

Urban-Rural Partnerships

A win-win approach to realize

Regional CES

(Regional Circular & Ecological Sphere)

Compendium of Good Practices from Japan



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Team Members:

1. Vibhas Sukhwani, Keio University, Japan
2. Bijon Kumer Mitra, IGES, Japan
3. Hikaru Takasawa, Keio University, Japan
4. Atsushi Ishibashi, Keio University, Japan
5. Rajib Shaw, Keio University, Japan
6. Wanglin Yan, Keio University, Japan

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This report is developed based on available literature and photographs from many different sources. The complete list of referred sources is provided at the end of every section.

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1. INTRODUCTION

Urbanization, globalization and climate change have emerged as the characterizing trends of the 21st century. Cities around the world today are witnessing phenomenal transformations in their levels of infrastructures and physical assets, paralleled by an inflow of rural population. By 2018, more than 55% of the world's population was living in urban areas, a proportion due to reach 68% by 2050¹. With the current trends of rapid and mostly unplanned urbanization, cities are becoming the centre of demands for natural resources like food, energy and water, which mostly come from the rural areas. While the rural population is moving towards urban areas in pursuit of livelihoods and quality of life, satisfying the resource demands for the exponentially growing urban population has become a serious concern for city governments. Over the recent years, the notion of urban-rural linkage has been highly recognized in the global development discourse. It has emerged as one of the fundamental elements of sustainable development in global policy frameworks and targets including the Sustainable Development Goals and Habitat Agenda. While cities around the world are facing the issue of urban-rural conflicts, there is a need for enhancing and better managing the urban-rural relationships through increased partnerships. Providing sustainable solutions to overcome the contemporary challenges demands study of urban-rural interlinkages at spatial and temporal scales. Correspondingly, the concepts of urban-rural linkage, Regional Circular and Ecological Sphere (Regional CES) and Food-Energy-Water nexus need renewed attention for ensuring sustainable development of urban and rural areas.

Scope of the document

Urban and rural areas both depend on a shared stock of natural resources. However, their development planning is mostly focused within their established boundaries. This report is an effort to bring together innovative methods of integrating urban and rural stakeholders to manage shared natural resources. The report looks at seven different case study examples from Japan, specifically focusing on water. The case studies have been selected based upon the principle of urban-rural partnership and consideration of stakeholder interests. It is hoped that this report will serve as guiding material for regional level policy making around the world.

The second section elaborates on the key concepts of urban-rural linkage, Food-Energy-Water (FEW) nexus and regional circular and ecological sphere. The third section summarizes the characteristics of selected good practices covering key issues, governance and funding mechanism, stakeholders & beneficiaries and sustainability aspects. The concluding section presents key learnings from the case studies and provides ideas for the way forward.

¹ United Nations (2018). Department of Social and Economic Affairs. <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>

2. CONCEPTUAL UNDERSTANDING

2.1. Urban-Rural Linkage

Urban and rural areas possess different and often complementary assets, and their healthier coordination is important to balance social and environmental interests. Their territories are functionally interconnected through different types of linkages that often cross traditional administrative boundaries¹. The urban-rural linkages consist of flows (of goods, people, information, finance, waste and information, as well as social relations) across space, connecting rural and urban areas². Urban and rural areas are collectively vulnerable to emerging socio-environmental changes, though at different levels, because of shared environmental resources. Therefore, it has become crucial to strengthen urban-rural linkages so as to methodically resolve the current and unforeseen bottlenecks related to resource security in urban areas, specifically with respect to food, energy and water, which are currently governed by a discrete sectorial approach. The secured supply of natural resources fundamentally relies on managing risks as well as urban-rural trade-offs, and realising synergies, which makes it important that these concerns are collectively addressed by urban and rural stakeholders. As the Sustainable Development Goals (SDGs) aim for balanced territorial development, the concept of urban-rural linkages holds paramount importance in the context of emerging climatic changes, not only for achieving SDG 11 (Sustainable Cities and Communities), but also SDG 2 (Zero Hunger) and SDG 12 (Responsible Consumption and Production) among others. The coordinated development of urban and rural areas is the key to sustainable development and reinforcing urban-rural linkages is an optimal pathway to achieve this.



Underlining urban-rural linkages

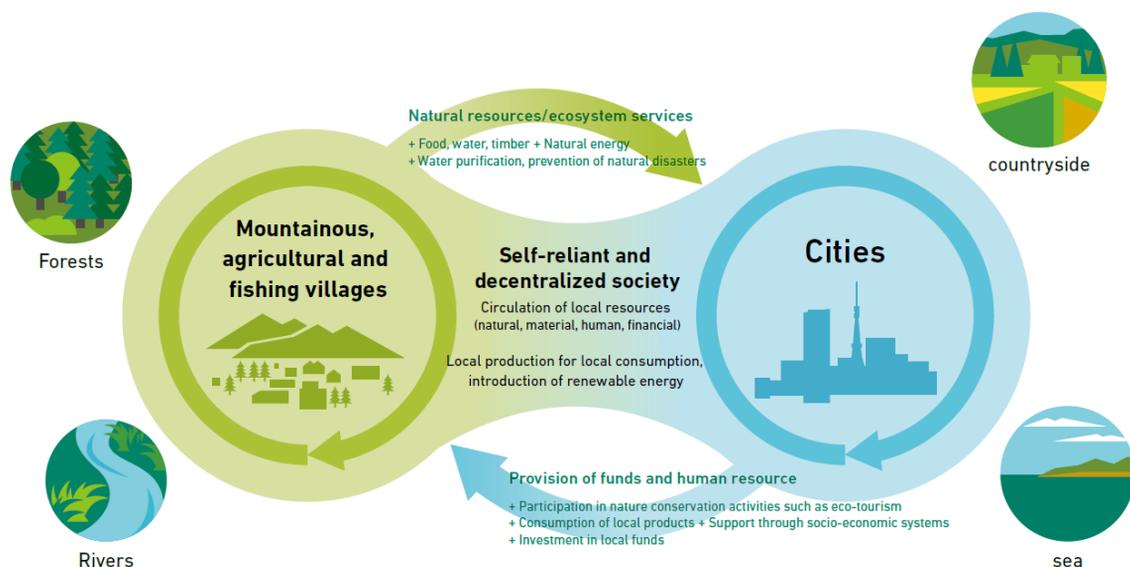
¹ OECD (2017). *Rural Urban linkages. The Organisation for Economic Co-operation and Development (OECD)*. <http://www.oecd.org/cfe/regional-policy/rural-urban-linkages.htm>

² Tacoli, C. (2015). *Rural urban linkages. International Institute for Environment and Development*. <https://www.iied.org/rural-urban-linkages>

2.2. Concept of Regional CES

The concept of Regional Circular and Ecological Sphere (Regional CES) emerged through deliberations on the 5th Basic Environment Plan of Japan. The concept was framed based on an integrated policy approach that incorporates the concepts of (a) low-carbon society, (b) resource circulation, and (c) living in harmony with nature. It aims to maximize the vitality of all regions through sustainable, equitable and efficient use of resources of mountainous, agricultural and fishing villages as well as cities in an integrated manner¹. Subject to the scale of resource circulation, the creation of Regional CES complements and supports regional resources by building broader networks, composed of natural connections (connections among forests, the countryside, rivers and the sea) and economic connections (composed of human resources, funds and others)². In this way Regional CES complement each other and generate synergy. The key to creating Regional CES is to re-discover regional resources through a collaborative approach by involving multiple stakeholders, and to make optimum use of resources in a sustainable manner, be it on community level or a larger scale such as a river basin.

Regional CES provides a concrete vision of an integrated approach covering economic, social and environmental dimensions as covered by the SDGs. The concept focuses attention on the wise use of locally abundant natural capital, such as solar, wind etc. and thus can serve as a means for local income generation and economic revitalization of rural communities. It also ensures a symbiotic relationship with nature, between people, the environment and living creatures in particular, recognizing the fact that humans are a part of the environment and are living creatures themselves².



Source: Ministry of the Environment³

Conceptual illustration of a Regional CES

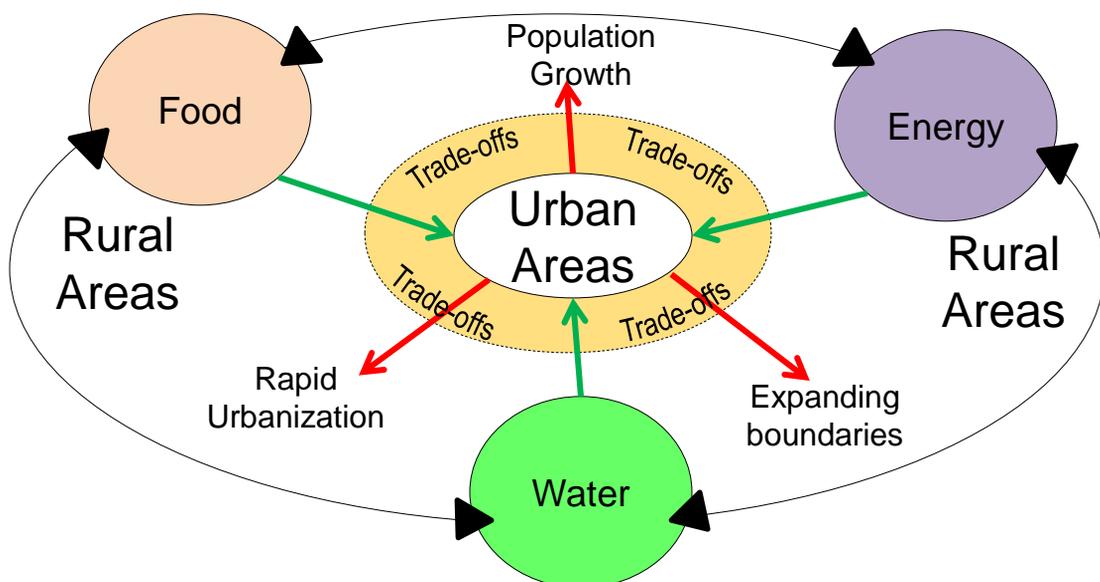
¹ <https://www.iges.or.jp/en/sdgs/sts.html>

² <http://www.env.go.jp/en/policy/index.html>

³ <http://www.env.go.jp/en/wpaper/2018/pdf/04.pdf>

2.3. FEW NEXUS in Urban-Rural Context

Food-Energy-Water (FEW) nexus refers to the complex relationships and trade-offs between these three closely linked systems. While water is needed for almost all forms of energy production and power generation, energy is required to treat and transport water, and both water and energy are needed to produce food. The concept of 'FEW nexus' gained renewed attention at global level in response to climate change and social changes including growing inequalities and social discontent¹. The demands for water, energy and food are estimated to increase by 40%, 50% and 35% respectively by 2030². The inter-linkages between these sectors further complicates the challenge of addressing their growing demands. Addressing the FEW nexus in a sustainable manner has therefore turned out to be one of the most critical global environmental challenge³. While planning for the secured physical and economic access to required FEW resources in urban areas, it is indispensable to consider the regional perspective and the linkages with rural areas. Urban areas depend on rural areas for a variety of natural resources including food, energy and water. With the backdrop of rapid urbanization, population growth and expanding city boundaries, more and more forest lands, water bodies, and productive agricultural lands etc. surrounding city boundaries are been acquired for development. The correspondingly evolving socio-environmental changes are further stressing the natural resources to critical thresholds. Although the governance structures for urban and rural areas are mostly discrete, there is a genuine need for revisiting the FEW resource planning principles in consideration of the growing number of urban-rural trade-offs and potential conflicts.



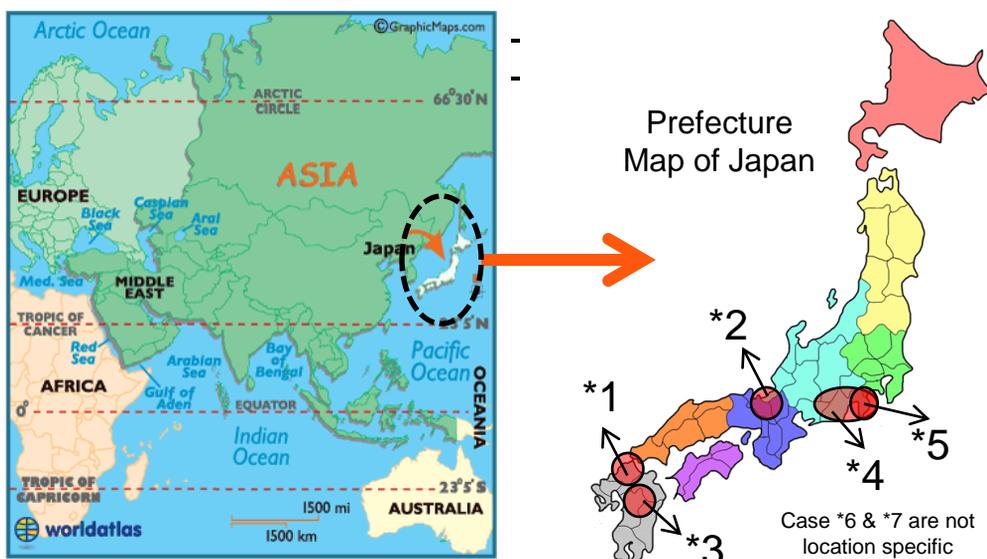
Understanding FEW Nexus in urban-rural context

¹Hoff, H. (2011). *Understanding the Nexus. Background Paper for the Bonn2011 Conference: The Water, Energy and Food Security Nexus*. Stockholm Environment Institute, Stockholm.

²US NIC. (2012). *Global Trends 2030: Alternative Worlds*. United States National Intelligence Council, Washington DC, USA.

³Endo et al. (2015). *Methods of the Water-Energy-Food Nexus*. *Water*. 7. 10.3390/w7105806.

3. CASE STUDY EXAMPLES



Location Map for Selected Case Study Areas ^{1,2}

S. No.	Case Study Name	Start Year	Key Highlights
*1	Case of Fukuoka city	1997	Innovative means of fund collection for water resource preservation and management
*2	Case of Lake Biwa	1972	Comprehensive development program for preserving and restoring the Lake Biwa
*3	Case of Kumamoto	2003	Industries off-setting the ground water utilisation by incentivising ground water recharge
*4	Case of Kanagawa	2005	Conservation and restoration of water source environment through taxation
*5	Case of Yokohama City	1916	Acquiring and managing the privately owned upstream water source forest lands with stakeholders
*6	Honda Suigenomori	2005	Private company engaging employees in forest management as CSR activity
*7	Suntory And Water	2004	Private company fostering environmental education for school students as CSR activity

¹<https://www.worldatlas.com/webimage/countrys/asia/japan/jplatlog.htm>

²https://en.wikipedia.org/wiki/Prefectures_of_Japan

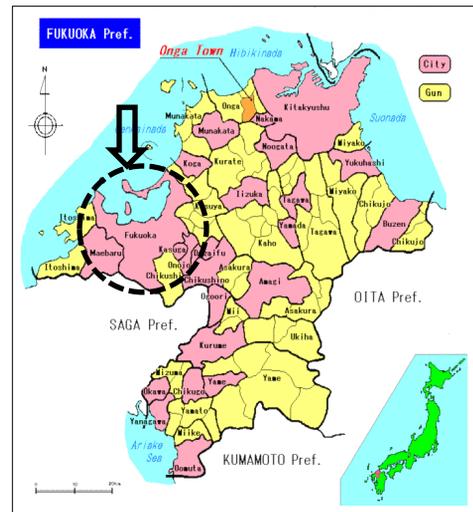
CASE STUDY 1: Case of Fukuoka city

Urban-rural partnership for revitalizing headwater areas

1. Introduction

- Case Study Area: Fukuoka city
- Prefecture: Fukuoka
- Population: 1.539 million (2015)
- Area: 340 square kilometers
- Annual Average Temperature: 16.3 °C
- Annual Rainfall: 1,600 mm

*Fukuoka city is the capital of Fukuoka Prefecture, located on the northern shore of Japanese island Kyushu.



Location Map of Fukuoka City

Key Issue: Fukuoka is the only major city in Japan without a main river flowing through it. The city depends on the Chikugogawa River for one-third of its water requirements and it relies on the neighboring cities in developing dams for the residual water supply demands. However, faced with the developing concerns of depopulation, ageing society and economic pressures on the forestry industry, the forests surrounding the water source dams have become degraded. This has weakened their water recharge functions to such an extent that maintaining a continued water supply for the city has become difficult.

Why and when the scheme started: Fukuoka city established the Fukuoka City Water Supply Foundation Fund for Water Resource Preservation Projects on April 1, 1997 for conservation and management of water source forests.

Key Highlights

1. Collaborative projects and proper coordination between local governments (both upstream and downstream) have helped improve the water recharge capacities of upstream forest areas.
2. Fukuoka city has come up with an innovative means of fund collection wherein the city government takes 0.5 Japanese Yen (JPY) from the water charge revenue and 0.5 JPY from the city's general budget per cubic meter of water consumed in the city.
3. The steering committee established with participation of citizen and academic experts cooperates with relevant local governments to promote the development of water source forests.

2. About the Scheme

Under this scheme, Fukuoka city executed exchange programs and collaborative projects with headwater areas, with the goal of enhancing water recharge capacities of the forest, revitalizing the headwater areas and enhancing partnership between local governments located in both upstream and downstream areas. To develop water source forests in the catchment areas, the city government ensured cooperation of the respective municipalities in water source areas, including the upper reaches of the Chikugogawa River. For the local dams, the city government engaged in efforts to purchase the privately owned forest lands in catchment areas and enhance their water recharge capacities while forestalling water contamination due to rapid developments. To improve cooperation with water source areas, the city government also invites its citizens to participate in silvicultural management activities, rice planting and catching trout upstream. Furthermore, the city upholds awareness campaigns to educate citizens about the status of city's water sources and the forest areas.



An example of maintained forest



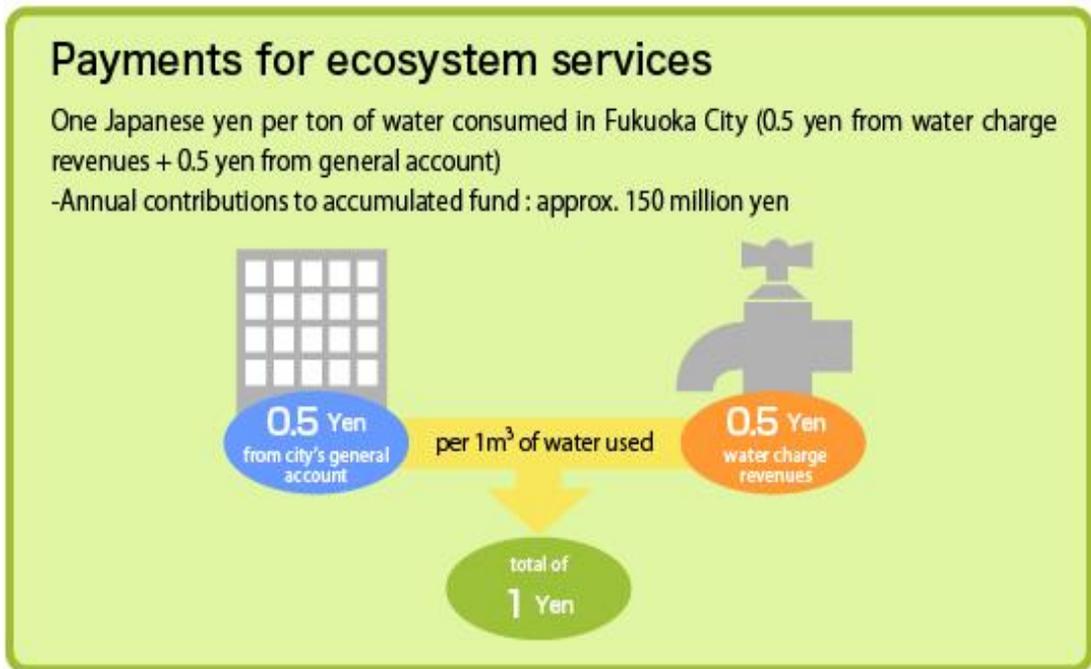
An example of citizen participation

3. Stakeholders & Beneficiaries

The scheme involves the local governments, local communities, academic experts etc. An independent steering committee has been formed to come up with ideas to manage funds, maintain forests and enhance community engagement in forestry activities. The committee includes 3 citizen representatives, 2 professors majoring in the field and 3 officials from the city government. The committee members are formally selected; the office term for selected members is 2 years and then the members are allowed to re-apply. With representation from different sectors, the committee ensures that stakeholder interests are taken into consideration. In addition, the details of all the meetings are open to the public, which enhances community participation and ensures transparency. The scheme has advanced with continued public support and has ensured thorough management of forest lands in water source areas, securing continued water supply for Fukuoka city.

4. Governance Mechanism

From 1997 to 2006, the Fukuoka City Waterworks Bureau set aside 1 JPY per cubic meter of water consumed for a water source conservation fund. This comprised of 0.5 JPY from the water charge revenue and 0.5 JPY from the city's general budget. As per the city government, it annually allocates 100 million JPY from the collected fund for forest management activities in water source areas, exchange programs and contribution towards a river basin based partnership fund which also includes neighboring municipalities. In addition, various grants are offered for supporting civil activities focused at planting trees, clearing underbrush as well as other interactive programs. Fukuoka city also contributes to a fund established by the Partnership for Public Administration in the Greater Fukuoka Area that promotes cooperation with neighboring local governments for shared undertakings in water source areas. The committee originally came up with a plan to save 1.5 billion JPY in 10 years starting in 1997. A total of 1.43 billion JPY had been saved by 2006. The local government is currently reconsidering the whole investment mechanism so as to ensure that target funds are available until 2026.



Funding mechanism for the scheme

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- *TEEBcase by Hiroshi Nishimiya (2010) Management of urban water sources, Japan, available at: TEEBweb.org*
- <http://www.city.fukuoka.lg.jp/mizu/ryuiki/0037.html>
- <https://en.wikipedia.org/wiki/Fukuoka>

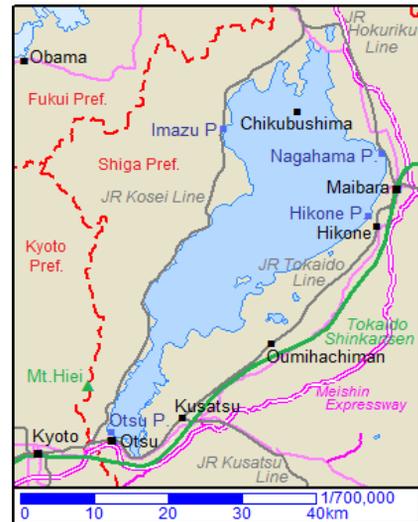
CASE STUDY 2: Case of Lake Biwa

Urban-rural partnership for comprehensive development program

1. Introduction

- Case Study Area: Lake Biwa
- Prefecture: Shiga
- Population: 1.41 million (2018)
- Area: 4,017.38 square kilometers

*Lake Biwa, with an area of 670 square kilometers, is the largest lake in Japan. It is located at the center of Shiga Prefecture. Length from north to south is about 80 kms and the widest part from east to west is about 25 kms. The altitude of the lake surface is about 84 meters and the depth is about 103 meters.



Location Map of Lake Biwa

Key Issue: The communities around lake Biwa have periodically been exposed to severe flooding and drought events. The progressive urbanization and industrialization trends have stressed the lake's natural environment. Since the post-World War II high economic growth period, the demand for water has gradually increased in the Yodo River basin (downstream area), imposing higher burden on Lake Biwa as an important water source.

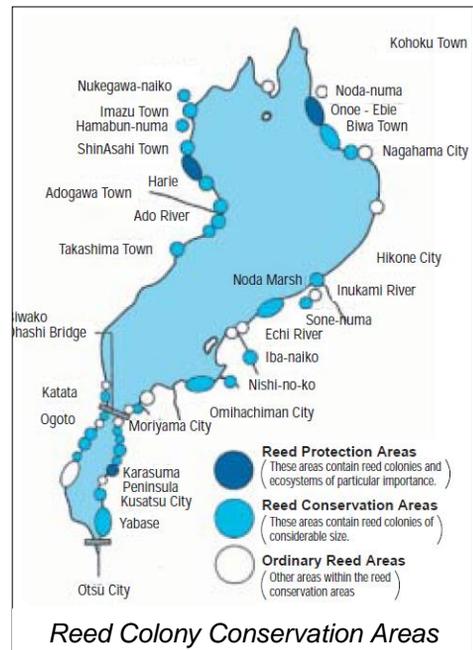
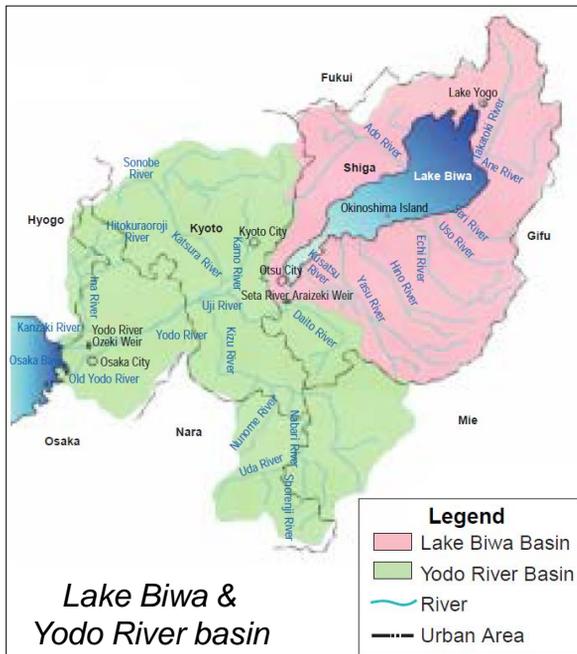
Why and when the scheme started: The Lake Biwa Comprehensive Development Program was introduced in the year 1972 as a national level project in compliance with the Special Law for Developing the Lake Biwa Region. The Special Law was extended twice (in 1982 and 1992) and the program was in operation for 25 years from 1972 to 1997.

Key Highlights

1. The Lake Biwa Comprehensive Development Program, initiated in the year 1972, aimed at promoting effective use of water, controlling floods and drought and creating rich waterfront areas.
2. The total expenditure for the Comprehensive Development Program reached 1,905 billion JPY. The funding was secured from different stakeholders including National and Prefectural (upstream & downstream) governments.
3. Citizens are highly engaged with non-profit organizations and governmental agencies to achieve the Program's objectives.

2. About the Scheme

Water from Lake Biwa and the Yodo River supports social and economic activities much beyond their respective basins, catering to extensive areas of the Kinki region. To address various issues in a holistic way and seek economic development of areas around Yodo River basin (both upstream and downstream), the comprehensive development program focused on promoting effective use of water, controlling floods and drought, and creating amenity-rich waterfront areas. The major objective of the program was to conserve and restore the lake's environment. An automatic monitoring station was built inside the lake in addition to the sewage treatment plant that was developed to restore the water quality of Lake Biwa. Overall, the program encompassed various projects in 22 categories, all contributing to wide-ranging development of the Kinki region. The total budget amounted to approximately 1,863 billion JPY, however when the program was fully completed, actual expenditures had reached 1,905 billion JPY



3. Stakeholders & Beneficiaries

The Yodo River basin covers a wide area of about 8,240 square kilometers, comprising six prefectures namely Mie, Shiga, Kyoto, Osaka, Hyogo and Nara. Tap water from the lake and river serves around 14 million people, the largest proportion of population benefiting from a single water source in Japan. With extensive projects of Lake Biwa Comprehensive Development Program, the water levels in Lake Biwa and Yodo River basin have improved significantly. Citizens, non-profit organizations and governmental agencies were collectively involved in the program activities like framing block level action plans, afforestation, eco-friendly agriculture, river improvement plans, network centres, environmental business exhibitions, and a museum, etc.

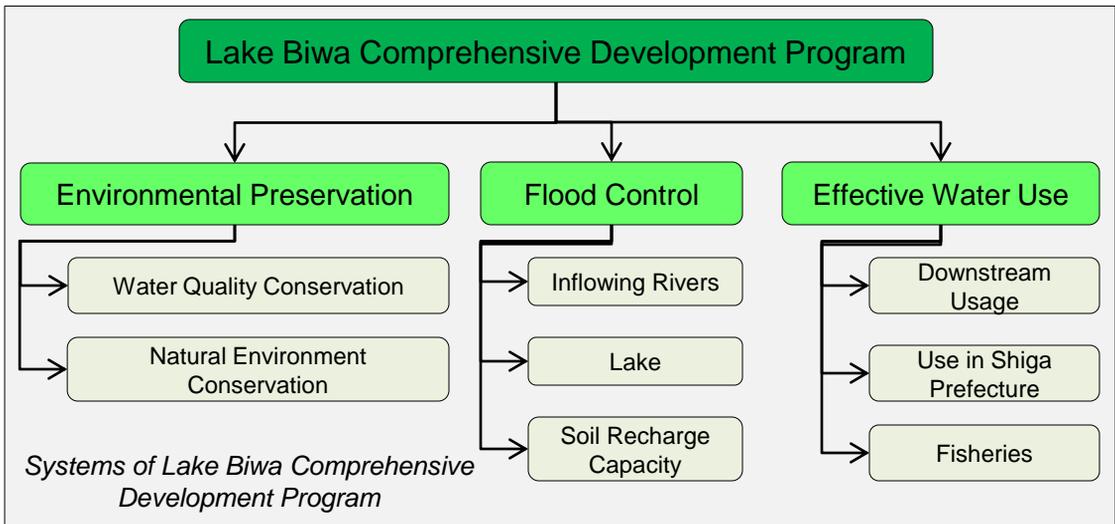
4. Governance Mechanism

The Lake Biwa Comprehensive Development Program was established in compliance with the Special Law for Developing the Lake Biwa region, which provided legal grounds for allocating special funds from the national government. This legal system paved the way for many successive water source development programs throughout Japan.

Special funds from national government: Special funds from the national government were allocated for many projects of the Program.

Lake Biwa Management fund: Shiga Prefecture instituted the Lake Biwa Management fund of about 10 billion JPY to finance the construction and operation of several projects like the automatic monitoring system.

Cost-sharing of Municipalities in Lower Basin: The municipalities in the downstream areas of Yodo river basin, that would benefit from the program, shared the expenses of the lake development projects which were implemented by Shiga Prefecture and other municipalities within the Prefecture. The share proportions were determined in accordance with the water volume that would be supplied from the newly developed resources (40 tons overall). The shares paid by all the concerned municipalities totaled approximately 60.2 billion JPY. Additionally, Osaka and Hyogo prefectures supported Shiga Prefecture with funds totaling 5 billion JPY.



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- <http://www.travel-around-japan.com/k65-01-lake-biwa.html>
- https://en.wikipedia.org/wiki/Shiga_Prefecture#Geography

CASE STUDY 3: Case of Kumamoto City

Urban-rural partnership incentivizing groundwater recharge

1. Introduction

- Case Study Area: Kumamoto City
- Prefecture: Kumamoto
- Population: 737,812 (2017)
- Area: 389.53 square kilometers
- Daily Mean Temperature: 16.9 °C
- Annual Rainfall: 1,985.9 mm

*Kumamoto is the capital city of Kumamoto Prefecture. It is located on the island of Kyushu, Japan.



Location Map of Kumamoto

Key Issue: Kumamoto prefecture relies on groundwater for 80 percent of its water requirement, while the capital city Kumamoto is completely dependent on groundwater. In the recent years, the groundwater levels have lowered in the region due to policy-driven reduction in the areas of land used for rice paddy cultivation and an increase in the areas used for residential purposes.

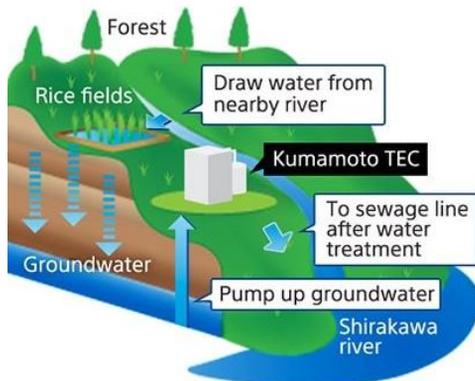
Why and when the scheme started: In response to the issue of reduced groundwater levels, Sony Semiconductor Manufacturing Corporation's Kumamoto Technology Center (Kumamoto TEC) initiated the concept of industries being water neutral or to completely return the groundwater they used. This innovative groundwater scheme was launched by Sony Semiconductor Kyushu in the year 2003 in association with a local non-governmental organization, a local agricultural cooperative and land improvement districts and local municipalities, and later engaging many other local firms, as well as Kumamoto city government.

Key Highlights

1. Sony semiconductor plant in Kumamoto introduced an innovative scheme to counterbalance their groundwater consumption by engaging with local farmers.
2. The participating farmers are asked to flood their paddy fields during the off-season, which facilitates groundwater recharge. In return the company provides incentives to the farmers based on established rates.
3. One of the key reasons for the success of this scheme was the development of a thorough scientific understanding of the issues by the local academic experts and researchers,.

2. About the Scheme

Under this scheme, the Sony semiconductor plant asks volunteering local farmers to flood abandoned rice fields between crops or organic rice paddies after harvest. The required water is drawn in from the Shirakawa river and allowed to soak into the ground. The estimated amount of water used by the plant as of 2009 was about 9.8 million tons. Through this scheme, it could successfully recharge ground water levels by 11.6 million tons. The scientific base has helped establish a standard payment rate for the farmers based on equivalent flooded area per month. The local farmers are paid a fee of 11,000 JPY per 1,000 square meters to cover various costs of management and preparation incurred during 30 days of off-season flooding. The farmers are correspondingly paid 11,000 JPY, 16,500 JPY and 22,000 JPY for flooding 1,000 square meters of rice fields for 1, 2 and 3 months respectively. From May to October, Kumamoto TEC, through its water facilities, assists in flooding the unused rice paddies with river water, thus allowing the additional water to penetrate into the soil and eventually replenish the aquifer. This is a win-win scheme because the farmers have an additional source of income and the private companies can offset their groundwater consumption in a transparent manner. Consuming 1 kilogram of rice grown in these fields is believed to have an effect of recharging 20-30 square meters of groundwater. In this way, the rice consumers are also able to indirectly contribute to recharging groundwater imposed by using tap water.



Payment Mechanism

Days of off-season flooding	Payment to partnering farmers
30 Days	11,000JPY/1,000m ²
60 Days	16,500JPY/1,000m ²
90 Days	22,000JPY/1,000m ²

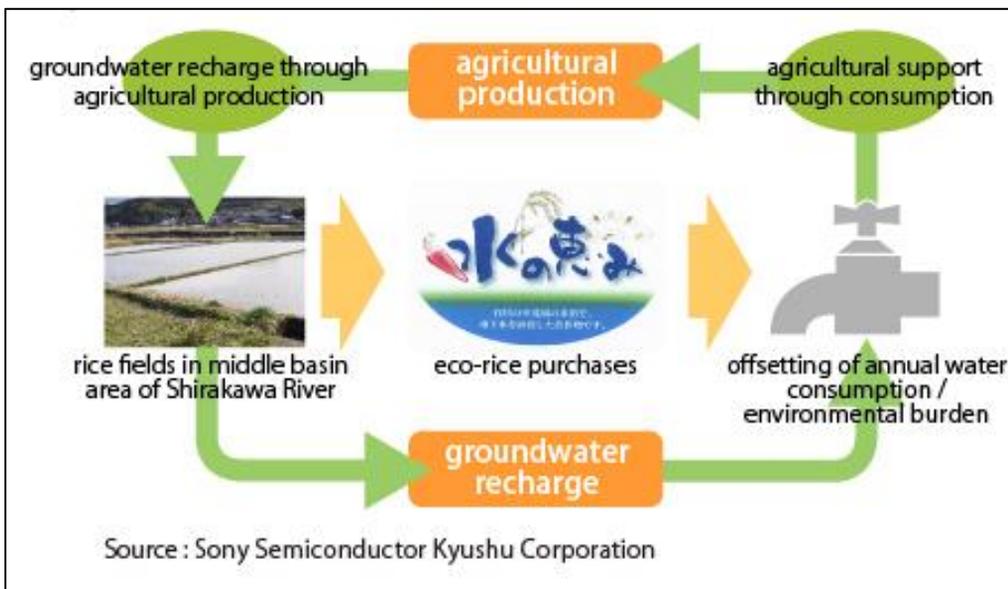
Mechanism of groundwater recharge using rice fields

3. Stakeholders & Beneficiaries

Kumamoto TEC is actively engaged in recharging groundwater using paddy fields in partnership with local environmental non-profit organizations as part of its corporate social responsibility policy. This scheme initiated by Sony Semiconductor involved many other stakeholders such as universities, Kumamoto Groundwater Foundation, farmers, industries and local non-profit organizations (NPOs). While the local communities benefit through the recharged groundwater levels and the incentives, Kumamoto TEC is successfully able to offset their water consumption.

4. Governance Mechanism

The groundwater recharge scheme at Kumamoto TEC began in fiscal year 2003. In fiscal year 2017, 2.31 million cubic meters more water than the company's yearly water usage (including tap water and groundwater) was recharged. The company has been encouraging its employees to purchase the agricultural crops produced in the groundwater recharge farming areas, thus supporting the local farmers and enhancing groundwater replenishment. The agency's initiative was later been joined by other local firms as well as the city government, which incorporated the groundwater recharge scheme in its five-year City Water Conservation Plan in 2004 and also during 2009-2013. Many other related initiatives have since sprung up, such as rice paddy training programs, citizens' water conservation movement, rotational paddy-flooding projects, rainwater harvesting, forest management practices, groundwater conservation agreements with neighboring towns, volunteer activities, environmental education and lifelong learning programs for elementary school students. The development of a thorough scientific understanding by the experts and researchers, mainly from the local universities, was the key factor for the scheme's success. The scheme was nominated for the best practice award for the '2013 UN Water for Life'. Groundwater recharge has now become one of the main priorities of the Kumamoto city government.



Water cycle in a water-offsetting scheme

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- <https://en.wikipedia.org/wiki/Kumamoto>

CASE STUDY 4: Case of Kanagawa

Urban-rural partnership for water environment conservation

1. Introduction

- Case Study Area: Kanagawa Prefecture
- Prefecture: Kanagawa
- Population: 9.072 million (2012)
- Area: 2,416.04 square kilometers

*Kanagawa is a coastal prefecture just south of Tokyo. It is a part of the Greater Tokyo Area. Sagami River and Sakawa River are the source of 90% of water in Kanagawa Prefecture. Notably, 80% of the catchment area of these rivers lies in Yamanashi and Shizuoka prefectures.



Location Map of Kanagawa

Key Issue: 70 percent of the total catchment forests for Sagami river and Sakawa river are privately owned. Over the decades, these privately owned forests have deteriorated due to various constraints on forestry operations like stagnant timber pricing. Resultantly, the quality of prefectural water sources is being affected and has become a serious concern.

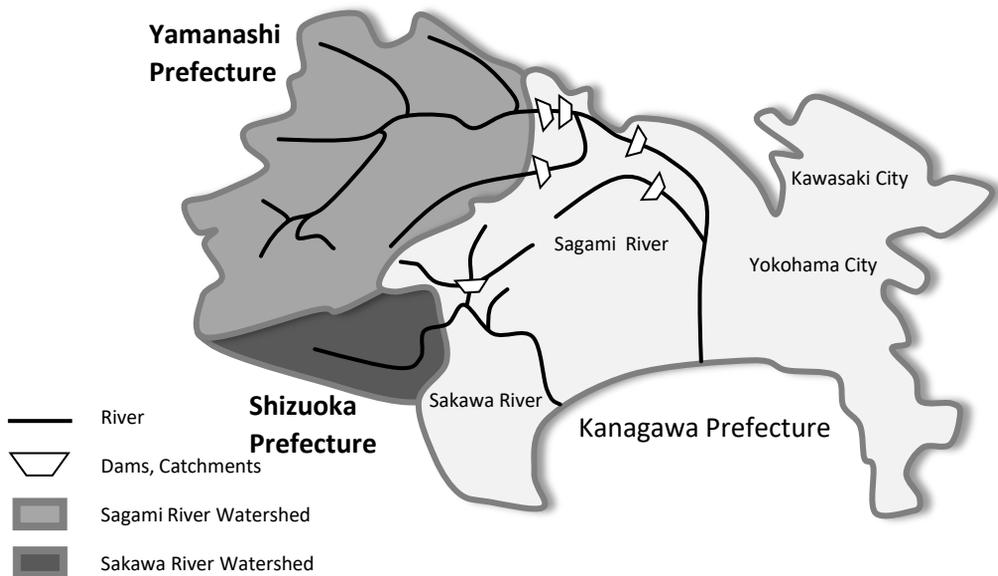
Why and when the scheme started: Kanagawa Prefecture laid out a long-term plan for conserving and restoring the water sources, by adopting the Basic Policy for Kanagawa Water Source Environment Conservation and Restoration (2005 to 2025). In line with this Policy, the Prefecture formulated the Five Year Action Plan for Conservation and Restoration of Water Source Environment (in its third phase as of 2019).

Key Highlights

1. Kanagawa Prefecture formulated a Five Year Action Plan for Conservation and Restoration of Water Source Environment, aimed at preserving the source of water supply in the upstream forest lands.
2. To secure the funding for the plan, the prefectural inhabitant tax has been increased by an average of 890 JPY per taxpayer.
3. The unique characteristics of the policy include stakeholder involvement, wherein the participating civil society organizations and local citizens are duly considered for decision making and complete transparency in project spending is maintained.

2. About the Scheme

To sustainably finance the forest management programs under the scheme, the Kanagawa prefectural inhabitant tax was increased by an average of 890 JPY per taxpayer. This tax comprises of fixed rates (300 JPY, regardless of income) and the remaining based on income levels (4 percent of total tax per capita). The taxation rate is determined every five years depending on the required expenses for implementing the programs stipulated in the Five Year Action Plan, which is presently 20 billion JPY. Apart from the forest conservation activities, the tax revenue is also used for sewage collection and treatment, monitoring of water environment, awareness raising, river and groundwater conservation.



Watershed areas of Kanagawa Prefecture (Mitra et al. 2019)

3. Stakeholders & Beneficiaries

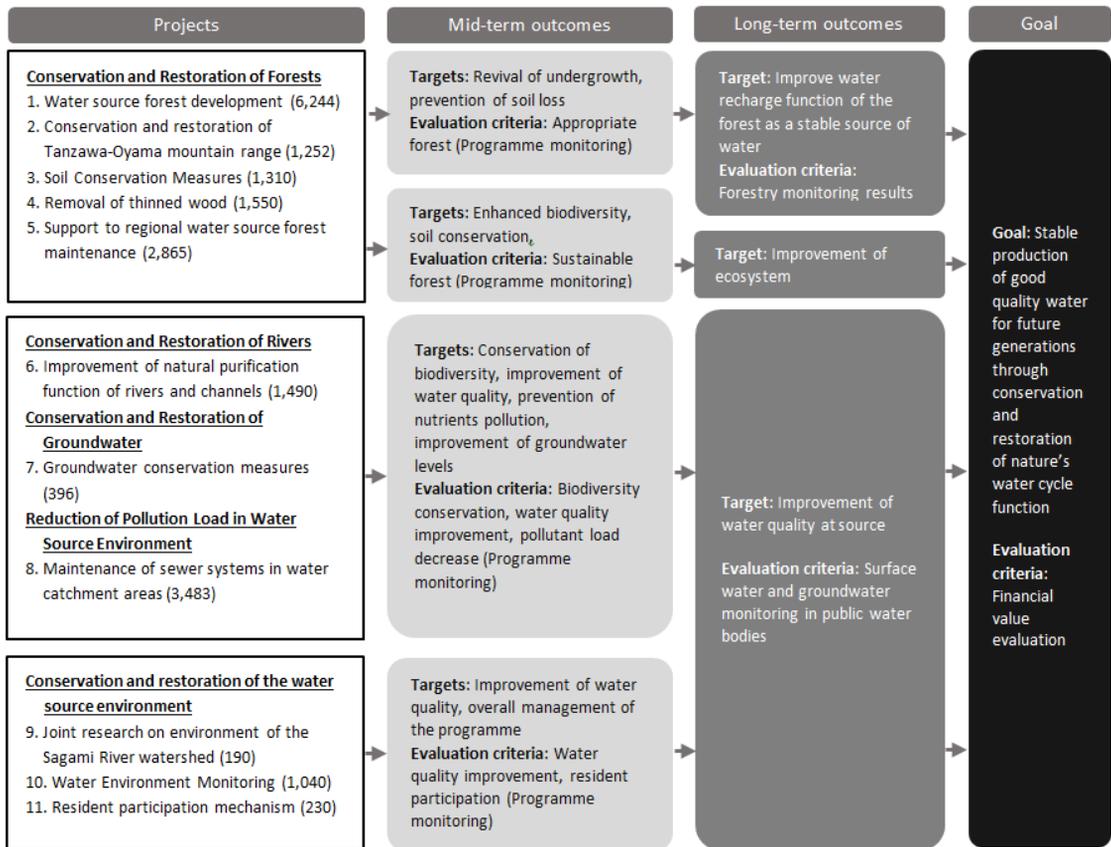
A committee is formed to manage the collected funds which comprises of stakeholders from different sectors including citizens. Notably, 25 % of the committee members are from civil society organizations. Few of the other key factors for the success of this policy are financial transparency and active involvement of private sector. The scheme includes regular monitoring and reporting to the public. The committee also arranges demonstration field visits for citizens.



Forest Management Practices

4. Governance Mechanism

As stated, the Kanagawa Prefecture framed the Five Year Action Plan for Conservation and Restoration of Water Source Environment. Every five years project progress is reviewed and necessary revisions are made to the activities. Evaluation of the Action Plan is carried out according to each stage of the outcomes, as well as collectively. The prefectural government establishes mid-term and long-term outcomes with the main objective of achieving stable supply of good quality water for future generations through conserving and restoring the natural environment. The below figure explains the evaluation framework for the five year action plans.



*figures represent total of newly required funds under Third Phase Five-year Action Plan (million JPY)

Evaluation Framework of Kanagawa Prefectural Five Year Action Plan for Conservation and Restoration of Water Source Environment (2016)

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CASE STUDY 5: Case of Yokohama City

Urban-rural partnership for upstream water source forest conservation

1. Introduction

- Case Study Area: Yokohama City
- Prefecture: Kanagawa
- Population: 3.725 million (2015)
- Area: 437.38 square kilometers
- Daily Mean Temperature: 15.8 °C
- Annual Rainfall: 1,688.8 mm

*Yokohama is the capital city of Kanagawa prefecture.



Location Map of Yokohama

Key Issue: While Yokohama today is the second largest city in Japan by population, it very much depends on rural areas for water supply. As much of the city consists of reclaimed sea and swampland areas, good quality water cannot be obtained even by boring wells. Doshi mura, located in Yamanashi prefecture is one of the key sources of water supply for Yokohama city. Notably, 60% of the forest lands in these upstream village areas are privately owned and their proper management has become a challenge for Yokohama city, owing to the concerns of depopulation, aging society and shortage of labour.

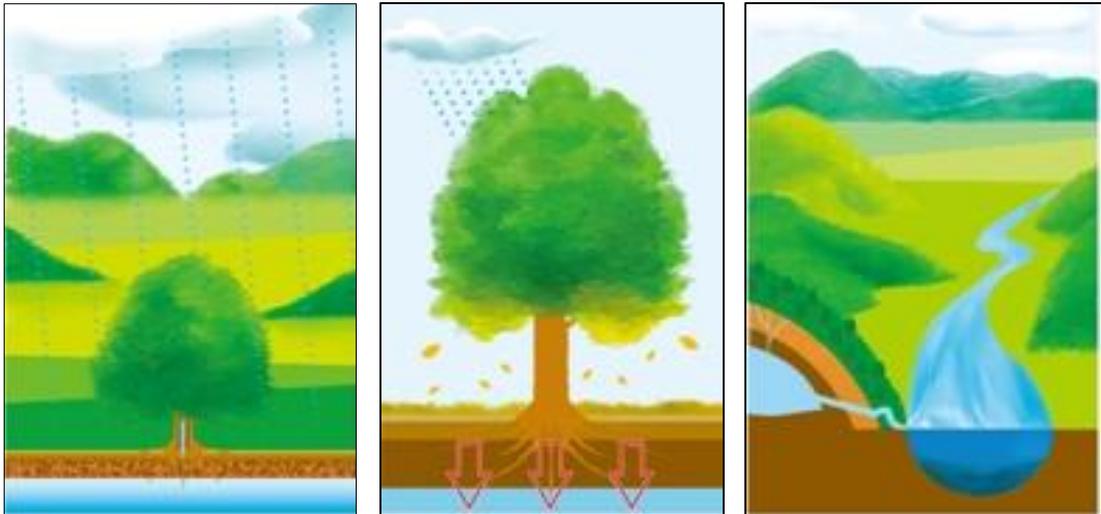
Why and when the scheme started: To ensure thorough management of the forest lands around the water source areas, Yokohama Waterworks Bureau came up with an initiative to purchase the privately owned forest lands and ensure their proper management with the help of different stakeholders including local communities, volunteer groups etc. The Bureau has maintained the forest lands in Doshi mura since 1916.

Key Highlights

1. Yokohama introduced the concept of water conservation forests, wherein the local government acquires the privately owned lands in the upstream water source areas and ensures their proper management.
2. The city government utilizes various funds including the Yokohama Water Birthplace Doshi-no-mori Fund for forest management activities in these designated areas.
3. A unique characteristic of this scheme is multi-stakeholder engagement. The water source management activities are mostly carried out by volunteer groups and other stakeholders.

2. About the Scheme

Yokohama city's daily water demand of 1,955,700 cubic meters is met from 5 different sources – Doshi River, Sagamiko, Banyu River, Sakawa River and Sagami River. As lack of forest management threatens most water source areas, Yokohama Waterworks Bureau established the concept of 'water conservation forest', also called 'green dam', which performs the three significant functions of storing water, purifying water and preventing flooding. Doshi River, which is the water supply source of Yokohama city, runs through Doshi mura, Minami-tsuru-gun in Yamanashi Prefecture. Yokohama Waterworks Bureau has maintained a water conservation forest in Doshi mura since 1916. The forest lands cover approximately 2,873 hectares, accounting for about 36 percent of the total village area, and about the same size as that of Tsuzuki-ku in the city of Yokohama.



Mechanism of water conservation forest

3. Stakeholders & Beneficiaries

In order to safeguard and develop Doshi water conservation forest, the city government is taking various measures for engaging different stakeholders. The forest has largely been maintained by volunteer groups since FY2004. Today, the maintenance works are promoted in cooperation with the volunteer organization 'Doshi Water Conservation Forest Volunteers Association', which was founded by the participants of such volunteer activities. Various non-profit organizations, local volunteer groups and high school students have also participated in these maintenance activities. The participation of volunteer groups has been an integral component of the scheme. Today, Yokohama city has secured access to water and the continuity of water supply in the future is assured. These water supply projects are also closely tied to the environment as they strive for optimal utilization of available resources and minimizing the water losses in everyday life.

4. Governance Mechanism

Yokohama Waterworks Bureau has established the Water Conservation Forest Management Office, which carries out various undertakings necessary to protect and enhance the capacities of water conservation forest, including thinning, pruning and weeding. Given the shortage of labor, depopulation and the aging society, the local government has made significant efforts to involve a range of stakeholders in the forest management activities. Utilizing the Yokohama Water Birthplace Doshi-no-mori Fund, the local government undertakes the maintenance of forest lands in the watershed areas together with the citizen volunteers. To ensure financial resources for the forest management activities, the local government also engages with private companies and business groups.

Further, a range of measures have been taken for enhancing stakeholder engagement in forest management activities like training programs, seminars and field visits to water source forest areas in Doshi mura. Subsidies have been announced for the volunteers participating in the forestry operations in Doshi area wherein the city government provides various allowances including for travel. Major emphasis has been put on environmental preservation through solar energy generation, interventions to mitigate heat island phenomenon and setting up of environmental action goals etc. Eco-projects have been initiated to enhance carbon dioxide absorption in the forest areas. Numerous innovative means of enhancing civic cooperation are put in place including collaboration with five universities for the development of human resources, technology and knowledge sharing, improvement of academic research and development of the water supply business as a whole. Further, Yokohama Civic Cooperation Guidelines were established, and these promote mutual cooperation with local people and experts in different fields. Numerous partnership desks have been setup to accept proposals on civic cooperation from private groups, such as companies and non-profit organizations, that specialize in water supply. The bottled water brand 'Hamakko Doshi the Water' is also based on the clear waters of Doshi River. This bottled water is sold through convenience stores and vending machines in the city. A part of the income generated from its sales goes towards 'Doshi Forest Foundation' and for supporting various campaigns organized by the local residents to protect water source forests in Doshi mura.

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CASE STUDY 6: Honda Suigennomori

Urban-rural partnership for water source forest management

1. Introduction

Honda Motor Company Limited is a Japanese public multinational conglomerate corporation primarily known as a manufacturer of automobiles, aircraft, motorcycles, and power equipment. Under Corporate Social Responsibility (CSR) activities, the company aims to create a positive impact on the society by reducing impacts on the environment through a range of public service works in the communities



Key Issue: Forest areas in the upstream areas are linked to the water supply for the majority of cities in Japan. With low timber prices, shortage of labour and the aging society, the management of these upstream forests has become a challenge for the local governments. Consequently, there is a clear need for stakeholder engagement, including the private sector and local communities, in forest management activities.

Why and when the scheme started: While the company generates carbon emissions at the various stages of its products – supply, manufacture, transportation and consumption – it strives to reduce its negative impact on the environment as part of its CSR activities. Since 2005, Honda has been engaging its employees, on a voluntary basis, in forest management activities in different areas of Japan, specifically towns in Gumma Prefecture, Tochigi Prefecture, Mie Prefecture, Saitama Prefecture, Kumamoto Prefecture, and Shizuoka Prefecture.

Key Highlights

1. Since 2005, Honda has engaged its employees in forest management activities in different parts of Japan.
2. Honda is supporting forest management activities as a part of its CSR program. Honda employees are asked to voluntarily participate in activities such as tree planting, management of forest lands, etc.
3. These activities are undertaken in many different areas of Japan in cooperation with local communities, non-profit organizations and other stakeholders to improve environmental conditions.

2. About the Scheme

Honda's recent efforts for reducing the environmental impact of its operations are strongly focused on bringing down carbon emissions through improved energy efficiency and decreasing emissions associated with the transportation of finished products. In 2005, Honda began to plant trees around Lake Kosuge with an aim to restore the natural environment. Since then, the forest management activities have continued in different parts of Japan on a voluntary basis. The participants are mainly Honda employees, (both current and former) and their families. In addition, people from local communities, NPOs and forest departments have also volunteered for the management activities. After 13 years, a total of 952 people have participated in this project. The management activities for many areas have already been completed (like Kosuge) while others are still in progress. The company maintains a progress record for all the areas on their website, which is open to general public.



Planting new trees



Conservation of water source forests

3. Stakeholders & Beneficiaries

The scheme is run by a private company but primarily serves for community welfare and environment restoration. The major stakeholders include Honda, the volunteers, NPOs and the local communities. The Honda employees are exposed to the natural environment in a way that is rare for urban citizens. The scheme has generated a positive environment for forest management and more volunteers are expected to join and contribute in upcoming years.

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CASE STUDY 7: Suntory & Water

Urban-rural partnership for fostering environmental education

1. Introduction

Founded in 1899, Suntory Group is one of the leading companies in beverages (alcoholic & non-alcoholic) at global level. Since, water is the key raw material for Suntory's business products, the company initiated public awareness and education programs in different parts of Japan for conservation of water source forests. The main objective of the program is to encourage environmental education in schools.

The Suntory logo is displayed in white, uppercase letters on a light blue rectangular background.

Key Issue: With changing climatic conditions and increasing population, ensuring secure access to water for every human being has become a global challenge. With acute shortage of surface water resources and fluctuating ground water levels in some areas of Japan, the excessive use of water by private companies has raised public concerns.

Why and when the scheme started: Suntory Group's business activities are fundamentally supported by water, so water security is one of its main concerns. Many of the general public are not aware of various aspects of water security, such as the importance of forest preservation to water supply. Raising environmental awareness is key to ensuring a healthy and abundant natural environment. Based on this understanding, Suntory launched the project Suntory Mizuiku -Education Program for Nature and Water in 2004 to raise environmental awareness and to teach future generations about natural resource elements, specifically water. In Japanese, 'Mizu' means water and 'iku' means education.

Key Highlights

1. Being highly dependent on water resources, the company Suntory initiated an environmental education program called 'Mizuiki' (water-education) for elementary school students in 2004.
2. Suntory is organizing these educational programs as part of its CSR activities. The programs include both indoor and outdoor learning experiences. Suntory, being a global company, has also launched this program in other countries and Online.
3. The program targets elementary students from grade 3 to 6 as well as their parents so as to ensure a holistic learning process.

2. About the Scheme

In 2004, Suntory launched the Mizuiku program to guide younger generations about the source of water and help them understand the significance of forest preservation. Suntory offers study programs in grades three through six in elementary schools. The Mizuiku program is aimed at offering students an interactive and hands-on experience which helps them understand and value the importance of forests and water resources. The core idea is to make a difference by teaching the importance of nature through videos and experiments so as to pass down knowledge on water issues to future generations. The educational programs, classroom activities as well as outdoor learning, have been held in different metropolitan areas of Keihanshin, Aichi, Gifu, Yamanashi, Tottori and Kumamoto prefectures. Until 2016, about 21,000 students and parents have visited Suntory's Natural Water Sanctuaries in the forests surrounding Suntory Tennensui facilities, together with environmental experts, as a part of outdoor learning on forest and water.



Teaching about Water at Schools



Outdoor School of Forest and Water

3. Stakeholders & Beneficiaries

More than 122,000 students and parents have participated in these programs at approximately 1,600 schools as of 2017. Many other students, from around the world, are also getting benefitted from the program as it provides detailed information about its education programs through Online websites, including Outdoor School of Forest & Water and the Teaching about Water for Schools programs in addition to kids pages such as the encyclopedia. As the outreach of the company's products is global, Suntory is also starting to implement these ideas in other countries such as Vietnam and South Africa with the objective of encouraging environmental based activities globally..

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4. CONCLUSION

This report has presented seven good practices from different parts of Japan showcasing unique practices of integrating urban and rural stakeholders in managing water resources. It has showcased various initiatives originating from local governments and the private sector. The case studies range from basic forest management initiatives to comprehensive development programs, and have applied different governance mechanisms and approaches. They highlight that community interests in rural areas need to be duly taken into consideration at all stages of policy making for urban areas. Further, to ensure resource circulation at optimal scales and to realize Regional CES, decision makers must address the significance of upstream areas for downstream areas in water resource planning.

Ecosystem services are subject to significant development pressures unless sustainable forms of finance are available for their maintenance. For continued water supply in urban areas, the maintenance of upper watershed areas holds great importance, and this needs to be financed. The selected case study examples presented different means of financing for environmental management from taxation to incentivization. The examples of payment for ecosystem services initiatives as discussed in two case study examples (Case of Fukuoka & Kanagawa) are mainly implemented through government intervention. However, as government budgets are limited, the engagement of the private sector is essential to secure necessary funds. For the case of developing countries where financial resources are limited, there is a need for innovative funding schemes, like in the case of Kumamoto. Further, the case studies underline the point that thorough scientific understanding including on the geographical context is critical to establish win-win solutions for realizing Regional CES.

The need and importance of stakeholder engagement to secure ecosystem services is apparent from all the case study examples. As water is used by everyone, there is need for all stakeholders to collectively address water-related concerns and contribute to resource management activities. Although local governments control and maintain the water supply in urban areas, they must consider stakeholder interests in upstream and downstream areas. They can establish platforms to address and incorporate opinions of all concerned stakeholder. The key to stakeholder engagement, as identified from the case study examples, is transparency and clear objectives. The case studies demonstrate the importance of involving all stakeholders, including academics, others experts, students, volunteer groups, local communities, the private sector, civil society organizations, and non-profit organizations in development planning.

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Institute for Global Environmental Strategies (IGES)
2108-11 Kamiyamaguchi, Hayama,
Kanagawa, Japan
Email: iges@iges.or.jp
URL: <https://www.iges.or.jp/>