

1. Overview

(1) Background and features of the practice

Through rivers and groundwater, the functions of forests in the upstream areas of rivers have great influence on downstream areas and coastal zones. For example, the supply of water in the flat land often depends on the water holding capacity of upstream forests. The nutrition supplied from forests through rivers is valuable to fish and shellfish in coastal areas near river mouths.

Beneficiaries of ecosystem services need to bear burdens such as funding and labor in order to maintain the health of natural resources that supply these services. However, the awareness of these benefits weakens among participants when the distance between forest and beneficiary grows and natural water circulations or material circulations exist between them. Even if the beneficiaries do not hold the burden, it does not pose a major problem when forests are properly conserved and regenerated, and forest owners gain sufficient income through forestry.

However, when upstream forests experience problems such as overexploitation or under-exploitation, and the problem causes a deterioration in water and fishery resources, it is necessary to go back to the principle that beneficiaries should pay for a project, and fishermen and water users who are the beneficiaries need to provide funds and/or labor for the conservation and regeneration of these upstream forests.

(2) Details of the practices and their applicability

In this practice, users of water resources and fishermen (including fish farmers) in coastal areas who are involved in the use or management of provisional services understand that they are the beneficiaries of ecosystem services that originate in upstream forests, and provide funds and labors for the conservation and regeneration of upstream forests in order to receive sustainable services in the future.

Two major practices are available as follows.

1) Watershed management

i. Details of the practice

- A basin area is a certain area defined by river basins, related areas of water use, and flood plains. Residents who live in such areas share issues involved in various ecosystem services such as water quality conservation, forest conservation and flood control, earth and sand management, and the management of forest and farmland.
- Basin area management aims for the sustainable enjoyment of ecosystem services that are relevant to these shared issues. It establishes plans that cover a wide variety of stakeholders including the managers and beneficiaries of natural resources and government organizations and implements various efforts based on these plans.
- Specific efforts based on these plans include direct benefit assessment activities through “upstream-downstream cooperation” which will be discussed below, a mechanism of benefit assessment through taxation (water source tax), and forest conservation and regeneration as public-work projects.
- This practice often includes not only the beneficiaries’ burden for provisional services but also the conservation of public ecosystem functions by public entities as described in Category No. 3.

ii. Range of application

- This practice can be applied to all areas.

iii. Implementing bodies

- The participation of various stakeholders such as the managers and users of natural resources and government organizations is necessary, based on the wide range of connections in basin area ecosystem services.
- This practice requires wide-range and general planning in addition to the coordination of stakeholders; thus, public entities such as government organizations often take initiatives in this practice.

[Cases]

In Japan No.14: Satoyama management and use activities in Hadano, Kanagawa Prefecture, Japan and support through water source conservation measures of the Prefectural Government

2) Upstream-downstream cooperation

i. Details of the practice

- Owners of upstream forests and those who enjoy ecosystem services that originate in upstream forests (e.g. fishermen, water users) form cooperative relationships. The beneficiaries directly return funds or labor to the forest owners for their services.
- The relationship is not necessarily limited to ones between individuals; organizations such as local communities and local governments often form cooperative relationships.

ii. Range of application

- This practice can be applied to all areas.

iii. Implementing bodies

- As described in i. above.

[Case]

In Japan No.13: Forests are Lover of the Sea campaign in the basin of the Ohkawa River in Miyagi Prefecture and Iwate Prefecture, Japan

2. Effects obtained from these Cases regarding the sustainable use and management of natural resources

Implementation of the practices in this category is associated with the following effects in the sustainable use and management of natural resources and the maintenance of a healthy secondary nature.

(1) Effects on the sustainable use and management of natural resources (socioeconomic effects)

- Labors and funds gathered from many diverse beneficiaries are used in sustainable forestry and other local businesses, which is expected to successfully result in both in the economic prosperity of the upstream areas and the sustainable use and management of forest resources.
- The stable supply of water resources in urban areas and the recovery of fishery yields can be expected through improvements in water holding capacity and the function to supply nutrients to the ocean areas.

(2) Effects on the health of the secondary nature (effects on ecosystem and biodiversity)

- When the health of an upstream forest ecosystem improves, the biodiversity of the forest is expected to improve along with improvements in species diversity in the river basin and the coast along the mouth of a river.

3. Toward the implementation of this practice : Points of planning and examples of action items based on the “Five Perspectives” of the SATOYAMA Initiative

Points of planning and action items for planning the employment of practices in this category are as follows.

Table: Points of planning and action items based on the “Five Perspectives” of the *Satoyama* Initiatives

“Five Perspectives” of the Satoyama Initiative	Points of planning	Action items
(1) Resource use within the carrying capacity and resilience of the environment	<ul style="list-style-type: none"> • It is necessary to identify causal relationships between weakened provisional services and problems associated with the use and management of upstream forests. • Based on the above, select areas where forest conservation and regeneration efforts will be effective and prepare plans. 	<ul style="list-style-type: none"> • Sort out current conditions and issues associated with the use and management of upstream forest resources. • Prepare a forest conservation and regeneration plan.
(2) Cyclic use of natural resources	<ul style="list-style-type: none"> • It is effective to explore the possibilities of cyclic use of natural resources of the new ecosystem to be produced. 	<ul style="list-style-type: none"> • Examine cyclic use of natural resources.
(3) Recognition of the value and importance of local traditions and cultures	<ul style="list-style-type: none"> • It is necessary to explore the applicability of traditional knowledge of the region. 	<ul style="list-style-type: none"> • Verify applicability of traditional knowledge.
(4) Natural resource management by various participating and cooperating entities	<ul style="list-style-type: none"> • It is necessary to establish an implementation system that involves participants beyond the boundaries of organizations from a wide range of areas. • It is necessary to implement awareness raising and activity programs in order to get a broad range of beneficiaries involved. • It is necessary to set up rules to ensure the sustainable and proper management of forests. 	<ul style="list-style-type: none"> • Establish wide-area implementation systems. • Plan awareness raising and activity programs. • Establish rules of use and management.
(5) Contributions to local socio-economies	<ul style="list-style-type: none"> • It is possible to explore the possibilities of local businesses that use conserved and regenerated forests. • It is important to provide education, human resources development, and capacity building to participants in order to continue the proper use and management of forests. 	<ul style="list-style-type: none"> • Utilization plan of the developed ecosystems. • Plan for education, human resources development, and capacity building.

(1) Resource use within the carrying capacity and resilience of the environment

Points of planning	<ul style="list-style-type: none"> • It is necessary to identify causal relationships between weakened provisional services and problems associated with the use and management of upstream forests. • Based on the above, select areas where forest conservation and regeneration efforts will be effective and prepare plans.
Action items	<ul style="list-style-type: none"> • Sort out current conditions and issues associated with the use and management of upstream forest resources. • Prepare a forest conservation and regeneration plan.

When the quantity and quality of water resources, fish, and shellfish are declining in plain and coastal areas, but no major cause can be found in neighboring areas, it is necessary to check for problems such as an overexploitation or under-exploitation of forest resources in the upstream areas of a river and analyze possible causal relationships between these problems. It is effective to seek the support of public entities such as government organizations or researchers, because this procedure requires expert knowledge and skills.

Based on the causal relationship, create forest conservation and regeneration plans that can solve the problems of overexploitation or under-exploitation of forest resources and contribute to the improvement of provisional services in downstream areas. It takes a long time to develop forests. Thus, establish a clear long-term goal, putting priority on the conservation of public ecosystem functions, and then create a gradual forest development plan.

Table: Major operations related to this practice

Action items		Content of major action and focus points
Organize the current status and problems associated with the use and management of upstream forest resources		<ul style="list-style-type: none"> • Locations of forests that lie at upstream parts of a river from the location where provisional services are deteriorating and might be affecting the deterioration. • Status of the use and management of natural resources in the above locations. (Example: Is the ecosystem used and managed in a way that is in harmony with the carrying capacity and resilience of the environment?) • Analyze causal relationships between weakened public ecosystem functions and problems associated with the use and management of natural resources. (Example: Compare the trend of fish catches and the changes in the amount of forest felling)
Forest development plan	The goal image and component tree species	<ul style="list-style-type: none"> • In areas where overexploitation is occurring, set up a goal of creating forests that can succeed both in timber production and an improvement of provisional services in downstream areas. (Example: Development and sustainable use of healthy artificial forests) • In areas where under-exploitation is occurring, set up a goal of converting the forest into a condition that can maximize provisional services at downstream areas. (Example: Convert an under-managed artificial forest into a natural forest.) • Refer to healthy natural ecosystems that exist near the area and use native species as much as possible.
	Gradual nurturing plan	<ul style="list-style-type: none"> • Utilize natural succession mechanisms (e.g. herbaceous plant → pioneering tree species → target tree species). • When the topography and soil conditions are not favorable, use species that grow well in oligotrophic soils with high soil conditioning properties (e.g. nitrogen fixing properties) in order to promote initial vegetation settlement.

(2) Cyclic use of natural resources

Points of planning	<ul style="list-style-type: none">• It is effective to explore the possibilities of cyclic use of natural resources of the new ecosystem to be produced.
Action items	<ul style="list-style-type: none">• Examine cyclic use of natural resources.

It is possible to use the forests developed through this practice as sources of food, fuel, and materials in a cyclic way by connecting them with surrounding land uses and human activities.

Thus, it is effective to examine the applicability of the compound operation of agriculture, forestry, and fishery based on multi-layered land use (Category No. 1) or biomass utilization (Category No. 5) with the implementation of this practice.

(3) Recognition of the value and importance of local traditions and cultures

Points of planning	<ul style="list-style-type: none">• It is necessary to explore the applicability of traditional knowledge of the region.
Action items	<ul style="list-style-type: none">• Verify applicability of traditional knowledge.

Local wisdom of traditional resource circulations and a knowledge of useful plants may include information that can be utilized in establishing ecosystem goals or selecting the tree species of this practice.

Thus, as a part of the preliminary research to plan the introduction of this practice, it is necessary to sort the content and locations of traditional knowledge, scientifically identify their natural and social rationalities, and examine their applicability.

(4) Natural resource management by various participating and cooperating entities

Points of planning	<ul style="list-style-type: none"> • It is necessary to establish an implementation system that involves participants beyond the boundaries of organizations from a wide range of areas. • It is necessary to implement awareness raising and activity programs in order to get a broad range of beneficiaries involved. • It is necessary to set up rules to ensure the sustainable and proper management of forests.
Action items	<ul style="list-style-type: none"> • Establish wide-area implementation systems. • Plan awareness raising and activity programs. • Establish rules of use and management.

The participation of many diverse stakeholders of provisional services that originate in forests is essential to increase the effects of this practice. In order to do so, it is necessary to establish a wide-area implementation system that becomes the core of the effort, and to implement awareness raising and activity programs to involve a wide variety of beneficiaries.

Forest owners and representatives of beneficiaries must be involved in the establishment of a wide-area implementation system. It is also effective for public entities such as government organizations and research facilities with scientific knowledge to become involved in these efforts.

In awareness raising activity targeting beneficiaries, it is effective to conduct quantitative evaluations of ecosystem services (e.g. economic evaluation of forest conservation on its function to prevent flooding or its influence on fish yield) as the evidence for the burden and widely notify the outcome to residents of the area where the beneficiaries reside.

In a program to collect funds and labors, it is effective to provide various ways to get involved in forest conservation and regeneration (e.g. continuous participants, sponsors, and event participants) so that it is easy for beneficiaries in remote locations to participate.

Proper use and management must be continued after the initial development of forests (such as tree planting) in order to realize forest conservation and regeneration. Thus, participants need to establish rules of use and management in order to avoid the repetition of problems such as overexploitation and under-exploitation.

Table: Planning items associated with the participation and cooperation of various groups

Action items	Contents
Establishment of an implementation system	<ul style="list-style-type: none"> • Establish an implementation system that involves entities with a strong relation to the forest, since there are a wide variety of stakeholders in ecosystem services that originate in forests. • Forest owners and representatives of beneficiaries need to be involved in the process. • It is effective for public entities such as government organizations to participate as coordinators or supporters. • It is effective for research facilities to participate as entities to provide advice from scientific perspectives.
Awareness raising targeting beneficiaries	<ul style="list-style-type: none"> • Using the implementation system described above, target awareness raising at residents in an area that enjoys ecosystem services in order to gain their understanding on beneficiaries responsibilities. • As a part of this procedure, it is effective to conduct quantitative evaluations of ecosystem services (e.g. conversion into economic values) and promulgate the outcomes.
Programs to collect funding and labor	<ul style="list-style-type: none"> • Using the above implementation system, plan and implement programs to collect funding and labor from wide beneficiaries. • It is effective to provide various ways to get involved in forest conservation and regeneration (e.g. continuous participants, sponsors, and event participants) so that it is easy for beneficiaries in remote locations to participate.
Rules for use and management	<ul style="list-style-type: none"> • Establish rules such as limits to forest use, zoning, and limits to actions in order to sustain proper use and management.

(5) Contributions to local socio-economies

Points of planning	<ul style="list-style-type: none"> • It is possible to explore the possibilities of local businesses that use conserved and regenerated forests. • It is important to provide education, human resources development, and capacity building to participants in order to continue the proper use and management of forests.
Action items	<ul style="list-style-type: none"> • Utilization plan of the developed ecosystems. • Plan for education, human resources development, and capacity building.

The overexploitation and under-exploitation of forests is often deeply related to the lowered economic vitality of rural agricultural villages. Therefore, along with the introduction of this practice, it is possible to aim for the ripple effects of launching new local businesses that utilize the forest resources of the upstream areas. Specific examples include the compound operation of agriculture and forestry based on multi-layered land uses (Category No. 1), the production of industries using traditional culture and skills (Category No. 4), biomass utilization (Category No. 5), and ecotourism (Category No. 7).

Also, in order to sustain the proper use and management of forests, it is important for individual stakeholders to understand the basic concepts of this practice and gain sufficient knowledge and skills to realize it. Therefore, it is necessary to provide education and implement programs of human resources development and capacity building that target all stakeholders involved in the use and management of forests.

Table: Examples of new local businesses in forests

Field of local business	Specific examples
Compound agricultural and forestry through multi-layered land use (Category No. 1)	<ul style="list-style-type: none"> • Introduction of agroforestry in tropical forests • Introduction of forest grazing that also works as undergrowth vegetation management
Production of industries with traditional culture and skills (Category No. 4)	<ul style="list-style-type: none"> • Manufacturing of traditional arts and crafts that use wood as a raw material • Cultivation of traditionally useful plants
Biomass utilization (Category No. 5)	<ul style="list-style-type: none"> • Fuel use or power generation (energy use) • Manufacturing of new products that use wood as a raw material (material use)
Ecotourism (Category No. 7)	<ul style="list-style-type: none"> • Implementation of ecotours that use the forest ecosystem and culture as resources • Accept people who wish to experience forestry