

# The Nature and Enhancing the Efficiency of Korean Fisheries Governance

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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

Korean Fisheries, Governance, TAC Quota Fishing, Efficiency, Legal Frameworks

## I. 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.

## II. The Institutional Nature of Korean Fisheries Governance

### A. 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].

**B. 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 Fig. 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.



Fig. 1: Key Components in the Purpose of Fisheries Management 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.

**C. The Organization and Means of Fisheries Governance Regime**

Korean fisheries governance regime is organized based on a fisheries management regime, as shown in Fig. 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.

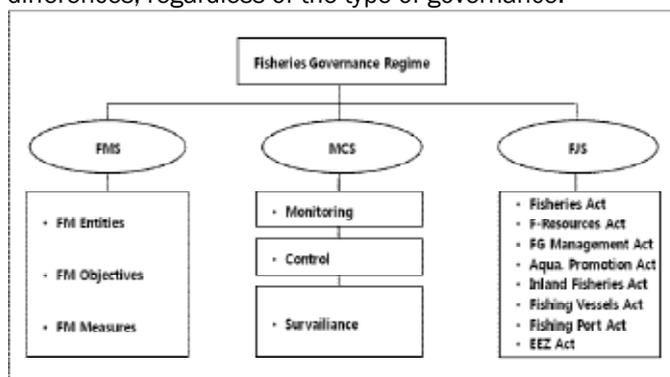


Fig. 2: The Organization and Means of Fisheries Governance Regime

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.

### III. Types and Management System of Fisheries Governance

#### A. 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 management resources, 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.

#### B. Participatory Governance in TAC Quota Fishing

As shown in Fig. 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 Fig. 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).

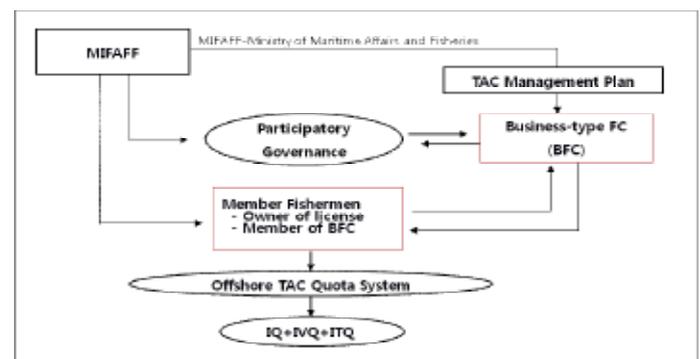


Fig. 3: The Framework of Participatory Governance in TAC Quota Fishing

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 Fig. 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.

### C. 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 Fig. 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.

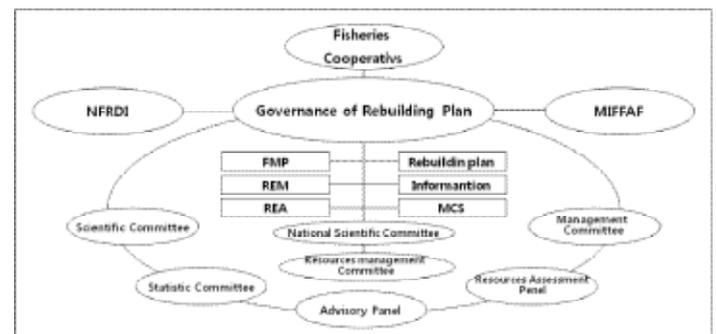


Fig. 4: Eco-centered Governance in Fisheries Rebuilding Plan

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 informatization in order to effectively overcome the weaknesses from incomplete information [7].

### D. 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].

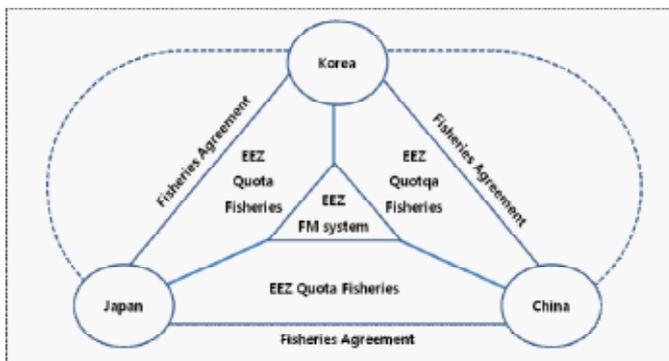


Fig. 5: The Structure of International Governance in Inshore Fishery

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.

#### IV. Enhancing the Efficiency of Korean Fisheries Governance

##### A. The Strategy for Enhancing the Efficiency of Fisheries

###### 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.

###### 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.

### **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.

### **B. 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.

### **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.

### **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.

### 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. 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.

### V. 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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