

# Common-Pool Resources and Local Community Networking

—A Study of the Onga River Basin—\*

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## 1 Introduction

Recently, there are many local governments whose aims are to improve their socio-economic inferiority and to defend the environmental destruction they perpetrate by means of preserving or recovering the inherent natural resources, forest, plain, river and marine life (we refer to these four inherent resources as “San-Ya-Ka-Kai”).

In environmental economics, it has been recognized that the studies of

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Common-Pool Resources like “San-Ya-Ka-Kai”, developed by Ostrom (1990) and Ostrom et al. (1995) are the key factor to examine local environmental and socio-economic inferiority problems. In the following chapter we shall abbreviate Common-Pool Resources as CPRs but we should notice this term is different from *common property resources*.

In this paper, we have focused on the Onga River Basin in order to investigate how to attain sustainable growth paths on which natural environments can be conserved. The origin of industrial development in the Onga River Basin began with the establishment of the state-operated steel industry in 1901. The mountains around the Onga River Basin had provided plenty of coal, and this region became one of the richest due to the prosperous coal industry in Japan. Since World War II, however, the change of the energy resource from coal to oil has deteriorated the economic situation of this region drastically. The high population density and the slack inflow from the ruins of coal mining into the water have caused the Onga River’s highly visible pollution. Even now this area faces serious economic and environmental problems. That is why the residents, the local governments and firms in the Onga River Basin are keen to reconstruct the economic situation without destroying CPRs.<sup>(1)</sup>

By using the networking model, it has been proved that regional networking channels can be a useful procedure to attain regional industrial development harmonized with the environment and livelihood. To clarify the current situation of the regional environmental strategies, we visited 30 local governments and asked questions focusing on three points: (i) the current positions and perspectives of economic and environmental issues; (ii) the expected effects of the regional network channels, or inter-regional cooperation, on the environmental preservation, and (iii); the administrative procedures for promoting and enforcing regional network channels.

Many administrators still want to pursue an old-fashioned, growth-oriented type of regional development. However, they have been aware of not only the risk of polluted rivers, but also the importance of preserving the natural resources and environment. Investigations show us that inter-relations between administrations and residents are the key to implement incentives of

the people for conserving nature. They also imply that the regional networking is expected to be an effective procedure, which can reconstruct the ecosystem around the Onga River Basin. We have found that there are still difficult problems to be overcome in promoting and enforcing the regional network channels. As for the software-side, we need more effective systems by which the residents can easily access and assess environment education or information. The hardware-side procedure must include the reform of current administrative structure and the local finance system.<sup>(2)</sup>

It must be essential for the local governments in the Onga River Basin to make and strengthen the regional network channels, not only to recover the community function among self-supported residents, but also to rebuild the damaged relationship of mutual faith among the government and /or local governments, firms and residents. The enhanced regional networks will establish their own identity, enforcing historical and cultural consciousness.

The structure of this paper is as follows. Part 2 provides a historical analysis of the development pattern of the Onga River basin area. We investigate the regional features related to the industrializing pattern and the environmental deterioration process in that area. We also feature a model of regional network through which the overexploitation of CPRs can be mitigated in part 3. In part 4, the current situation of environmental preservation as well as regional development in the Onga River basin area is investigated. We also give a summarized note concerning the field research in the Onga River basin area. Finally, in part 5, we provide a scope for the new communities in the Onga River basin area.

## **2 The Historical Utilization Patterns and the Current Trends of the Onga River Basin**

### **2.1 An Overview of the Onga River Basin**

The Onga River system consists of eleven major tributaries, such as the Inunaki River, the Hikosan River, and the Chuganji River. The main stream, the Onga River, is approximately 61 kilometers in length and covers an area of 1,026 square kilometers (see Fig. 2-1). The Onga River Basin is located in Fukuoka Prefecture between the Chikushi Mountains and the Hibiki Sea from

the south to the north, and comprises 30 political jurisdictions (5 cities, 24 towns and 1 village). The Onga River Basin is a Mother Nature for fostering and maintaining all CPRs. It contains the highest density of population in Kyushu, 639 persons per square kilometer, and around 0.6 millions people are living there. Land use by area is 52 percent for forestry, 14 percent agricultural, 10 percent housing and the remainder for industry and urban. Based on the Hierarchical Cluster Analysis<sup>(3)</sup>, we can show in the following table (see Table 2-1), the Onga River Basin can be typically divided into three distinct sections: the down stream region (1 city and 4 towns), the middle stream region (4 cities and 16 towns) and the upper stream region (4 towns and 1 village).

Regarding water utilization, water supplies in the upper stream area are very poorly equipped and inhabitants in this area utilize “riverbed water” and “water from shallow wells”. In the middle stream area, the equipment rate is 96.7% and they utilize “water from river (24.3%)”, “water from shallow well (21.8%)” and “riverbed water (17.0%)”. On the other hand, in the down stream area, they have well-equipped water supply systems and they buy purified water from Kitakyushu City, which is one of Japan’s largest centers for international trade and industry and has the rights to obtain water from the Onga River.

The administrative agencies for maintenance and management of the rivers in Japan are classified into three types according to the River Law. The first class rivers are under the control of the Minister of Land, Infrastructure and Transport, and the second class rivers are under the prefectural governor. The law-applied rivers, i. e., the third class rivers, are under the Mayors, town headmen. The Onga River and the Hikosan River are mostly under the direct control of the State and assigned parts under the control of the prefectural governor are very short. The percentage of assigned parts are 38.3% on the Inunaki River, 34.2% on the Sasao River, 50.0% on the Kuro River, 63.6% on the Kibe River, 65.5% on the Chuganji River, 74.5% on the Honami River, 80.3% of the Nishi River, and 82.9% on the Yakiyama River respectively. The wide range of percentage depends on the significance of the river from the viewpoint of the State side.

The sewer systems have been well equipped in the down stream area and

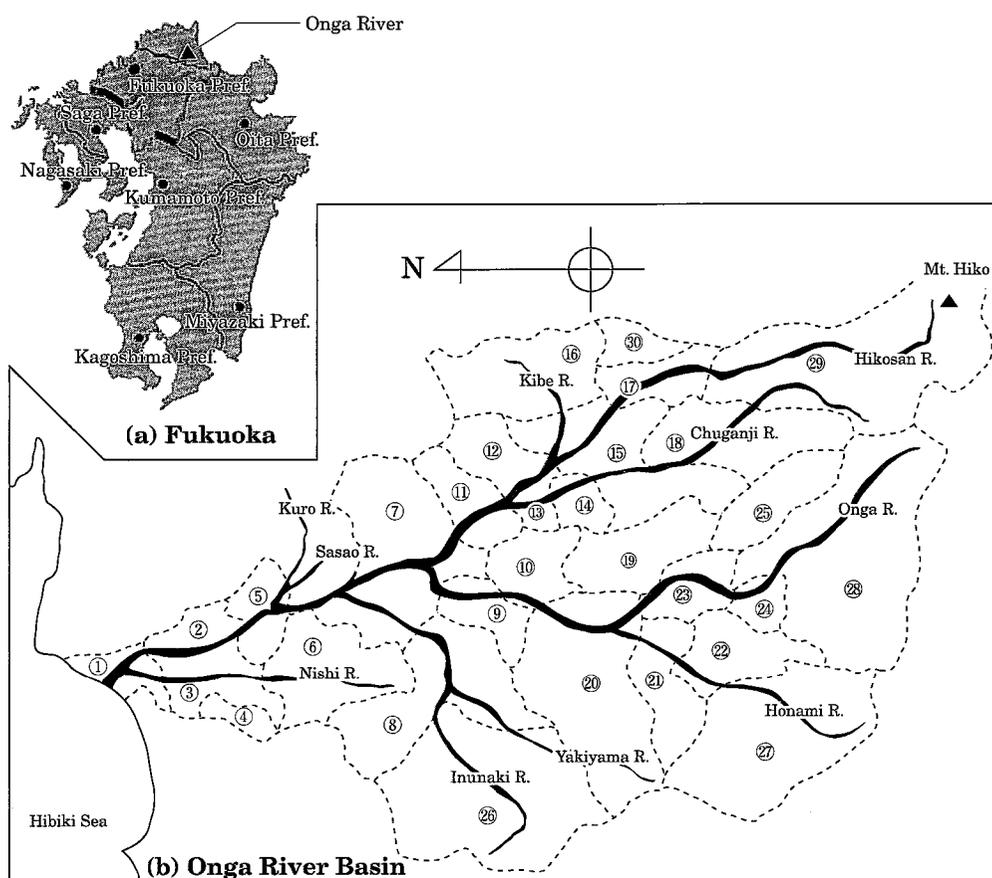


Figure2-1 A Location of Onga River Basin

<b>The down stream</b> 1 city and 4 towns	①Ashiya T.	②Mizumaki T.	③Onga T.	④Okagaki T.
	⑤Nakama C.			
<b>The middle stream</b> 4 cities and 16 towns	⑥Kurata T.	⑦Nogata C.	⑧Miyata T.	⑨Kotake T.
	⑩Kaita T.	⑪Akaike T.	⑫Hozyo T.	⑬Kanada T.
	⑭Itoda T.	⑮Tagawa C.	⑯Kawara T.	⑰Oto T.
	⑱Kawasaki T.	⑲Shonai T.	⑳Iizuka C.	㉑Honami T.
	㉒Keisen T.	㉓Inatsuki T.	㉔Usui T.	㉕Yamada C.
<b>The upper stream</b> 4 towns and 1 village	㉖Wakamiya T.	㉗Chikuho T.	㉘Kaho T.	㉙Soeda T.
	㉚Aka V.			

Table2-1 Local Governments in Onga River Basin

neighboring area of the middle stream, but the upper stream and most of the middle stream area have not been so equipped. On the Onga River, middle stream sewer systems are under construction. The simplified and cheap

purifying facilities in agricultural communities are not fully equipped even now.

## 2.2 The History of Utilization Patterns of the Onga River Basin

The origin of industrial development in the Onga River Basin started from the establishment of the state-operated steel industry in 1901 as cited above. The mountains in the Onga River Basin had provided plenty of coal, necessary for steel production, and it became one of the richest regions due to the prosperous coal industry in Japan. Since World War II, however, the decline of the steel industry as well as the switching of the energy resource from coal to oil has caused the drastic deterioration of the economic situation of this region. The high population density and the slack inflow from the ruins of coal mining into the water have caused the Onga River's highly visible pollution. The Onga River was thus, called "zenzai-gawa" (muddy black river).

Although the economic and environmental situations in the Onga River Basin differ from region to region, it must be a common development strategy for the regional authorities within this basin to impose more stringent pollution controls and incentive-compatible environmental policy into their local comprehensive development plans.

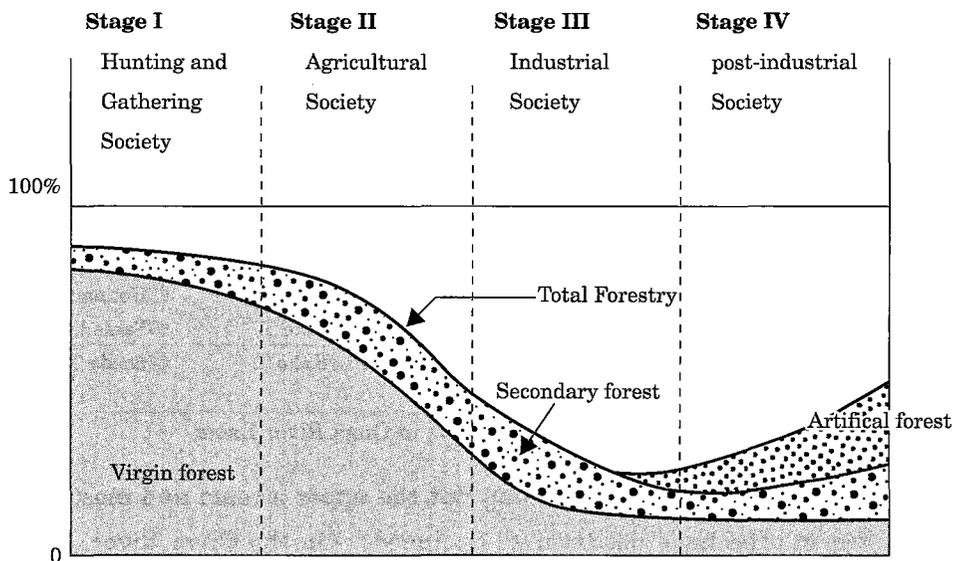


Figure2-2 Historical Trend of the Forestry

We have a useful theory to understand the linkage between the level of economic development and the transition of utilization patterns of CPRs (see Fig. 2-2). This is the U-shaped hypothesis of forest resources as the representative example for CPRs.<sup>(4)</sup> According to this hypothesis, the stock of forest resources decreases initially, but increases with the process of industrialization. As a result, its locus forms a U-shape. We can expect the future of this area by using this hypothesis when we consider the historical changes of utilization patterns of CPRs.

We confirm that the utilization patterns of the Onga River have changed dramatically in proportion to the economic development stages. The Onga River has been utilized as a source for water for agricultural use and as a waterway for carrying rice for land tax, a special product before the Meiji era. After that, the utilization patterns of the Onga River changed in relevance to the degree of industrialization, the prosperity of the coal-mining industry, the operating start of state-operated Yahata steel, and the degree of the completion of the railway transport network.

The first River Law enacted in 1896 was intended mainly for river improvement to prevent flood disaster. In 1964, the government instituted the New River Law in response to the problem of severe water resource demand during the rapidly economic growth period and the consistent management of water systems. Finally from the viewpoint of the importance of the river environment, the River Law (amended in 1997) insists on the preservation and maintenance of the river environment. We have to mention the changes of industrial structure when we investigate the linkage between changes of the purposes of public river works and changes of utilization patterns of the Onga River after the Meiji era.

In fact, the existence value of organized forests and fields has changed for regional residents over time. Also, we are able to mention Shugendou (like animism) at Mt. Hiko from the viewpoint of the spiritual and cultural relationship between mountain and people in the Onga area. Finally, we have to consider the fact that river fishing was prosperous during the medieval period. After that, we can obtain a great deal of knowledge about changes of utilization patterns of the Onga River.

### 2.3 The Current Features of the Onga River Basin

The local governments in the Onga River Basin have different relations on the rivers and not the same interests. What kind of mutual recognition of this area is required to make close co-operation? It is the common recognition of this water system as a CPR. It is the time to form network systems, whose community's people have recognized this area as their natural heritage for future generations.

It has been shown that negative externalities should occur when we use CPRs in consumption or production. Because each resource-user in the CPRs tends to place immediate self-interest above that of the community, the CPRs are doomed to overexploitation.<sup>(5)</sup> Therefore, it is very natural to expect that a cooperative management or the establishment of common rule to improve social efficiency and its sustainability can be an effective procedure for avoiding overexploitation of CPRs. We here refer to such an autonomous regional community level cooperation as a "regional network channel". The regional network channel consists of all phases of cooperation by regional residents, regional authorities and firms.

Recently, it has been pointed out that there are many activities to establish a regional network channel in many regional areas. Also at this area of the Onga River Basin, various kinds of network activities have been carried out progressively. These activities give us some useful suggestions to understand the river basin network for the 21st century.

As in "the Grand Design of Japan for the 21st Century", determined by a cabinet meeting on March 31 in 1998, the government started to take account of the "river basin" from the view point of the framework for solving problems, such as depopulation, the expansion of the income distribution gap, and so on. Stress has been placed on linkages among the different subjects in the region. And a variety of zonings of the Onga River Basin have been set in administrative planning of Fukuoka Prefecture (for example, the Fukuoka Plan for the next century announced in June, 1998).

It is necessary to investigate the networks developed in the Onga River Basin. There are various kinds of environmental networks among the regions in the Onga River Basin. The bond of the network from upstream to

downstream is growing in this basin. NGOs and NPOs as the undertaker of activities of the networks, have an important role to preserve the inherent natural resources. The festival managed by “I LOVE Ongagawa Ryuiki Zyumin Koryukai” which intends human interchange among many groups and inhabitants, has been held these past 7 years.

In the Chikugo River Basin closer to the Onga River Basin, the “Chikugogawa Festival” managed by several NPOs has been held since 1987 and sharing its role with the public organization. There is a core NPO, known as Chikugogawa Ryuiki Renkei Club, organizing regional residents, regional authorities and firms. The Onga River Basin has faced how to solve the various problems of the management of group, interchanges among groups, the significance of public support by administrative organization.

### **3 Regional Network and CPRs**

#### **3.1 Enforcement of the Regional Network by the Japanese Government**

In Japan, there were many CPRs such as forests, rivers and inshore fishing grounds in every region. The Meiji government after feudal times, the Edo era (1603–1868), however, rushed into modernization in all fields. And in the course of the economic recovery at full speed following World War II, we have lost parts of our essential regional CPRs throughout the country geographically. Moreover, we also lost much of the virtue of collective co-operatives necessary for managing CPRs.

We recognized that each CPR had an interdependent relationship inherently before modernization. Regional residents or local communities had administered most CPRs conventionally. That system had well preserved the environment in many local areas and each CPR. Japanese government has promoted urbanization in all rural areas since the 1960's. As a result, the conventional self-governing systems of CPRs are extinct in urban and rural areas. Therefore, if we intend to recover the traditional CPRs, we have to have a new understanding of the original CPRs and cope with the CPRs' problems beyond the range of current administrative districts.

Recently, in some fundamental programs of the government such as “The Basic Environment Plan” and “The Grand Design of Japan for the 21st Century

(multiple purpose development program)", the existing CPRs which are peculiar to a region have come to the front. Also they require new organizations which introduce the conception of the river basin connecting "San-Ya-Ka-Kai". Our responsibility for the new century is to manage the regional CPRs systematically to keep their inherent functions with voluntary Co-operation between regional residents and municipalities. Moreover, to form a new self-governing organization and institution of CPRs is a key strategy for our future.

So far there have been a lot of national-level as well as local-level plans concerning regional development and environmental preservation. The Third Comprehensive National Development Plan during 1977 to 1987, the Basic Environmental Law in 1994, or the Fukuoka Plan for the next century in 1998, have already mentioned an important role for the regional cooperation corridors where regions can attain sustainable development by the efforts of local authorities. The national development plans have inherently pursued the rapid and balanced income growth without deteriorating the natural environment of all ecosystems. Unfortunately, it is still a current vital issue for future human development to abolish income differentials among regions, as well as to restore ecological vibrancy. For example, as far as the Onga River Basin is concerned, there still remain large differences in the level of earnings, in the stock of the local infrastructures like drainage or road building, and in some other phases related to the natural environments.

The new comprehensive national plan, Grand Design for the 21st Century, was approved in 1998. The plan was to build a national land area that is more environmentally and friendly. It states that national land preservation and maintenance can be carried out effectively by introducing policies tailored to the concept of a river basin sphere that includes the river basin, the flood plain, and other areas relating to the river. The plan stresses the role of regional networking in a specific river basin area through which people living there can use the various environmental resources more effectively and preserve them for successive generations. Hence it is natural to say that building and renovating inter-intra regional network channels seem to be the keys to encourage people living in the Onga River Basin to create sustainable growth preserving CPRs. In the regions, participation and cooperation of local governments, and NPOs

organized by individuals and private enterprises are all factors in creating an action program for establishing a new way of life that is more in harmony with the natural environments.

### **3.2 A Model Analysis of Regional Network for Managing CPRs**

In this section we will examine a theoretical model of the regional network channels, which is an application of the network model designed for communications networks to the human networks.

It is well proven that if natural resources are open to all economic agents in a specific area, they are deemed to be overexploited. The tendency of such an overexploitation of CPRs, or analogously a deterioration of the natural environment, is called the “Tragedy of Commons” or “Externality of the Common Pool”. The Tragedy of Commons occurs when people living in a specific region try to make their individual benefit optimal, while such selfish behavior of an economic agent can affect the other agent’s welfare. For example, if the water that runs through a specific river basin is free to access and there is no regulation or management rule there, it is easy to imagine a picture of the river becoming terribly polluted and malodorous.

The question here is how we can avoid such tragedies. According to Ostrom (1990) and Ostrom, Gardner and Walker (1995), we need at least the following three distinctive rules. The first is the boundary rule for preventing outsiders from accessing the inside region freely so that overuse or overexploitation can be mitigated. It is also expected that by introducing this rule into the community, the residents can share a common sympathy with the environment’s preservation. The second is the allocation rule under which residents tend to collaborate mutually in allocating finite CPRs. This rule includes regulations related to the time interval, place, period, skill, quantity and kind of the CPRs. The third concerns the penalty or monitoring rule as a part of the managing rule of CPRs. Some agent must always monitor the user’s behavior and impose a penalty for violation if necessary. It has been proved by many studies that these three rules are so effective that the CPRs could be managed adequately. A sustainable development in the region can be attained under these rules. We now come to the next question. What makes

the agents living in the same river basin area join and employ such regional rules for managing CPRs? The answer simply seems to be “regional networking”.

We shall define the term ‘regional network’ or ‘regional networking’ as the networking device whereby the regional agents, especially the local governments, employ and lead to a more efficient and productive outcome with a given level of input of CPRs. Mainly the cooperative activities, alliances or unification among any local governments can formulate the regional networking. For example, as far as the Onga River Basin area is concerned, there are 1 village, 24 towns and 5 cities, and most of them have virtually constructed some regional networking with their neighbors.

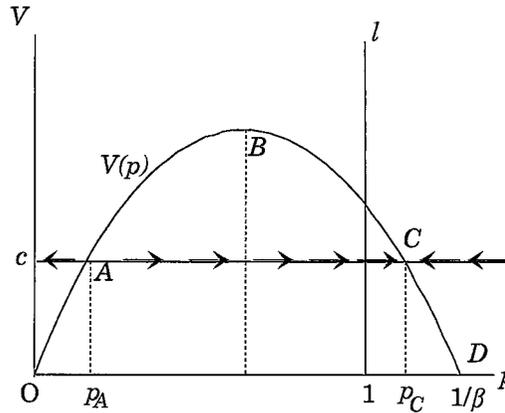
We shall feature a simple model of regional networking. Assume that there are  $n$  areas governed by  $n$  local governments in a river basin area, and each of them has a marginal productivity of CPRs  $m_i$ ,  $i = 1, 2, \dots, n$ , which are different from each other mainly due to geographical or historical situation. Although firms and residents in each local government are assumed to use the same level of CPRs for production or daily life, the difference in marginal productivity leads to gaps among the welfare level of the people living in a local government.

For convenience, we assume that the highest marginal productivity in the river basin area is  $M$  whereas the smallest one is  $m$ , and the  $q^{\text{th}}$  marginal productivity ( $q = 1, 2, \dots, n$ ),  $m_q$ , is given by

$$(1) m_q = M - p(M - m),$$

where  $p = q/n$ . We can say  $p$  as the participant rate. There are a lot of motivations for joining or forming a regional network. Cooperative administrative procedures by adjoining local governments, for example, including a construction of common public building for providing public services like a library, can lead to a decrease in public expenditure. Moreover, it is easy to imagine that building an efficient incinerator by three or more local governments should mitigate the emission level of dioxin. Therefore, it follows that building a regional network must be beneficial for a local government who joins this network.

We assume that the incremental benefit of taking part in the network for



**Figure 3-1** Evolution of the Regional Networking

the  $q^{\text{th}}$  local government ( $V$ ) is given by

$$(2) V = m_q \times p \times \alpha,$$

where  $\alpha$  is the discount factor. By taking (1) into consideration, we have

$$(3) V = \alpha M p (1 - \beta p),$$

where  $\beta = (M - m)/M$ , means the rate of maximum marginal productivity gap in the river basin area. It is very natural to assume that a local government tends to join the regional network channels whenever the marginal benefit of joining the networking exceeds the marginal cost of participating. Let  $c$  be the marginal cost of taking part in the regional network.

The pattern of decision making related to participation for the regional network can be depicted as Figure 3-1. In Figure 3-1, the quadratic equation, that is the convex line from below, shows  $V$  in (3) and the horizontal line gives the level of  $c$ . Once the marginal benefit  $V$  becomes greater than the marginal cost  $c$ , the participant rate  $p$  will be forced to increase towards its maximum level,  $p_c$ .

### 3.3 Some Pocyly Implications for Enforcing the Regional Network

It has been proved before that negative externalities should occur when we use CPRs (common-pool resources) in consumption or production. Because each resource-user in CPRs tends to place immediate self-interest above community interest, CPRs are doomed to overexploitation. Therefore it is very natural to expect that cooperative management or the establishment of a

common rule to improve social efficiency and its sustainability can be an effective procedure for avoiding overexploitation of CPRs. We here name such an autonomous regional community level cooperation a “regional network channel”. The regional network channels consist of all phases of cooperation by regional residents, regional authorities and firms.

The model analysis developed in the former section has proved that the regional network channels among communities as well as local governments can lead to a Pareto-superior situation through mutual exchange of regional information, human resources and administrative abilities. They also lead to a new stage of regional management for CPRs in which regional residents make common rules for managing CPRs voluntarily and cooperatively. It is also shown that the following five points are crucial for making the regional networking more effective and feasible:

1. an initial contribution by the local governments, including policy instrument for decreasing the marginal cost of participation  $c$ , is a very important factor for extending the number of participants towards the regional network channels;
2. less economic discrepancy between communities, meaning less gap in the marginal productivity given by  $m_i$ , is an incentive to further extending the regional network;
3. a partial regional networking within a larger networking is also effective;
4. a leader among participants of the regional network channels, who has a maximum marginal productivity  $M$ , must play an important role; and
5. a regional network with multiple channels or connections can lead to a more efficient state.

It therefore follows that regional networking is one of devices by which society can avoid the overexploitation of CPRs, and sustainable management of the regional environment and economic development can also be attained.

## **4. Environmental Conservation and Regional Economic Development in the Onga River Basin**

### **4.1 Field work-contents and methods-**

As investigated above, we are able to expect positive externalities of the

formation of local networks to preserve local environmental goods such as CPRs. And we know that voluntary willingness to perform regional growth by residents and administrators contributes to regional economic development harmonized with environmental conservation. Moreover, we confirm the necessity for the formation of a multi-staged regional network and the strength of a network channel to accomplish regional sustainable development. Now, we present field work that clarify the effects of local networking for local administrators and residents, and the contents of current networking.

To clarify the current situation of the regional environmental policy with which cities or towns in the Onga River Basin have practiced economic development, we have made an intensive investigation (questionnaire) in detail. We visited 30 local governments located in the Onga River Basin and asked questions focusing on three main points:

- 1: the current positions and perspectives of economic and environmental issues;
- 2: the expected effects of the regional network channels, or inter-regional cooperation, on environmental preservation;
- 3: the administrative procedures for promoting and enforcing the regional network channels.

To put these more concretely,

- (1) the perception of environmental issues and current countermeasures;
- (2) the direction of original environmental policy;
- (3) the content and problems of regional development policy conducted previously;
- (4) the vision of a new regional development policy compatible with environmental conservation;
- (5) the current regional networks among local autonomies-including weak network-;
- (6) the expected effects of stronger network channels in all the fields, such as the level of production, livelihood and culture;
- (7) the subjects to make and strengthen regional network channels;
- (8) the barriers to strengthening regional network channels, and so on.

## 4.2 Analysis of the intensive investigation

Many administrators of local governments still want to pursue an old-fashioned, growth-oriented type of regional development. However, they have been aware of not only the risk of ill-polluted rivers, but also the importance of preserving the natural resources and environments related to CPRs.

We can summarize the results of our intensive investigation as follows:

### 1. Concerning environmental preservation

There are mainly two cases in the activities of promoting environmental preservation. One is that administrators play the main role; the other is that administrators support the voluntary activities of residents. In addition to environmental education for students, there are two ways of which one is the direction jointing school activities with people's voluntary activities, and the other is public sectors, such as local school boards and health centers, managing or coordinating the contents of educational level. Moreover, as to the methods of publicity, many cities and towns utilize public information magazines and leaflets.

### 2. Concerning the recognition of the Onga River

Many administrators perceive the importance of the Onga River as natural environment and a productive resource related to our daily activities. In the lower stream area, however, there are some who do not recognise the importance of the Onga River as natural environment. This is the reason why there is another branch stream and other river in those towns. Generally, scores on identity and amenity in the questionnaires are low because nowadays people do not receive much benefit or comfort from the Onga River. Some administrators replied to us frankly that 'the river is dirty' and 'the river is dangerous'.

### 3. Considering externalities of the regional network

Though most all administrators expect positive effects of regional network for almost all items of the questions, there are some differences in the level of expectation among areas. The middle stream areas are eager to form the regional network aggressively, while the lower stream areas are not. On average, the score on the degree to which regional network affects natural environment is exclusively highest in spite of the regional perception gaps.

This means that each administrator is aware of the necessity for making a regional network somehow in the case of tackling environmental conservation.

To sum up the results, investigations show us that inter-relations between administrations and residents are the key to implement incentives of the people for conserving nature. They also imply that from the environmental point of view, regional networking is expected to be an effective procedure which can reconstruct the ecosystem around the Onga River Basin. It is also notable that administrators in the upper and the middle stream regions tend to regard the NPO activities by residents as the most essential, whereas administrators in the lower stream tend to think that local governments must behave as the leader to extend the network channels. Moreover, we have found that there are still difficult problems to be overcome in promoting and enforcing the regional network channels. As for the software-side, we need more effective systems by which the residents can easily access and assess the environment education or information. The hardware-side procedure must include the reform of current administrative structure and the local finance system.

#### **4.3 New trend of local activities**

Traditionally in Japan, each local government has managed everything in each administrative area. Residents also have expected too much from the government. So, in the face of any problems, the local government has had the initiative to solve them in cooperation with residents. In the case of regional development, central government has been in contact with only local government except residents. Now we can easily find many environmental issues behind the pursuit of local economic development. Some residents think that government failure has caused these problems.

For environmental conservation, there are various types of groups in the Onga River Basin. The activities of each group have many variations, from cleaning narrow branch streams to planting trees in the upper stream area. Each group is composed of only residents -Non Profitable Organization (NPO) or Non Governmental Organization (NGO)-; needless to say, some groups are supported by administrators and local government.

We can classify the many on-going activities conducted by residents and

administrators in the Onga River Basin into four types as follows:

1: the type of collective resident participation

Fundamentally, residents voluntarily take part in and manage the activities such as “the day of no trash”, “the campaign of environmental beautification”, and “the strategy for cleaning rivers”. In these activities, they need to try every possible means for promoting the residents’ voluntary consciousness of keeping the natural environment. At the newer residential section, new comers have an inclination to stand face to face with neighborhoods who have been living in that place.

2: the type of school and lifelong education

In this type of activity, lecture meetings are held for keeping nature, “school of waterside” and “the campaign of natural prevention” consistent with children’ and residents’ desire for learning something. Thus they are trying to develop and maintain the voluntary perception of conserving the environment.

3: the type of events

The organizers grope for originality to their catchy slogans and events such as “the sunflower festival”, “the raft race”, “the campaign of abundant flowers”, and “the corbicula festival” supported by the local government financially. We can evaluate that people participate in some events for their pleasure and become aware of the improved sense of natural environment.

4: the type of voluntary residents’ activities

The residents who have much interest in conserving natural environment participate in this activity progressively and manage each event on principle voluntarily. This includes “the formation of hometown for firefly”, “the association of keeping each river” and “I LOVE the Onga River”. In these cases, local governments are eager to participate in each activity more affirmatively than other types, because these have a geographically wide expanse. Therefore, it is important how they bridge the gap between organizers and local government.

## **5 Promoting New Commons in the Onga River Basin**

The area of the Onga River Basin we investigated has been tied up with the rapid decline of the coal industries. Even now this area faces serious problems

such as depopulation, the flight of industries to other areas, and higher median ages. Investigations show us that inter-relations between administrations and residents are the key to implement incentives of the people for preserving the natural resources. They also imply that from the environmental point of view, regional networking is expected to be an effective procedure. It will be able to reconstruct the ecosystem around the Onga River Basin. Moreover, we have found that there are still difficult problems to be overcome in promoting and enforcing the regional network channels. As for the software-side, we need more effective systems by which the residents can easily access and assess the environmental education or information. The hardware-side procedure must include the reform of current administrative structure and the local finance system.

The Onga River was called “Zenzai-gawa (muddy black river)” formerly. Though this river is not in such a good condition regarding water quality and quantity at present, there are many volunteer groups (about 40 groups, in 2003) doing their best to revitalize their own river. The water resources is “the resource of resources”, that is, the essential CPR for all our lives. It is very natural to expect that the construction of the water recycle system in this area would serve as the fountainhead for affluent and safe water resources.

The Onga River Basin has to be designed not only for the preservation or rejuvenation of the inherent natural environments, but also for the development of new industries harmonized with the environment and livelihood. The recovery of community function among self-supporting residents, the rediscovery of history and culture establishing their identity, and the rebuilding of damaged relationship of mutual faith among governments, businesses and citizens, are all essential for designing them. To realize these aims, it is necessarily for 30 local governments and 40 volunteer groups tied up with the Onga River to make and strengthen the network channels. As some case studies demonstrate, the rules originating *within the group* for the use of the essential CPR, these are just the Commons, will improve the social outcome and its sustainability.

### Footnotes

- (1) For a more detailed explanation about CPRs, see Imaizumi et al. (1995, 1996).
- (2) As one of the reforming system, we cite on the merger of town and village local governments. Central government is eager to this reforming; however, in this area the incentive to merger is not so strong.
- (3) For the precise description of this analysis, see Kitakyushu Urban Association (1999).
- (4) Nagata et al. (1995) showed that the U-shaped hypotheses was fit for Japan's case.
- (5) For the mechanism of this overexploitation, see Imaizumi et al. (1995), for example.

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