

Sustainability of Common-pool Resource Management by Communities

– Focused on the Case of Jongdal-ri Fishing Village Cooperative of Jeju Special Self-governing Province

Kyeong-Min Kang¹

Abstract

Sustainability of Common-Pool Resource (CPR) management by communities is very important also for future generations in managing and inheriting CPR. A study was conducted on the CPR case of the village fishery managed by the Jongdal-ri Fishing Village Cooperative of Jeju Special Self-governing Province. The eight principles presented by Ostrom (1990) as the designed principles of sustainable CPR, that is to say, Clearly defined boundaries, Congruence between appropriation and provision rules and local conditions, Collective-choice arrangements, Monitoring, Graduated sanctions, Conflict-resolution mechanisms, Minimal recognition of rights to organize, and Nested enterprises, were analyzed. It was confirmed that the object case, Jongdal-ri Fishing Village Cooperative was managed based on these principles. Autonomous management rules are established by each fishing village cooperative community to fit their respective characteristics. Besides mere establishment of the rules, these rules should be preferentially be put into practice. The Jongdal-ri Fishing Village Cooperative successfully put them into practice, and was designated as the most superior fishing village cooperative community successively for three years. Collection was prohibited during a closed season for preservation of resources, and those of which the body length was shorter than that specified in the rules were not caught.

That is to say, communities can sustainably manage CPR by complying with the conditions to be sustainable as well as following and putting in practice the rules, providing a CPR management system for future generations.

Keywords : Shared resources, Sustainability, Fishery management, Community, Autonomous management rules, and Fishing village cooperative

¹ Ph.D in science of public administration, World Association For Island Studies, Auditor.

1. Introduction

CPR is not infinite. CPRs such as village fisheries have the chance of being depleted at any time through imprudent use. A question comes to mind as to whether the sustainability that allows us to turn CPR (village fisheries) over to future generations by preserving resources and environment exists. Then how should village fisheries be managed? What are the systems and rules involved? Can management by the state or a privatization plan be an efficient way of management? How about a plan to jointly manage them by local communities?

Diverse questions are focused on sustainability of CPR. Ostrom (1990) argued that there are limitations in sustainable management of the CPR possessed and used jointly by social communities through market intervention or management by the government, and as an alternative, CPR can be efficiently managed by way of a community-centric cooperative system.

This paper intends to verify this through the case of Jongdal-ri Fishing Village Cooperative of Jeju Special Self-governing Province.

2. Objective and Method of the Study

The objective of the study is to analyze whether management of village resources that are the CPR of Jeju Special Self-governing Province by communities (village cooperative) is sustainable or not.

Diverse fishery resources are widely distributed over the coast of Jeju Special Self-governing Province not only as the island is surrounded by the sea but also due to the oceanographic characteristics of the neighboring waters, and the Type 1 Common Fishery (depth of water within 10 meters) which is the village fishery is managed by the Fishing Village Cooperative under the license received from Jeju Special Self-governing Province. Due to the characteristics of

marine resources, the possibility of over-fishing cannot be ruled out. For this reason, the issue of sustainability is raised together with the issue of management of the resources.

In the 5th general meeting of the IUCN World Conservation Congress held in Jeju Special Self-governing Province from September 6 to 15, 2012, particular attention was paid to female divers (called haenyeo) who form a renewable environment by diving without using a respirator and have a habitual practice of forming a sustainable marine environment by removing waste for marine cleanup, through which a human coexisting with nature model of nature preservation type is created. This means that their contribution to preservation of the ecological system as 'Managers of Sustainable Marine Ecological System' has been acknowledged.

A case study was selected for this research. Among the qualitative study methods, a case study is used when thick description and analysis are unfolded for a single case or multiple cases and a deep understanding of a single case or multiple cases is desired to be enhanced. In order to grasp the sustainability of the fishery management by Jongdal-ri Fishing Village Cooperative of Jeju Special Self-governing Province which was the case area, possible methods such as the characteristics of the relevant area, rules, and interviews were used. The interview was conducted on December 13, 2014 in the office of the Fishing Village Cooperative with the head of the Fishing Village Cooperative.

The analysis was carried out using the 8 sustainable principles presented by Ostrom (1990) as the frame of the judgment on sustainability. As the shared areas Ostrom used as the objects are rapidly going out of existence along with expansion of capitalistic relation of possession, it is sufficiently meaningful work to find a way to sustainably manage commons (Kim Sun-Pil, 2014: 197). Though there also is an opposite view² to the eight principles presented by Ostrom, we intend to use the eight principles pre-

² As the papers related to this, readers are requested to refer to the pages 179 to 207 of the Approach of the Commons Theory on En-

sented by Ostrom as a verified theory.

The reason why the Jongdal-ri Fishing Village Cooperative of Jeju Special Self-governing Province was selected as the case area suitable for this paper because the cooperative was designated as the most superior fishing village cooperative successively for the three most recent years since 2011 in the evaluation of resource restoration and fishery management.

3. Theoretical Background

1) Community Theory

The word 'community' is very widely used. Not only a small unit such as family, group, club and village but also school, company, region, country, race and even mankind and the entire earth is called a community (Jung Sun-Hoon, 2011). Since Chosun Dynasty, village communities have had a very unique character in that they have emerged spontaneously, have become a tradition by having lasted for a long period of time, have been ascriptive, comprehensive and interdependent on the basis of whole-personal

relationship, and, in addition, community-led coercion has been carried out (Lee Jae-Yeol, 2006: 26 - 27). The term 'community' has value orientation such as personal, common bond, equality, cooperation, friendship, and brotherliness (Choi Seung-Ho, 2009: 243).

Community is intrinsically related to the way the members exist, which is because people experience effective socialization through it and acquire various rules operated in its culture (Yoon Eun-Ha, 2012: 24). Irrespective of the form, each community has its own fixed rules, customary or explicit, which are learnt by the members. In fact, economic activities of humans have been led not by the market economy as a rational being that pursues maximization of personal profit of individuals but by the principle of reciprocity³ closely related to the local environment and custom originated from the tradition and culture (Kwon Byung-Wook, 2011: 123).

The community in this paper is based on the village community which is a type with low ideology/finality and strong regionality according to the classification carried out by Lee Jae-Yeol (2006) based on the strength/weakness of ide-

Table 1. Classification of Communities based on Regionality and Finality

		Ideology - Finality ⁴	
		Low	High
Regionality⁵ - Spontaneousness - Traditionality and Persistence - Attribution - Personal Relation	High	Village communities	Commune Yamagish communities Religious villages
	Low	Cooperatives Occupational associations	Ideological associations Civic groups

Data: Lee Jae-Yeol (2006), Korean Sociological Association, Collection of Symposium Dissertations, 26.

vironmental Conflict Mediate, Kim Ja-kyung (2004), Critical Sociological Association of Korea, Economy and Society, and the pages 172 to 201 of A Theoretical Review on the Reconstruction of the Commons, Kim Sun-pil (2014), Study on Marxism, vol. 11(3), Gyeongsang National University.

³ It means the aspect of existence and principle of behavior of mutual aid existed and maintained in the history of humans.

⁴ Ideology/Finality represents whether or not the lives of the entire members are consistently controlled under a common belief and goal.

⁵ Regionality represents whether or not the resources have been historically formed being embedded into a specific region, the tradition has lasted for such a reason, and whole-personal relation has settled down between the members.

ology/finality and regionality. It is because the tradition of mutual dependence remains around the village communities in Jeju region due to the characteristics of Jeju which is a rural village centered society, their level of ideological finality is low, and they have both spontaneously generated traditions and attribution to the villages at the same time.

2) CPR Management Theory⁶

The term "CPR" refers to a natural or man-made resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use (Ostrom, 1990: 30) (Ostrom, 1990: 30). The CPRs such as waterways, coastal fisheries, irrigation facilities, meadows, forests, underground water, hot spring water and stratosphere are the resources of which the users are difficult to be limited once they are provided by nature or humans (Ostrom, 2006: 151).

Table 2. Classification of Resources

Classification	Contestability ⁷		
		Low	High
Exclusivity ⁸	Impossible	Public resources	CPR
	Possible	Charged resources	Private resources, Civil resources

Data: Re-prepared referring to Ostrom (2005: 24).

(1) The Tragedy of the Commons

Since the Tragedy of the Commons is presented by Hardin (1968) in the magazine, *Science*, it has been accepted as a meaning that symbolizes foreseen aggravation of the situation when a rare resource is planned to be jointly used. It is providing a logic that a meadow will be devastated due to the conflict between the 'personal rationality' to infinitely increase the number of domestic animals on the limited meadow and the 'collective rationality' of joint use of the meadow, and, consequently, pursue of maximization of personal interest will rather destroy the public interest and further even the personal interest itself.

In 1973, five years after the Hardin's paper

was made public, the third United Nations Conference on the Law of the Sea was held and the world made a big move to reorganize a new marine order. Since the 1970s when the issue of environmental protection campaigns gushed out, the concepts of public interest and public goods have come to take an important part in sharing theory and remained so up to the present. Sharing theory is discussed not only for meadows but also across diverse areas and environment such as waters, rivers, lakes and swamps, forests, farm lands and urban spaces (Lee Sun-Ae, 2007: 31).

Ostrom (1990) has pointed out that, though the Tragedy of the Commons may not be such a big concern if important CPRs include only

⁶ Please note that, as to the theory of CPR, the pages 12 to 20 of the A Study on the Process of Quasi-Possession in the Commons, Kang Kyeong-Min, Jeju National University Publication Department.

⁷ Contestability means that the consumption by a certain person reduces the consumption by another person or its efficacy.

⁸ Exclusivity means prohibiting use of the goods if the cost is not shared.

several meadows or fisheries, the problem is that it is not the case. 'The Tragedy of the Commons' has been used to describe diverse problems such as the Sahelian Famine in the 1970s (Picardi and Seifert, 1977), the Crisis of Felling of Fuel Rods across the Whole Third World (Norman 1984; Thomson 1977), the Problem of Acidic Rain (Wilson 1985), Mormonism Organization (Bullock and Baden, 1977), Incompetence of the United States Congress related to Restriction on the Excessive Use of Budget by USA (Shepsle and Weingast, 1984), Urban Crime Problem (Neher, 1978), The Issue of Public and Private Sectors in Modern Economics (Scharpf 1985, 1987, 1988), International Cooperation Issue (Snidal, 1985), and the Dispute between the Communities in Cyprus (Lumsden, 1973) (Ostrom, 1990, translated jointly by Yoon Hon-Keun and An Do-Kyung, 2010: 24 - 25).

(2) Logic of Collective Action

Collective action provides the logic to intervention by the government for efficient management of CPR. Olson (1965) argued in 'The Logic of Collective Action' that an organization can perform its function only when there is a common interest or collective interest. And, though an organization is sometimes used purely for personal or individual interest, the important and unique function of an organization is in enhancing the common interest of the group comprised of each individual (Olson, 1965, translated by Yoon Yeo-Duk, 1987: 16), and individuals are viewed as the beings that have purely personal interest different from the interest of other members of the organization or the group (Olson, 1965, translated by Yoon Yeo-Duk, 1987: 17).

The total amount of the gain which can be obtained from collective goods - higher price - in a market situation is limited. Accordingly, the members of a market group have a tendency of attempting to reduce the size of the group they belong to. Olson (1965) regarded such type of collective goods as 'exclusive collective goods' and, on the other hand, because supply of collective goods automatically increases as

the group expands in a non-market situation, he defined such public goods as 'comprehensive collective goods'. Whether a certain group acts exclusively or comprehensively depends not on the characters of the group members but on the character of the object the group desires to obtain (Olson, 1965, translated by Yoon Yeo-Duk, 1987: 52 - 53). In particular, scale is one of the critical factors when determining whether voluntary and rational pursue of personal interest will bring a group oriented action or not. Small groups enhance their common interest more than big groups do, and 'selective incentives' are also regarded as one of the critical factors. That is to say, it is premised that, if there is no coercion or other mechanism that makes individuals to act for their common interest, rational and selfish individuals will not act for their common interest or collective interest (Olson, 1965, translated by Yoon Yeo-Duk, 1987: Introduction).

(3) Autonomous Management Theory

Autonomous Management Theory promotes joint ownership and management through autonomous management in the aspect of multi-level management in the place of the management of CPR of local communities by the state. Ostrom (1990) argued the necessity for an autonomous management system of CPR through the traditional theories on CPR - the tragedy of commons, the game theory called the prisoner's dilemma, and collective action theory - that is to say, through the successful cases of management by autonomous local communities as an alternative management system to direct management by the government or privatization.

He said that autonomous management could be achieved by voluntarily establishing comprehensive rules of conduct suitable for the local circumstances that include not only the method for individuals to use the CPR but also division, boundary and adjustment of the responsibilities of maintaining and managing them, developing an effective method to monitor observance of these rules and apply sanctions, and creating a device to resolve conflicts.

These rules require not only the extensive culturally accepted rules but also reliable information about the time, place, and the related variables. The models should also be specific and empirically valid and the participants in the actual circumstances should understand how to operate the new rules (Ostrom, 1990: 14).

(4) CPR License System

A license means the administrative action of permitting a generally prohibited action in a particular case or establishing a particular right, and according to the judicial precedents of the Supreme Court, its nature is regarded as a patent and it lapses naturally as the effective period expires. A patent is a new right an administrative agency grants to a particular person as needed for public interest, and it is at the discretion of the administrative agency whether to issue the patent or not, in principle, unless there is a special provision in the related law.

Savas (1987) regards a license as a collective action that can preserve natural supply. When such collective actions are induced and controlled, problems such as the risk of depletion which is the problem inherent in CPR, the limit in the traditional approach dependent on the government, and difficulty in exclusion still exist. As an alternative to overcome such problems, he sees that preservation and successful management can be achieved when the CPR is transformed to private goods and belong to a single owner. Savas classifies goods into 10 types: government service, government sale, inter-government agreement, contract, license, subsidy, purchase certificate, market, voluntary service, and self-service; and presents the supply alternative for each goods.

3) Sustainability

The concept of sustainability horizontally includes all the realms of living such as politics, economy, society and culture, and, vertically at the same time, is a development concept which acts in the integrated and overall aspect that political decision making as well as personal and

selective decision making should involve considerations for environment (recited from Kim Wang-Keun, 2010: 264; Nam Kyung-hee, 2011: 5).

Hwang Kee-Yun et al. (2005) defined sustainability as pursuit of economic use of resources in the relation between the human economic system and ecological system, and said that it means the effect of human activities should be maintained within the scope not damaging the original function of the ecological system in order for human life to be sustainable. That is to say, sustainability can be said to commonly mean pursuit of a society where growth and environment are harmonized, breaking away from the existing growth-centric society (Hwang Kee-Yeon et al., 2005: 61). In other words, sustainability is to include environmental/economic sustainability by restoring the ecological system damaged by human activities and limiting the economic activities of humans within the limit capacity (Kang Sung-Chul et al., 2008: 9).

The concept of 'Sustainable Society (SS)' can be helpfully used in enlightening people that, in order to properly understand sustainable advancement and to form an environmentally sound ecological communities (ecological cities and villages), social and personal changes and efforts are required (Kim Dae-Hoe et al., 2004: 165). In realizing sustainable society, social sustainability such as changes in the dominant values and norm of the past and arrangement of a system to support such changes is also included as a major sub-concept of sustainability together with environmental sustainability and economic sustainability (Kang Sung-Chul et al., 2008: 9).

Whenever sustainability is discussed, limit in resources and extent of use have been the problems. Sustainability is to maintain a state of equilibrium between these two. Sustainability can be said to be the process of making efforts to maintain such a state not the result (Hong Sun-Kee, 2011: 158).

Up until now, the conceptual attributes of sustainability looked into can be summarized as consideration for environment, concurrent

achievement of economic advancement and preservation of environment, society of harmonized growth and environment, environmentally sound ecological community, and sustainable society. Such conceptual attributes result in emphasizing the necessity for systems or rules. In this paper, we intend to define sustainability as the process carried out by past and present generations to enable future generations to create a sound community⁹ which takes care of the environment through systems or rules that can satisfy their needs.

In other words, it is very important to grasp the systems and rules in order to judge sustainability. Ostrom has presented the sustainable design principles confirmed through the CPR system that has lasted for long time as follows:

Clearly defined boundaries, Congruence between appropriation and provision rules and local conditions, Collective-choice arrangements, Monitoring, Graduated sanctions, Conflict-resolution mechanisms, Minimal recognition of rights to organize, and Nested enterprises

4. Analysis of the Case of Jongdal-ri Fishing Village Cooperative

1) Establishment of Jongdal-ri Fishing Village Cooperative¹⁰

In most of the fishing villages in Jeju Island, a fishing village cooperative is organized. Each of these fishing village cooperatives has an articles of incorporation or rules for maintenance and existence of the fishing village cooperative. The Jongdal-ri Fishing Village Cooperative established on February 15, 1962 was operated and managed by the head of Jongdal-ri until it was divided and reorganized into Jeju Fishery in February 1949, and the sea mustard, fusiformis, and sargassum fulvellum that are major products were used as food; ecklonia cava and sargassum

fulvellum agardh were used as fertilizers, and spiny top shell and abalone were the only commodities.

After that, the head of Jongdal-ri had also taken the post of the head of the Jongdal-ri Fishing Village Cooperative and operated it dividing it into five Dongs until the Jeju Fishery Cooperative was reorganized in April 1962, from when the Jongdal-ri Fishing Village Cooperative and Jongdal-ri were separated and the fishery was managed by the Cooperative. However, the investment was jointly made by the village people and the fishing right was jointly exercised until April 1976, when the members of the Fishing Village Cooperative were reorganized and the fishing rights were given to individuals in accordance with the policy of the Jeju Fishery Cooperative that only the members of the Cooperative who made an investment in the Cooperative can exercise the fishing right. From this time female divers started wearing an improved diving dress. The entire quantity of the fishery products is sold by the Cooperative on consignment, and was sold to fishery product gatherers before it has been collected and sold by the sales persons of the Cooperative from June 19, 1983.

The major businesses of the Cooperative include ① Acquisition and development of fishing rights, ② Exclusive use of joint fisheries and fish farms, ③ Joint purchase of daily necessities, fishing boats and fishing gear for members, ④ Installation of common facilities: Boating site, wharf, slipway, joint treatment plant, weather signal station, fish shelter forest, and other fishing village common facilities approved by the head of the Cooperative.

2) Analysis of Sustainability

Is Jongdal-ri Fishing Village Cooperative equipped with the 8 sustainable design principles presented by Ostrom? In order to analyze sustainability, it is important to check whether it

⁹ According to A Study on the History of Sustainability Indicators of Seo Eung-Chul (2004), pp. 73 - 78, 8(3), published in the journal of The Korea Institute of Forest Recreation Welfare, it is changing to development of indicators around communities after the 2000s.

¹⁰ Culturecontent.com(2004), Korea Creative Content Agency, Naver <http://terms.naver.com>. Jongdal-ri Fishing Village Cooperative

is institutionally equipped with the 8 principles. And, are these principles practically observed? It is important to check the answer to this question through the autonomous management rule which is an institutional device and a direct interview. In this study, the answer was checked through the institutional device and a direct interview with the head of the Fishing Village Cooperative.

(1) Clearly defined boundaries

Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must the boundaries of the CPR itself (Ostrom, 1990: 91).

The individuals who have the right to withdraw resource units from the CRR are clearly defined. No one except those who fall under one of the items ① to ④ can join the Cooperative or exercise the right: ① A member of the district Fishery Cooperative Federation who has lived within the jurisdiction of the relevant Cooperative for 2 years or longer can become a member of the Cooperative and exercise the fishing right in the village common fishery. ② Admission of a new member should be resolved and approved by the general meeting, and the approved new member should pay the admission fee. (However, the admission fee shall be managed as a special saving fund under the name of fishing village cooperative admission and withdrawal fee.) ③ A member of the Cooperative who has not lived within the jurisdiction of the Cooperative for 2 years or longer or who has left and returned to the jurisdiction less than 2 years ago can exercise the right after obtaining a resolution of the Cooperative general meeting. ④ Exercise of the village fishing right in accordance with Paragraphs ①, ②, and ③ above is subject to a resolution of the Cooperative general meeting.

As a result of the interview with the head of the Fishing Village Cooperative, it has been found that the boundary with the appropriators is clearly defined and executed.

The qualifications of the exercisers have been

strictly established. Nobody can enter the village fishery to catch marine products, whether animals or plants, without getting a consent from the Fishing Village Cooperative. Female diver groups can exercise the right by concluding a contract with the Fishing Village Cooperative. Nobody except those who have the right to exercise can catch marine products. The boundaries are indicated in a zone map. Though the boundaries can be clearly indicated by floating buoys, as they will be moved by the sea wind, the boundaries have been measured and indicated by zone.

(2) Congruence between appropriation and provision rules and local conditions.

Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions and to provision rules requiring labor, material, and/or money (Ostrom, 1990: 92).

The rule of use of withdrawing resource units and the rule to provide labor are as follows: The period of exercise as a rule of use is from January 1 until December 31, and the period of exercise cannot exceed ten days per month. (However, the number of days of fishing operation and the closed season may be adjusted through a meeting of diver group leaders, the fishery management committee members, if the Fishing Village Cooperative acknowledges that it is required.) As closed seasons, it is specified that sea cucumber is prohibited to be caught from July 1 until 31, abalone from October 1 until December 31 (Catching is prohibited for 3 years in a fishery to which spats have been released.), spiny top shell from June 1 until September 31, Obeunjagi from July until mid of September, fusiformis from October 1 until April 30 the next year, Gelidium amansii from November 1 until April 30 the next year, Grateloupia spp. from October 1 until April 30 the next year, and ecklonia cava is prohibited to be caught from January 1 until December 31. To prevent depletion of the resources, abalones smaller than 11 cm, spiny top shells smaller than 8 cm and Obeunja-

gi smaller than 4 cm are prohibited from being caught. Sickles, hoes, knives, mattocks, shovels, algae frame, rakes and harpoons which use a rubber band are defined as illegal fishing gear and are prohibited to be used.

As the rule to provide labor, cleanup of fishery and so on are stipulated. ① Cleanup of fishery is carried out once every month by all the members of the Cooperative in order to inhibit contamination of the village fishery by various industrial wastes and domestic garbages. ② Fishery formation project such as rock cleaning, shellfish throwing, and fish seed release should be carried out one or more times every year depending on the circumstances of the fishing ground in order to improve the inhabitation of the environment of the village fishery and formation of resources, and the area for the inhabiting environment improvement project should be 1% or more of the total fishery area. ③ In order to eradicate starfish that disturb breeding of useful marine animals and plants, the expense shall be allocated in the Fishing Village Cooperative budget every year and starfish shall be eliminated from time to time during every low tide in principle (10 times a month or more frequently).

As a result of the interview with the head of the Fishing Village Cooperative, it has been found that the rule of use and the rule of provision are actually observed.

Rules are there to be observed. For preservation of resources, what should not be done should not be done. In particular, ecklonia cava which becomes a habitat and feed of marine resources are prohibited to be caught all the year round. Only the ecklonia cava which has been washed ashore by the wind can be caught. Its catch is absolutely prohibited during the closed season, which should be observed by all for formation of resources and it is done so. It is to preserve the resources.

(3) Collective-choice arrangements

Most individuals affected by the operational rules can participate in modifying the operational rules (Ostrom, 1990: 93).

The village fishery management rules are an object to be resolved by the general meeting, and most of the people who are affected by the operational rules can participate in the process of revising the rules. The general meeting is organized by the members of the Cooperative and is divided into regular general meeting and extraordinary general meeting. The general meeting is assembled when a majority of the current members are present, and an issue is resolved by a majority of those present, unless it is otherwise stipulated in the law or the articles of association. Revisions of the village fishery management rules of the Fishing Village Cooperative which are the matters related to village fishery management and exercise of the right are subject to resolution by the general meeting.

As a result of the interview with the head of the Fishing Village Cooperative, it has been found that members are participating in the process of revising the operational rules.

There are village fishery management rules and autonomous management rules. The contents are almost same. The standard articles of association of the Fishery Cooperative Federation stipulates that a delegate system can be adopted if the number of the members is fifty or more, and the number of the members of Jongdal-ri Fishing Village Cooperative exceeds 300. Accordingly, the work is carried out having delegates, and revision of the rules or the articles of association and withdrawal of members are taken care of by the general meeting. Though the delegates should be directly elected, as the village is comprised of five Dongs, two delegates are elected from each Dong and the number of delegates are about fifteen including the group leaders such as the diver group leaders. Election of the delegate itself is entrusted to each Dong. Accordingly, the members participate in the process of revising the operational rules through the meeting of the delegates elected by the members and the general meeting.

(4) Monitoring

Monitors, who actively audit CPR conditions and appropriate behaviour are accountable to the appropriators or are the appropriators (Ostrom, 1990: 94).

In order to monitor the resources of the village fishery, ① the acts of catching marine animals or plants of which the catch is prohibited or use of illegal fishing gear are jointly monitored by all the members of the Cooperative; ② the member of the Cooperative who found an act of illegal fishing should immediately report it to the person in charge of fishery management, who should take a necessary action against the committer such as criminal accusation; ③ when a member of the Cooperative has committed an illegal fishing act, the person in charge of the fishery management should limit the exercise of the fishing right in the village fishery, and, if the seriousness of the act is judged to be heavy, an action of expulsion may be taken in accordance with the procedures stipulated in the articles of association.

The Cooperative may not only limit or prohibit exercise of the right by the violator or cancel the exercise contract and impose a penalty but also prohibit the violator whose exercise contract has been cancelled from concluding a new exercise contract within 6 months after the date of the cancellation.

As a result of the interview with the head of the Fishing Village Cooperative, it has been found that the person in charge of fishery management is selected among the appropriators and is takes responsibility.

Monitoring is very important. Monitoring is carried out alternately by a team of 7 persons comprised of the head of the Fishing Village Cooperative, diver group leader, one leader from each Dong, and one employee of the Cooperative. As a result of monitoring, no case of a person entering the village fishery illegally to commit illegal catch or capture has been found. Though thorough monitoring is carried out, it is because the members of the Cooperative are

well observing the rules above all.

(5) Graduated sanctions

Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense) by other Appropriators, by officials accountable to these Appropriators, or by both (Ostrom, 1990: 94).

Graduated sanctions are imposed cumulatively on the appropriators who violate the operational rules depending on the object, content and seriousness of the offense.

For the members who have failed to participate in the fishery environment improvement projects such as throwing, or harmful organism elimination, who have fished in a fishery during its rest-year or to which abalones have been released, or who have failed to participate in or cooperate for the resource formation projects such as formation of a sea jungle or release of spats, a warning is given at first, a penalty of KRW50,000 is imposed when it happens the second time, a penalty of KRW100,000 is imposed when it happens the third time, and a sanction of fishing suspension for one month is inflicted when it happens the fourth time.

When a resource management rule such as closed season for spiny top shells, abalones, etc., or the body sizes prohibited to catch is violated, a penalty of KRW50,000 is imposed when it is violated for the first time, a penalty of KRW100,000 is imposed when it is violated the second time, a sanction of fishing suspension for 1 month is inflicted when it is violated the third time, and a sanction of fishing suspension for 2 months is inflicted when it is violated the fourth time.

When a production management rule such as maintenance of production, or adjustment of fishing operation and fishing efforts is violated, and when selling and distribution rule such as sales through the system or limit on the amount to be sold on entrustment is violated, a penalty of KRW30,000 is imposed when it is violated for the first time, a penalty of KRW100,000 is

imposed when it is violated the second time, a penalty of KRW200,000 is imposed when it is violated the third time, and a sanction of fishing suspension for 1 months is inflicted when it is violated the fourth time.

As a result of the interview with the head of the Fishing Village Cooperative, it has been found that, though cumulative sanctions are taken, there has been no case of applying the regulation.

Cumulative sanctions are specified in the rules. Up to now, no one has ever been subjected to a sanction. It is because the rules are well observed. Aren't the rules there to be observed?

(6) Conflict-resolution mechanisms

Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials (Ostrom, 1990: 100).

As a conflict-resolution mechanism, a Fishery Management Committee is organized among the appropriators for efficient management of the village fishery and maintenance of the order in fishing operation. The Fishery Management Committee carries out the functions of the matters related to establishment of fishery products production plan, prohibition of fishing of the items designated to be produced by the village fishery for formation of resources and exercise of the fishing right in the village fishery, formation of resources in the village fishery (throwing and release of spats), use of the exercise fee (fishing fee), restriction on fishing for breeding and protection of marine animals and plants and maintenance of fishing order, sanctions against the violators of exercise contracts and the management rules, and other matters related to the management and use of the village fishery not established in the general meeting.

According to the regulation related to autonomously managed fishing as a conflict-resolution mechanism at the district level, it is stipulated that an autonomous mediation committee shall be installed in the Korea Fisheries Association

which shall mediate in the problem or dispute arising between fishers, districts or business types to let them autonomously settle the issue through consultation and discussion. Also, according to the enforcement decree of the Fisheries Cooperative Federation Act, ① the head of each district Fisheries Cooperative Federation directs and supervises the works of the fishing village cooperatives in its area. However, the projects for which the local government has provided a subsidy and the related works may be directed and supervised by the head of the relevant local government. ② It is stipulated that the head of each district Fisheries Cooperative Federation and the head of the local government may have one of its workers or officials audit fishing village cooperatives, if it is acknowledged to be required to carry out the tasks of Paragraph ①.

In order to prevent disputes between the appropriators and non-appropriators who want to use the resources, it is stipulated in the village fishery management rules that the 26 ha shellfish experience fishery, a part of the village fishery, shall be open to non-appropriators all the year round so that the village can be introduced to urban residents and tourists through fishing village experience and the income can be also increased.

As a result of the interview with the head of the Fishing Village Cooperative, it has been found that there is a conflict-resolution mechanism and there has been no case of conflict.

Though there is a delegates' meeting and the general meeting as a mechanism of the Fishing Village Cooperative itself to resolve conflicts between the appropriators, no case of conflict has appeared yet. The issues related to the village fishery are immediately settled by holding a delegates' meeting. The fishery management committee members belong to the delegates' meeting. The issues that cannot be resolved by the delegates' meeting are resolved in the general meeting. The matters likely to be a cause for dispute are stipulated in the fishing village

cooperative management rules in advance. If there is a conflict which is unable to be resolved autonomously, such a conflict can be resolved by the Jeju Special Self-governing City, the government authority having jurisdiction, or the Fishing Cooperative Federation.

(7) Minimal recognition of rights to organize

The rights of appropriators to devise their own institutions are not challenged by external governmental authorities (Ostrom, 1990: 101).

The qualification for those who have the right to withdraw resource units are limited to the members of the Fishing Village Cooperative, and the village fishery management rules are autonomously established by the members of the Fishing Village Cooperative. It is stipulated that the objective of the Jongdal-ri Fishing Village Cooperative management rules is to establish the matters required for rational management of the village fishery and improvement in the productivity in parallel with the autonomous management rules of the autonomous management community. In addition, there is a regulation on general meeting, which makes the resolutions related to revision of the rules, revision of the village fishery management rules of the Fishing Village Cooperative, selection of the part of village fishery where the fishing right is exercised, determination of the exercise fee, basic policy of the Fishing Village Cooperative for resource management, disposal of profit, account settlement for the village fishery management, and the object of system sales.

As a result of the interview with the head of the Fishing Village Cooperative, it has been found that the minimum right for autonomous organization is guaranteed.

The fishery management rules are more strict than the scope of the rules stipulated by the autonomously managed fishing. The reason is because the rules can be autonomously established to fit the circumstances of the Fishing Village Cooperative. In particular, the purpose of specifying the body length of abalone, etc. that

is allowed to be caught longer than that of other districts is to prevent depletion of the resources. Each fishing village cooperative is using a management rules made autonomously. As being a member of the Fishing Village Cooperative itself is strictly managed, there is no room for intervention.

(8) Nested enterprises

Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises (Ostrom, 1990: 101).

According to the village fishery management rules at the level of fishing village cooperative, the smallest unit, it is stipulated that the head of the Fishing Village Cooperative shall take the responsibility as the head of the fishery management committee to manage all the matters related to the village fishery based on all the fishing rights acquired by the Jongdal-ri Fishing Village Cooperative and all the matters related to fishing vessel fishery. The general leader of diver groups and the diver group leader of each Dong are to assist the head of the Fishing Village Cooperative, and to manage and monitor fishery by partitioning it into, say west and east, etc. The person in charge of the fishery management has organized and is operating a fishery management committee for efficient management of the village fishery and maintenance of order in fishing operation. Article 37 of the Fisheries Act stipulates that the fishing right possessed by a fishing village cooperative shall be exercised by the members of the fishing village cooperative pursuant to the provisions of the fishery management rules. Also, it is stipulated that fishery management rules including the qualification for the persons who can fish in the fishery or exercise the fishing right, the fishing method and the exercise method, period of fishing, fishing method, fishing fee and exercise fee, and other matters required for management of the fishery shall be established.

It is stipulated that, for mediation, compensation, and decision-making related to fishing and

screening of the matters related to cultivating fishery, a Central Fisheries Mediation Committee shall be organized in the Ministry of Marine Affairs and Fisheries, and a City/Province Fisheries Mediation Committee and si/gun/gu Fisheries Mediation Committee shall be organized in each city/province and si/gun/autonomous gu respectively. The function of Fisheries Mediation Committees are mediation of disputes between fishery businesses, mediation of disputes related to fishing between cities and provinces, review of the basic plan, review of the matters related to the license priority of the applicants for license for cultivating fishery in the open sea, and compensation of the loss or screening/mediation of the dispute related to cultivating fishery in the open sea. As a result of the interview with the head of the Fishing Village Cooperative, it has been found the activities are organized in multiple layers of nested enterprises.

The village fishery is autonomously managed based on the rules. Also, it is important to maintain organic relations with upper organizations. There are two types of relations. First, in the aspect of administration, it maintains mutual relations with the upper organizations such as eup, si and adheres in relation to the policy on the measures of marine resource preservation, and, for distribution and market development, it is maintains mutual relations with the Fishery Cooperative Federation. It is because fishing village cooperatives are mutually connected with fishing village cooperatives, and fishing village cooperatives with districts.

5. Implications and Conclusion

Sustainability of CPR management by communities is very important also for future generations in managing and inheriting CPR. A study was conducted on the CPR case of the village fishery managed by the Jongdal-ri Fishing Village Cooperative of Jeju Special Self-governing Province. The analysis was conducted using the

8 sustainable designed principles of CPR presented by Ostrom (1990), that is to say, Clearly defined boundaries, Congruence between appropriation and provision rules and local conditions, Collective-choice arrangements, Monitoring, Graduated sanctions, Conflict-resolution mechanisms, Minimal recognition of rights to organize, Nested enterprises. It was confirmed that the Jongdal-ri Fishing Village Cooperative which was the object case was operated based on these principles.

The autonomous management rules are autonomously established by each fishing village cooperative community to fit its characteristics. Besides establishment of the rules, these rules should be preferentially put into practice. The Jongdal-ri Fishing Village Cooperative put them into practice, and was designated as the most superior fishing village cooperative community successively for three years. Collection was prohibited during a closed season for preservation of resources, and those of which the body length was shorter than that specified in the rules were not caught.

That is to say, communities can sustainably manage CPR by complying with the conditions to be sustainable as well as following and putting into practice the rules, providing a CPR management system for future generations.

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Receiving Date : November 12, 2014

Reviewing Dates : November 20 & 27 , 2014

Reporting Date of Article Appearance : November 28, 2014