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INSTITUTIONAL ARRANGEMENTS, COMMUNITY ATTRIBUTES, AND PERFORMANCE OF COASTAL FISHERIES IN KOREA

by

In Kim
Pusan National University

Workshop in Political Theory and Policy Analysis
Indiana University • 513 North Park • Bloomington, IN 47408-3895
phone 812 855 0441 • fax 812 855 3150
workshop@indiana.edu • www.indiana.edu/~workshop

Institutional Arrangements, Community Attributes, and Performance of Coastal Fisheries in Korea[1]

In Kim(Pusan National University, Korea)

(abstract)

Korean government approves the appropriation rights of neighborhood coastal fishing grounds as common property resources, and give the rights to the fraternity of fishing village(FFV). This paper aims to find appropriate institutional arrangements and community attributes which influence performance of neighborhood coastal fishery in Korea, and to propose recommendations for the efficient management of neighborhood coastal fishing grounds.

By the result of this study, instional framework can be used usefully to analyze the Korean social problems, especially CPRs problems, even though the critics of institutional approach or framework often assert that it is well operative in western society where they keep the rules well. It is because that many rules specifying how to use and preserve the CPRs are greatly related with performance of CPRs management, preservation of resources in Korea.

Second, if we analyze the institutional arrangements and performance of CPRs in a country with cross-sectional analysis, we can only study operational level rules of CPRs. It is because that all the same commons in a country are applied by the same laws and ordinances.

This study also suggests that the preservation of neighborhood coastal fishery resources is influenced by the rules. It means that institutions are also important in Korean society to get high performance of CPRs management. Especially, the performance is greatly influenced by the rules specifying as followings: (i) qualifications of those to exercise the appropriation rights, () way of withdrawal and distribution, () available kinds of gear to harvest, period unable to harvest, length of fish and seaweed not to harvest, () how to secure the expense of fostering the fishery resources, and specific efforts to foster the resources. It is also influenced by the following attributes of fishers' group: (v) chairman's role behavior, () cooperation of fishers' group, and () maintaining rules.

It is necessary to specify the above factors influencing preservation of fishery resources in the Rules for Management of Coastal Fishery Grounds, and to find measures to make the chairman to be more positive in his or her role behavior, and to make the members of fishers' group to be more cooperative and to conform to the rules. All the measures should be only recommended to the fishers' groups because they should be self-governance systems.

. Introduction

1. The Purpose of This Study

The three sides of Korean Peninsula are surrounded by sea, and there are many port cities in Korea. In those cities, conflicts on coastal fisheries often become one of serious social problems among fishers. Recently, conflicts between two neighborhood fisher communities on fishing young eel at lower stream of Naktong River, conflicts on illegal fishing and regulation against it at the area of Pusan coast, and conflicts between two fisher groups of Youngnam and Honam regions on anchovy fishing rights are just a few cases. Recently, the serious conflict on management of neighboring seas between Korea and Japan has been one of the most hotly debated issues in Korean society. All those conflicts cause from the nature of common pool resources of fishing grounds.

Many scholars including E. Ostrom, the co-director of the Workshop in Political Theory and Policy Analysishave studied to find efficient managerial system of common pool resources(Ostrom, 1992; Ostrom, Gardner, and Walker, 1994). In those studies they have much concerned about what kind of institutional arrangements can bring high performance as well as who governs the resources more efficiently, government or residents(National Research Council, 1986, Ostrom, 1998a).

The common resource is easily destroyed due to the nature of itself if they don't make and enforce a suitable managerial system, that is, a set of rules. Since Hardin(1968) clarified the tragedy of commons, many scholars from various fields, such as economics, political science, public administration, anthropology, law, sociology,

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and even forestry and fishery have studied the commons for almost three decades. In fact, though many scholars have concerned about the institutional arrangements of their own individual resources in Korea, it is very rare to review and analyze the institutional arrangements of the common pool resources with an institutional framework. But recently it is perceived as necessary to study common pool resources with that framework by scholars of public administration(Kim, I., 1992, 1994, 1998a; Kim Y., 1992; Lee, 1995).

In this context, this paper seeks to find appropriate institutional arrangements and community attributes which influence the performance of neighborhood coastal fishery in Korea, and to make recommendations for improvement of the performance based on those findings

2. Scope and Method of This Study

Many kinds of resources in coastal fishing ground are harvested through various fishing methods. In most countries having coasts they enforce fishing regulations aimed to preserve their precious fishery resources and to maintain industrial peace. These regulations are made by a set of rules, such as, constitution, laws, ordinances, operational rules, etc.(Rhyu, 1991). All the rules except self-governance rules of neighborhood coastal fishing ground, are commonly applied to all coastal fishing ground or all fishers' groups. Therefore, if we analyze whether institutional arrangements influence the performance of fishers' group or not with cross-sectional analysis, we have to choose neighborhood fishers' group, which has its own self-governance rules, as basic unit of analysis.

Though the group as a small community or residents of a neighbor which is geographically partitioned as a unit is analyzed, another group can be utilized if it performs another function and works with a different set of rules. If fishermen fishing with gears in a neighborhood coastal fishing ground produce seaweed under another set of rules, we have to consider the group producing seaweed and the fishing group as two different groups. But a group who produces various items of fishery resource under a set of rules can be the same coherent group. This group can be characterized as a group of fishers who harvest at the same fishing ground and who are relatively similar in terms of legal rights to appropriate fish, withdrawal rate of fish, exposure to variation in the supply of fish, level of dependency on fish withdrawn from the resource, and use of the fish they harvest(Ostrom, Gardner, and Walker, 1994: 257). Therefore, a unit of analysis in this study is a fishers' group, that is, fraternity of a fishing village who harvest fish and seaweed under the same set of rules.

A study with institutional framework focuses on the outcomes and performance of an organization or a group which adopt and use an institutional arrangements.[2] Therefore, this study seeks to find difference of performance of neighborhood fishers' groups having different rules and their different attributes.

From a large port city and lots of coastal cities as well as many typical fishing villages, 126 neighborhood fishers' organizations in Korea were selected for this study. The data were collected by telephone interviews with the chairmen of the organizations at the early year of 1998.

. The Nature of Coastal Fishery and Institutional Framework

Management of fishing ground is usually a decision needed to keep order in harvesting and to make high performance of harvesting fish and seaweed. Due to the nature of common pool resource of coastal fishing grounds, the traditional major means

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[2] To conduct an institutional analysis of urban services, we first had to understand the attributes of these services that would affect the incentives of producers and consumers. In the neighborhood coastal fishery, producers and consumers are the same fishers. When they foster the fishery resources, they are producers, and when they withdraw or harvest, they are consumers of the commons(Ostrom, 1998a: 17).

for management of the ground are based on license and permission, and various regulations are used as supplementary means. They are restrictions or prohibitions of harvesting method, such as available gear, light equipment, size of fishing boat, fishing period, fishing area, length of fish, and prohibition of selling of illegally harvested fish(Jang, 1994: 229-265). Generally, various rules are made which are different depending on the fishery resource to harvest and withdraw, to manage coastal fishing ground efficiently .

To identify those rules and to measure the outcomes of activities under the rules are very important for management of coastal fishery. It is the institutional framework developed by Elinor Ostrom to identify the rules and analyze the outcomes. By the framework, community attributes, physical conditions, and a set of rules-in-use influence action arena composed of two elements, action situations and actors, and in turn, this arena influences the pattern of interactions of participants in the activities, finally the pattern influences the outcomes of the activities(Ostrom, 1990; Gellar, Oakerson, and Wynne, 1990; 10-15; Oakerson, 1986). We can easily understand that the outcomes of neighborhood coastal fishery are greatly influenced by the community attributes, physical conditions, and institutions as a set of rules.

1. Common Pool Resource as Nature of Coastal Fishing Ground

The characteristics of goods and service and physical attributes of facilities to make them available influence the interdependency of individuals(Ostrom and Ostrom 1978, Gardner, Ostrom and Walker, 1990; Oakerson, 1986; Tang, 1991: 42-3). Considering fishery, it is very difficult and expensive to exclude fishers from withdrawing and harvesting fish. Therefore, they use fishing ground together. Because a fisher could not catch the fish which another fisher had withdrawn from the fishing ground, the fish in fishing ground can be subtractable. Inexcludability of fishers from using fishing ground and subtractability of available amounts of fish bring about high level of interdependency among fishers.

Fishers using the same fishing ground and withdrawing from the common fishing area influence each other. This interdependency brings about problematic situations. Therefore, all the coastal fishery can be characterized as common pool resource dilemma(Gardner, Ostrom, and Walker, 1990). This dilemma is a social dilemma that individual behavior based on the individual rationality does not bring about social rationality(Messick and Brew, 1983). This situation of using the common pool resources can be easily explained with the prisoners' dilemma games(Wade, 1988; Ostrom, 1990).

This nature of fishery as common pool resources(CPRs) can easily devastate the fishing ground if there are no rules to regulate fishers' activities. It is common that they make rules to regulate their activities in order to increase their amounts to harvest. Those kinds of rules are in place at all communities which have to preserve their common fishing resources. Ostrom reviewed 14 cases of CPRs in the world which have been successfully managed for long time. She identified a set of necessary design principles for the success of these institutions in sustaining the CPRs and gaining the compliance of generation after generation of appropriators to the rules in use[3] (Ostrom, 1990: 89-91; Kim Y., 1992: 324; Kim, 1998b: 10-11).

In conclusion, we have to lower the level of using CPRs for their efficient management. It is important in order to lower the level of using that they make and enforce the rules themselves(Hackett, 1992:326). Thus, the collective means to enforce the rules are prerequisite for self-solubility of dilemmas of common pool resources. This method implies that they make the CPRs as common property or jointly

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[3] To solve social dilemmas, successive generations have added to the stock of knowledge about how to instill productive norms of behavior in their children, to craft rules to support collective action that produces public goods and avoids "tragedy of the commons", and to enforce them. Ostrom asserts the theory of collective action is the central subject of political science. It is the core of the justification for the state(Ostrom, 1998b: 1).

owned private property without unilaterally tradable shares(Thomson, 1992: 10-11; Mckean, 1992: 252).

2. Rules-in-use as Institutional Arrangements

The most important factor is a set of rules-in-use as institutional arrangements in institutional framework. There are many kinds of rules, such as boundary rule, scope rule, position rule, authority rule, aggregation rule, information rule, and payoff rule in the institutional framework to structure and analyze the situation of common pool resources(E. Ostrom, 1992 :19).

Position rules specify a set of positions and how many participants are to hold each position(Ostrom, Gardner, Walker, 1992: 41). These kinds of rules specify many positions within a fraternity of the fishing village(FFV), which takes the responsibility to manage the common fishing grounds. The examples are chairman, manager of general affairs, and inspector of the fraternity. Position rules specify whether they assign watchman within the fraternity to watch for illegal fishing or not.

Boundary rules specify how participants enter or leave these positions. By those rules, we can know that the participants in neighborhood coastal fishery are those exercising their legal rights to appropriate fish, those withdrawing fish, those fostering fishery resource, and those watching for the illegal fishing, etc.. Who benefits and bears the cost, who can be a member, which groups can be included as members are the core issues relating to the rules.[4] In the case of coastal fishery, license from government should be required at first to harvest fish. For the neighborhood coastal fishing ground, it is supposed to give license to the fraternity of the fishing village(FFV). All the fraternities have to make their rules for management of fishing ground. The rule of qualifications of those who withdraw fish and those who have the rights to appropriate fish may be the most important among the rules. If the qualification is strictly restricted, the number of withdrawer decreases and the exhaustion of common resources can be avoidable. And conflicts among them may also occur, because those withdrawn their fish for a long duration can assert their rights. But, the fraternities of fishing villages(FFVs) should enforce boundary rules strictly to preserve their common resources.

Authority rules specify which set of actions are assigned to which positions at each node of a decision tree.[5] Within the fraternity, it is the authority rule to specify who can do what in relation to various decision making. It is a good example of authority rule to specify what can be decided in the general meeting of the fraternity or what authority chairman has. The license to engage in various cultivating fisheries within the coastal fishing ground or neighborhood fishing ground is supposed to be issued by the chief of district office, the basic governance unit of local autonomy system in Korea. In addition, the period to harvest fish, the amounts to harvest, and the kind of available gears, etc. can be specified by the authority rules.) Ostrom and colleagues use the term of 'Authority and Scope Rules' which include withdraw at specific locations/sports, withdraw fish of at least a specific size, withdraw in a fixed order, withdraw only during specific seasons, and withdraw at a fixed time slot in their study(Ostrom, Gardner, and Walker, 1994: 259- 260). In fact, it is not easy to divide two kinds of rules.

Aggregation rules specify the transformation function to be used at a particular node, to map actions into intermediate or final outcomes(Ostrom, Gardner, Walker, 1994: 42). They specify how the choice is made for the collective decision within a

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[4] Generally, eligible users have to be local residents who would be available to perform their full duties to contribute to the commons. Absentee landowners are not welcome. This requirement minimized enforcement costs, since eligible local users and outsiders could be instantly distinguished(Mckean, 1992: 258).

[5] Authority rules can be confused with scope rules. The former specifies the rights of those holding a position and deals with who can do what, and the latter specifies what kind of works which the fraternity can do , that is, the scope of the activities.

community or a group. In the case of Korean eighborhood coastal fishery, the fraternities of fishing village(FFV) have the rights of appropriation of fish in the fishing ground and govern the fishery. They also specify how appropriators are selected, how the expense of fostering neighborhood fishing ground are decided in the general meeting of the FFV. Many studies report that the autonomy of collective decision making of potential user groups is important for the successful management of common pool resource. Mckean who studied the institutional arrangements for the management of common pool resources in Japan and Europe, found that the co-owners of the commons had been a self-conscious and self-governing community with the political independence to manage the commons successfully even within the context of an authoritarian polity(Mckean, 1992: 275).

Scope rules specify the set of outcomes that may be affected, including whether outcomes are intermediate or final(Ostrom, Gardner, Walker, 1994: 42). They are essentially definitive of the domain of outcomes over which actors in the system have effect. Because scope rules prescribe the domain within which users have effect, they may have substantial impact upon the users' sense of ownership of common resources(Hilton, 1992:286). Therefore, they specify what kind of rights to harvest fishers have and how long they exercise the appropriation rights with a contract. For example, they specify whether the fishers can cultivate seaweed or shellfish, or picking seaweed or shellfish. They are important rules to specify what kind of fishery they can carry out.

Information rules specify the information available to each position at a decision node(Ostrom, Gardner, Walker, 1994: 42). They dictate the manner in which information is distributed among actors(Hilton, 1992: 287). These rules specify what kind of information they have to inform to the members of FFV when they plan to cultivate fish or seaweed at neighborhood fishing ground. They specify important information of fishery based on the common fishing ground such as technology of cultivating fishery resource, the price of fish, etc..

Payoff rules specify how benefits and costs are required, permitted, or forbidden in relation to players, based on the full set of actions taken and outcomes reached(Ostrom, Gardner, Walker, 1994: 42). Payoff rules are those that shape the distribution of benefits. Their basic structure is of the 'if ... then' character. Payoff rules essentially delineate the consequences of behaviors or actions, given the physical and cultural environment. Incentives exist in relation to anticipated benefits. Payoff rules in an institutional setting prescribe what can reasonably be anticipated as in the consequence of a particular behavior or action(Hilton, 1992: 287). When a member withdraws fish, they specify how much rate of fish he gets. The rule of "Joint withdrawal, equal distribution" is also a kind of payoff rules. Payoff rules also specify how much money fishers should pay for their withdrawal, how much money the appropriators should pay for their exercising of rights to appropriate fish, and how much they should pay for fostering the fishery resources.

For a given activity and environment, if the rules operative in each of these categories are identified, it is possible to discern the institutional structure which affects incentives. Thus, we can examine relations between incentives and outcomes(Hilton, 1992: 287). Of course, as Ostrom cautions, individuals are not always following a set of written rules, thus it is not easy to identify all the rules in use(Ostrom: 1986: 466). In this case, we have to find why they are not following the rules. One cause is ineffective monitoring the participants' activities, and they do not punish violators properly. This is also due to the shortcomings of rules of the monitor and rule enforcer, and culture of community. But, individuals do not keep a set of written rules, or we could not easily find the rules-in-use(E. Ostrom, 1986: 466). Any way, in realities the written rules are different from the rules-in-use. The former can not be always compatible with latter. The rules-in-use function as important rules of long traditional practice to the community composed of the participants in the activities. Therefore, information on the behavior that actually occurs is important, if not more so, than that on what should occur(Hilton, 1992: 287). In this context, it is very important to identify the information of realities of neighborhood coastal fisheries besides the written rules of them.

3. Attributes of Community

The attributes of community influence the action situations with the rules and physical conditions. Therefore, the action situations are not influenced only by the rules, but also by the social cultural traits. Even though we introduce the same institutional arrangements as those to have solved successfully the dilemma of the same common pool resources in America or Europe, a solution to the problems is difficult to procure due to cultural difference between the East and the West.

Ostrom does not specify what the community means in her institutional framework. Singleton and Taylor(1992: 315) define the term as a set of people () with some share beliefs, including normative beliefs, and preferences, beyond those constituting their collective action problem, () with a more-or-less stable set of members, () who expect to continue interacting with one another for some time to come, and () whose relations are direct and multiplex.

Ostrom asserts that a group of individuals who share the above four attributes identified by Singleton and Taylor can more easily than others develop social capital of considerable value to help them address problems of mutual vulnerability. Individuals with share similar beliefs are more likely to be able to communicate effectively about the problems they face. If the group is stable, can communicate directly, and will interact over a long period of time, the likelihood that the group will find solutions to many of the problems they face is indeed higher than for those groups lacking these characteristics(Ostrom, 1992: 343-344). She also asserts that community is important, but not sufficient for the solution of CPRs problems. Because the external government may intervene and take over the governance and management of local CPRs, community is not necessary for the solution of CPRs problems. But if community is built up, it is necessary. She argue that neither community nor enforcers are sufficient. Both are needed, and both can enhance the other(Ostrom, 1992: 344-351).

In this context, it is evident that the attributes of community are important for solution of CPRs problems. In the case of neighborhood coastal fishery, the fraternity of fishing village(FFV) is the community. Neighborhood fishing has been carried out by the fisherman of the village for a long time. Thus, the license of neighborhood fishery is issued only to the FFV(or area unit of fisheries cooperative including several FFVs).) Similarly, cotemporary fishing cooperatives in Turkey are greatly aided in their management of inshore fisheries by national law acknowledging their collective existence as juridical persons with the right to sue to protect their property(Berkes, 1986). Different community may be built up when fishers harvest different items of fisheries. But, it is reasonable to say that they compose one community because they simultaneously withdraw various fish and seaweed under a set of rules in most neighborhood fisheries. In the case of fisheries with permission in Korea, the fishermen do not make a community because they do not communicate or interact with each other for the solution of problems related to the management of fishing ground they face.

It is very important in using CPRs or collective goods that they are familiar and get along with each other. If they know well each other, they can easily forecast other's actions with relation to the use and the contribution of those resources(Olson, 1965). An important fact found in the case studies of CPRs is that it is difficult to govern the CPRs when their users are heterogeneous. The sources of heterogeneity are diverse, and include differences in the opportunity cost, appropriation skill, caste, language, ethnicity, initial wealth, political influence, technology and physical location(Hackett, 1992: 326).

In addition, when most of the members of community keep well the rules, individual fisher also keeps the rules. When the members of the FFV cooperate with each other and the chairman of FFV is very positive in performing his duty, the fishery resources of NCFGs are abundant and preserved well.

4. Outcomes and Performance

Outcomes can be analyzed in terms of abundance of resource, amounts and quality of products, and the service level. Outcomes are measured and evaluated in terms of many dimensions of performance. They are effectiveness, efficiency, equity, responsiveness, etc.. Outcomes are deeply related to the objectives which a system is

to produce.

Objective of coastal fisheries is to harvest efficiently fish or seaweed while keeping sustainable condition of fishery resources. The fishery resources have a tendency of natural rebirth and regrowth, and natural fluctuation of amounts is inevitable. Not to harvest fish does not always bring about abundance of fishery resources. Fisherman should not also withdraw fish too much. It is, therefore, necessary of us to harvest fish in order that the fishery resources can be maximum sustainable yields(Jang, 1994: 205-210). This is the problem of preservation of fishery resources of coastal fishing ground. Schlager uses four measures of performance. Two of the measures focus upon characteristics of the flow of fish which composed of the amounts and quality of fish, and one other measure is the extent of technological externalities, and the final measure is the existence of assignment problems.[6] Technological externalities and assignment problems are related with conflicts among fishers. The first two measures deal with the abundance of fishery resources.

The abundance is greatly influenced by the environment factors such as temperature and contamination of water, a red tide, a presence in the water of small plantlike organisms that killed the predators of young fish, etc.(Sutherland, 1986: 36). If we consider the relative level of outcomes of fishery as compared to the physical and natural conditions, we can neglect the conditions. It means that we do not concern about the absolute amounts of fish or seaweed harvested, but relative level of outcomes. Especially, if we concern about the influence of rules with a data of cross-sectional analysis, relative level of outcomes may be proper as the measure of performance.

The fishers' group who has an institutional arrangements to regulate strictly the harvesting activities would harvest more fish of high quality. In the study of relationship between institutional arrangements and the amounts and quality of harvested fish, some relationship was found(Schlager, 1990: 174). The amounts and quality of fish are related to the preservation of fishery resources.

III. Institutional Arrangements of Korean Neighborhood Coastal Fisheries and the Performance

1. The Exercise of Appropriation Rights and Preservation of Fishery Resources

It is important in preserving the fishery resources who can withdraw fish and exercise the appropriation rights, because it is the problem of distribution of benefits and bearing the costs of CPRs. With relation to the exercise of fishery rights, qualification is an important factor. The qualification of exercise the fishery rights is required to be specified in the Rules of Management of Common Fishing Ground(RMCFG). In some FFVs, the qualification is restricted to the members of FFVs, and in others, it is given to the members of other FFVs and quasi-members of FFVs in addition to the regular members. Strict restriction of qualification for appropriation rights to regular members would preserve the fishery resources due to lessening the number of users of the ones.

Therefore, Hypothesis- of boundary rules is as following: the FFVs which have boundary rules in RMCFG strictly restricting the qualification of appropriation rights only to the members would preserve better the fishery resource of neighborhood common fishing grounds(NCFGs) than the others.

<Table 1> Qualification of Appropriation Rights and Preservation of Fishery Resources

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[6] Ostrom and colleagues argue that coastal fisheries experience CPR dilemmas, which include appropriation externalities, technological externalities, and assignment problems. They use assignment problems and technological externalities as measures of performance of fishers' organizations(Ostrom, Gardner, Walker, 1994: 250-264)

Frequency(%)

	Excellent	Medium	Poor	Total
Only regular members	80(72.1)	25(22.5)	6(5.4)	111(88.8)
Others	6(42.9)	5(35.7)	3(21.4)	14(11.2)
Total	86(68.8)	30(24.0)	9(7.2)	125(100.0)

Chi-Square: 6.87679 D.F.: 2 Sign.: .0321

As shown in the above table, 111FFVs, 88.8% of 125FFVs have the rules to specify that only the members of FFV can exercise the appropriation rights. 80FFVs, 72.1% of those 111FFVs preserve well the fishery resources of neighborhood coastal fishing ground as compared with the fact that 6FFVs, only 42.9% of 14FFVs which gives the rights to others as well as the members preserve well the fishery resources.) There is a book which deals with results of interview with the chairmen of FFVs on the subjects of fishery activities and fishery administration(Jang, 1992).

The relationship between strict restriction of qualification of those exercising the appropriation rights and the preservation of fishery resources in NCFGs is statistically significant at the level of .05. From the results of analysis, we can conclude it is required to restrict the qualification only to the members to preserve the resources of NCFGs if there are no conflicts among residents.

The period of contract for appropriation rights would also influence the activities of fishers, and can be different depending on the item at the same NCFG. Usually, the period is one year as short term, and it also can be the period from two to five years as medium term. It may be extended. When they can extend the period of contract or make a contract of long period, they can harvest fish or seaweed from the same NCFG for long time. Therefore, they try to make efforts to harvest in order to get maximum sustainable yields.

Therefore, Hypothesis- of scope rules is as following: FFVs which make contracts with long period would preserve better their fishery resources of NCFGs than the others.

<Table 2> The Period of Contract for Appropriation Rights and Preservation of Fishery Resources

Frequency(%)

	Excellent	Medium	Poor	Total
1 year	30(78.9)	5(13.2)	3(7.9)	38(30.4)
2 years- 5 years	19(63.3)	8(26.7)	3(10.0)	30(24.0)
Extendable	37(64.9)	17(29.8)	3(5.3)	57(45.6)
Total	86(68.8)	30(24.0)	9(7.2)	125(100.0)

Chi-Square: 4.229239 D.F.: 4 Sign.: .3759

As shown in the above table, the number of FFVs which make contracts with extendible period is the most frequent as 57FFVs, 45.6% of 125FFVs. According to the period of contract, the degree of preservation of fishery resources is a little different as shown at the table. But the difference is not significant at the level of .05.

The method to harvest fish and seaweed and the way of distribution of them would influence the preservation of fishery resource of NCFGs. This method how to harvest and distribute the fish is specified by the payoff rules. In the case of joint withdrawal and equal distribution, fishers do not get all the fish or seaweed they withdraw even though they do too much. Under this method, they tend not to withdraw immature fish because everybody can see the immature fish they withdraw.

Therefore, Hypothesis- of payoff rule is as following: FFVs which have the rule of joint withdrawal and equal distribution would preserve better the fishery resources of NCFGs than the others.

<Table 3> Method of Withdrawal and Distribution, and Preservation of Fishery Resources.

Frequency(%)

	Excellent	Medium	Poor	Total

Joint WithdrawalEqual Distribution	57(91.9)	5(8.1)		62(49.6)
Getting All the Fish They Withdraw	25(43.9)	24(42.1)	8(14.0)	57(45.6)
Open Competitive Bids , Etc.	4(66.7)	1(16.7)	1(16.7)	6(4.8)
Total	86(68.8)	30(24.0)	9(7.2)	125(100.0)

Chi-Square: 33.3670 D.F.: 4 Sign.: .0000

As shown in the above table, in the case of joint withdraw and equal distribution, 57FFVs, 91.9% of 62FFVs preserve excellently the fishery resources, 5FFVs, 8.1% preserve them at medium level, and no FFV preserves poorly. In the case of getting all the fish they withdraw, 25FFVs, 43.9% of 57FFVs preserve excellently them, 24FFVs, 42.1% preserve them at medium level, 8FFVs, 14% preserve poorly them. In the case of open competitive bids or etc., 4FFVs, 66.7% preserve them excellently, 1FFV, 16.7% preserve them at medium level, 1FFV, 16.7% preserve poorly them.

From the result of analysis, we can easily find that joint withdraw and equal distribution controls excessive withdrawal of fish, and thus make it possible to preserve the resource excellently. Therefore, payoff rules specifying how to withdraw and distribute are very important to keep the resources.

2. Prohibition Rules to Harvest and Preservation of Fishery Resources

For preservation of fishery resources, Korean laws of fisheries specify that they can prohibit or restrict the activities of fishery if necessary for preservation of fishery animals and plants and keeping the order of fishery. Therefore, the ordinances of fishery require that the rules of management for coastal fishery ground(RMCFG) should include the articles on the length of fishery animals and plants not to harvest, the period not to withdraw fish, etc. for preservation of resources and keeping the order of fishery.

In sum, some FFVs specify the length and the period of animals and plants concretely in their RMCFGs, but others does not specify them except only a statement that they should keep ordinances. Fishers do not know better ordinances than their own rules, that is, RMCFG.

Therefore, Hypothesis- of authority rules is as following: FFVs which specify the available gears, the length of fish not to harvest, and the period not to withdraw fish would preserve better the fishery resources of NCFGs than the others.

<Table 4> Rules of Restriction to Harvest Fish and Preservation of Fishery Resources

Frequency(%)

		Excellent	Medium	Poor	Total
Available Gear	Have	70(80.5)	13(14.9)	4(4.6)	87(69.0)
	None	17(43.6)	17(43.6)	5(12.8)	39(31.0)
Total		87(69.0)	30(23.8)	9(7.1)	126(100.0)
Chi-Square : 17.13242 D.F. : 2 Sign. : .0002					

Period not to Harvest Fish	Have	70(80.5)	13(14.9)	4(4.6)	87(69.0)
	None	17(43.6)	17(43.6)	5(12.8)	39(31.0)
Total		87(69.0)	30(23.8)	9(7.1)	126(100.0)
Chi-Square : 17.13242 D.F. : 2 Sign. : .0002					

Length of Fish not to be Harvested	Have	60(81.1)	12(16.2)	2(2.7)	74(61.2)
	None	24(51.1)	17(36.2)	6(12.8)	47(38.8)
Total		84(69.4)	29(24.0)	8(6.6)	121(100.0)
Chi-Square : 12.90859 D.F. : 2 Sign. : .0016					

As shown in the above table, 70FFVs, 80.5% of 87FFVs which specify the available gears to prohibit the illegal fishery in RMCFG preserve the fishery resources excellently, and 4FFVs, only 4.6% of 87FFVs preserve the resources poorly. In

contrast with this, 17FFVs, only 43.6% of 39FFVs which does not specify them preserve the fishery resources excellently, and 5FFVs, 12.8% of 39FFVs preserve the resources poorly. Whether the rules specify the available gear or not influences significantly preservation of fishery resources in their NCFGs(=.001).

70FFVs, 80.5% of 87FFVs which specify clearly the period when they are unable to harvest fish preserve the fishery resources excellently, and 4FFVs, only 4.6% of 70FFVs preserve the resources poorly. But, 17FFVs, only 43.6% of 39FFVs which do not have those rules preserve the fishery resources excellently, and 5FFVs, 12.8% of 39FFVs preserve them poorly. That FFVs specify the periods when they are unable to harvest fish in RMCFGs influences significantly preservation of their fishery resources in their NCFGs(=.001).

60FFVs, 81.1% of 74FFVs which have the rules on the length of fish not to be harvested in their RMCFGs preserve the fishery resources excellently, and 2FFVs, 2.7% of 74FFVs preserve them poorly. 24FFVs, 51.2% of 47FFVs which do not have those rules preserve the resources excellently, and 6FFVs, 12.8% of 74FFVs preserve them poorly. Whether FFVs have the rules on the length of fish not to be harvested in their RMCFGs or not influences significantly the preservation of their fishery resources(=.002).

From the result of analysis, we can conclude that FFVs should specify the available gears, the period unable to harvest fish, and the length of fish not to be harvested in their RMCFGs for preservation of fishery resources.

3. Fostering and Preservation of Fishery Resources

For joint management of neighborhood coastal fishing grounds (NCFGs), it is required to specify fostering fishery resources in their rules of management for coastal fishery resources(RMCFGs). Generally, some FFVs specify that all the fees for exercise of the appropriation rights and for withdrawal should be used as the expenses for fostering fishery resources and managing NCFGs, others specify that all those fees should be their incomes of FFVs and the expenses for fostering fishery resources should be decided at the general meeting of FFVs. In contrast, other FFVs do not have any rule to specify the expenses of fostering the fishery resources at their NCFGs. It is difficult to foster fishery resources at common fishing grounds to desirable level without any rules due to the problem of social fences(Sell, 1988: Lee, 1995: 1292; Kim I., 1998a: 5; Kim, I., 1998b: 6).

Therefore, Hypothesis-of payoff rules is as followings: FFVs which specify how much they foster the fishery resources would preserve better the fishery resources of NCFGs than the others.

<Table 5> The Rules of Fostering Resources and Preservation of Fishery Resources

Frequency(%)

	Excellent	Medium	Poor	Total
Have	38(64.4)	19(32.2)	2(3.4)	59(48.0)
None	21(58.3)	9(25.0)	6(16.7)	36(29.3)
Total	86(69.9)	29(23.6)	8(6.5)	123(100.0)

Chi-Square : 18.82526 D.F. : 4 Sign. : .0009

As shown in the above table, 38FFVs, 64.4% of 59FFVs which have the rules of fostering resources in their RMCFGs preserve the fishery resources excellently, and 2FFVs, 3.4% of 59FFVs preserve them poorly. But, 21FFVs, 58.3% of 36FFVs which do not have those rules preserve the resources excellently, and 6FFVs, 16.7% of 74FFVs preserve them poorly. Whether FFVs have the rules in their RMCFGs specifying how to foster fishery resources at their NCFGs or not influences significantly preservation of their fishery resources(=.001).

Therefore, it is important in preservation of fishery resources to make rules of fostering the fishery resources as payoff-rules in their RMCFGs.

4. The Attributes of Fraternity of Fishing Villages and Preservation of Fishery Resources

Preservation of resources at the NCFGs is greatly influenced by the attributes of the community, that is the fraternity of fishing village (FFV)(Kim, W., 1984). The preservation of resources of NCFGs is greatly influenced by the collective efforts of one of fisher group, FFV, and these efforts are greatly influenced by chairman of the group.

Therefore, Hypothesis- of attribute of community is as following: FFVs whose chairman performs his role more positively would preserve better the fishery resource of NCFGs than the others.

<Table 6> Role of Chairman of Fisher Group and Preservation of Fishery Resources

Frequency(%)

	Excellent	Medium	Poor	Total
Positive	59(83.1)	9(12.7)	3(4.2)	71(56.3)
Not Positive	28(50.9)	21(38.2)	6(10.9)	55(43.7)
Total	87(69.0)	30(23.8)	9(7.1)	126(100.0)

Chi-Square : 15.05702 D.F. : 2 Sign. : .0005

As shown in the above table, 59FFVs, 83.1% of 71FFVs whose chairmen perform positively preserve their fishery resources at the NCFGs excellently, and 3FFVs, 4.2% of 71FFVs preserve the fishery resources poorly. In contrast with this, 28FFVs, 50.9% of 55FFVs whose chairmen do not perform positively preserve the fishery resources excellently, and 6FFVs, 10.9% of 55FFVs preserve the fishery resources poorly. The relationship between whether the chairmen perform their roles appropriately or not and preservation of fishery resources is statistically significant at the .001 level.

Preservation of fishery resources at NCFGs may be greatly influenced by how well the members of FFVs keep their rules. If fishers' group, that is fishers' group keep their rules well, then individual fisher also keeps the rules well, and if not, individual fisher does not keep the rules due to the characteristics of fishing grounds as common resources.

Therefore, Hypothesis- of attributes of community is as following: FFVs whose members keep their rules well would preserve better the fishery resource of NCFGs than the others.

<Table 7> Keeping Rules of Management of Fishing Ground and Preservation of Fishery Resources

Frequency(%)

	Excellent	Medium	Poor	Total
Keep Rules Well	76(82.6)	12(13.0)	4(4.3)	92(73.0)
Not Keep Rules	11(32.4)	18(52.9)	5(14.7)	34(27.0)
Total	87(69.0)	30(23.8)	9(7.1)	126(100.0)

Chi-Square : 29.40704 D.F. : 2 Sign. : .0000

As shown in the above table, 76FFVs, 82.6% of 92FFVs whose members keep the rules well preserve the fishery resources excellently, and 4FFVs, 4.3% of 92FFVs preserve the fishery resources poorly. In contrast with this, 11FFVs, only 32.4% of 34FFVs whose members do not keep the rules well preserve the fishery resources excellently, and 5FFVs, 14.7% of 34FFVs preserve the fishery resources poorly. Whether the members of the fishers' group keep the rules well or not statistically influences on the preservation of fishery resources at NCFGs at .001 significance level. And their keeping the rules is also influenced by the familiarity among members of FFVs. That is, the FFVs whose members know well and get along with each other keep their rules, RMCFGs better than the others, and this statement is significant at the level of .0003.

How well the members of FFVs cooperate with each other for the works of FFVs may influence fostering the fishery resources at NCFGs. Therefore, Hypothesis- of attributes of community is as following: FFVs whose members cooperate well with each other for the works of FFVs would preserve better the fishery resource of NCFGs than the others.

<Table 8> Cooperation for Works of Fishers' Groups and Preservation of Fishery Resources

Frequency(%)

	Excellent	Medium	Poor	Total
Cooperate Well	84(79.2)	17(16.0)	5(4.7)	106(84.1)
Cooperate Not Well	3(15.0)	13(65.0)	4(20.0)	20(15.9)
Total	87(69.0)	30(23.8)	9(7.1)	126(100.0)

Chi-Square : 32.50054 D.F. : 2 Sign. : .0000

As shown in the above table, 106FFVs, 84.1% of 126 all the FFVs cooperate well with each other for the works of FFVs, and 20FFVs, 15.9% of all do not. 84FFVs, 79.2% of 106FFVs whose members cooperate well for the work of FFVs preserve the fishery resources at their NCFGs excellently. 5FFVs, 4.7% preserve the resources poorly. But, Only 3FFVs, 15% of 20FFVs whose members do not cooperate well with each other for the works of FFVs preserve the resources excellently, and 4FFVs, 20% preserve the resources poorly.

The cooperation with each other for the works of fishers' group influences the preservation of fishery resources at NCFGs at the statistical significance level of .001.

The results of this analysis suggest that the attributes of community are important in preservation of fishery resources. Therefore, it is necessary to make a good community to preserve the fishery resources.

5. Discussion of Results and Policy Recommendations

The purpose of my research was to find whether many rules derived from the institutional framework were related with the preservation of resources of NCFGs or not, and to propose recommendations for the preservation of resources. While I studied on this subject, I could make some conclusions on methodological issues of institutional studies.

First, institutional framework can be used usefully to analyze the Korean social problems, especially CPRs problems, even though the critics of institutional approach or framework often assert that it is well operative in western society where they keep the rules well, but it is not important in other countries because they do not keep the rules. According to institutional framework, the outcomes of human activities are greatly influenced by the rules-in-use. As shown in my research, all the rules except the rules of contract period of appropriation rights are greatly related with performance of CPRs management, preservation of resources in Korea. It suggests that institutional framework may be also useful tool to study Korean society.

Second, if we analyze the institutional arrangements and performance of CPRs in a country with cross-sectional analysis, we can only study operational level rules of CPRs. It is because that all the same commons in a country are applied by the same laws and ordinances, and there is no difference in the rules to specify how to use and preserve the commons. Therefore, we have to try to find only operational rules, which government gives a community an authority to make. The study of those level rules may be trivial as compared to the study of collective choice level rules.

Next, I found several facts on the institutional arrangements, attributes of community, and performance of neighborhood coastal fishery. Therefore, I can argue as followings based on the research results for the efficient management of NCFGs.

First, I can find that the boundary rules are very important in preserving the common pool resources, because the FFVs which restrict the qualification of those exercising the appropriation rights to the members of FFV preserve the fishery resources excellently. Usually, those who have lived for long time at the fishing village are supposed to get the rights to withdraw fish by Korean Fishery Laws. But, FFVs specifying that the members of other fishers' groups can exercise the appropriation rights by contract could not preserve the fishery resources excellently. Therefore, it is required to restrict the qualification of those exercising the appropriation rights for the efficient management of fishery resources at NCFGs.

Second, scope rules specifying the contract period for exercising the appropriation rights do not influence the preservation of fishery resources unlike our expectation. The proper period of contract of the appropriation rights to fish may be different according to items they cultivate. Therefore, it is required to analyze the relationship between the period of contract and the outcomes of neighborhood coastal fishery.

Third, in the case of common pool resources like neighborhood fishing ground, the behaviors of users change according to how to specify the payoff rules on the way of harvesting and distributing fish. The way they get all the things they withdraw may cause fishers to withdraw fish or seaweed too much. I found that the way of 'joint withdrawal and equal distribution' makes the fishers to preserve their fishery resources more excellently than other ways, such as the way that they get all the things they withdraw or open bids, etc.. Therefore, for the efficient management of neighborhood fishing grounds, it is recommendable to make payoff rules specifying that they withdraw jointly and distribute fish or seaweed equally to the participants.

Fourth, many fishers do not know well Korean Fishery Ordinances even though the ordinances specify how to harvest the fishery resources, that is, the available kinds of gears for withdrawal, the period unable to harvest fish and seaweed, the length of fish to harvest, etc. for the preservation of fishery resources. The fisher groups who have their rules specifying accurately the regulatory contents may have much concern about keeping the regulations. I found those fisher groups keep the rules well, and those fishers' group preserve the fishery resources at their neighborhood coastal fishing grounds by this study. Therefore, they should make authority rules specifying clearly the available gears to harvest, the period unable to harvest, the length of fish and seaweed to harvest, etc. in their rules of management of coastal fishing grounds(RMCFGs).

Fifth, the common pool resources are not provided to the desirable level due to the social fences caused from their inherent nature. Whether are there the rules, that is a kind of payoff rules, specifying how to secure the expense of fostering fishery resources at neighborhood fishing grounds or not influence the preservation of fishery resources at their grounds. Therefore, they should specify the rules of fostering the fishing ground more thoroughly.

Finally, the attributes of community also greatly influence the performance of Korean neighborhood coastal fishery. We found that the fishers who know well and are familiar with each other keep their rules well, in turn, it makes fishers to preserve the fishery resources efficiently. We also found that the fishers' groups who cooperate well with each for the works of fishers' groups preserve their fishery resources excellently, and the fishers' groups whose chairmen perform their role positively preserve their fishery resources excellently. Korean government gives the license to appropriate fish or seaweed at neighborhood fishing ground to the fishers' group.

Therefore, we should try to find the measures to improve the familiarity among the members of fishers' group, and to activate the role performing of chairmen of fishers' groups.

. Conclusion

It is not easy to manage efficiently the neighborhood coastal fishing ground because of the nature of common pool resources. It could also not be managed efficiently only if the government take the responsibility to govern and manage the fishing ground, or only if the fishers' group take the responsibility. When the fishers' group can meet easily with each other while sharing water space, and govern the ground for themselves with discussion on the efficient management of the fishing ground, and solve the problems of commons, self-organizing and self-governing by the fishers' group is desirable. In this context, Korean government approves the appropriation rights of neighborhood coastal fishing grounds as common property resources, and gives the rights to the fishers' group, the fraternity of fishing village(FFV). This makes the open accessible resources into the common property resources for the efficient management of common pool resources.

The paper seeks to find whether institutional arrangements and community attributes influence performance of neighborhood coastal fishery in Korea, and to find recommendations for the efficient management of neighborhood coastal fishing grounds.

The results of this study suggest that the preservation of neighborhood coastal fishery resources is influenced by the existence of rules and how to specify it. It means that institutions are also important in Korean society to get high performance of CPRs management. Especially, the performance is greatly influenced by the rules specifying as followings: (i)the qualification of those to exercise the appropriation rights, () the way of withdrawal and distribution, () the available kinds of gear to harvest, the period unable to harvest, the length of fish and seaweed not to harvest, () how to secure the expense of fostering the fishery resources, and specific efforts to fostering the resources. It is also influenced by the following attributes of fishers' group: (v) chairman's positive role behavior, () cooperation of fishers' group, and () their keeping rules.

In this context, for the efficient management of neighborhood coastal fishing ground, it is necessary that if possible, the qualification of those to exercise the appropriation rights should be strictly restricted, and the way of joint withdrawal and equal distribution should be specified in their RMCFGs. It is also necessary that the available gear, the period unable to harvest, the length of fish and seaweed not to be harvested, etc. should be specified in their RMCFGs, and how to secure the expense of fostering the fishery resources, and specific efforts to fostering the resources should be specified in their RMCFGs.

Finally, It is necessary that we should review the measures for the chairman of FFV to perform his or her role positively, for the members of FFV to cooperate with each other for the works of FFV, and for the members to keep their rules well through furthering the familiarity among the members of FFV. All the measures should be only recommended to the fishers' groups because they should be self-governance systems.

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