec. 30, 2009	• Fisheries variety system being restructured	• Institutional infrastructure is required to be made for fisheries variety protection policy
	Oct. 15, 2010	• Laver variety development has to be made under UPOV	• Process of new laver variety development was introduced
Korea Fisheries Newspaper	Jan. 22, 2010	• Laver variety successfully developed	• New seeds are resistant to disease, show good color and applied to patent
	May 3, 2010	• Home grown <i>porphyra</i> to be restored	• Center for Seaweed Biology Research pursues to develop new laver variety (<i>porphyra tenera</i>)

Such efforts proved effective and variety protection for seaweeds has been postponed until 2012 when the UPOV Convention goes into effect. Until then, policy development, institutional support and new variety development will have been pushed for in an effort to resolve diverse issues expected to arise afterward.

During the grace period, the central government conducted a study on new variety development measures in preparation for the UPOV Convention in 2007, and a

policy study on the registration of seaweed variety and establishment of protection mechanism in 2008. The media played a central role in promoting early establishment of a seaweed variety protection system jointly with research institutions, civil servants, seed producers and aqua-farmers. The Haenam branch of Ocean and Fisheries Science Institute under Jeollanam-do provincial government developed a new laver variety in cooperation with the aquaculture industry, which has led to higher income of marine farms and a reduced burden of royalty expected after the UPOV Convention goes into force.

What is noticeable is that the Haenam branch in Jeollanam-do distributes the new variety and focuses on public awareness campaign jointly with the media and broadcasting companies.

In conclusion, transparent and fair decision-making and mutual cooperation of the central and local governments, research institutions, the aquaculture industry, the media and academia resolved issues stemming from a seaweed variety protection system that could have caused a serious hurdle on the aquaculture industry. This particular good governance case well demonstrates that the stakeholders can resolve tensions even before they are manifested.

FIGURE 10
Public awareness campaign

- Successfully cultured new laver variety suitable for Haenam conditions: January 2010
- KBS News Network, Mokpo KBS's "Go to the West Sea!" program, Yonhap News and 11 others
- Jeollanam-do names a laver variety for the first time: March 2010
- Gwangju Daily and 5 others, Fisheries trade papers, etc.
- New laver variety went into test aquaculture: October 2010
- Yonhap News and 7 others, Fisheries trade papers, etc.
- New laver variety rewrites the history of laver culture: December 2010
- MBC News Today, KBS & MBC 9 O'clock News, KBS 8 O'clock News, Yonhap News and 15 others, Fisheries trade papers, etc.
- MBC-TV, National Issues program broadcast on December 29, 2010
- KBS-TV, Live Today program to be broadcast

Legal professionalism and revision of relevant act for greater accountability

Since Korea signed the UPOV Convention in January 2002, its new variety policies mainly revolved around agricultural products. That being so, preparations for seaweed variety protection lagged behind. Yet the environment changed in 2007 when the Korean government started to pay attention to marine plant variety protection and it commissioned the Korea Maritime Institute to review and supplement the marine plant section in the Seed Industry Act.

As a result, the terms such as "marine plant," "spores," and "culture," which never appeared in the Seed Industry Act until 2009, are inserted in the Act. On September 1, 2010, the Enforcement Decree of the Seed Industry Act was revised and delegated the responsibilities of the Minister for Food, Agriculture, Forestry, and Fisheries, such as variety protection, variety application, seed management and production, to the Chairman of the National Fisheries Research and Development Institution. The change allows the NFRDI to protect fisheries variety using their expertise, and the legal accountability for seaweed variety protection was transferred to the right institution, ensuring the legitimacy of law enforcement.

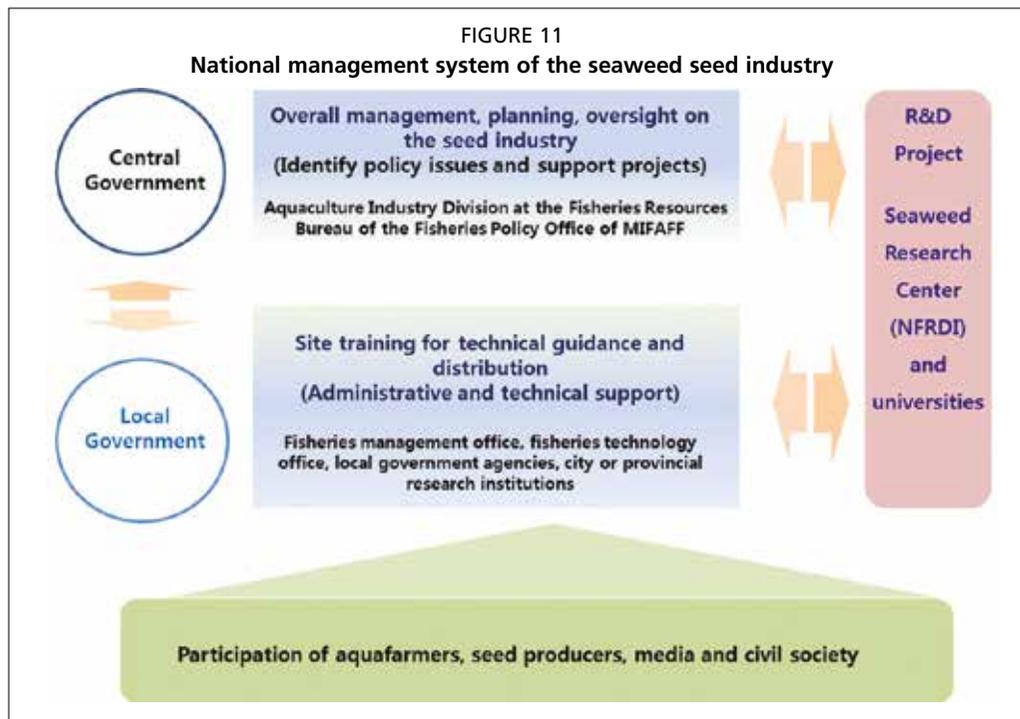
Efficient and distributed national management system

Distributed fisheries management structure proved to be efficient enough to play a big role in developing the new laver variety in Haenam. As mentioned before, overall management of the seed industry was done by the central government; local administration and management was the responsibility of the local government.

Research and development on seaweeds was mainly assumed by the NFRDI Center for Seaweed Biology Research under the central government and several universities; site training for technical guidance and distribution was done by the research center of the local government. The NFRDI local research center’s R&D activities were designed to provide technology to the culture industry, which has formed a cooperative relationship between research institution and the industry.

With the distribution of roles and responsibility, the local governments were put in a position to independently resolve local issues and this led to the development of the laver variety. Oftentimes, local governments join forces with the local media, civil society and the industry to bring about support from the central government.

In conclusion, a distributed mechanism of authority had a positive effect on the development of the variety in Haenam.



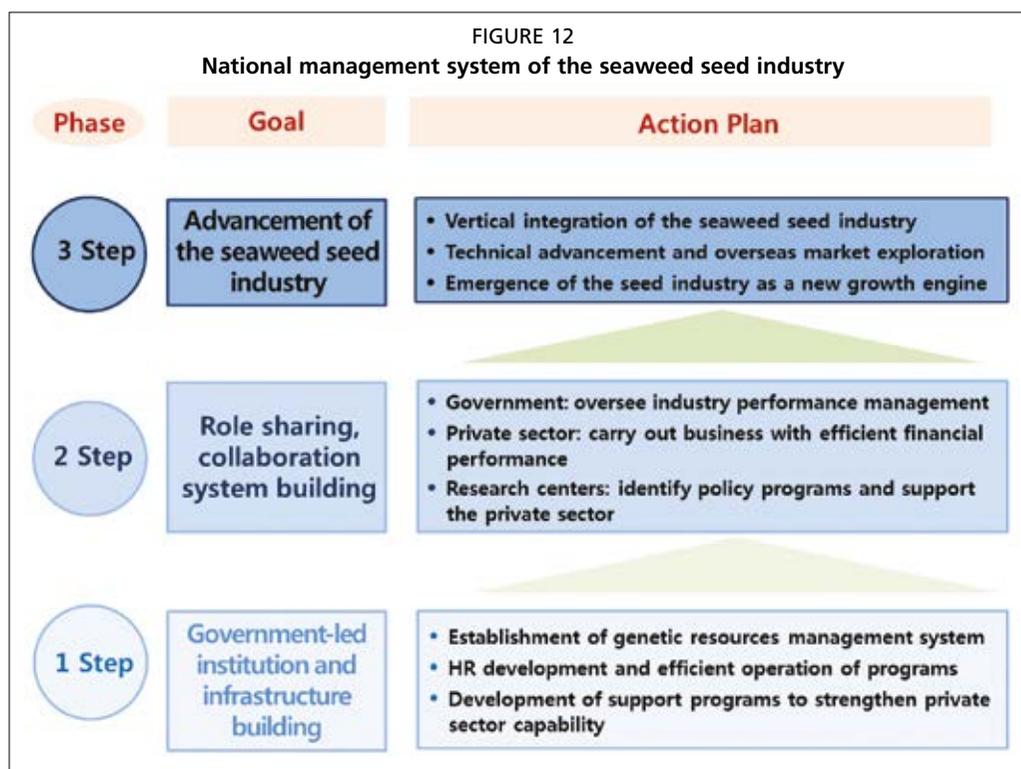
3.2 Future direction

3.2.1 Comprehensive road map for the Korean seaweed seed industry

As the knowledge economy becomes important and the economic value of intellectual property gets more tangible in the 21st century, the world shows greater interest in the seed industry. Fiercer international competition surrounding biological resources is boosting the significance of national management and systematic use of genetic resources of marine plants including seaweeds. As Korea exports a large quantity of fisheries, it has to pay greater attention to strengthening the competitiveness of seaweed variety and its capability to supply seeds. Against this backdrop, Korea needs a comprehensive road map to attain good fisheries governance and gain global competitiveness of the domestic seed industry.

The first step is to establish institutional infrastructure led by the central government. The action plan includes a management system for genetic resources,

human resources development, efficient operation of the project program, and support for strengthening private sector capability. The second step is to establish a role-sharing and collaboration system between the public and private sector. The government takes responsibility for managing and overseeing performances; the private sector focuses on efficient economic performances; research institutions identify and develop programs to support the private sector. The third step is to bring the seaweed seed industry to the next level by formulating a vertically integrated system, advancing technology and exploring the overseas market, and turning the industry into a new growth engine of the nation.



In conclusion, the road map has goals and action plans for each phase. Each individual action plan reflects the norms and operational principles of fisheries governance, such as organization, management, administration, institution, law, infrastructure building; cooperation and communication between the government and private sector, central government and local government; education and training programs.

3.2.2 *Action plan designed to attain the goal by phase* *Government-led institution and infrastructure building*

In order to establish a seaweed variety protection mechanism and develop the seed industry, the government first has to establish a framework. Particularly, Korean seed companies are very small, and thus the government should take initiative in building institutional, business and administrative infrastructure.

Also, a genetic resource management system has to be created. In other words, a proper procedure for such a system needs to be created: establishment of genetic resources, registration, multiplication, vitality and trait examination, DB registration and notification, multiplication and distribution. In particular, to safely manage genetic resources, a genetic resources management entity operated by the NFRDI center for Seaweed biological research needs to be expanded.

Lastly, assistance programs to strengthen the capability of the private sector have to be developed. The programs include private sector breeding support, a variety

registration and management system, and a production and supply system for registered seeds. More specifically, for private sector breeding, policy support has to be offered for expanding seed production facilities, and modernizing and automating multiplication, culture and collection facilities. For a variety registration and management system, the same variety application, application notification, assessment, registration and its notification mechanism as agricultural products have should be prepared, which requires a specific organization to be in charge. Last, for seed production and supply system, who will be subject to the seed industry policy has to be decided so that they enjoy guidance and support to stably supply seeds. Also, production trends and the distribution process have to be monitored thoroughly.

Role sharing and collaboration system of the government and private sector

To attain good fisheries governance in the seaweed seed industry, the government and the private sector have to divide responsibilities and build a close collaboration system. Most of all, the government should provide support for HR development and education/training so that the private seed producers can develop superior variety. At the same time, once a variety applies for variety protection and successfully goes through rigorous assessment, the right to the variety should be protected for fair competition. In summary, the government should support private breeding and conduct supervision and management carefully. The private sector has to enhance its capability by taking advantage of education and training programs provided by universities and government research institutions with an ultimate goal of developing a globally competitive variety.

Last, research institutions should focus on identifying projects so that private companies can enjoy the security of livelihood. For instance, a research study on increasing seaweed consumption can be done by a research institution to help private culture farmers predict consumption trends.

Advancement of the domestic seed industry

Good fisheries governance can advance the Korean seed industry only when the industry is vertically integrated, breeding techniques are developed, overseas markets are explored and the industry plays the role of new growth engine.

For the industry to be vertically integrated, everything from genetic resource collection and management, variety development, seed production and distribution, aquaculture, processing, use, sale to export should be systematically arranged and structured. This requires legal, administrative, economic institutions to be adopted, and consensus and agreement between industries of different phases to be reached. For the industry to advance its technical capabilities and enter into the overseas market, a globally competitive brand has to be created by modernizing breeding technology, culture techniques, facilities and equipment, and advancing process and usage techniques. This should be based on close collaboration among the seed industries of different phases.

For the seed industry to become a new growth engine, it has to expand into related industries with added-value products such as biotechnology and pharmaceuticals, energy, functional food, animal feed and fertilizer. This is a long-term action plan heading for green growth that needs the convergence of various disciplines.

4. CONCLUSION

The new laver variety developed in Haenam, Jeollanam-do is an exemplary case of good fisheries governance: the government, local governments, research institutions, the culture industry, the media and citizens joined forces to come up with countermeasures in the run up to the UPOV Convention going into effect in 2012. The case demonstrates most norms and operational principles of good fisheries governance presented by the

Food and Agriculture Organization.

First of all, the development of the new variety increased the income of laver farmers in Haenam. Second, the case shows how the local government and aqua-farmers can have easy and continued access to each other's resources. Third, the seed development project enhanced the productivity of the aqua-farmers, securing their fishing rights. Fourth, the variety development is the result of the transparent decision making of the central and local governments, the media, academia, research institution, and the culture industry, and resolving a tension beforehand that might occur when the UPOV Convention takes effect. Fifth, the law on seaweed variety protection was delegated to the professional fisheries organization, ensuring professionalism and accountability of application of law. Lastly, the case is the first one in Korea to develop the new seaweed variety through efficient and distributed fisheries management system. However, the Korean seaweed variety protection system and the seed industry still have a long way to go compared to Japan and China.

Against this background, this paper presented a comprehensive road map and action plan for each phase with the aim to spreading good fisheries governance for variety protection system and the aqua-farming industry.

In summary, the first phase in the comprehensive road map has set the goal of establishing institutions and infrastructure led by the government. The second phase goal is to ensure role sharing and collaboration between the central and local governments, and the goal at the third phase is to advance the seed industry. Action plans for the first phase are to build a system of genetic resource management; specialist development and efficient operation of training program; and development of support program to strengthen the private sector capability. In the second phase, the government focuses on collective performance management and supervision; the private sector concentrates on efficient economic performance; research institutions identify and develop policy programs and assist the private sector. In the last phase, a vertically integrated system in the seed industry is built; breeding technology advances and the overseas market is explored; the industry plays the role of new growth engine.

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A case study on the process of conflict resolution in aquaculture: *Land-based water tank aquaculture (LWTA) and village fishery in Jeju-do*

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1. INTRODUCTION

Governance is a neutral concept whereby a state, a civil society and an interest group seek to manage society through exercising political, economic and administrative power, employing institutions and processes to oversee conflicting interests among groups. As with all natural resources, fisheries are a ‘common property’ resource, open for use by all mankind and cannot be exclusively possessed: their ownership is vested in the State. Fisheries institutions may acquire selective rights of use through a license or permit. Due to their finite nature, competition over use is all but inevitable. In the case of aquaculture, operating in a clearly demarcated area for use by a specific group of persons, the number of stakeholders may be fewer than in fisheries in general; disputes are more likely to originate over the use of antibiotics against fish disease and sedimentation of fish feed. A Land-based Water Tank Aquaculture (LWTA) lends itself to conflicts with village fisheries and farming activities over villagers’ use of discharged water from tanks. Hence, the current laws and regulations setting out conditions for resource use has become a ‘sticking point’. Although in principle, LWTA is operated by using the land owned by individuals, in practice a village fishery exercises the real power over the use of the water. This study will review the conflicts between a LWTA and a village fishery and the challenges posed in conflict resolution, and suggest future directions.

2. GOVERNANCE IN AQUACULTURE AND VILLAGE FISHERY

2.1 Aquaculture in Jeju-do

History of fish farming development

LWTA was first developed with flounder farming in Jeju-do. Flounder aquaculture had begun in Japan in 1965 with the advent of fingerling production technology. Fingerlings were being distributed to farmers in Japan from the latter half of the 1970s, and the production technology was fully developed by 1980, leading to real growth in flounder aquaculture.

Flounder aquaculture in South Korea originated in the mid-1980s when the Fish Gene Research Center of the National Fisheries Research and Development Institution (NFRDI) caught adult flounders in its coastal waters, raised them in a Land-Based water tank, and produced fingerlings. Thereafter, South Korea imported flounder eggs from Japan, making mass production possible. In the case of fish aquaculture, this started on a trial basis using cages in 1964 in Gampo, Pohang, Samchuck, on the east coast while trials on yellowtail and puffer were conducted in 1967 in Hansando and Sanyangmyen, Tongyounggun on the south coast. In 1968, NFRDI experimented

with industrial-scale aquaculture, identifying certain key problems and suggesting future directions. However, at that time, national and international market conditions prevented wide-scale introduction of fish-farming. In 1974, Yokji, Sanyang, Gonri, Bongam and Hansan in Tyongyoung Gyongsangnamdo began yellowtail aquaculture, and in 1975 Gumundo followed with wintering of yellowtail caught from the longline fishery. The year 1983 heralded the start of red sea bream and sea bass aquaculture, with rockfish following in 1985.

The history of aquaculture development could be divided into three stages. The first stage, dating back to before the 1970s, was marked by the production of seaweeds such as laver, sea mustard in rather small amount. During the second stage, in the mid-1970s, there was a rapid growth in production of shellfish aquaculture, such as oyster, blood clam. The third stage, starting in the mid-1980s, saw the large-scale production and diversification of high valued species such as flounder, yellowtail, and pearl clam.

2.1.1 *Land-based Water Tank Aquaculture (LWTA)*

LWTA in Jeju-do

Most of the LWTA businesses in Jeju-do have produced flounder, and LWTA offers the ability to easily observe and control their color, feeding and swimming characteristics as well as environmental factors such as water temperature, salinity, resolved oxygen and light. . A flounder lives on the bottom, and even a water depth of 70 to 80 cm is sufficient. However, LWTA has certain disadvantages: 1) the availability of a large area of land adjacent to coastal areas at an affordable price; 2) the high cost of installing tanks and other facilities; 3) the high cost of electricity to pump water in and out of tanks, with the risk of mass fish kills resulting from energy disruption or other accidents. Jeju-do, with its seawater with abundant resolved oxygen and the appropriate temperature and salinity, is the ideal place for LWTA in South Korea. The sufficiently warm water temperature allows flounder production all-year-round. However, the concentration of village fisheries along this coastal area gives rise to conflicts.

Status of LWTA

The number of households engaged in fish aquaculture in South Korea was 2 404 in total in 2010 and among them Jeju-do accounted for 10.7 percent or 257 households (4 464 people). Meanwhile, the number of households with land-based water tank farming was 624 across the nation, among which Jeju-do took up 40.9 percent or 255 households (2 393 people). Most of the fish farmers in Jeju-do have produced flounders by using water tanks.

TABLE 1
Status in fish aquaculture and LWTA in 2010

	No. of household		No. of farmers	
	Total	Land-based water tank	Total	Land-based water tank
Nation	2 404	624	4 464	2 393
Jeju-do	257	255	1 428	1 413
Ratio	10.7%	40.9%	32.0%	59.0%
	Area (km ²)			/
	Total	Land-based water tank	Flounder	
Nation	5 448	2 621	2 557	
Jeju-do	1 281	1 182	1 127	
Ratio	23.5%	45.1%	44.1%	

Source: Statistics Korea, 2010, Survey on the status of fish aquaculture.

Production and value in flounder aquaculture

Total flounder production was only 1,037 tonnes at the beginning of the 1990s when flounder aquaculture was started, and since then production has rapidly grown: 14-fold to 14 127 tonnes in 2000, reaching a peak of 54 674 tonnes in 2009, then decreasing slightly in 2010, at 40 925 tonnes. During the two decades from 1990 to 2010, flounder production has increased 40 times, its value increasing 24 times, reaching 481.8 billion won.

Flounder production in Jeju-do has grown much faster than in the other provinces, beginning at only 105 tonnes in 1990, peaking to 30,899 tonnes in 2009 and declining to 21 367 tonnes in 2010. The production during the two decades from 1990 to 2000 has increased 203 times and the value 151 times. Due to amenable conditions for land-based aquaculture, Jeju-do accounted for 52 percent of production (an average of recent 6 years from 2005 to 2010).

TABLE 2
Trends in production and value in a flounder aquaculture (unit: tonnes, million won, %)

Years	Nation (a)		Jeju-do (b)		Ratio (b/a)	
	production	Value	production	value	production	Value
1990	1 037	19 998	105	1 661	10.1	8.3
1995	6 733	78 390	2 620	33 021	38.9	42.1
2000	14 127	190 091	5 385	73 331	38.1	38.6
2005	40 075	353 585	20 371	174 340	50.8	49.3
2006	43 852	458 933	21 910	223 476	50.0	48.7
2007	41 171	438 934	20 804	220 349	50.5	50.2
2008	46 432	408 262	25 027	223 986	53.9	54.9
2009	54 674	545 701	30 899	305 241	56.5	55.9
2010	40 925	481 793	21 367	251 148	52.2	52.1
Average ('05-'10)	44 522	447 868	23 396	233 090	52.6	52.0

Source: Statistics Korea, KOSIS.

Production by species in Jeju-do

Flounder production made up 21.7 percent of total fisheries production in Jeju-do. Hair tail production accounted for 28.4 percent, but in terms of value both species ranked almost the same. Relatively less important were: anchovy production (8.4 percent), followed by mackerel and yellow croaker (both 5.5 percent).

TABLE 3
Production ratio by species in Jeju-do (Average from 2000 to 2008)

	Farming flounder	Hair tail	Mackerel	Red tilefish	Anchovy	Yellowtail	Yellow croaker	Agar-agar	Hundred-sheet bundle
Production	21.71	28.42	5.50	1.84	8.42	0.73	5.46	3.29	2.71
Value	36.59	36.60	1.40	3.79	0.38	0.74	6.57	0.53	0.30

Sources: Statistics Korea, 2009, 20 years of fishery species in Jeju-do.

2.1.2. Village fishery

Formation of a Fishing Village Fraternity (FVF)

In a coastal area within 1 km from the shoreline, fishery institutions focus on the Fishing Village Fraternity (FVF) that has entitlement, through license, over fisheries resources in the licensed water. Conflicts over fisheries governance with land farmers center on a FVF because farming on land may cause an environmentally negative impact on a fishing ground exclusively used by the FVF. A FVF is one of the organizations under

the Fisheries Cooperatives Act, established by members of a local Fishery Cooperative over an administrative region or economic bloc within its jurisdiction. The following offers a historical perspective on the birth of a FVF.

Before the start of the Japanese colonial era in 1910, there had been civilian organizations aiming at cooperation on various matters in Korean society. They were called a fraternity whose organizational framework, purpose and function reflected the specific time and region and which have adapted to environmental, social and economic changes. A fraternity maintains close cooperation among its members based on the spirit of self-reliance and unity. According to the record,¹ at the end of the Lee Dynasty in Korea, there were 480 kinds of fraternities nationally, numbering a total of 19 067, comprising 814 138 members. The reasons why fraternities became so popular among the population engaged in agriculture, fisheries, commerce and manufacturing were a common sense of purpose, social association, and as a means to protest against the existing ruling class who had vested rights but were politically corrupt in the face of poverty. The fraternity engaged in fisheries development functioned in a particularly autonomous manner. In the process of industrialization and urbanization, accompanied by the provision of agricultural technology and farm mechanization, however, such autonomy gradually disappeared or weakened. In the coastal fishing villages, on the other hand, the autonomous nature of fraternities has been maintained and even strengthened, having adapted well to environmental and economic changes. This quality may be explained by the philosophy of joint ownership and joint use of a coastal fishing ground, in operation through one generation to the next. The demarcations between coastal fishing grounds that were owned by these fishing villages were decided by consensus and respected through the ages. It is this spirit of voluntary self-regulation that has been the pride of the FVF.

FVFs in Jeju-do

The number of FVFs in South Korea amounted to 1 993 in 2009, up from 1 809 in 2000, where a single large village may have two or three FVFs. The number of FVFs in Jeju-do has remained at 100 between 2000 and 2009, or approximately 5 percent of the national total.

TABLE 4
Trends of the number of FVF (Unit: No., %)

	2000	2005	2006	2007	2008	2009
Jeju-do	100	100	100	100	100	100
Ratio	5.5	5.1	5.1	5.1	5.1	5.0
Nation	1 809	1 952	1 969	1 972	1 978	1 993
Ratio	100.0	100.0	100.0	100.0	100.0	100.0

Source: Federation of Fisheries Cooperatives, 2010, Classification and Assessment of Fishing Village Fraternities.

FVFs may be classified according to 3 development stages: Welfare, Self-reliance and Growth. Of the total number of FVFs in the country, 177, or 8.9 percent, were of the 'welfare' type. In comparison, Jeju-do takes account of 15 percent of the welfare FVFs. In Jeju-do, 56 percent of FVFs became welfare stage in 2000, while self-reliance fraternities took up 63 percent (as against 28 percent for the entire nation) and growth fraternities 22 percent (compared to 62.7 percent at the country level) in 2009. The above reflects the higher quality of life in Jeju-do than the national average.

¹ Federation of Fisheries Cooperatives, 40 years of Fisheries Cooperatives, 2002

TABLE 5
Number of FVFs (Unit: No. %)

	Jeju-do			Nation		
	2000	2005	2009	2000	2005	2009
Welfare	56	27	15	545	228	177
%	56.0	27.0	15.0	30.1	11.7	8.9
Self-reliance	42	61	63	994	682	567
%	42.0	61.0	63.0	54.9	34.9	28.4
Growth	2	12	22	270	1 042	1 249
%	2.0	12.0	22.0	14.9	53.4	62.7
Total	100	100	100	1 809	1 952	1 993
%	100.0	100.0	100.0	100.0	100.0	100.0

Source: Federation of Fisheries Cooperatives, 2010, Classification and Assessment of Fishing Village Fraternities.

The average income of Jeju-do's FVF was 28 414 thousand won in 2009, 5.3 percent higher than national average, this gulf having widened as compared to 2005.

TABLE 7
Income level of a FVF member (Unit: thousand won)

Jeju-do			Nation		
2000	2005	2009	2000	2005	2009
21,682	21,704	28,414	19,142	21,684	26,988

Source: Federation of Fisheries Cooperatives, 2010, Classification and Assessment of Fishing Village Fraternities.

In Jeju-do, women divers have traditionally been engaged in fishing on the coastal grounds, the number being larger than in other regions. Jeju-do also dispatched divers to other villages where the water depth was significant to gather sedentary species. A sample survey of 8 FVFs among 100 in Jeju-do showed that the women divers have aged: there were no women divers under age 41. Women divers constituted 2.6 percent of the 41-49 age cohort, 21.3 percent of the 50-59 age bracket, 46.3 percent between ages 60 and 69, while 29.8 percent were aged 70 or older. Within a few years, it may turn out to be impossible to find new women diver recruits, and hence the need to develop new fishing methods.

TABLE 8
Age composition of women divers in 2009

	Total	Age 40 to 49	50 to 59	60 to 69	Equal to or more than 70
No.	352	9	75	163	105
%	100.0	2.6	21.3	46.3	29.8

Source: Jeju-do, 2011. 3, Fishing Ground Environment Survey in Jeju Coastal Waters.

2.2 Fisheries policy and management

2.2.1 Policy objective and means

Land-based Water Tank Aquaculture (LWTA)

By restricting the number of permits, the LWTA permit-granting system seeks to ensure a stable supply of fishery products while preventing rapid price falls due to glut. The licenses are issued by a Mayor or a chief of a County, stipulating that there be no environmental pollution. Furthermore, the occupancy and use of public waters are governed by the Public Waters Management Act.

Village fishery

A village fishery also operates under license, granting exclusive user rights of use over the coastal fishing ground near the fishing village, which, it is hoped, provides meaningful incomes while ensuring management of the fisheries resources in a sustainable manner.

2.2.2 *Management system and institutions*

LWTA

(1) Management system under the Fisheries Act

The LWTA license period, as granted by a Mayor or Governor, was five years at the time of introduction of the Fisheries Act (Article 46). In December 1995, LWTA was earmarked under the government policy drive for deregulation, but in July 2004, it became a licensed fishery again amid an oversupply of fishery products, lower consumption and a fall in fish prices, due to a rise in the number of LWTA businesses.

According to paragraph 3 of article 41 of the Fisheries Act, any person who intends to run any fishery business shall obtain a license for each fishing vessel, fishing gear or facility from the head of the city or county concerned. In the same article, land or seawater aquaculture was defined as aquaculture to cultivate marine animals and plants in a certain area of artificial land or seawater. The requirements for facilities associated with a land or seawater aquaculture are as follows. First, the need for a wintering facility: any person who wants to farm a species that needs a wintering period should set up facilities of a certain scale. Second, the necessity to install a water pollution prevention facility according to paragraph 2 of article 60 of the Water Quality and Aquatic Ecosystem Conservation Act and article 87 of its enforcement regulation. The specifications for a water tank are as follows.

- (a) A sediment facility whose size is more than 20 percent of raising facility and whose depth is 1 to 1.5 m should be installed to process feed remnants, fish excrement, sludge, etc;
- (b) Pollutants that result from cleaning water tanks or machines used for farming shall be processed in the facilities mentioned above (a) or in a separate sediment facility;
- (c) When water tanks are cleaned, the time as well as number and frequency of cleanings per year shall be recorded in a report;
- (d) The sediments in the sediment facilities mentioned above (a) and (b) shall be removed periodically, and in this case water removal equipment such as a filter shall be installed;
- (e) Dead fish shall be removed without delay and moved to land to prevent water pollution; and
- (f) Overdose of antibiotic substance in order to prevent or cure fish disease shall be prohibited.

(2) Water pollution prevention system

To prevent water pollution, the Ministry of Environment has established and enforced “Quality Standards and Management Guidelines on Waters Discharged from Fish Farming Facilities” in accordance with article 30.2 of the Water Quality Environment Preservation Act and article 49 to 51 of its enforcement decree. The Act stipulates that a Mayor or Governor, taking the regional characteristics into account, establish quality standards for discharged water, either building a separate facility or taking other necessary measures. Accordingly, Jeju-do’s governor has established a management system for water quality for waters discharged from land-based fish farming facilities in operation in the province in order to maintain a clean environment in the coastal area (Jeju-do decree No. 2004-49). In the case of land farming facilities using water tanks of size equal to or more than 500 m², concentrations of Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) are to be maintained under or equal to 2 ml/l and 5 ml/l in feeding time, respectively. Concentration of Suspended Solids (SS) shall be maintained at between 3 ml/l and 10 ml/l in feeding time.

(3) Public water management system

Public water occupation or use permission period

Starting a LWTA business requires not only a permit in accordance with the Fisheries Act but also one to use public water in accordance with the Public Waters Management and Reclamation Act (PWMRA). Paragraph 1 of article 8 of the PWMRA states that anyone who intends to perform an act falling under certain specific cases shall obtain permission for occupancy or use from the management agency of public waters. And Case Number 5 which relates to a land aquaculture business says that “Drawing in water into public waters or flowing out water from public waters: Provided that acts provided by Ordinance of the Ministry of Land and Ocean shall be excluded from here.” Article 11 of the PWMRA regulates periods of occupancy or use by the type of use. The permit periods are: 30 years for artificial constructions such as wharf, breakwater, bridge and lock gate; 15 years for other artificial constructions; 5 years for others including a water pipe used for a land farming business. However, this 5-year permit period for water pipe is too short, taking into consideration the operational life of the pipe. When the PWMRA provided further details of the types of use in April 2010, the permit period for certain uses was extended to 30 years while that for water pipe for land farming was maintained at 5 years.

Consent of stakeholder in permitting public waters occupancy or use

Article 12 of the PWMRA states that installation of any water pipe for land farming on a water body over which certain people have rights and which is open to public use or occupancy would only be permitted after consultations are held and the rights holders give their consent to the occupancy or use. Article 12 of the PWMRA Enforcement Decree defines rights holders as fishermen in a fishing village or any person who has acquired a fishery license. Subsequently article 4 of the PWMRA Enforcement Rule stipulates that anyone who applies for public water occupancy or use should submit a written consent granted by the rights holders. Article 7 of the PWMRA Enforcement Rule also states that any person who requests change of permit content shall submit to the management agency 4 written documents, that is, a topographical map, a blueprint, a ground plan and a written consent of rights holders. In case of change of permit period, only a written consent of rights holders is required.

Village Fishery

A village fishery generally refers to fishermen residing in a certain locality to manage and catch shellfish, seaweed or sedentary marine animals in a demarcated area of waters, contiguous to the shore, within a certain depth range. This is the kind of licensed fisheries described in article 8 of the Fisheries Act. When granting a license, the head of a city, county or ward shall do so within the scope of the development plan, taking into account the order of priority stipulated in article 13 of the Act. Article 9 of the Act also prescribes that a license for a village fishery shall be granted only to a FVF or a fisheries cooperative located in each district in order to promote the common interests of fishermen who reside in a certain locality. The permit period for a licensed fishery is 10 years but the period of validity of such a license may be shortened, where a simultaneous renewal of fishery licenses is necessary in accordance with paragraph 5 of article 8 of the Fishing Ground Management Act, or where Fisheries Act Enforcement Decree prescribes necessary matters to protect fisheries resources and coordinate fisheries matters. When a fishery rights holder applies for an extension of the license period, the head of a mayor, county or ward shall extend validation period of the license within the maximum period of 10 years from the date when that of the old license is closed. A fishery right becomes valid only when the license is registered on

the original register of fishery rights. The fishery right shall be a real right, to which the provisions of the Civil Act governing land shall apply *mutatis mutandis*; as such, it is inherently linked to real action toward claims for obstacle removal and prevention. As to the fishery right and the rights derived therefrom, the provisions of the Civil Act governing pledge rights shall not be applicable. It shall be deemed that any fishery right held by a FVF, which is not a legal entity, is owned collectively by the FVF.

3. CONFLICTS AND DISPUTES BETWEEN LAND-BASED AQUACULTURE AND VILLAGE FISHERY

3.1 Background of conflicts and disputes

Fishermen's strong mind-set for independence

The people of Jeju-do are said to be 'exclusive', with a strong sense of independence in order to survive in a harsh natural environment because of geographical characteristics of the island. The term "Yukzicgeot" refers to people from the main land Jeju-doin order to differentiate Jeju-do natives from those who have moved to Jeju-do from the mainland.

Such a sense of exclusivity in Jeju-do may stir up the people's emotions when a person in Jeju-do purchases a land near the village fishing ground and installs land farming facilities, creating a source of conflict. As an expression of strong will and independence, it was the fisherwomen of Jeju-do, some 17,000 women-divers, who took part in a struggle against Japanese colonial rule and looting over three months in 1932, using nothing more than their hooks for harvesting abalone.

Sea ownership of fishermen, in particular women divers

Village fishery in Jeju-do is little different from that of the mainland of the Korean Peninsula, except in terms of the extent of use of a fishing ground. Under the Lee dynasty, when there was no FVF, the Jeju-do governor had a duty to pay tribute to a king with sea cucumber and abalone; the village fishing ground was their natural abode, and the task of procuring these fell on the women divers. Also, the importance of village fisheries was attributed to the shortage of arable and fertile land in Jeju-do, as compared to rice farming on the mainland.

Because any mismanagement could lead to an unsustainable fisheries business adversely affecting livelihoods, the resources were strictly regulated by the village concerned. A FVF set access period and harvest amount voluntarily and thereby became an exemplary community at managing resources. In recent years, in spite of a more lax management system, a decline in resources, aging women divers and weakened unity in the village, the social and economic characteristics of the FVF in Jeju-do have strengthened the linkage with and ownership of the sea. A sudden emergence of land-based fish farming facilities owned by rich capitalists, along with their associated physical and environmental impacts, was not acceptable to Jeju-do's fishermen who have made intensive use of the coastal waters for ages.

3.2 Main factors of conflicts

Distrust in managing water quality of farming tanks in the initial stage

Nowadays water quality in farming tanks is strictly managed by the farmers themselves to conform to water quality standards set by the Ministry of Environment and Jeju-do. However, in the initial stage of farming, some problems occurred regarding injection of medicine into water tanks against fish disease. As a result, the odor emitted by the water discharged to the FVF fishing ground caused vomiting in women divers. This explains their entrenched distrust in land-based fish farming facilities as causing environmental pollution, regardless of how better water quality may be managed today.

Concern for fishing ground pollution

Fishermen operating a land-based fish farming facility insist that the water discharged to the village fishing grounds in Jeju-do easily dissipates with the currents because the shorelines are not much indented, and claim that the possibility for environmental alteration is relatively slim as compared to the mainland. Land-based fish farmers have made significant efforts at reducing sources of conflict with village fishermen over discharged waters, for instance equipping themselves with facilities such as sediment settling tank and net to reduce their pollutant load. Jeju-do carries out annual inspections on a certain number of farming grounds to identify any sources of environmental impact on adjacent village fishing grounds. However, village fishermen are distrustful of the results of inspections, pointing to the occurrence of floating particles in fishing grounds originating from the feeding on the land-based farms and to the whitening of the sea bottom. They have little faith in the three criteria for inspecting and managing discharged water, namely COD, BOD and SS. They affirm that the feed lost from the farms along with fish excrement are the causes of the accelerated eutrophication of water on the fishing grounds. A research study² on whitening of the sea bottom adjacent to fishing grounds as being more significant than other areas attributed the problem to an increase of water temperature and inflow of pollutants from land. There is a wide range of opinions between village fishermen, land farmers and administrative authority on the causes of pollution, which could potentially lead to conflicts among stakeholders concerned.

Requirement for a written consent from stakeholders

One of the sources of conflict between village fishermen and farmers is the requirement for land-based fish farmers to obtain written consent from the FVF, which holds primary rights over the fishing ground, in the form of a “Permission of Public Water Occupancy or Use” when intending to install water pipes in the fishing grounds or what is called a “Permission of Valid Period Extension.” Farmers point out that the latter requirement is a fundamental defect in the system, considering that the period eligible for is relatively short compared with the life of a structure such as water pipe (5 years as against 15 years).and that written consent was already granted at the very outset when installing farming facilities.

4. RESOLUTION OF CONFLICTS BETWEEN LAND FARMERS AND VILLAGE FISHERMEN

4.1 Conflicts resolution process and performance

Issues recognized

The conflicts ownership rights over the sea as the basis for their livelihood, having been inherited over the generations. Modern-day land-based farmers, with economies of scale and with significant capital are inherently at odds with FVF fishermen. In addition, the adverse side-effects from the use of medicine at the initial stage of a land-based farming operation have further deepened mistrust among FVF fishermen and created conditions for conflicts. At the same time, both land-based farmers and FVFs share a common sense of purpose and goal: they both eke out a livelihood from fisheries including aquaculture and seek a stable level of production.

Policy and institutional approach towards conflicts resolution

Environmental pollution was pointed out as being the biggest problem by village fishermen, and various institutions exist for tackling the same. The installation of a primary sediment tank to properly remove the remains of feed, fish excrement and

² Kim, Innsun and Kang, Inngu, 2004, A Research on Impacts of Discharged Water from Farms on the Expansion of Whitening.

other sludge is required. Subsequently, when regulations were put in place to ensure cleanliness of water tanks or machines, the need to install an additional sediment facility to collect the pollutants was deemed necessary. To prevent water pollution from the discharge from farming facilities, various other measures were taken such as an annual inspection. Besides the above, farmers themselves have made a special effort at resolving environmental problems to facilitate the granting of written consent for extension of the use of a discharge water pipe from tanks or to extend the period of occupancy or use of public waters. They also seek to avoid pouring medicine-treated water into tanks, opting to inject fish directly instead.

Communication and cooperation among stakeholders

Village fishermen have the upper hand in relations with land-based farmers, given that the latter are more likely to ‘offend’ in terms of polluting village fishing grounds, and which thus necessitates written consent for the continuous use of water pipe during its life of 30 years. A spirit of cooperation and partnership between the two parties is thus of key importance. Therefore, both strived toward the principles of social compensation and mutual co-existence. Land-based farmers devoted part of their income to support village fishermen in various ways, for instance co-organizing village events, providing equipment for operating a restaurant by a FVF, assisting the aged and contributing to a village development fund. There are some farms owned by a FVF and in this case another land farmer with expertise assumes the operation of the farms or transfers farming technology to the FVF.

Outcome of conflict resolution

Land-based farmers, thanks to their efforts at avoiding conflicts, have increasingly gained recognition among FVFs as a benefactor. Outright opposition from FVFs to the establishment of land-based farms is a rarity. Although some concerns have been raised by village fishermen over water pollution, the results of water quality inspection by authorities show that farming facilities are, on-the-whole, well maintained. All-in-all, a win-win framework is being cultivated.

4.2 Limitations in conflict resolution process and future direction

4.2.1 Limitations in conflict resolution process

Non-productive social contribution from farmers

Hence, two factors contributed to preventing or resolving the conflicts: land-based farmers’ efforts to protect fishing grounds from pollution; and their social, non-productive support to village fishermen. While environmental improvement may be laudable, it would be desirable if social contribution, being of rather limited value, could somehow be invested toward rendering the fisheries operation more competitive.

Formation of hierarchy by the written consent of right holder

The situation whereby land-based farmers are intrinsically relegated to a lower echelon, vis-à-vis the FVF, does not augur well for future mutual relations, especially given the economic vulnerability of LWTA businesses in spite of their economies of scale; some 30 percent of LWTA facilities suffer from a financial deficit. Superimposing the additional burden of the obligatory social contribution to the FVF could, in some instances, lead to bankruptcy.

4.2.2. Future direction

Change to productive support

As mentioned earlier, land-based farmers’ support for village fisheries, in the form of social contribution, as a major informal tool for conflict resolution, should be destined toward more productive pursuits. These could be: education, village resource

enhancement, welfare housing, and village tourism, among others. By doing so, real mutual co-existence could result.

Development of a cooperative program for co-existence

In addition to the more productive uses, a joint program may be developed, solely geared toward co-existence of FVFs and land-based fish farmers. One example could be to set up model centers, demonstrating farming, fishing and harvesting, which would draw tourists and thereby increase income of village fishermen. A second example could be to develop tourism based on flounder. Flounder produced in Jeju-do is not well recognized by the general public because of a lack of public engagement. The flounder farmers could set up a restaurant operated by a FVF with flounder below the market price (with the help of land-based farmers' social contribution), developing flounder recipes, suiting the palates of tourists. Aside from being an extra income-earner for the FVF, higher flounder consumption may result among the general population through greater publicity.

Electricity generation using discharged water and tourism promotion

Discharged water from land-based farms could be used to generate hydroelectric power. Such a facility is already part of the plan to upgrade Jeju-do's land farming facilities, orienting them toward a 'green growth' industry. Installing combined water purification and electricity generating facilities in specific farm-centered regions in Jeju-do could simultaneously mitigate pollution while generating tourism revenue.

Extension of permission period of public waters occupancy or use

The permit period for public waters occupancy or use should be established realistically from the perspective of the working life of the facility concerned. In the case of water pipe, the permit period currently granted is only 5 years as against an operational life of 15 years, compelling farmers to incur unnecessary administrative costs for permit renewal and triggering conflict with village fishermen regarding the written consent from right holder of the fishing ground. Correcting this defect may go far toward effective management of both the facility and the public waters.

5. CONCLUSION

The number of stakeholders in aquaculture is less than that in general fisheries with vessels because an aquaculture business is usually limited to a demarcated area. However, the use of medicine to control disease, feed waste and wastewater from discharge pipes in a land-based facility and their associated adverse impact, compounded by sea currents, significantly increase the number of stakeholders. This paper reviewed the conflicts that arise between LWTA and village fisheries and the process of conflict resolution, the challenges encountered and the desirable future direction.

The number of households engaged in LWTA in Jeju-do is 255 or 40.9 percent of the national total; the province covers an area of 1 182 000 m² or 45.1 percent of the national area. Jeju-do accounted for about 52.6 percent of national LWTA production. Within Jeju-do, flounder production occupied the second place after hairtail; however the respective values of production were almost the same. While LWTA is a major method of production in this province, village fisheries, with its long history, occupies a key position in people's livelihoods.

With the development of LWTA, the associated construction of water pipes, the discharge water and its environmental impact, conflicts with village fishermen were inevitable. The main causes of conflicts are as follows. First, fishermen questioned water quality management at the time when land-based farms were first developed, and, even now, the distrust of village fishermen remains in spite of institutionalization of water quality control in fish farms. Second, concerns over degradation of the fishing ground environment continue. Land farmers counter that, because farms are institutionally well managed and the shoreline of

Jeju-do is relatively straight, the pollution issue may not arise. However, village fishermen point to the occurrence of Suspended Solids due to remains from feeding, whitening of the sea bottom, among others, as indicators of pollution. Third, the requirement for land-based farmers to secure the written consent from rights holders, typically a FVF, whenever they intend to occupy or use public waters or install facilities or water pipes, ignites conflicts. This requirement should be limited to one-time only at the time of installation and not whenever extension of permission is needed. When land farming facilities are established, the installation of sediment control equipment to deal with remains of feeding, fish excreta, and other sludge is already mandatory. Land farmers, for their part, are making serious efforts to resolve environmental issues in order not only to comply with these regulations but also to create a favorable climate for the written consent from village fishermen. They are responsibly managing discharged water and administering antibiotics directly into fish instead of placing it in the water tank. They are also trying their best to improve relations with village fishermen, for instance by contributing to a 'social' fund, drawing on their economies of scale.

As for the future, consideration should be given to: 1) channeling the 'social' contribution to more productive uses for the FVF; 2) addressing the hierarchical imbalance between the land-based farmers vis-a-vis the FVF in the context of obtaining written consent to use or occupy public water; 3) developing what could be called a cooperative programme for co-existence, which is mutually beneficial and fosters interdependence; 4) establish a small-scale hydroelectric power generation facility using discharged water, which may bring both cost savings as well as attract tourists, with associated new revenue; and 5) align the permit period for public waters occupancy or use with the working life of the land-based farming facility concerned or its associated infrastructure.

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ANNEX 1

Opening address

Good morning! Ladies and Gentlemen!

I would like to thank you for attending South Korea-FAO Joint Workshop on the Governance of Tenure in Korean Fisheries and Aquaculture despite your busy schedule. The international workshop is focusing on governance issues in coastal, off-shore, inland, aquaculture and deep sea fisheries, which were overlooked in the Korean fisheries discourse in the past. In particular, the workshop is meaningful because it is the first cooperative project based on the Memorandum of Understanding on Research Cooperation among FAO, MIFAFF and KMI signed on 11 February 2011.

In general, governance is considered as a comprehensive supervision system to effectively achieve goals of state affairs. It includes exercise of political, economic and administrative power and should be based on legitimacy and ethics. Governance in fisheries is a collection of legal, social, economic and political institution, including legal bound and customary social institutions to manage fisheries. There are several reasons why the governance is emerging as an important issue in national and international fisheries nowadays.

Firstly, the conflicts and disputes among stakeholders are worsening nationally and internationally as a result of rapid globalization in fisheries. Globalization in fisheries is progressing in fisheries production, trade and processing sectors, and international trade is being conducted in a wide range of areas across national borders. In particular, a global fisheries enterprise has grown into a synthetic enterprise that handles fishing, farming, food and medicine businesses, and its annual turnover is estimated at billions of dollars. Globalization in fisheries has brought about governance issues in deep sea fisheries. Above all, the effectuation of 1982 UNCLOS in 1994 has brought about the reduction of fishing grounds across the world while market demand has expanded. To overcome this problem, it is necessary to secure a new fishing ground and to advance aquaculture overseas. This is possible only when good governance of coastal states and international fisheries organizations is maintained. Therefore, the governance issue should not be limited to the relations between government and enterprise but applies also to the relationship with other states and international fisheries organizations with which S. Korea is cooperating. The tasks in governance of international fisheries will include international fisheries cooperation with international organizations such as FAO and with developed states in fisheries, and standardization of fishing rules. As you may already know, FAO is planning to hold a workshop on world fisheries in Rome next month. The workshop is designed to produce guidelines on fisheries governance by reviewing various cases in different states. We can say that we have launched work to standardize international fisheries governance.

Secondly, the reason why fisheries governance is such an important issue is because we always have conflicts and disputes in managing fisheries resources that are based on our fisheries because the users are plenty but the resources are limited. About 60 000 vessels from about 40 fisheries and 170 000 fisheries population are competing for the fisheries resources in the coastal and offshore waters. So fishery conflicts and disputes among regions and fishing gears will arise. Furthermore, the competition with neighboring Japan and China in exploiting fisheries resources brought about the issue of governance with those countries. In light of global warming, natural disaster, and furtherance of nationalization of resources from coastal states, good governance will be more important than ever.

Thirdly, we have many issues to be resolved in national fisheries. In case of community based fishing grounds and aquaculture grounds, 88 percent of the ground is utilized by the fisheries cooperatives and fishing village fraternities. However, inefficient use and management of those fishing grounds has resulted in the decline of fishery resources and fishermen's income and decrease in competitiveness in fisheries. Therefore, we have to make an effort to resolve those problems, recognizing them as part of coastal fisheries governance, regarding restriction of a newcomer into those fishing grounds and aging of fishermen which have been pointed to as hampering coastal fisheries development.

Good governance in the coastal fisheries will revitalize fisheries and prevent fishermen from leaving fishing village through the provision of more opportunities with fishermen to rent fishing grounds, restriction of license or permit to weak fishing and aquaculture grounds, and deregulation of qualification criteria to be a member of fisheries cooperatives and fishing village fraternities.

Today's workshop may not be able to provide answers to all these problems in governance because research on fisheries governance is only at a beginning stage, but it is meaningful that we are dealing with fisheries governance for the first time in S. Korea. I surely believe that the workshop will be the starting point and at the same time a landmark to promote good governance in Korean fisheries.

I would like to express my deep appreciation to the speakers, participants and staff for preparing this workshop. I wish that Korean fisheries governance to be presented today will contribute to the fisheries development in S. Korea and will be a good example internationally. Once again, thank you very much.

HakSo Kim
President
Korea Maritime Institute
Seoul, South Korea

ANNEX 2

Welcome address

Good Morning, Ladies and Gentlemen!

On behalf of Mr. Gyu-yong Seo, Minister of the Ministry of Food, Agriculture, Forestry and Fisheries (MIFAFF), I would like to sincerely thank all of you from fishing industries, academia, research institutions, government and local autonomies, to attend this meeting to discuss the past, present and future governance of fisheries in the Republic of Korea. In particular, I warmly welcome the participants from the United Nations Food and Agriculture Organization who have deep interests in the Korean fisheries.

Korean fisheries have not only played an important role in national economic growth such as creation of jobs and provision of quality protein to the people, but also contributed to fishery resources management, promotion of tourism and leisure industry, cultural diversification in fishing communities, international cooperation and national security in recent years. In the era of green growth, more attention will be given to the value of fisheries which can provide food sustainably through effective fisheries management. However, if we could not manage the fisheries resources, commons in nature, and fishing activities effectively, the resources will be diminished by overfishing activities, which will result in competitive fishing among fishermen, and a vicious circle will go on. Therefore, only “good governance,” comprehensive institutions which involve in effective decision making on and implementation of management of fishery resources and fishing activities will ensure sustainable fisheries development.

MIFAFF, KMI, and FAO are jointly holding South Korea-FAO Joint Workshop on the Governance of Tenure in Korean Fisheries and Aquaculture to discuss the future off “Good Governance”. The workshop will review the status of governance by fisheries with some case studies and suggest future direction of governance in Korean fisheries. The workshop will be the stepping stone for the future development of Korean fisheries and the result of the workshop will be presented to the “FAO Workshop on Fisheries Governance” to be held next month and, by doing so, contribute to the international society.

I hope that the workshop will be an invaluable opportunity to discuss joint strategies that are mutually beneficial for all stakeholders. In addition, I ask you to share your ideas to create stable, transparent, fair and responsible fisheries industry.

Once again I sincerely welcome all of you to this workshop.

Thank you.

Kwang-Soo Lim

Deputy Minister for Fisheries Policy

Ministry of Food, Agriculture, Forestry and Fisheries

South Korea

ANNEX 3

Programme

Time	21 June	
Opening Ceremony		
10:00–10:40	Opening Remarks	Hak-So Kim President, Korea Maritime Institute
	Welcoming Address	Kwang-Soo Lim Deputy Minister for Fisheries Policy, MIFAFF
	Welcoming Address	Keun-Soo Kim 2012 Yeosu EXPO Organization
10:40–11:40	Keynote Speech 1	“Setting the Scene: The voluntary guideline for the governance of land and other natural resources” Paul Munro Faure FAO Principal Officer
	Keynote Speech 2	“Voluntary guidance on the governance of tenure in fisheries” Rebecca Metzner FAO Fishery Planning Analyst
	Keynote Speech 3	“Overview of Korean Policy and legal framework for the management of fisheries” Young-Hoon Chung Director General of Fisheries Resource, MIFAFF
Session 1 (Coastal Fisheries)		
13:00–15:20	Topic 1	“Coastal fisheries: the current fishery governance and its improvement” Seong-Kwae Park Professor of Pukyung National University
	Topic 2	“Coastal fisheries: best practice of fishery governance” Myung-Saeng Joung Director of Fishery Resources Research Dept., KMI
	Topic 3	“Coastal fisheries: a case study on conflict resolution processes” Byung-Ho Kim Professor of Pukyung National University
	Coffee Break	
	Discussion	Chairperson: Rebecca Metzner FAO Fishery Planning Analyst Panelist: Ok-Sik Kim Deputy Director of Fisheries Policy, MIFAFF Jung-Soo Lim Secretary General, Korea Fishermen Association Jong-Joo Kim President, Self-management Fisheries Association Woon-Hyun Jung Director of Fisheries Dept., Kyung-Nam Province Floor Q&A
Session 2 (Inland Fisheries)		
15:40–18:00	Topic 1	“Inland fisheries : the current fishery governance and its improvement” Jeung-Sook Park Senior Researcher of NFRDI
	Topic 2	“Inland fisheries: best practice of fishery governance” Dae-Young Kim Senior Researcher of KMI
	Coffee Break	
	Discussion	Chairperson: Jeung-Sook Park Senior Researcher of NFRDI Kwangsuk Oh FAO Fishery Management Officer Panelist: Nam-Chul Lim Secretary of Resource Environment, MIFAFF Jae-Min Baek Director of Central Inland Fisheries Institute, NFRDI Joo-Hyung Park President of Korea Trout Aquaculture Association Heung-Kyu Choi Inland Fisheries Fisherman Floor Q&A

Time	22 June	
Session 3 (Offshore Fisheries)		
09:30–12:00	Topic 1	“Offshore fisheries : the current fishery governance and its improvement” Sang-Go Lee Professor of Pukyung National University
	Topic 2	“Offshore fisheries : best practice of fishery governance”
	Topic 2	Jeong-Gon Ryu Director of Fishery Policy Research Dept., KMI
	Topic 3	“Offshore fisheries : a case study on conflict resolution processes”
	Topic 3	Chul-Pyo Cha Professor of Pukyung National University
	Coffee Break	
Discussion	Chairperson: Sang-Go Lee Professor of Pukyung National University Rebecca Metzner Fishery Planning Analyst, FAO Panelist: Se-Oh Lee Deputy Director of MIFAFF Dong-Gil Cho Chief of Large pair-trawl Association Jae-Gil Lee President of Kyeongbuk Red Crab Trap Association Chul-Oh Park Deputy Director of Fisheries Dept., Busan City Floor Q&A	
Session 4 (Deep-sea Fisheries)		
13:00–14:40	Topic 1	“Deep Sea fisheries: the current fishery governance and its improvement” Hyun-Pyo Hong Director of Global Fishery Research Dept., KMI
	Topic 2	“Deep Sea fisheries: best practice of fishery governance” Kwang-Nam Lee Director of Fishery Policy Institute, Korea Fisheries Association
	Coffee Break	
	Discussion	Chairperson: Hyun-Pyo Hong Director, Global Fishery Research Dept., KMI Panelist: Jang-Woo Seo Director of International Organization, MIFAFF Ki-Seon Song Director of Korea Overseas Fisheries Association Jong-Goo Lee Executive Vice President of Dongwon Industries Gyung-Rak Chol Advisor of Seonwoo Co. Floor Q&A
Session 5 (Aquaculture)		
14:50–16:50	Topic 1	“Aquaculture fisheries : the current fishery governance and its improvement” Woo-Soo Kim Professor of Gyeongsang National University
	Topic 2	“Aquaculture fisheries : best practice of fishery governance” Jong-Oh Nam Senior Researcher of Fishery Resources Research Dept., KMI
	Topic 3	“Aquaculture fisheries : a case study on conflict resolution processes” Hyun-Yong Kim Director of Fisheries Economic Institute, NFFP
	Coffee Break	
	Discussion	Chairperson: Woo-Soo Kim Professor, Gyeongsang University Panelist: Kwang-ee Lim Director of Aquaculture Fisheries, MIFAFF Dong Soo Kim Haenam Chief of Cheonnam Ocean & Fishery Science Institute Seung-Gi Jeong Laver Farmer Gi-Soo Oh President of Plaice Aquaculture Association Corporation Baek-Yeon Lim Aquaculture Fisherman of Jeju Floor Q&A
Final Discussion		
17:00–18:00	Final Discussion	Chairperson: Jung-Bong Kim Director of Division of Fisheries Research, KMI Panelist: Il-Jeong Jeong Director General of Organization, MIFAFF Paul Munro Faure Principal Officer, FAO Rebecca Metzner Fishery Planning Analyst, FAO Kwanguk Oh FAO Fishery Officer Seong-Kwae Park Professor, Pukyung National University Sang-Go Lee Professor, Pukyung National University Woo-Soo Kim Professor, Gyeongsang National University Jung-Suk Park Senior Researcher of NFRDI Hyun-Pyo Hong Director of Global Fishery Research, KMI Floor Q&A

Proceedings of the Workshop on the Governance of Tenure in Fisheries and Aquaculture in the Republic of Korea

21–23 June 2011

Seoul, Republic of Korea

These proceedings contain the submitted papers from the Workshop on the Governance of Tenure in Fisheries and Aquaculture in the Republic of Korea, held in Seoul, the Republic of Korea, from 21 to 23 June 2011. The papers cover the following topics: (i) improving onshore fisheries governance in the Republic of Korea; (ii) research on a model case of governance of a coastal fishery; (iii) case study on the process of conflict settlement in coastal fisheries; (iv) current status and direction for improvement of inland fisheries governance in the Republic of Korea; (v) research on a model case of governance in inland fisheries; (vi) institutional nature and the efficiency of offshore fisheries governance in the Republic of Korea; (vii) a study on the best practice of offshore fisheries governance; (viii) case study on disputes and conflicts settlement in the offshore fisheries; (ix) the effectiveness of the deep-sea fisheries governance in the Republic of Korea; (x) model case for deep-sea fisheries governance; (xi) current status of and improvement plans for aquaculture governance in the Republic of Korea; (xii) a case of fisheries governance in aquaculture; (xiii) a case study on the process of conflict resolution in aquaculture.

The workshop reviewed the status of the governance of tenure in fisheries and aquaculture in the Republic of Korea, suggested best practices in the governance of tenure, and provided information about conflict-solving processes.

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