

A COMPARATIVE STRUCTURAL ANALYSIS ON ASSISTANCE METHODS FOR AN ECONOMICAL AND COLLABORATIVE APPROACH FOR THE PRESERVATION AND RESTORATION OF THE WATERSHED ENVIRONMENT IN JAPAN

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ABSTRACT: It is necessary to develop new economical and collaborative approaches in Japan for the preservation and restoration of the watershed environment that include public works and volunteer activities. This study reviews the economical and collaborative approach concept related to the preservation of the watershed environment. It also reviews the watershed environment management system with regards to the use of forests, vegetation, wetlands, rivers and coastal lands, and the rural/urban environment which is considered to be an “environmental asset and a local resource”, by applying the profit generated by and the manpower towards the effective preservation and restoration of the watershed environment. This paper classifies the assistance methods for watershed environment management into ten types. Using a comparative structural analysis of the relationship between the stakeholders, these methods are subsequently reviewed. The results obtained by this analysis clearly identify the structure of stakeholder participation and the economic/social return on the same. The review further evaluates the method’s applicability, sustainability and feasibility. Finally, key-factors that affect the utility of these assistance methods are reviewed by presenting a few present watershed environment issues.

KEYWORDS: watershed management, economical and collaborative approach, structural analysis

1. INTRODUCTION

It is necessary to develop new economical and collaborative approaches for the preservation and restoration of the watershed environment that include public works and volunteer activities in Japan. Recently new economical and collaborative activities using assistance methods have been attempted by numerous NPOs (Non Profit Organization), local governments, corporations, and citizens in Japan. However these actions have remained at the stage of trial and error, while development of effective techniques and know-how of new economical and collaborative approaches are awaited. New economical and collaborative approaches can be applied to environmental preservation and restoration in developing countries, as has been the case with the establishment of Microfinance by the Grameen Trust [1].

Many current economic studies on the environmental preservation in the region have

focused on the analyzed of the economical value of the environmental impact of the development project [2, 3]. These studies provide important suggestions for the evaluation of the environmental conditions, policy decisions, and consensus building. Nonetheless, these studies do not address the issue of funding for the preservation of the environment.

On the other hand, in Japan, some new approaches are being tried which obtain working capital and manpower that is being applied to the preservation of the environment, specifically just to name a few, the “environmental point system”, the “environmental labeling system”, the “new business creation for environment preservation by citizen’s funds”, and “corporate social responsibility (CSR)”. Several studies have attempted to analyze these various approaches [4-6]. However, many of such studies have not systematically organized the assistance methods.

Recently, a non-profit financial system has been organized and introduced by Fujii [7]. The Ministry

of the Environment, Government of Japan has established 12 methods aimed at raising capital [8] to develop sustainable regions under the efforts of various NPOs. However, these organizations are not necessarily intended to be active in the area of watershed environmental preservation and restoration.

On the basis of many case studies [9], the author has classified and described various new economical and collaborative approach assistance methods that aim to preserve and restore watersheds and the water source areas in Japan. In an extension of those studies, it is necessary to clarify the applicability of an effective environmental preservation and restoration assistance method, since such depends on the local watershed condition and other related environmental issues.

In this study, taking into account these previous works, environmental issues of the typical watershed in Japan are described, and background information on the necessity of an economical and collaborative approach for the preservation of the watershed is explained.

With this information as the backdrop, this study reviews the concept of the economical and collaborative approach for the preservation of the watershed environment, including forests, vegetation, wetlands, rivers, coastal lands and the village/city environs. Subsequently, the assistance methods for watershed environment management are classified into ten types. The characteristics and trends of these assistance methods are reviewed using a comparative structural analysis of the relationships of the stakeholders.

In addition, the principal factors of applying these assistance methods are discussed.

2. AN ECONOMICAL AND COLLABORATIVE APPROACH FOR THE PRESERVATION AND RESTORATION OF THE WATERSHED ENVIRONMENT

In this Section, environmental issues related to the typical watershed in Japan are described, and

background information is presented on the necessity of an economical and collaborative approach for the sustainable preservation of the watershed is explained.

2.1 Environmental issues related to the Japan watershed

Under Japan's domestic post-war "expanded reforestation" schemes, many woodlands and community forests were covered by man-made forests, many of which were planted with the Japanese cedar (sugi) and cypress (hinoki).

However, recently, forest owners have limited interest in forestry due to the recent decline in timber prices. As a result, land management of forestlands and community woodlands is presently limited, which has damaged the general public benefit in the area of biological habitats and water resources for cultivation. To solve these and other related problems, new mechanisms to obtain capital and manpower for regional water source activities, forest owner's organizations, forest mechanizations, domestic demand for timber and, a forest environmental management system with biodiversity are required.

With regards to the environment of rivers and lakes, some problems such as the deterioration of the biological habitats, the constant decrease in river water volume, and the reduced inter-relationship with humans exist. The main cause of these problems are projects carried out in recent years; such as watershed development, urban development, river bank development of, dam construction, increase in sewage flow, changes in water cycle, and many others. To improve the environment of rivers and lakes, restore the ecosystem and develop a sound water cycle in watersheds, regional governments and NPOs have attempted various activities. However public investments are inadequate for such activities and voluntary activities are limited within any basins.

Concerning the rural environment, biological habitats have been damaged and community forests have seen a lack of care by the impact of watershed development, while in the urban area, problems such

as the degradation of the green space and waterfront environment, depletion of water springs, heat islands and others are ever increasing. Accordingly, it is necessary to develop effective funding mechanism and approaches.

Moreover, environment of the coast has problems as well including coastal erosion, increase in waste, water pollution, deterioration of the ecosystem and others due to the impact of watershed development, dam construction, and urbanization. Capital and effective approaches are needed for watershed preservation and restoration.

Thus, to solve these environmental problems and other such issues in Japan's watersheds, new economical and collaborative approaches for the preservation and restoration of the environment must be developed.

2.2 Concept and perspective on the economical and collaborative approaches for the preservation and restoration of the watershed environment

Megumi, et al. [10] held workshops discussions with various researchers and government officials on the watershed environment and developed the concept of the economical watershed management as follows: "Economical watershed management is to establish economical principles to apply to the national land conservation by developing a system of techniques and mechanisms for the sound cycling of resources. It is further the creation of

enhancement systems which activates regional communities and economies to cooperate in public investment and of well-meant volunteer manpower, etc."

On the basis of the above mentioned workshops, the concept of a economical and collaborative approach to solve the problems and issues of preservation and restoration in watershed environments is defined as follows: "To preserve and restore watershed environments and create sustainable basin societies; a system which creates the opportunity to allow the flow of new capital into the region, utilizes new knowledge and technology, and draws manpower into itself by various participating and cooperating stakeholders inside and outside the watersheds, and thereby develops a virtuous cycle of environment and economy in the watersheds by using and investing in its environmental and economical resources appropriately".

This concept is different than the improvement in the environmental business of a company. Rather this concept is an economical and collaborative approach for the preservation, restoration and sustainable use of the public watershed environment including forests, vegetation, wetlands, rivers, coastal lands, and rural/urban environment which represent perspectives for developing new markets in the region that can make opportune use of these resources. This is considered to be an

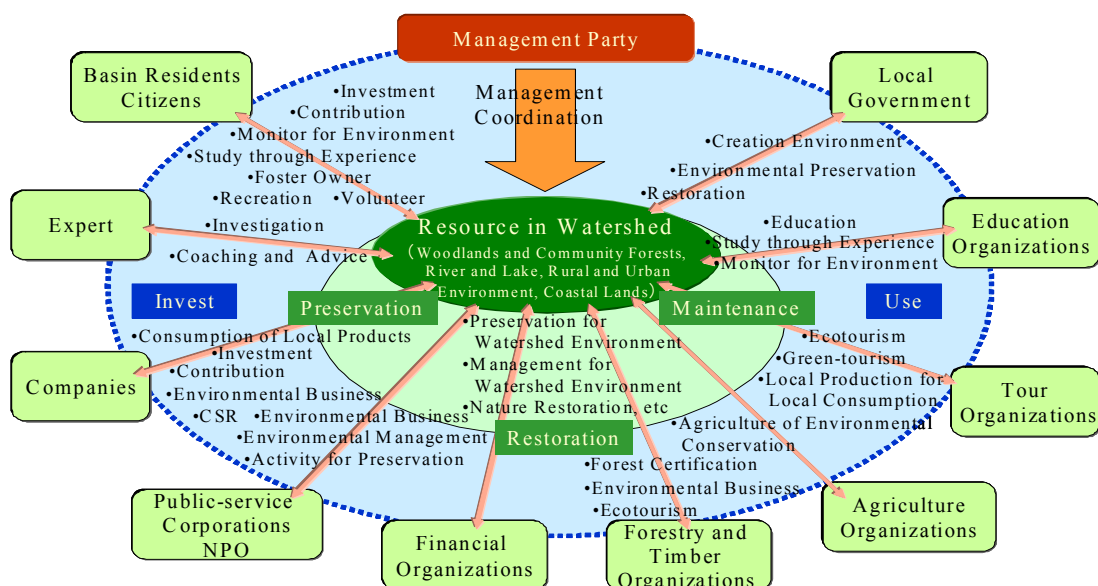


Figure 1: Image of economical and collaborative approaches

“environmental asset and local resource” since it applies the profit and manpower of the region in the effective preservation and restoration of the watershed environment (as shown in Fig. 1). In addition, it is also the viewpoint that this develops a virtuous cycle of capital as well as knowledge, technology and manpower.

Essentially, the preservation and restoration of the watershed environment is to be managed by the owners and governments. Nonetheless, it may be meaningful and there is the possibility to gain the participation of interested third parties when considering the public function and potentials of these environmental resources.

3. ASSISTANCE METHODS FOR ECONOMICAL AND COLLABORATIVE APPROACHES

New economical and collaborative activities applying various assistance methods have been attempted at some regional watersheds in Japan. In this Section, these assistance methods are classified into ten types and described below.

3.1 Environmental certification and labeling systems

The environmental product and certification system adds an environmental value ‘tax’ to products produced in the local market that are tagged for environmental preservation. For instance, regarding forest management, the International FSC (Forest Stewardship Council), and the Japanese SGEC (Sustainable Green Ecosystem Council) have on a trial basis employed the forest certification system, which is also expected to promote the organization of various private forest owners. Furthermore, for the agricultural and fishery sector various environmental certification systems have been established, including the green certificate system (carbon offset value) and others. As the result of these activities, some products are sold as premium brands and use the environmental labeling system that notes the environmental preservation activities.

Through the management of public-service

corporations, industrial groups and others, many environmental certifications and labeling systems have been developed. These parties have certified producers of products and resellers, and have raised substantial capital by selling products with the added environmental value after creating public awareness with the citizens at large, watersheds residents and companies. The valued added sum is then applied to the preservation and restoration of the local environment. The purchaser of the certification and the buying consumer obtain the feeling of contributing positively to society, as well as trust and/or satisfaction in the product and a sense of being social responsible.

3.2 Business for Environment preservation by local citizen’s funds

By utilizing the local citizen’s funds, this system invests in environmental business opportunities within the watershed resources. Later, a dividend is paid to the investors and is applied to the preservation and restoration of the environment. An investor obtains the feeling of contributing positively to society, as well as trust and satisfaction and a sense of being social responsible.

This system has been applied to many green energy projects in Japan. The citizen’s wind power plant projects are well known, which have been constructed by using the local citizen’s funds, with dividends being paid to the investors and applied towards the preservation and restoration of the environment. Some biomass energy projects have also been developed by these citizen’s funds.

3.3 Corporate social responsibility (CSR)

Recently social activities by companies with regards to the preservation and restoration of the environment have become popular corporate social responsibility (CSR) activities.

Specifically, for example, the planting of woodlands and community forests, the restoration of fallow paddy fields, the clean up of rivers and coastal lands, environmental education and others. Companies have in turn obtained a positive public relationship, improved community exchanges and

more positive attitude of its employees.

It is often difficult for a CSR activity to be carryout by one company alone. Therefore, many companies and environmental management parties, which tend to be regional NPOs or regional governments, have been established and have build upon that relationship with the preservation of the basin as the goal.

Companies assume some social returns for their contributions to the regional environment including the trust of basin residents and citizens as a whole.

3.4 Environmental point system, community currency and eco-money

The environmental point system, community currency and eco-money are exchange systems of one's personal efforts, for goods and for other possible benefits. These include such activities as the uses of one's own personal supermarket shopping bag(s), use of public transportation verse one's own car, and participation in an activity aimed at the preservation of the environment. The Kita-Kyusyu passport system, the Yokohama environment point system, and the others are being introduced. These systems are applicable to for economical and collaborative approaches.

With regards to many environmental point systems, the management party who develops the system offers it to participating local stores. Later, capital generated by this activity is applied towards the preservation of the region by exchanging it for environmental points. As a side benefit this also stimulates the regional economy. Residents, companies and participating merchants obtain the sense of social return since their activity contributes to the preservation of the environment.

3.5 Local residential government bond

Recently local residential government bonds have been utilized as a new method to capitalize many local governments in Japan. The yields of these bonds are considered to have good returns for both local residents and companies. These funds are invested in public construction and environmental preservation projects. Hachioji and Kiyose cities

located in the Tokyo metropolitan area have been successful in the acquisition of community forests by issuing local residential government bonds. Similarly, Saitama Prefecture aims to carryout a river restoration project with the issue of the "Saitama Love River Bond".

The issuing of public bonds raises capital through local banks, and is for a specific project. The capital is invested in public construction or environmental preservation projects. Local residents who invest in these bonds not only obtain the economical return of the principal, plus and interest after a period of time, they also garnish the positive sense of social return by their contribution to the preservation environment.

3.6 Ecotourism

The existing nature of a watershed area has the potential to attract ecotourism. The Japan government is also promoting ecotourism as evidenced by the enactment of the "Ecotourism Promotion Law" of June 2007. Ecotourism is aimed at activities that preserve the environment and that increase the interest in the watershed environment by experience with as well as to learn about the existing nature found within the watershed by visiting citizenry. It further has a positive ripple effect on the local economies, such as the income and consumption generated by eco-tours, etc.

With regards to this system, establishing and building a cooperative relationship with the regional tourism organizations, NPO, and the others, the management party promoting ecotourism develops a menu and various eco-tour programs and advertises offered services for basin residents, other nationals of Japan (tourists, companies and the like). The profit gained by promoting eco-tours is then allocated for the preservation of the environment; tourists also participate in environmental preservation activities. Participants in eco-tours obtain the feeling of contribution and satisfaction as a social return.

3.7 Carbon offset

Carbon offset carries the possibly of an enhancement

system for the planting and care of woodlands and community forests. This system offsets the amount of CO₂ emissions from citizenry and other economic activities by planting and thinning of trees. However, these tree-planting activities are difficult to authenticate and to follow up as clarifiable carbon offsets. Still, the “Collaborative Forest”, located in Kochi prefecture, Japan has issued certifications of carbon-offset contributions to companies for their thinning and maintenance of woodlands and community forests.

With regards to this carbon offset system, after organizing owners of the woodlands and community forests, the management party, such as the local government, public-service corporation or other such groups, offer basin residents, other citizens and companies the opportunity to provide capital towards a carbon offset. The capital is then used to invest in the planting and maintenance of the woodlands and the community forests. Those who provide the capital obtain a certificate, etc. as evidence of the carbon offset they have contributed to clearly showing their social return.

In addition, under the framework of measures to cope with global warming after 2013, the effect of carbon storage of harvested wood has been discussed. Thus, it is expected that the encouragement of the preservation and restoration of forests by expanding the demand for timber will occur in the future.

3.8 Fundraising and charity campaigns

Fundraising and charity campaigns have a solid history. These methods create public fund systems to make investments and receive donations from basin residents, citizens and companies, and to use this capital to invest and apply for welfare, health, environmental preservation and the like. Various fundraising and the charity campaigns are active in the area of watershed preservation throughout Japan.

With regards to the fundraising and the charity campaign systems, management parties such as local governments, public-service corporations, NPOs and other groups offer basin residents and other citizens and companies of Japan the opportunity to provide

cash by direct bank/postal account transfer, donation boxes, online donations and the like. Such funds are invested through financial institutions and then allocate to the preservation of the environment. Providers of this cash obtain the sense of contributing to the preservation of the environment as a social return.

3.9 Contribution regulation and hometown-tax

The contribution regulation is similar to the system for fund raising and charity campaigns. Currently, more than 130 regional governments in Japan have created systems to provide funds for specific projects from around the country [11].

The “hometown-tax” in Japan is a kind of local tax to pay for specific projects in other region. With regards to this hometown-tax, individuals and companies provide funds to the prefecture or the local government in the mind that their hometown is located in one or the other. Individuals deduct the donated amount from their residents' tax, while companies enter the donation as an expense. The hometown-tax procedure is similar to the regulation of a contribution; only the selection of a specific projects and the system of deducting tax are different. Many local governments have established regulations regarding donations including where/how the donations can be used. The management party as these types of donations is the local government, which is different from the fundraising and the charity campaign system.

3.10 Adopt and the foster ownership system

Citizens or companies can become foster owners and care for woodlands, community forests, and farmlands that are not fully maintained by the tax paying owner. In this case, with an agreement to properly maintain the environmental preservation of the land, the ‘foster owner’ is given the right to obtain an economical return through the selling of produce, etc. produced thereon. Many foster owner’s farm rice-terraces, while many types of woodlands are ‘adopted’ by companies. This situation is recently increasing during these pass years in Japan.

With regards to this “adopt” and “foster

ownership” system, after settling with the tax owners of the woodlands and the community forests, the management party, such as the local government, an NPO or other such groups, request basin residents, others citizens, and companies of the foster owners to provide funds. Subsequently, the management party takes over maintenance of the woodlands and the community forests with the aim to preserve the land, while promoting a broader participation in the maintenance activities. The woodlands and the community forests are managed by the foster owners or the management party, or by related organizations such as an agricultural organization, an NPO or forest organization. Participants obtain the sense of social return by being foster owners.

4. THE COMPARATIVE STRUCTURE AND CHARACTERISTIC ANALYSIS ON ASSISTANCE METHODS

In this Section, assistance methods are analyzed by comparative structural analysis with regards to the relationship between the environmental stakeholders and the segment for preservation of the environment respectively.

First, referring to the present Section, (A) environmental preservation segment, (B) resource, (C) management party, (D) partner, and (E) targeted

group listed within the assistance methods as shown in Table 1. Clearly, it is important that excellent cooperation occurs between the owners of the woodlands, community forests, and farmlands; which are also the stakeholders. However, it is assumed here that only parts of the management party are stakeholders.

Then, plotting these subjects as shown in Figure 2, the relation with (a) Capital flow, (b) Participation in preservation activities, (c) Public relation and information to targeted group, (d) Support and cooperation, and (e) Social return in each area is shown as the arrow diagram. In this case, for simplification of the comparative structural analysis, (A) Environmental Preservation Segment; (B) Resources are categorized into 4 types, namely, “Woodland and Community forest”, “River and Lake”, “Rural and Urban Environment” and “Coastal lands”; (C) Management Party is categorized into 5 types namely “Local government”, “Public-service corporations”, “NPOs”, “Agriculture organizations”, “Forestry and Timber organizations” (D) Partner, while including some of those included under (C) is categorized into 3 types namely “Expert”, “Related organizations (Education, Agriculture, Forestry and Timber, Financial, and Tour organizations, Public-service corporations, NPO, Certification companies and Merchants)” and

Table 1: Sector, Resource, Party, Partner, Targeted Groups, and Stakeholder in Assistance Methods

Name of Method	Environmental Preservation Segment	Resource	Management Party	Partner	Targeted Gr.
Environmental certification and Labeling system	Woodland and Community Forest, River and Lake, Rural and Urban Environment, Coastal Lands	Woodland and Community Forest, River and Lake, Rural and Urban Environment, Coastal Lands	Local Governments, Public-service Corporations, NPOs, Agriculture Organizations, Forestry and Timber Organizations	Expert, Certification Companies, Local Governments	Basin Residents, Citizens, Companies
Business for environment preservation by local citizen's funds	Woodland and Community Forest, River and Lake, Rural and Urban Environment, Coastal Lands	Woodland and Community Forest, Rural and Urban Environment, Coastal Lands	Public-service Corporations, NPOs, Agriculture Organizations, Forestry and Timber Organizations, Companies	Expert, Financial Organizations, Local Governments	Basin Residents, Citizens, Companies
CSR	Woodland and Community Forest, River and Lake, Rural and Urban Environment, Coastal Lands	Woodland and Community Forest, River and Lake, Rural and Urban Environment, Coastal Lands	Local governments, Public-service Corporations, NPOs, Companies	Expert, Agriculture Organizations, Forestry and Timber Organizations, Local Governments	Companies
Environmental point system, Community currency and Eco-money	Woodland and Community Forest, River and Lake, Rural and Urban Environment, Coastal Lands	Woodland and Community Forest, River and Lake, Rural and Urban Environment, Coastal Lands	Public-service Corporations, NPOs, Agriculture Organizations, Forestry and Timber Organizations	Expert, Agriculture Organizations, Forestry and Timber Organizations, Local Governments	Consumer; Basin Residents, Companies
Local residential government bond	Woodland and Community Forest, River and Lake, Rural and Urban Environment, Coastal Lands	Woodland and Community Forest, River and Lake, Rural and Urban Environment, Coastal Lands	Local Governments	Financial Organizations, Expert	Basin Residents; Residents or Worker in local Government Area
Ecotourism	Woodland and Community Forest, River and Lake, Rural and Urban environment, Coastal Lands	Woodland and Community forest, River and Lake, Rural and Urban Environment, Coastal Lands	Public-service Corporations, NPOs, Agriculture Organizations, Forestry and Timber Organizations, Tour Organizations, NPOs	Expert, Tour Organizations, Local Governments	Basin Residents, Citizens, Education Organizations, Companies
Carbon offset	Woodland and Community Forest	Woodland and Community Forest	Local governments, Public-service Corporations, NPOs, Agriculture Organizations, Forestry and Timber Organizations	Expert, Agriculture Organizations, Forestry and Timber Organizations, Local Governments	Basin Residents, Citizens, Companies
Fundraising and Charity campaigns	Woodland and Community Forest, River and Lake, Rural and Urban environment, Coastal Lands	Woodland and Community Forest, River and Lake, Rural and Urban Environment, Coastal Lands	Local Governments, Public-service Corporations, NPOs	Expert, Agriculture Organizations, Forestry and Timber Organizations, Local Governments	Basin Residents, Citizens, Companies
Contribution regulation and hometown-tax	Woodland and Community Forest, River and Lake, Rural and Urban environment, Coastal Lands	Woodland and Community Forest, River and Lake, Rural and Urban Environment, Coastal Lands	Local Governments	Expert, Financial Organizations	Basin Residents, Citizens, Companies
Adopt and the foster ownership system	Woodland and Community Forest, Rural and Urban Environment	Woodland and Community Forest, Rural and Urban Environment	Local Governments, Public-service Corporations, NPOs, Agriculture Organizations, Forestry and Timber Organizations	Expert, Agriculture organizations, Forestry and timber organizations, Local Governments	Basin Residents, Citizens, Education Organizations, Companies

“Administrative agencies -- local governments and the others.” (E) Target is also categorized into 3 types namely “Citizens”, “Basin residents” and “Companies”.

4.1 Comparative structural analysis on assistance methods

4.1.1 Relationship between stakeholders and assistance methods

Assistance methods are classified into 2 groups as shown in Figure 2: (1) methods to build relationships are centered on management parties and (2) methods to present goals after relationships have been established between the management parties and the related organization based on support and cooperation.

In the former above-mentioned method, a relatively simple structure, regulation for contributions and the hometown-tax exist and are offered to basin residents and citizens by the local government as the management party. The fundraising and the charity campaigns have a similar structure. However, these two activities offer different key points, namely: (1) the targeted group includes companies --otherwise some contribution regulations and the hometown-tax would have the

same goal as companies, and (2) the importance of building a relationship with the local government.

In the later case above-mentioned, a relatively simple offering structure is the local residential government bond. This assistance method can be utilized by local governments and is aimed at the residents in their local areas. This method requires neither to be coordinated nor in cooperation with other stakeholders. Thus, this later method is seen as a relatively easy approach to obtain and apply capital in the short term, as witnessed in the successful cases of Hachioji city community forest purchase [12] and the capitalization of Saitama Prefecture’s river restoration [13] project.

Nonetheless the above, relatively simple structures that generate the flow of capital are the environmental certification, labeling, and environmental point systems, ecotourism, and others.

Both of the above-mentioned methods must spread out their offerings, targeting supporters through public relations, and after relationships have been established between the management party and the related organization based on support and cooperation.

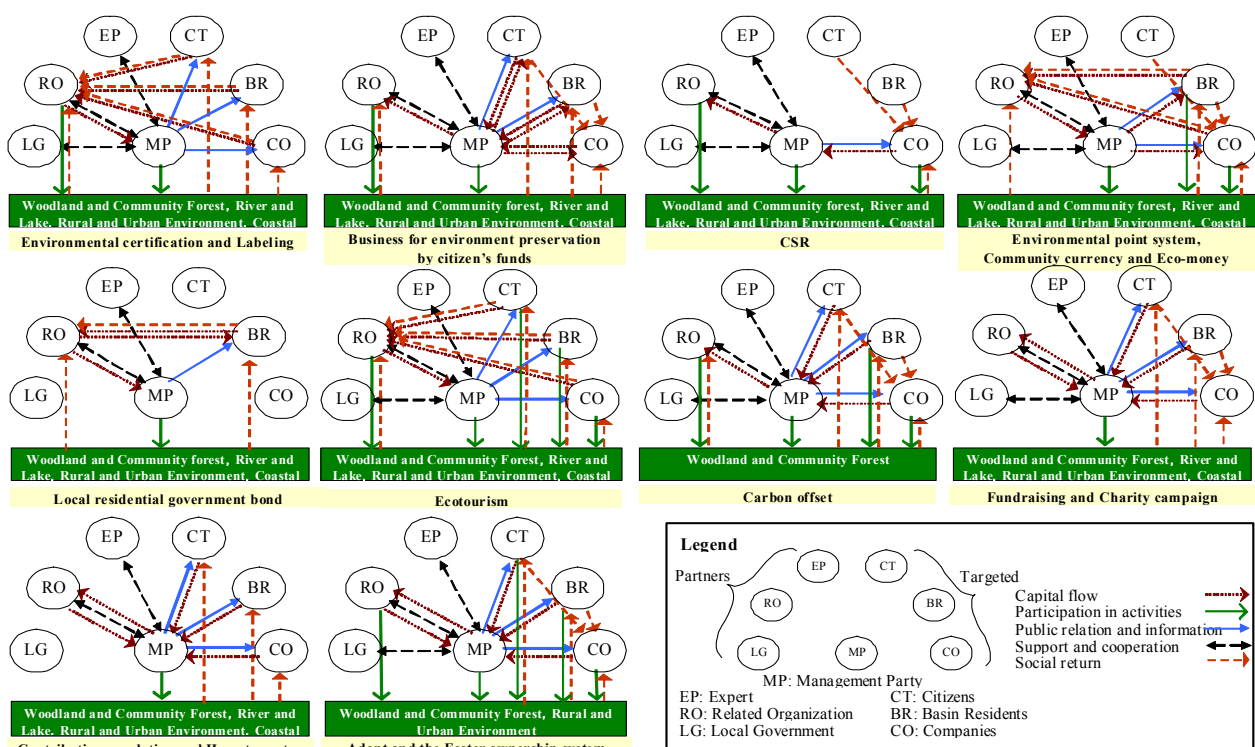


Figure 2: Structure of Stakeholders – Assistance methods

4.1.2 Relation of social return

Methods that have economical returns for the targeted groups (basin residents, citizens, companies and others) are business aimed at environment preservation by the citizen's funds, the environmental point system and the residential local government bond. Within the structures of these methods, the "Capital Flow" indication arrow is pointing towards one subject or more. The citizen's funds and residential local government bonds have economical returns including dividends and interest. On the other hand, the capital flows of the environmental point system can be viewed as flows of community currency or eco-money suitable for exchange of goods and services or some such similar activity and not currency per se.

All the other many methods have indication arrows showing only a "Social Return" toward the targeted group(s). Nevertheless, all have some kind of benefit. Thus, the incentive for these methods is to enhance the feeling of contribution or satisfaction as a social return. Otherwise, as the case of participating companies, the social return become measured in the built-up of trust of basin residents and citizens.

4.1.3 Relation with environmental preservation segment

The methods which the targeted groups directly carry out activities related to environmental preservation are: CSR, environmental point, ecotourism, carbon offset, and the planting, adopt and foster ownership methods/systems. These methods/systems have a direct relationship between the targeted groups with the environmental preservation segment and the strong feeling of contribution or satisfaction, although a few differences between the cases do exist. In fact, for the targeted groups, as the interest in and the contribution to the environmental preservation segment becomes greater, the level of social returns becomes higher. These methods also seem effective in the case where the basic human needs towards the environment exist, such as the maintenance of community forests, thinning and the like, and are not

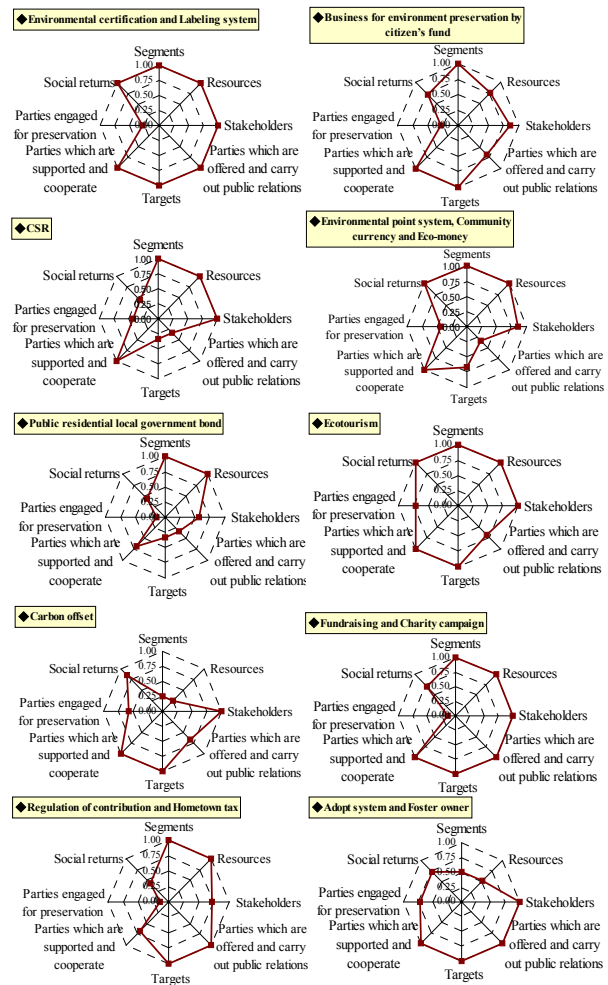


Figure 3: Characteristic of assistance methods

just the needs of capital flow.

4.2 Comparative characteristic analysis on assistance methods

In this Section, Table 1 and Figure 2 show the number of environmental preservation segments, where each method can apply, resources types that can be utilized, stakeholders' stakes, parties which are offered and carry out public relations, targeted groups, parties which are supported and cooperate together, parties engaged for preservation, and types of social returns. Then, by dividing the maximum value for each of the numbers, these numbers are standardized. The result of this calculation is shown as Figure 3-- the radar chart and the characteristics of each method are analyzed comparatively.

4.2.1 Applicability on assistance methods

As shown in the radar chart of Figure 3, the value of the segment types for watershed environmental

preservation and the value of resources can be utilized as indicators of applicability for assistance methods. In other words, the indicator shows the degree of applicability-- how many segment types for watershed environmental preservation can be applied and how much resource can be utilized by each method, respectively.

In Figure 3, the values of the segment for watershed environmental preservation and the value of resources can be utilized and are nearly equivalent to a high value on most of the methods, except the carbon offset, and the adopt and the foster ownership system. In other words except for the carbon offset, the adopt and the foster ownership system, various methods can be applied for the many different segments of environmental preservation, which also can utilize many resources. Moreover, the application and utilization of the carbon-offset method is limited to woodlands and community forests due to the reduction of CO₂ connection. The adopt and the foster ownership system are effective methods for woodlands, forests or farmlands where a clear owners exist, otherwise, they are can not be applied towards public resources such as rivers, lakes and coastal lands.

4.2.2 Ease to build upon

It is easier to build up a system after the method has a few stakeholders and parties and some public relation has been carried out, as the foundation for coordination and cooperation with others is established. Possible appropriate funding methods as pointed in the present structural analysis are the local residential government bond and the regulation of the contribution under the hometown-tax. Almost all of these methods can be built upon within the local areas by the local governments and do not require extensive coordination and/or special cooperation, and as the result these methods can be easily built upon compared to others.

4.2.3 Independent and sustainability methods

It is necessary to be independent and sustainable on an economical and collaborative basis. All assistance methods in this study have mechanisms for

promoting fundraising and the attraction of manpower for the targeted groups, which are thereby independent and sustainable. Especially, methods that have many types of targeted groups such as suppliers and many types of activities for their preservation have greater social returns and are considered to be more independent and sustainable. In other words, in case that various suppliers of funds and many supporters for preservation exist, greater social returns shall be achieved, and if a targeted group is not be expected to fund and participate in the preservation activities, other targeted groups will be expected to fund the activities and thereby participate with much satisfaction and contribution. In this case then, their methods are considered more independent and sustainable.

From the above-mentioned points of view, ecotourism, the adopt and the foster ownership systems are the highest evaluated on all three key values, namely types of targeted groups, parties engaged in preservation and social returns. These methods are likely to be funded by many types of targeted groups -- suppliers and those who participate in the preservation activities directly, much satisfaction and contribution is achieved. Thus they are considered to be more independent and sustainable than the other methods. In fact, if ecotourism, and the adopt and the foster ownership systems have been established, they can be expected to acquire various interested targeted groups -- suppliers and repeaters with a sustainable management and continuous activities. Nevertheless, it is certain that sustainable and continuous management cannot be carried out without an attractive and well-managed activity.

5. Principal factor to more suitable apply assistance methods

This Section reviews and considers the principal factors to more suitable apply the assistance methods aimed at the preservation or restoration of a regional watershed.

5.1 Environmental Crisis

If a crisis in the environment has occurred in a regional watershed and also if such a problem has become well known to require immediate attention by many of the regional residents and citizens in and around region, they will contribute in some way, provide funds, or participate in some activities aimed at the preservation or restoration of the environment immediately.

In such a case, fundraising, charity campaigns, residential local government bonds, foster ownership system or the like, best be applied. Especially, if an emergency occurs and the need to provide significant amounts of capital in the short-term, the local residential government bond, which can be created easily as noted in the analysis under Section 4, would be the methods of choice.

5.2 Interest in the environment by basin residents, citizens and companies

If the basin residents, citizens and/or companies have a significant interest in a segment of a local environment, especially if the name value of the segment is well known, significant capital and manpower from wide area can be assumed. For example, Mt. Fuji, Mt. Aso, the Biwa Lake and others in Japan have this level of potential support.

In the above case, CSR, fundraising, charity campaigns, local residential government bonds and/or the hometown-tax would be the methods of choice..

5.3 Relation between basin residents

The relation between the segment of environment and basin residents can motivate activity aimed at the preservation and restoration of the environment. If a relation between the segment of environment and basin residents is closely connected to a resident's life or their perceived valued environment, residents will engage themselves towards preservation or restoration. The key point to consider for measuring the interest is the relation between the local environment and basin residents.

The adopt and the foster ownership systems, fundraising, charity campaigns or the local

residential government bonds would be the methods of choice.

5.4 Capability of resource

The potential of a nature resource in the basin is also a principal factor when considering applying for some type of assistance method. In this case, a significant resource capability within the environment will enable the creation of various new businesses such as a possible natural energy project, eco-tour development, establishment of new local products, and others, and will thereby likely be able to obtain development capital.

In the above-mentioned case, the business of environment preservation by citizen's funds, ecotourism, and the environmental point, environmental certification and labeling systems or the carbon-offset methods are more suitable applying to develop these new businesses. Later a part of profit of these businesses can be allocated towards the preservation and restoration of the local environment.

5.5 Continuity of preservation

In regards to the preservation or restoration of the local environment over the long term, continuous funding and participation is required to ensure the preservation and/or restoration of the environment. Based on the analysis Section 4, ecotourism and the adopt and foster ownership system are significantly independent and thereby sustainability, with many types of targeted groups and activities for preservation, and impressive social returns.

In addition, the adopt, the foster ownership, the environmental point, environmental certification and the labeling systems, and the community currency, eco-money, and the business activity for environment preservation by citizen's fund can be applied in such case. With regards to selecting the best assistance method, it is necessary to consider various factors as the level of the crisis to the environment, the interest in the environment, the relation between basin residents and the resource capability of the area.

6. Conclusion

In this paper, to activate the preservation and to require the restoration of a watershed environment, with regarding to the economical and collaborative approaches related thereto were reviewed and assistance methods for these approaches were laid out. Subsequently, on the basis of the result of the comparative structural analysis of these methods, the characteristics and trends in the relationship between the stakeholders and segments of preservation were drawn-out. Furthermore, the applicability, ease to establish, and the independence and sustainability of the methods were evaluated. Finally for this study, the principal factors to more suitable apply these assistance methods towards were reviewed.

In the follow-up study, key-driving factors for applying best assistance methods will be analyzed, focusing on case studies relevant to watershed environmental issues. Also, how to apply the economical and collaborative approaches of assistance methods will be laid out in the future study.

Finally, the footnote to this paper has been re-edited including some additional new considerations [14].

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