

Reservoir Area Development Measures and Some Examples in Japan

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1. Necessity and a purpose of measures for a Reservoir area development

Inhabitants of lower-stream areas benefit from dam projects in various ways such as flood-defense, water supply (domestic and industrial) as well as maintenance of minimum volume of water flow necessary for river transportation, fishery, landscape, prevention of salt and closure of estuaries, protection of river management facilities and so on.

On the other hand, it is inevitable that people living on the site of dam structure and reservoir should be displaced. Thus dam projects bring about disintegration of community life and loss of identity based on territorial and ancestral background. Displaced inhabitants need to re-start their livings against these negative backgrounds. And, in addition to physical changes caused by construction works over a long period, displacement of inhabitants makes it impossible to sustain the life-style and economic activities based on community. Decline in local tax revenue (income tax and corporate tax) also creates serious difficulties for provision of basic public service, such as care for the elderly and education.

In this way, dam projects bring about fundamental changes in natural, economic and social conditions of water-source areas. Their influences persist long after the works are completed and operations of the dams are started.

This disparity makes it all the more difficult for displaced inhabitants to accept their sufferings as well as for water-source areas to willingly cooperate with the projects.

These circumstances made it necessary to improve the compensation system and resettlement assistance measures. As institutional frameworks for compensation, the Guideline for Compensation for Losses Caused by the Acquisition of Land for Public Purposes and the Guideline for Compensation for Losses Caused by Public Works Projects were instituted in 1962 and 1967, respectively. As resettlement assistance measures, the Law Concerning Special Measures for Reservoir Area Development (hereafter referred to as

the "Special Measures Law") and the so-called "Three Laws for Electric Power Development" were enacted in 1973 and 1974, respectively.

This articles show the outline of reservoir area development measures and some examples in Japan.

2. Process of Japanese measures for a Reservoir area development

2.1. Compensation to property to land acquisition

2.1.1 Uniform Compensation Standard

Delivery of compensation for purchase of properties is implemented under <Uniform Compensation Standard for Purchase of Properties for Public Purposes (Cabinet Decision, 1962/6/19)>. Compensation under this standard is considered to correspond to the <just compensation> under article 29 of the Japanese Constitution

Article 29 of the Japanese Constitution

The right to own or hold property is inviolable. Law, in conformity with public welfare shall define property rights. Private property may be taken for public use upon just compensation therefor.

2.1.2 Background of the Establishment of Uniform Standard for Compensation

In postwar Japan, rapid economic growth was accompanied by expansion of public investment for infrastructure development. Corresponding rise in land price enhanced expectations for compensations on the part of landowners, which made land purchase for public works more difficult. Given time limits for purchase negotiations, settlements of compensation were often arbitrary. Spread of information about arbitrary settlements made landowners in other projects more demanding to create a vicious circle of project undertakers forced to make further arbitrary concessions. Thus, it came to be globally recognized that difficulty in purchase of property is the main stumbling block of infrastructure development, leading to the establishment of a just and uniform compensation standard applicable to all public works projects.

2.1.3 Substances of Uniform Standard for Compensation

a) Compensation corresponding to the value of properties taken for projects

Taking of properties includes extinction of fishery rights and mining rights. The basic principle is that compensation should be equal to the objective value of the properties taken, that is, their normal market value. This means that neither spiritual values the owners attach to inherited properties nor special uses of the properties should not be taken into account.

The principle of <normal market value> is expected to be applied not only to negotiated purchases but also to expropriation of properties under Land Expropriation Law (Law No.219 of 1951).

For determination of normal market value, <Real Estate Appraisal Standards> was officially established in 1964.

b) Incidental indemnities

Incidental indemnities cover costs of removal of buildings and timbers, those resulting from abolition or suspension of operations made necessary by the taking of properties as well as decline of value incurred on the remainder when only part of a piece of land is taken for a project.

2.2 Public Compensation

Execution of public works projects often causes abolition or suspension of public facilities for which undertakers of the projects should be held responsible. For example, roads running on the site of dam structure or its reservoir should be abolished and dislocated alongside the submergence area at the expense of the undertaker of the dam project.

Normal market value principle is not applied for this type of compensation. Public facilities are in service for the interests of their users and their utilities cannot always be measured in terms of market values of properties constituting the public facilities.

Thus, <Uniform Public Compensation Standard for Execution of Public Works (Cabinet Decision, 1967/2/21)> was established to ensure that functions of public facilities that should be abolished or suspended are properly restored so long as it is technically and economically viable.

2.3 A measure for resettlement and vitalization of reservoir area

2.3.1 Special Measures Law for Water-Source Areas (Law No.118 of 1973)

By improving living environment and industrial infrastructures in water-source areas that undergo enormous changes of their fundamentals as well as preventing water pollution in reservoirs of dams, the purpose of this law is to ensure stability of living and improvement of welfare thereby promoting construction of dams and water level controlling facilities to contribute to water resources development and preservation of national territory.

So this law integrates measures to address the issue of vitalization of water-source areas and restoration of living which compensation (including public compensation) by the undertakers of dam projects alone cannot satisfy. (Fig. 1)

2.3.1.2 Designation of Dams and Decision of Water-Source Area Development Plan

As of April 2005, there are 94 dams and 1 water level controlling facilities for lakes designated by cabinet order under the law. Among them, 12 dams and the 1 water level controlling facility are undertaken by the JWA (Japan Water Agency). 26 dams (including 2 JWA dams) and the 1 water level controlling facility are designated under the law to be eligible for augmented rate of subsidies by the State. Delimitation of water-source area and decision of water-source area development plan have been completed for 84dams and the 1 water level controlling facility.

24 projects that can be included in the water-source area for dams

Land improvement, erosion defense, flood defense, road, small-scale water supply system, sewerage, compulsory education facilities, medical clinics, housing estate development, public rental house, forestry road, collective-use facilities for modernization of operation of agriculture, forestry or fishery, facilities for protection or exploitation of natural parks, community center and other facilities for conservation and utilization of folk cultural properties or tangible cultural properties, sports or recreational facilities, nursery house and other facilities for children, welfare facilities for the cared residence of the elderly, welfare facilities for the handicapped and the elderly, facilities for cable broadcasting or radiotelephone, fire fighting facilities, facilities for disposal of water resulting from stock raising, facilities for disposal of physiological wastes, waste disposal facilities (underlined are projects to which application of augmented rate of subsidies of the state is envisaged.)

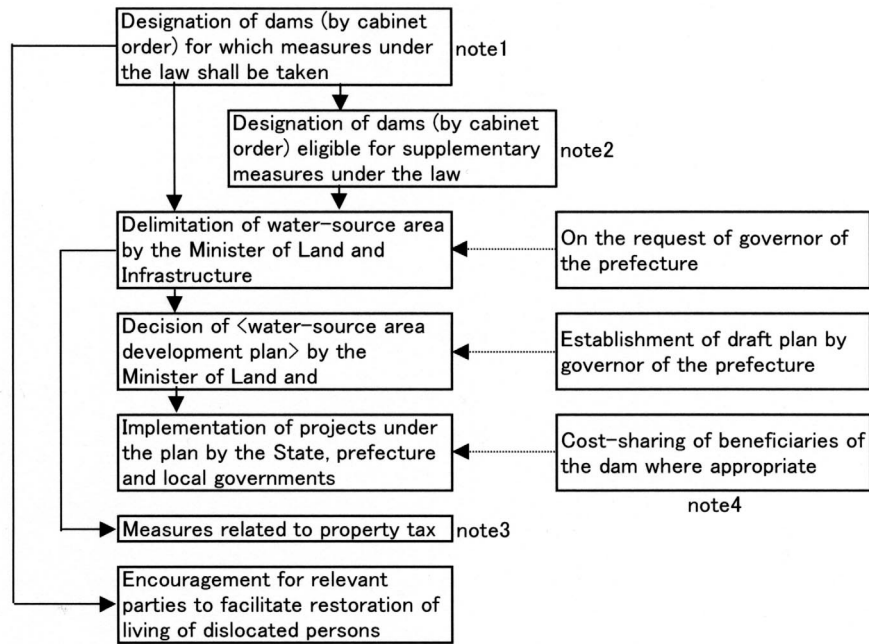
2.3.1.3 Project Package under the Water-Source Area Development Plan

Next table is an overview of 72 water-source area development plans for dams decided by the end of FY1995. No data are available for the other water-source area development plans decided after then.

Overview of water-source area development plan

• estimated project cost for the 72 plans and its distribution among interested parties (million yen)		
total aggregate	627,879	
(per project)	8,721	
State	311,079	(49.5%)
prefectures	143,556	(22.9%)
local governments	159,693	(25.4%)

Fig. 1 Flow chart of the scheme



- note1: condition for designation
no less than 20 houses or no smaller than 20ha farmland should be submerged
(in Hokkaido region, 60ha farmland instead of 20ha)
- note2: condition for designation
no less than 150 houses or no smaller than 150ha farmland should be submerged
(in case the dam provides extra-ordinary benefits to prefectures that do not contain the water-source area of the dam, 75 houses or 75ha farmland)
designation entails application of augmented rate of subsidies by the State for projects under the plan
- note3: revenue slump caused by reduced rate of property tax shall be filled by the State
- note4: local governments who share cost of a project under the plan can negotiate with beneficiaries to agree on cost sharing.
The Minister responsible for the project may intervene as mediator on the request of a negotiating party.
<beneficiaries>
water-supply undertakers, industrial water-supply undertakers, electric generators
local governments comprising water-supply area of the dam
local governments comprising flood defense area of the dam

others	13,551	(2.2%)
Others include beneficiaries assuming cost sharing under the law.		
• Road is included in most of the 72 plans. Other projects included in more than half of the 72 plans are land improvement, flood defense, sports or recreational facilities, community center and other facilities for conservation and utilization of folk cultural properties or tangible cultural properties, small-scale water supply system and forestry road.		

Source: <Practical Manual for policies on Water-Source Areas> p.202-205, Taisei Publishing Co., 1996 Japan

2.3.2. Aides from Water-Source Area Foundations

Local governments of water-source areas and those of beneficiary areas jointly establish water-source area foundations. Their missions are restoration of living of displaced inhabitants and vitalization of water-source areas.

As for vitalization of water-source areas, their provision of aides can be directed to those dams that are not eligible for the designation under the Special Measures Law for Water-Source Areas. The flexibility of their aide package represents their complementary role to the measures implemented under the same law.

Up to now, there are 13 water-source area foundations, 8 of which have received investment to their core assets by the Ministry of Land, Infrastructure and Transport.

2.3.2.1 Mission of Water-Source Area Foundations (Vitalization of water-Source Areas)

- provision of subsidies for small projects that are not included in the water-source area development plan
- support for various events held in water-source areas such as exchanges between water-source areas and lower-stream beneficiary areas

2.3.2.2 Financial Sources of the Foundations

Business expenses related to the missions of the foundations are financed by contributions from beneficiaries of the dam concerned (local governments). Interests produced by the core funds finance administrative expenses including wages for employees of the foundations.

2.3.3 Water-Source Area Vision

Besides infrastructure development, sustainable engagement of interested parties is essential for vitalization of water-source areas after the end of construc-

tions. In this light, since FY2001, the Ministry of Land and Infrastructure and JWA has undertaken <Water-source area vision> for the dams constructed and operated by them. Key concepts of water-source area vision are ① use of natural riparian environment and cultural heritages ② enhancement of awareness of the importance of water-source area's vitality to maintain quality and quantity of water provided by the dam. Up to now, water-source area visions are established or being drafted for 98 dams. The works for the establishment for water-source area vision are undertaken jointly by the operator of the dam, local authorities, residents of the water-source area, representatives of agriculture, forestry, industry and commerce as well as relevant academicians or specialists.

2.3.4 Dam open to the local community

As public demand for the natural environment and recreation continues to grow, it is being hoped that dams, reservoirs and the surrounding areas are made to play an important role in enhancing the vitality of the regions in which they are located by promoting the use of them as green open spaces and taking measures to conserve the natural environment.

A "dam open to the local community" project aims to enhance the vitality of an area by hearing the opinions of the local community, making effective use of the creative efforts of local residents, making the dam even more open to the local community, improving the dam according to the local needs with the assistance of the organizations concerned, and using the dam as a core element for regional revitalization.

2.3.5 Encouragement and Support for Voluntary Activities

There are varieties of activities that are better promoted voluntarily than by operators of dam or under administrative framework. In order to encourage and support these voluntary activities for the purpose of

vitalization of water-source areas, <Water Resources Environment Technology Center> (<http://www.wec.go.jp>) introduced in FY2000 <Water Source Area Support Program>.

Water Sources Area Support Program

The program aims at continuous activities that contribute to independent and sustainable development of water-source areas. Organizations eligible for aids under these programs are corporations (non-governmental organizations, private companies, non-profit organizations), associations (such as volunteer associations) as well as elementary and junior high schools. Financial aid of 500,000yen/year is delivered to each acknowledged organization over a period of 3 years. By FY2003, 22 organizations are acknowledged under this program.

(See Fig. 2.)

3. Example: Hiyoshi Dam

3.1 Hiyoshi Dam

3.1.1 Data on Hiyoshi Dam

(See Table 1, Photo 1, and Fig. 3)

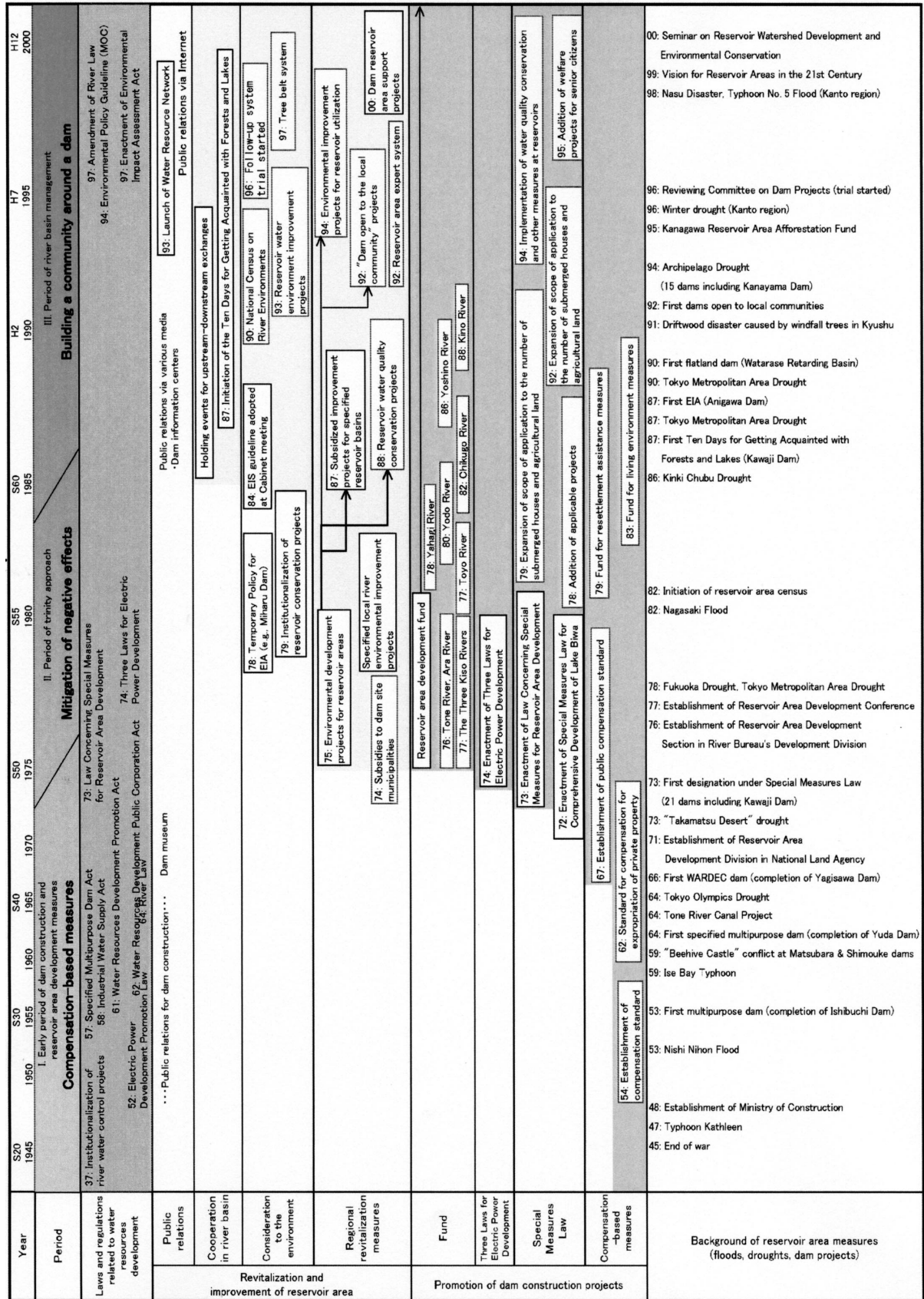
3.1.2 Reservoir area development plan for Hiyoshi Dam

In the case of the Hiyoshi Dam project, a total of about 350 ha or land including about 85 ha of agricultural land and 216 houses was to go under water. In order to prevent serious impacts on the production capability, living environment or other aspects of the adjacent areas, in December 1983 the reservoir area extending over Hiyoshi-cho, Yagi-cho and Keihoku-cho was designated as a "reservoir area" under the Special Measures Law. In March 1984, the Reservoir Area Development Plan for Hiyoshi Dam involving 47 projects was adopted. Key events related to the Reservoir Area Development Plan are summarized below.

Table 1 Data on Hiyoshi Dam

Dam operation and maintenance office	Naka, Hiyoshi-cho, Funai-gun, Kyoto-fu (right bank)
Location	35° 08' 51" North, 135° 31' 01" East
River	Katsura River in the Yodo River System
Purpose/Type	FNWI/concrete gravity dam
Dam height/length/volume	70.4 m/438 m/800,000 m ³
Catchment area/reservoir area	290K m ³ /274ha
Total storage capacity/effective storage capacity	66,000,000 m ³ /58,000,000 m ³
Dam owner	Japan Water Agency
Commencement/completion	1971/1997
Name of reservoir (lake)	Lake Amawaka
Random information	<p><i>Special Measures Law</i>: Hiyoshi (Article 9, Designated Dams), total submerged area: 274 ha, the number of submerged houses: 188, the area of submerged agricultural land: 94 ha, date of dam designation: June 2, 1956, date of reservoir area designation: December 6, 1983, date of adoption of plan: March 5, 1984</p> <p><i>Dam open to the local community</i>: (Designated in April 1993)</p> <p><i>The 100 Best Dam Lakes in Japan</i>: Selected one of the 100 Best Dam Lakes designated by Water Resources Environment Technology Center (published on March 16, 2005)</p>

Fig. 2 Evolution of reservoir area development measures



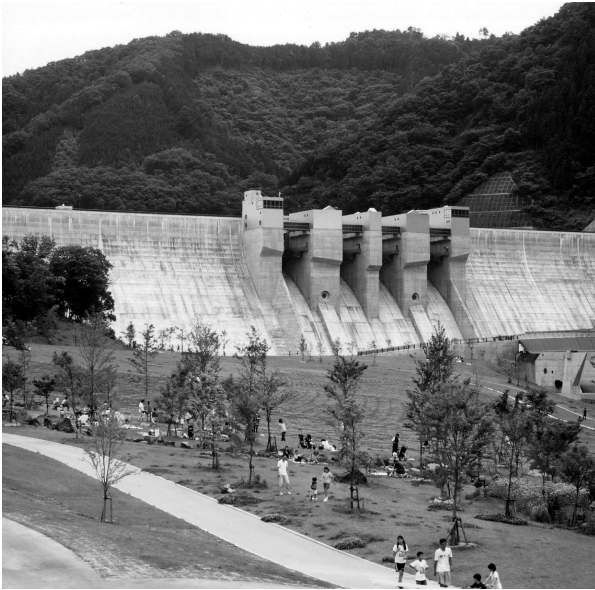


Photo 1 Hiyoshi Dam

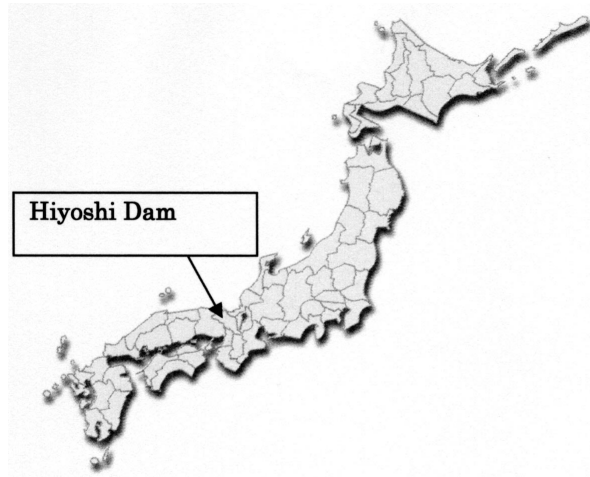


Fig 3 Hiyoshi Dam

- June 1981

Hiyoshi Dam received designation under Articles 2 and 9 of the Law Concerning Special Measures for Reservoir Area Development.

- December 1983

Notification on "reservoir area" designation

- March 1984

Adoption of the Reservoir Area Development Plan under Article 4 of the Law Concerning Special Measures for Reservoir Area Development

The Kyoto, Osaka and Hyogo prefecture governments agreed on the funding shares to be borne by the downstream communities under Article 12 of the Law Concerning Special Measures for Reservoir Area Development and signed on a memorandum.

- The funding shares to be borne by the downstream communities were paid to the reservoir-area municipality.

Under the reservoir area development plan, measures were taken to mitigate the effects of dam construction on the production capability and living environment of the adjacent areas, stabilize the life of local residents and enhance their welfare. The plan includes a wide range of including land improvement, road improvement, erosion control, flood control, small water-supply systems, joint-use facilities, and sports and recreation facilities. These projects are shown in Table 2)

At the Hiyoshi Dam, a number of projects related to the Special Measures Law that are not classified as subsidized public works projects or Special-Measures-Law projects are implemented to supplement the Special-Measures-Law projects. These projects are shown in Table 3)

For the Hiyoshi Dam project, the Yodo River Reservoir Area Development Fund was established in March 1980 with the aim of contributing to the stabilization of the affected local residents and the growth and pros-

Table 2 Reservoir area development projects ("Special Measures Law" projects)

(Amounts in Thousand Yen)

no.	Name of project	Implementing body	Total project cost
1	Reorganization of organization-operated farmland in Tonoda area	Hiyoshi Mun.	115,076
2	Comprehensive development of agricultural infrastructure in Kihata and Kozumi areas	Hiyoshi Mun.	427,648
3	Small-scale farm reorganization in Shimoutsu area	Keihoku Mun.	38,777
4	Small-scale farm reorganization in Chuji area	Keihoku Mun.	47,741
5	Small-scale improvement of old reservoir (Higashi-okajiri Pond)	Yagi Mun.	31,000
6	Improvement of old prefecture-operated reservoir (Tomisaka Pond)	Kyoto. Pref.	642,300
7	Preventive erosion control in Tonoda area	Kyoto. Pref.	8,636
8	Corrective erosion control in Nakasegi area	Kyoto. Pref.	19,833
9	Preventive erosion control in Nakaseki area	Kyoto. Pref.	6,835
10	Corrective erosion control in Kozumi area	Kyoto. Pref.	12,868
11	Preventive erosion control in Kozumi area	Kyoto. Pref.	18,097
12	Improvement of the Tawara River	Kyoto. Pref.	1,166,752
13	Improvement of the Goma River	Kyoto. Pref.	992,272
14	Smaller stream improvement for the Katsura River	Kyoto. Pref.	399,438
15	Improvement of the Akeshi River	Kyoto. Pref.	206,627
16-1	Improvement of Prefectural Road Kyoto Hiyoshi-Miyama Line	Kyoto. Pref.	2,917,000
16-2	Improvement of Prefectural Road Kyoto Hiyoshi-Miyama Line	Kyoto. Pref.	2,888,049
16-3	Improvement of Prefectural Road Kyoto Hiyoshi-Miyama Line	Kyoto. Pref.	2,413,000
17-1	Improvement of Prefectural Road Sonobe-Hiraya Line	Kyoto. Pref.	234,000
17-2	Improvement of Prefectural Road Sonobe-Hiraya Line	Kyoto. Pref.	1,947,000
18	Improvement of Prefectural Road Chuji-Hiyoshi Line	Kyoto. Pref.	847,176
19	Improvement of Prefectural Road Atago-Yuzuki Line	Kyoto. Pref.	603,400
20	Improvement of Municipal Road Asahiyama Line	Hiyoshi Mun.	584,912
21	Improvement of Municipal Road Kihata Line	Hiyoshi Mun.	461,110
22	Improvement of Municipal Road Kashiwagi Line	Hiyoshi Mun.	1,184,000
23	Improvement of Municipal Road Omukai Line (provisional name)	Keihoku Mun.	4,252
24	Improvement of Municipal Road Omukai Line (provisional name)	Yagi Mun.	4,265
25	Improvement of Municipal Road Kojo Line (provisional name)	Keihoku Mun.	73,550
26	Improvement of Municipal Road Shimoutsu Line (provisional name)	Keihoku Mun.	464,200
27	Improvement of Municipal Road Kamiyoshi-Hidokoro Line	Yagi Mun.	418,866
28	Construction of Kamiyoshi small drinking water supply system	Yagi Mun.	140,000
29	Reconstruction, etc., of the main building of Tonoda Junior High School	Hiyoshi Mun.	255,603
30	Construction of forest road Ikegaya Line	Keihoku Mun.	315,300
31	Construction of Rural Environment Improvement Center	Hiyoshi Mun.	185,000
32	Construction of rice processing facilities	Hiyoshi JA	257,538
33	Construction of Agricultural Product Processing Center	Hiyoshi JA	115,718
34	Construction of freshwater aquaculture facilities	Hiyoshi Mun.	15,463
35	Construction of fishpond facilities	Keihoku Mun.	363,662
36	Construction of Kozumi meeting facilities	Hiyoshi Mun.	32,354
37	Construction of Hiyoshi Dam Memorial Park (provisional name)	Hiyoshi Mun.	1,459,314
38	Construction of rest facilities for cyclists	Hiyoshi Mun.	77,072
39	Construction of "Fumin no Mori" forest park	Kyoto. Pref.	1,091,537
40	Construction of Tonoda sports ground	Hiyoshi Mun.	106,291
41	Reconstruction of Central Day Care Center	Hiyoshi Mun.	174,573
42	Construction of fire-fighting facilities	Hiyoshi Mun.	46,222
43	Construction of fire-fighting facilities	Keihoku Mun.	7,888
	Total		23,822,221

Note: Total project cost as of the end of fiscal 2001. The costs of ongoing projects are estimated costs of completed projects (as of the end of fiscal 2001). The costs of municipal projects include funding shares for water utilization provided under Article 12 of the Law Concerning Special Measures for Reservoir Area Development.

**Table 3 Reservoir area development projects
(Projects related to the "Special Measures Law")**

(Amounts in Thousand Yen)

no.	Name of project	Implementing body	Total project cost
1	Reorganization of prefectural farm in Hiyoshi area	Kyoto Pref.	1,256,700
2	Improvement of the Tawara River	Kyoto Pref.	263,359
3	Improvement of the Kozumi River	Kyoto Pref.	58,650
4	Improvement of Prefectural Road Sonobe-Hiraya Line	Kyoto Pref.	4,167,877
5-1	Prefectural Road Kyoto Hiyoshi-Miyama Line (Tonoda work section)	Kyoto Pref.	539,000
5-2	Prefectural Road Kyoto Hiyoshi-Miyama Line (Shimo-honoda work section)	Kyoto Pref.	195,000
6	Improvement of Prefectural Road Tomita-Goma Depot Line	Kyoto Pref.	196,000
7	Improvement of Municipal Road Kihata Line	Hoyoshi Town	671,726
8	Improvement of Agricultural Road Katano-Honoda Line	Hoyoshi Town	479,400
9	Improvement of low-traffic trunk agricultural road in Goma	Kyoto Pref.	569,500
10	Construction of Forest Road Teratani Line	Hoyoshi Town	32,100
11	Construction of Forest Road Kakutani Line	Hoyoshi Town	6,600
12	Construction of "Fumin no Mori" forest park	Kyoto Pref.	1,373,033
13	Construction of municipal gymnasium	Hiyoshi Town	800,110
14	Reorganization of organization-operated farm in Kamiutsu area	Keihoku Town	169,024
15	Reorganization of organization-operated farm in Akeshi area	Keihoku Town	466,558
16	Smaller stream improvement for the Katsura River (Chuji to Kashiwara)	Kyoto Pref.	300,000
17	Improvement of the Hosono River	Kyoto Pref.	53,559
18	Improvement of Prefectural Road Yagi-Shuzan Line	Kyoto Pref.	1,508,518
19	Improvement of Prefectural Road Chuji-Kumata Line	Kyoto Pref.	307,046
20	Improvement of Prefectural Road Miyanotsuji-Kamiyoshi Line	Kyoto Pref.	515,864
21	Improvement of Municipal Road Nishi-uno Line	Keihoku Town	516,107
22	Improvement of Municipal Road Utsu-Segi Line	Keihoku Town	25,784
23	Construction of forest road Tonodani Line	Keihoku Town	4,088
24	Construction of forest road Mikodani Line	Keihoku Town	3,443
25	Construction of forest road Takatani Line	Keihoku Town	74368
26	Construction of forest road Tanotani Line	Keihoku Town	4558
27	Reconstruction of Utsu Day Care Center	Keihoku Town	77,822
28	Reorganization of prefectural farm in Kamiyoshi area	Kyoto Pref.	1,333,300
29	Improvement of Nishi-okajiri reservoir	Kyoto Pref.	850,000
30	Smaller stream improvement for the Katsura River (Yagi-cho, etc.)	Keihoku Town	463,837
31	Erosion control for the Okutsuhara River	Kyoto Pref.	25,000
32	Local improvement of the Umada River	Kyoto Pref.	351,113
33	Improvement of Municipal Road Aoto-Hidokoro Line	Yagi Town	331,000
34	Construction of a branch road off the forest road Umenoki Line	Yagi Town	3,700
Total			17,993,744

perity of the areas to be submerged, and various assistance projects are being implemented.

These projects include providing interest subsidies to affected local residents who wish to acquire real estate such as substitute lots, paying the expenses for occupational training in cases where job conversion is necessary, providing living counselors, and conducting studies on measures to be taken to revitalize the affected areas.

Funds for Hiyoshi Dam

As of the end of fiscal 1997 (Amounts in thousand yen) (Table 4)

**Table 4 Funds for Hiyoshi Dam
As of the end of fiscal 1997**

(Amounts in thousand yen)

Name of project	Planned amount	Actual amount	Period (year)	Funding entity
Resettlement assistance projects	254,000	206,816		Kyoto Pref.
1. Real estate acquisition subsidizing projects	127,000	97,466		31.3%(1.16t/s)
(1) Project for subsidizing interest for the Kyoto Prefecture system	126,000	96,958	1985 to 1987	Osaka Pref.
(2) Project for subsidizing interest for relocation in Hiyoshi-cho	1,000	508	1985	42.6%(1.576t/s)
2. Occupational training allowance subsidizing project	9,000	0		Hyogo Pref.
3. Livelihood counseling personnel cost subsidizing project	19,000	10,350	1985 to 1987	26.1%(0.964t/s)
4. Special financial assistance project	99,000	99,000	1985	Itami City 5.7%(0.21t/s)
Regional revitalization projects	65,000	65,000		Hanshin Water Supply Authority
1. Local museum construction project	50,000	50,000	1997	
2. Study subsidy projects	15,000	15,000	1985	20.4%(0.754t/s)
Total	319,000	271,816		

In April 1993, Hiyoshi Dam was designated as the first "dam open to the local community." Since then, efforts have been underway, in cooperation with three local towns (Hiyoshi-cho, Yagi-cho, Keihoku-cho), to improve the environment of the dam and reservoir area in order to enhance the vitality of the region, aiming to achieve the basic goal of "creating a healthy, culturally rich community founded on the natural environment."

The process of "dam open to the local community" planning is summarized below.

- April 1993
Received the "dam open to the local community" designation from the Director-General of the River Bureau, Ministry of Construction.

- July 1993
The Hiyoshi Dam Environmental Improvement Council was established.

- February 1994
The "Dam Open to the Local Community" Plan drawn up by Hiyoshi-cho was approved by the Director-General of the River Bureau.

- February 1995
The plan was expanded to involve three towns (Hiyoshi-cho, Yagi-cho, Keihoku-cho) in the dam area.

The projects implemented under the "Dam Open to Local Community" Plan for Hiyoshi Dam are shown in Table 5.

3.1.3 Vision for the Reservoir Area

A "Vision for the Reservoir Area" is an action plan that the local government and residents of the dam reservoir area and the dam owner and the dam manager jointly draw up with the cooperation of the local governments of the downstream areas and the administrative organizations concerned in order to enhance the vitality of the reservoir area as an independent, sustainable community by making effective use of the dam.

A vision is drawn up by establishing an organization composed of the dam owner and the dam manager, local governments in the river basin, local residents, administrative organizations concerned, academic experts, etc., and using a method that makes it possible to reflect the opinions of the stakeholders in the reservoir area.

Table 5 Projects implemented under the “Dam Open to Local Community” Plan for Hiyoshi Dam

Name of project	Implementing body	Year	Relationship with the "open to local community" dam
Dam memorial park construction project	Hiyoshi Town	1995-1999	"Special Measures Law" project
Project for the construction of rest facilities for cyclists	Hiyoshi Town	1993-1996	"Special Measures Law" project & Specified local river environmental improvement project
Lake surface leisure facilities construction project	Hiyoshi Town	1997-1998	"Special Measures Law" project
Camp site construction project	Hiyoshi Town	1996-1998	"Special Measures Law" project
Local museum construction project	Hiyoshi Town	1996-1998	Yodo River Fund project
Youth outdoor activity facilities, etc.	Hiyoshi Town & Keihoku Town	1996-	"Special Measures Law" related project
Stream park construction project (provisional name)	Keihoku Town	1996-1997	"Special Measures Law" project
Segi Dam reservoir area development project	Yagi Town	1995-	Specified local river environmental improvement project
"Fumin no Mori" forest park construction project	Kyoto Pref.	1996-1998	"Special Measures Law" project
Dam construction project	Japan Water Agency	1982-1997	* Improvement of Prefectural Road Hiyoshi-Miyama Line * Ring road construction for making effective use of municipal roads including Amawaka Line, Yamago Line and Omukai Line * Construction of a gallery in the dam body, observation platform, project presentation hall, etc.

Work to draw up visions for 23 dams in Japan (dams managed by the Ministry of Land, Infrastructure and Transport and dams managed by Japan Water Agency) began in 2001. The vision for Hiyoshi Dam was drawn up and announced and published toward the end of March 2002. Currently, the plan is being implemented through joint efforts led by the local governments.

3.1.4 Usage

According to dam reservoir usage survey results, the number of visitors to Hiyoshi Dam in 2000 (from the spring of 2000 to the winter of 2003), the first year of survey, was about 870,000. The number of visitors in 2003 was 530,000, a decrease of about 340,000. (Fig. 4)

According to survey results by type of use in 2003, "use of facilities" such as museums and hot springs accounts for about 38 percent, followed by "outdoor activities" using forest parks, sports grounds, etc., account for about 23 percent. "Boating" use ranked at the bottom, accounting for about less than 0.1 percent.

Comparison of the results of the two surveys reveals that the percentage of "outdoor activities" increased, indicating that the number of users of parks and other facilities that are integrated with the dam body is on the increase. (Fig. 5)

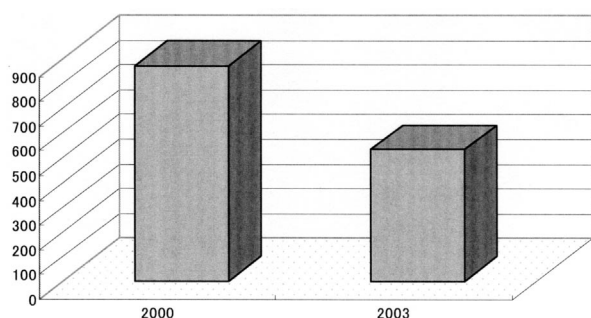


Fig. 4 Changes in the number of visitors per year (numbers in thousands)

Characteristics of the dams in Japan that attract the greatest numbers of visitors (five most used dams) and the types of facilities and places that attract many users are depicted in Photos 2, 3 and 4.

3.2 Iwaya Dam (Water-Source Area Vision)

In addition to its flood defense function, Iwaya dam provides agricultural water, domestic water and industrial water totaling 45.69t/s to Kiso river area including Nagoya city.

Its water-source area vision, established in March 2003, installs in itself operation management cycle <plan → do → check → action> following the principle of policy evaluation (Figure 6).

3.3 Sameura Dam (Water-Source Area Vision)

Sameura dam is constructed and operated by JWA. Besides the important role it plays for the flood defense of Yoshino river basin, it provides agricultural water 18.4t/s, domestic water 7.44t/s as well as industrial water 14.11t/s. It is also used for electric generation.

In the Sameura dam water-source area vision established in February 2002, priority was set on promoting integrated use of its reservoir lake, the largest in Shikoku region. Accordingly, <reservoir surface use plan> was established in January 2005. (Figure 7)

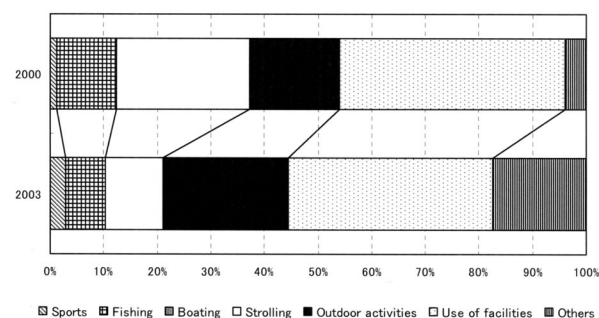


Fig. 5 Changes in the percentages of different reservoir uses



Photo 2 Hiyosh dam and springs park



Photo 3 Visitor Center



Photo 4 "Fumin no Mori" forest park

<outline of the reservoir lake use plan>

α basic principles

protection of dam's utilities

Necessary measures should be taken lest use of reservoir surface not create such troubles as;

Hinderance to the dam operations

Physical damages to operational facilities or reservoir banks

Diminution of reservoir capacity or reduction of outlet volume due to structures for reservoir surface use

protection of environment

Attention should be paid in order to prevent degradation of environment such as deterioration of reservoir's water quality, landscape decline and production of pollutive wastes.

inexclusiveness

Reservoir surface of dams are created for public

purposes and creates a part of river space. Under the river law(Law No.167 of 1964), opportunities for the use of river space should be open to the general public.

So delivery of reservoir surface use licence should make sure that this principle of its inexclusiveness is not compromised.

β practical rules for reservoir surface use

Users by boats are requested to obtain membership of the Sameura dam reservoir users' council (annual membership fee is 4000yen).

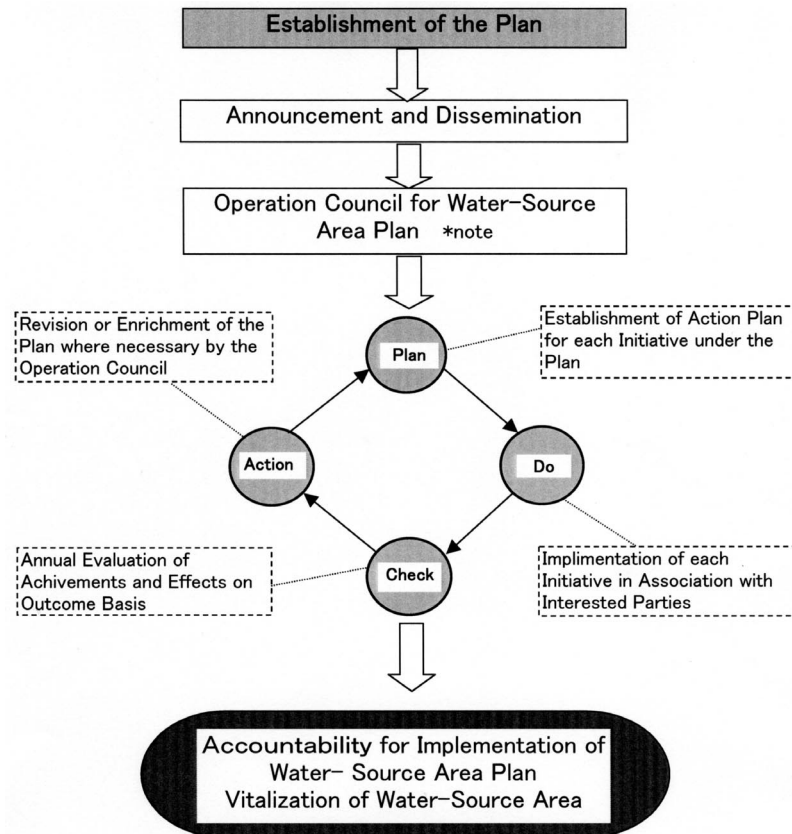
Camping and swimming are prohibited.

Reservoir surface use is possible when the inflow volume to the reservoir does not exceed 100t/s.

Designation of access route to the reservoir

Designation of non-parking areas in the reservoir side

Prohibition of activities causing damages to the



Note: Operational council is composed of those responsible for implementation of each initiative under the water-source area vision, that is, the operator of the dam, local authorities, representative of agriculture, forestry and commerce and other relevant parties

Fig. 6 Establishment of Iwaya Dam Water-Source Area Plan



Photo 5 Reservoir Surface
750ha (Approx.)

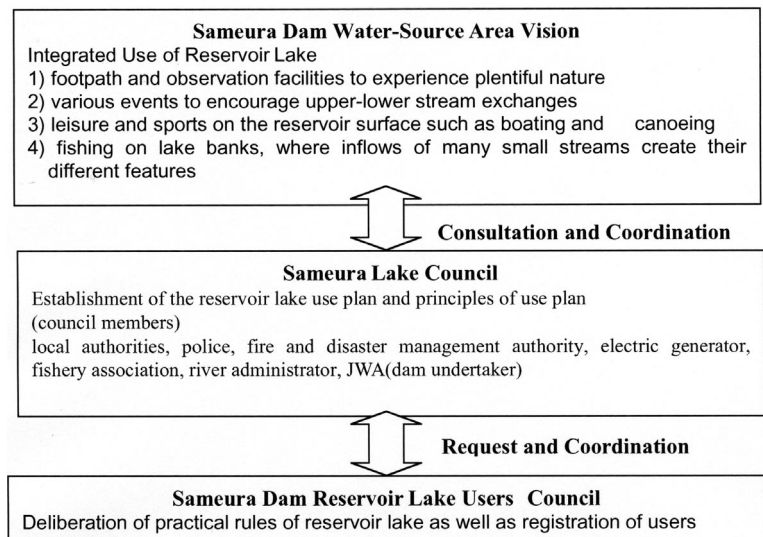


Fig. 7. Organization for the Establishment of the Reservoir Surface Use Plan

water quality or nuisances to other users. Users are strongly advised to carry back home their wastes.

4. An example of a reservoir area support business

- Misogawa Dam (constructed and operated by JWA)
Acknowledged Organization: association for promotion of upper-down stream exchanges



Performance of folk entertainment by children of Kiso river basin, exchange of messages, installation of time capsule, monuments with poems and promotion of summer-camp as field of exchanges.

- Tamagawa Dam (constructed and operated by Ministry of Land and Infrastructure)
Acknowledged Organization: forum on the history and culture of Tama river basin



This forum makes researches of the history and cultures of Tama river basin area including field works on its life, industry, economy and culture, thereby presents proposals to integrate its rich natural and historical resources into community building.

- Nibutani Dam (constructed and operated by the Hokkaido Development Bureau of the Ministry of Land and Infrastructure)
Acknowledged Organization: Hidaka town forest lovers' association



Its activities center on consciousness-building on the importance of forest protection including fire prevention. The association also organizes environmental education programs for pupils in the river basin such as rafting, forest trekking and observation of mushrooms.

5. Challenges for the future

5.1 Severe Economic and Financial Circumstances

Quite naturally, financial resources that can be affected to measures for water-source areas are not unlimited in the context of severe economic and financial circumstances. Especially, difficulty lies in obtaining funds for measures after dam construction is completed and operation of dam is started. Besides delivery of large blocks such as government grants and installment paid by beneficiaries, various initiatives should be promoted to meet ground needs of water-source areas.

5.2 Increasing maintenance cost

Many of the municipal governments in the reservoir areas feel that dam construction has been beneficial because facilities in the reservoir areas have been improved. Struggling with increased maintenance cost, however, many municipal governments wish to receive financial assistance from dam owners.

In cases where a management organization has been established, if the management organization is unable to obtain financial assistance, it may become impossible to maintain the environment of the dam reservoir area.

Another challenge is to find ways to maintain facilities whose attractiveness will decrease over time as they become old.

The reason for this kind of problem may be that the facilities constructed in connection with dam projects may be too large to support financially for the local governments of the reservoir areas or that a labor shortage results as volunteer workers engaged in the management of facilities become older. Some say that changes should be made to the current system so that facilities in dam reservoir areas can be maintained as "parks" under the City Planning Law.

There are cases where dam owners provide assistance such as providing information on projects eligible for subsidies and reducing labor cost by mechanization. In many cases, however, more improvements are hoped for.

5.3 Attractiveness of adjacent facilities

Decreasing attractiveness of adjacent facilities because of, for example, the natural deterioration of the facilities, failure of the facilities to meet the needs of the time and inadequacy of functions (e.g., adjacent roads, parking lots, toilets, information signs) is being seen as a problem.

The local governments in the reservoir areas hope to make effective use of the adjacent facilities for the purpose of regional development. They hope, therefore, that effective use is made of dams by, for example, tying up with local events or building tourist routes

so that people can visit the reservoir areas.

The “Vision for the Reservoir Area” that has been drawn up for many dams in the country since 2001 aims to make effective use of adjacent facilities and enhance their attractiveness by reflecting the opinions of local communities in the facility plans. The “Vision for the Reservoir Area” scheme is expected to help make the adjacent facilities more attractive.

5.4 Upper-Lower Stream Exchanges

For sustainable and stable use of domestic and industrial water, it is necessary to promote mutual understanding and partnership on the relevant issues such as the roles of forests, protection of river water quality, impacts of dam construction on water-source areas and effective use of water.

From this standpoint, more efforts need to be made to encourage upper-lower stream exchanges.