Water Management Policy in Lake Biwa Basin and Local Government Finance

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Outline of Sewerage Policy in Japan

Institutional Framework

This paper will initially survey the institutional framework of sewerage policy in Japan. Fig. 1 shows the institutional framework of Japan's sewerage policy. Fig.1 broadly classifies sewerage on the basis of management form, legal status, service provision, and government office executing jurisdiction. There is also a sanitary sewage disposal policy according to which construction and maintenance are carried out by the local public services; this covers the areas of public sewerage, valley sewerage, and rural sewerage. On the other hand, in order to promote installation of a combined septic tank for each household, autonomous local government funds provide subsidies for construction. Thus, the sanitary sewage disposal policy can be classified according to management form, local public services, or local government financial support. A sanitary sewage disposal policy can be classified legally according to the Sewerage Law and the Septic Tank Law. In Japan, sewerage means that which the Ministry of Construction approves under the Sewerage Law. This is "sewerage" in the narrow sense. Rural sewerage, a combined septic tank system and other types of system are based on the Septic Tank Law. Three ministries and government offices, the Ministry of Construction, the Ministry of Health and Welfare, and the Ministry of Agriculture, Forestry, and Fisheries, implement public policy in connection with sanitary sewage disposal. Therefore, although a municipality has primary responsibility for public policy in connection with sanitary sewage disposal within the local municipality, this autonomous policy decision is influenced by the policy of these three national ministries and government offices.

Fig. 2 explains the sanitary sewage disposal system according to government office. Three ministries and government offices perform the following roles. Although sewerage is an important part of a city's infrastructure, this so-called "infrastructure" is under jurisdiction of the Ministry of Construction. Therefore, a city municipality building a sewerage system receives a national subsidy and instruction from the Ministry of Construction. The Ministry of Construction is responsible for construction of public sewerage systems and valley sewerage based on the Sewerage Law.

On the other hand, the Ministry of Agriculture, Forestry, and Fisheries is responsible for construction of rural sewerage systems. In rural communities, sewerage systems are built using subsidies from the Ministry of Agriculture, Forestry, and Fisheries as a source of revenue. Rural sewerage systems are intended both to modernize the villages, providing the ability to flush toilets, and to preserve rural water sources.

The Ministry of Health and Welfare administers the sanitary sewage disposal policy for household drainage in the area of sewerage policy where the Ministry of Construction and the Ministry of Agriculture, Forestry, and Fisheries responsibilities overlap. When all the households of a particular area cannot have such services installed, they install a combined septic tank system, and the Ministry of Health and Welfare and the municipality give a subsidy to the households. Thus, a policy of autonomy is divided among three ministries and government offices, and is controlled through the vertical policy system.

The Development of Sewerage Policy

The sewerage capacity level of Japan is low compared with Western countries. The main objective of postwar sewerage policy was the spread of sewerage systems. The situation of sanitary sewage disposal in Japan is shown in Table 1. The rate of sanitary sewage disposal expresses the percent of the population covered by the present sanitary sewage disposal systems. Currently, the rate of sewage health processing in Japan is 58.1%. The sewerage capacity level is 50.8%. The capacity for rural sewerage is 0.9%, and the capacity level of a combined septic tank is 6.4%.

As stated previously, the public sewerage system refers to the cities. Aside from public sewerage or a rural sewerage system, the spread of combined septic tanks have constituted a substitute sewage health

processing system. An individual home installs a combined septic tank for the purpose of processing of drainage from the household and human waste.

Table 1: The sanitary sewerage systems in Japan (1998)

	All Population (A)	Public sewerage system	Rural sewerage system	Combined septic tank, others	Total of the sanitary sewerage system	Unsettled population
Population	127,115,584	64,571,936	1,145,130	8,192,600	73,909,666	53,205,918
/(A)*100 (%)	100	50.8	0.9	6.4	58.1	41.9

Source: Ministry of Home Affairs

These three systems share sewage health processing. As a consequence, the problem of mutual adjustment between these distinct sewage health-processing systems has arisen. The mutual adjustment problem relates to the financial problems of sewerage policy, and the problems of a water preservation policy. Generally, since the financial base of a local municipality is limited, decision-making of a local municipality is dependent on a national subsidy policy. The local government has many self-governing bodies, which do not introduce a sanitary sewage disposal system suitable for a particular area, but are guided by subsidies and instead introduce valley sewerage and public sewerage. The following section uses the case of Shiga Prefecture to highlight these issues of public and valley sewerage in Japan.

Development of Sewerage Policy in Shiga Prefecture
The Situation of the Sanitary Sewerage System of Shiga Prefecture

Table 2 shows the situation of the sanitary sewerage system of Shiga Prefecture. In Shiga Prefecture, rural sewerage provision is offered to 6.5% of the population, and the combined septic tank system to 11.8%. A notable feature of Shiga Prefecture's situation is that the alternative sanitary sewage disposal system provides for 1/3 as many as the full-sanitary sewage disposal. The alternative sanitary sewage disposal system shares 12.6% of full-sanitary sewage disposal with all Japan.

Table 2: The sanitary sewerage systems in Shiga Prefecture (1998)

	All Population (A)	Public sewerage system	Rural sewerage system	Combined septic tank, others	Total of the sanitary sewerage system	Unsettled population
Population	1,326,683	511,968	86,840	156,611	755,419	571,264
/(A)*100 (%)	100	38.6	6.5	11.8	56.9	43.1

Source: Ministry of Home Affairs

The Historical Features of the Sewerage Policy of Shiga Prefecture
Sewerage policy in Shiga Prefecture has the unusual feature including policy for the redevelopment of the Lake Biwa area, a plan referred to as "BIWASO". BIWASO is also concerned with water-resources development for the Keihanshin area, and community development for Shiga Prefecture. BIWASO carried out public works amounting to 353,200 million yen, concerning water-resources development, and public works of 1,907,400 million yen for community development. Sewerage development of Shiga Prefecture was carried out according to the framework for community development of BIWASO. Four disposal plants for Lake Biwa valley sewerages will share the sanitary sewage disposal of Shiga Prefecture. The Lake Biwa valley sewerage development was an important development project of BIWASO, as described in detail by Kondo (2002). BIWASO, which is a national project, was treated as a special case with respect to some financial details. One of them was the valley financial adjustment system called 'down-stream burden charge'. The 'down-stream burden charge' was the system whereby a down-stream irrigation municipality shared the expenses required for the community development of sewearge infrastructure upstream in Shiga Prefecture because downstream users were also beneficiaries. The Lake Biwa valley sewerage development had two features concerning the 'down-stream burden

charge'. The down-stream burden charge promoted valley sewerage development as community development. Therefore, the down-stream burden charge provided funds for development which were generated from municipalities including Osaka, Kyoto and Kobe. In turn those down-stream urban areas were able to expect that the water quality of Lake Biwa and its status as water resources would be preserved as a result of construction of valley sewerage. In short, it was thought that the down-stream burden charge would ensure an even regulated spread of costs and responsibility for the valley sewerage. Shiga Prefecture collected and appropriated the down-stream burden charge. Since construction of sewerage was lagging behind other developed countries, promotion of sewerage construction was an important administration subject for Shiga Prefecture. Sewerage development was not left to an individual city or an individual town, rather Shiga Prefecture developed valley sewerage, and this method of managing a valley unitarily was adopted. Development of the Lake Biwa valley sewerage project was planned from the viewpoint of both compensation in the Shiga region as a whole, and the promotion of sewerage construction. In the framework of BIWASO, there was little room for autonomous policy selection. BIWASO is a national project and regulates a municipality policy through intergovernmental financial relations. In this way, Shiga Prefecture aimed at unitary valley management through the down-stream burden charge.

The Challenges Facing Sewerage

As stated previously, the Lake Biwa valley sewerage project has been carried out according to the framework of BIWASO. This problem of the valley sewerage in Shiga Prefecture is typical of valley sewerage in Japan. Three points summarize the criticisms of valley sewerage.

The first point is the long time period required for construction of valley sewerage. Therefore, household discharged and accompanying drainage problems, continued until construction of the sewerage system was completed. Eliminating the environmental load from drainage takes time.

The second point is that sewerage construction needs a large amount of capital. Furthermore, since half of the cost of construction materials are paid for through borrowing, payment of a large amount of debt is required after construction. The local municipality, which is responsible for construction, is faced with financial stress both at the time of construction, and with respect to maintenance management.

The 3rd point is that valley sewerage destroys the water cycle of an area. Valley sewerage collects the water of both home drainage and rainwater in an upper region. Consequently, valley sewerage forms an artificial water cycle so that the water resources of an upper region are passed down-stream.

Such criticism relates also to having changed the area where the valley sewerage and public sewerage are built. Table 3 shows the sewerage enforcement situation relative to autonomous population scale. Following from the construction of the sewerage in urban areas, sewerage came to be built in areas of low population density, which includes small villages. A problem arose in that the city-type sewerage system came to be built in a farm village situation. By such construction of the sewerage system, the municipality is faced with financial stress not only in the construction stage but also in the maintenance management stage. In order that sewerage is managed efficiently, management is undertaken by local public services and is maintained by the collection of charges and payments. However, under the present sewerage financial system, the cost of administrative and maintenance expenses and the debt from the time of construction cannot be met by those charges alone. For example, the cities, towns and villages in the municipality of Shiga Prefecture, which maintain sewerage services in the Lake Biwa valley sewerage system, receive some17, 505 million yen in assistance from the general account of autonomy in 1995. This is equivalent to 9.4% of the municipal tax of 186,184 million yen for the fiscal year.

Legend for box = Criticisms of a valley sewer system

The point of argument of the criticism of a valley sewer

(1) Since a valley sewer system is a huge institution, construction requires a long period of time. Cutting down the environmental load by drainage takes time.

(2) Valley sewer construction requires huge expense. Therefore, the local municipality, with responsibility for the project, is faced with financial stress both at the time of construction, and during subsequent maintenance.

(3) A valley sewer destroys the water cycle of an area.

The Case of An Alternative Sewage Health Processing System

As stated previously, the problems result from the construction of city type sewerage systems in rural areas. The following section uses case studies, to explore the possibility of an alternative sanitary sewerage system, which is suitable for areas of low population density, such as farm village areas.

The Case of a Rural Sewerage System

The case of Koto Town of Shiga Prefecture and its sewerage policy is considered here. Koto Town seceded from the valley sewerage plan upon which Shiga Prefecture had decided, and promoted the rural sewerage system. The municipalities of surrounding Koto Town have participated in the valley sewerage plan, which Shiga Prefecture is building. As a consequence of autonomous decision making with respect to sewerage policy, Koto Town's approach yielded benefits with respect to both environment and expense.

Table 3 compares the construction cost of an alternative sanitary sewerage system. Koto Town completed construction in a short period of time, 13 years, compared to surrounding municipalities which had, after 13 years, finished only 23.7% of their systems. If the Rural sewerage of Koto Town is compared with the valley sewerage of the surrounding municipalities according to construction costs per person, Koto Town's system would be built at a 30% reduction cost.

Table 3 Construction cost comparison of the sanitary sewerage systems

	Per capita construction costs (Yen/person)	Construction cost per ha (Yen / ha)	Term	Population served by sewerage systems
Koto town *Rural sewerage*	1,090,000	32, 000,000	13 years	100%
1 city and 4town average *Public sewerage*	1,570,000	64,020,000	13 years	23.7%
Sangawa Town *Combined septic tank*	227,000	Measurement impossible.	8years	68%

Source: Shiga Prefecture, Koto town, Sangawa Town

The rural sewerage of Koto Town returns the reclaimed water to the area, and it is aimed at environmental improvement, without destroying the water cycle of the area. Moreover, this rural sewerage has composted the sludge generated from the disposal plant. The compost is returned to farmland as manure. This is also a positive feature of this system.

The Case of a Combined Septic Tank

The case of Sangawa Town in Kagawa Prefecture

An alternative sanitary sewerage system can be seen in Sangawa Town of Kagawa Prefecture. Sangawa Town implemented a drainage-from-the-household policy using combined septic tanks as an alternative system to the 'city-type' sewerage system. An individual home installs a combined septic tank for the purpose of processing drainage from the household and also human waste. Sangawa Town attained a 68% rate of sanitary sewerage disposal in eight years. Consequently, the water of Sangawa Town showed rapid improvement. The construction cost of a combined septic tank is 227,000 yen/person, and was built at a cost of 1/7 of the 'city-type' sewerage system. Since a combined septic tank does not need a soil pipe, an individual home can install a combined septic tank at low cost in this way. The Sangawa Town system also yielded benefits in terms of both construction cost and environment. Sangawa Town also aimed at the improvement of water quality, without destroying the water cycle by returning reclaimed water to the water cycle.

Compared with other sanitary sewerage systems currently managed by the local public service, the combined septic tank has some disadvantages with regard to maintenance and management. However, in the case of Sangawa Town, maintenance and management of a combined septic tank is managed by the nonprofit residents organization. The nonprofit organization collects the charge aiming at maintenance and management from an installation household, and commissions a maintenance contractor. Sangawa Town established the maintenance and management system, which is based on the nonprofit organization.

The Future

The outline of a sanitary sewerage policy in Shiga Prefecture has been presented. As for the municipality of Shiga Prefecture, there was no room for policy selection within the framework of BIWASO. The example of Koto Town, where an original sanitary sewerage policy was implemented, and subsequently modified to incorporate an alternative sewerage system, shows that there are benefits both environmentally and financially. Furthermore, the example of Sangawa Town shows that a combined septic tank is not inferior to a public sewerage system in respect of local water and environmental preservation.

Moreover, a water and environmental preservation policy, which includes the combined septic tank, can be cheaply implemented compared with a public sewerage system. In a farm village area, a municipality can enjoy the benefits of both environmental improvement and the mitigation of a fiscal burden by utilizing a combined septic tank as an alternative sanitary sewerage. In Japan, construction of the ideal sanitary sewerage system in a rural area is dependent upon adoption of a policy, which preserves water, addresses environmental concerns, and also addresses the problem of local public finance.

References

Kondo, M. (2002). Water Resource Management and Inclusive Democracy: a Case Study of the Environmental NGO Movement and its Role in Shiga Prefecture. (This volume).

Mays, L. W. (ed). (1996), *Water Resources Handbook*, McGraw-Hill.

OECD, (1987). *Pricing of Water Services*, OECD.

OECD (1999). *The Price of Water*, OECD.

Fig. 1: Classification of sanitary sewerage systems in Japan

	Type of service provision	**Legal status**	**Service provision**	***Jurisdiction government office***
Sewerage in the broad sense	Local public services	The Sewerage Law	Public Sewerage	*Ministry of Construction*
		Valley Sewerage		*Ministry of Construction*
		The Septic Tank Law	Farm Village Sewerage	*Ministry of Agriculture, Forestry and Fisheries*
	Services financed by local government	The Septic Tank Law	Community plant (a kind of combined septic tank)	*Ministry of Health and Welfare*
		Combined Septic Tank		*Ministry of Health and Welfare*

Fig. 2: The triangle of the sanitary sewerage policy