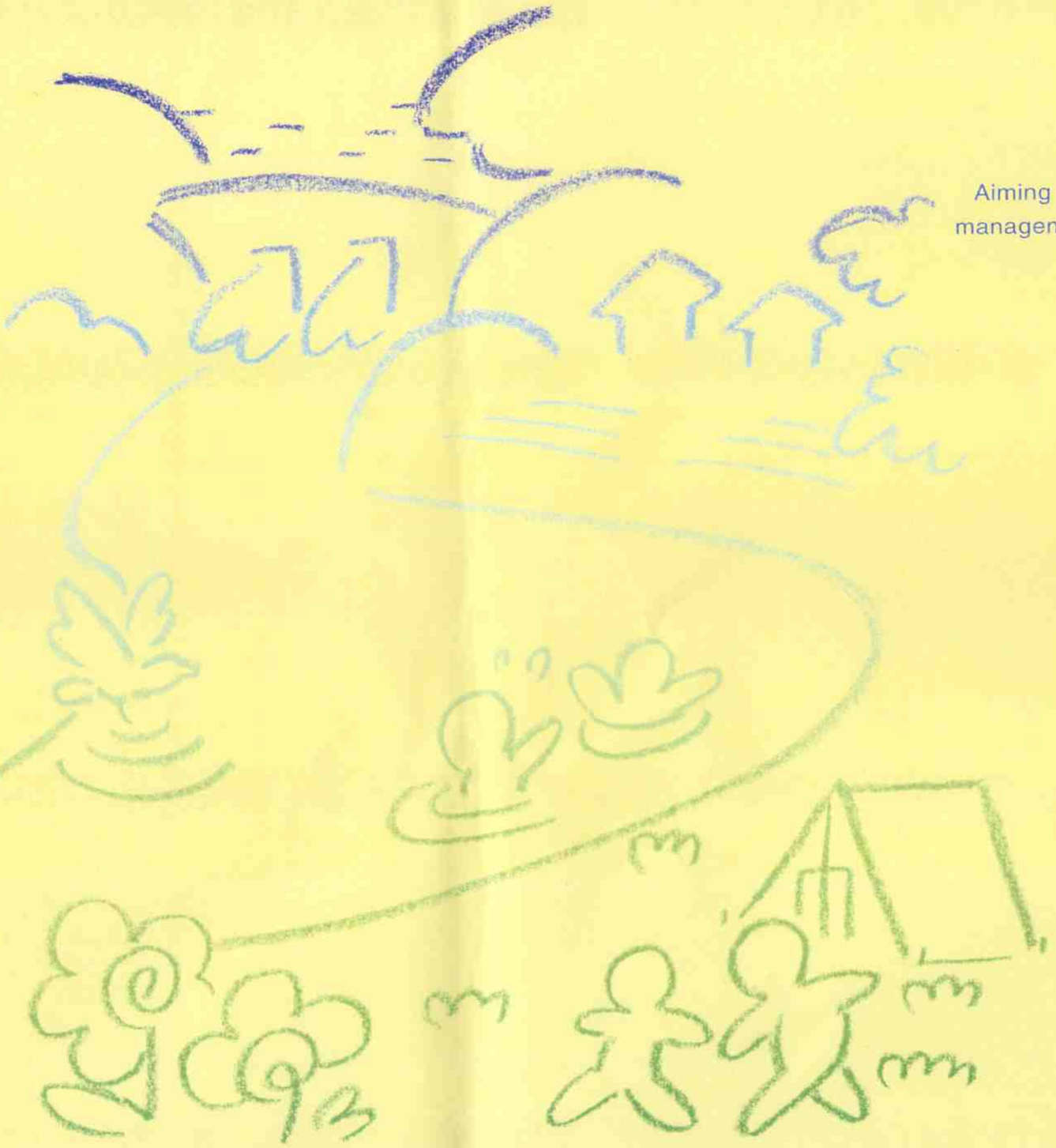
Profile of Yodo River Dam Control Center



Aiming an even higher quality water management for the Yodo River basin

Yodo River Dam Control Center

Kinki Regional Development Bureau
Ministry of Land,Infrastracture and Transport

10-1,Yamadaikekitamachi, Hirakata City,Osaka, 573-0186
Tel. 072-856-3131

http://www.kkr.mlit.go.jp/yodoto/

October, 1999 (1st edition) July, 2000 (revised) April, 2001 (revised) August, 2004 (revised)

Walking together with
Water and Green…

Refreshing Contact Forest and Lake

We assure a life with safe and abundant WATER.

In order to supply urban water and to control flood in the Yodo River Basin, Seta River Weir, Amagase Dam and Yodo River Great Weir were constructed in the main river Yodo.
In addition,Takayama Dam, Shorenji Dam, Murou Dam, Nunome Dam, Hinachi Dam, in the Kizu River, and Hiyoshi Dam in the Katsura River, have been constructed making a total of 9 facilities.

These facilities are integrally managed by the Yodo River Dam Control Center.

At present, in addition to these facilities, Kawakami Dam(Aoyama Town, Mie Pref.), in the upper stream of Kizu River, Daido River Dam(Otsu City, Shiga Pref.), in Daido River in the upper stream of Uji River and Niu Dam(Yogo Town, Shiga Pref.), in the Takatoki River in the Northern part of Lake Biwa, are under construction.

With the completion of these dams, it will be possible to provide a higher level of flood prevention and more plentiful water.

SETA RIVER WEIR

River name : Seta River(Yodo River)
Location : Otsu City,Shiga Pref.
Lake area : 3,848km²(Lake Biwa)
Reservoir surface area : 680km²(Lake Biwa)
Gross storage capacity : 275billion m³(Lake Biwa)
Type : [Main Weir]
2 levels Roller Gate(10.8m×10gates)
[Bypass Channel]
3 levels Roller Gate(5m×1gate+15m×1gate)
Completion : March,1961 (Bypass channel: March, 1992)
Urban water : To every city in the Keihanshin area 40m³/s
(Data from the Lake Biwa Integrated Development Works)

HIYOSHI DAM

River name : Katsura River
Location : Hiyoshi Town,Funai County,Kyoto Pref.
Drainage area : 290 km²
Effective Storage capacity : 58 millionm³
Type : Concrete Gravity Dam
Dam height : 67.4m
Crest length : 438.0m
Completion : March,1998
Flood Control : 2,200m³/s→500m³/s
(Tentative design discharge150m³/s)
Urban water : Kyoto Pref. 1.16m³/s
Osaka Pref. 1,576m³/s
Itami City 0.210m³/s

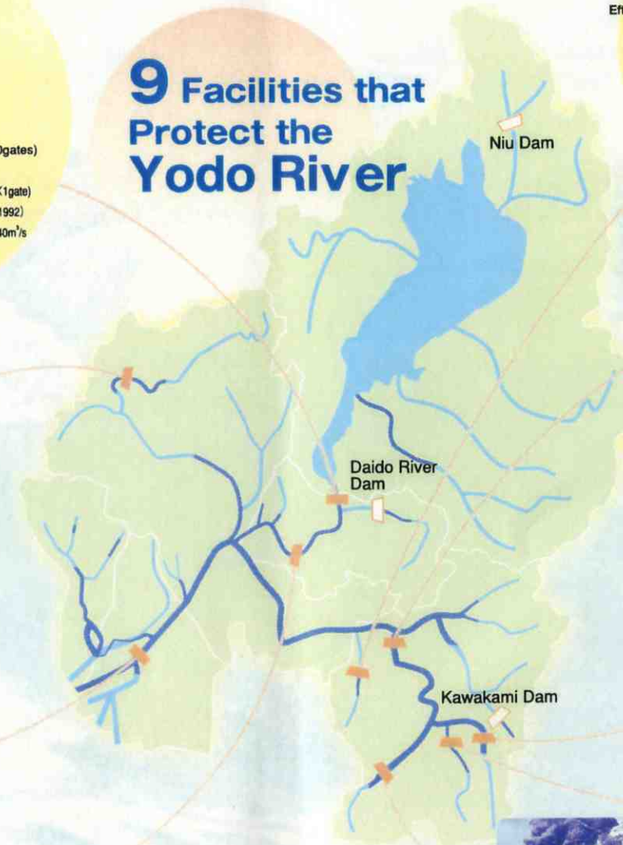
YODO RIVER GREAT WEIR

River name : Yodo River
Location : Osaka City,Osaka Pref.
Type : Shell Type Roller Gate
Main gates 55.0m×4 gates
Regulation gates 40.0m×2 gates
Fish passage : 2 gates, at left and right sides, ladder type passage
Completion : March,1984

AMAGASE DAM

River name : Uji River(Yodo River)
Location : Uji City,Kyoto Pref.
Drainage area : 4,200km²
(Lake Biwa 3,848km²,direct 352km²)
Effective Storage capacity : 20 million m³
Type : Concrete Arch Dam
Dam height : 73.0m
Crest length : 254.0m
Completion : November,1964
Flood control : 1,360m³/s→840m³/s
Urban water : Kyoto Pref. tap water 0.3 m³/s

9 Facilities that Protect the Yodo River



Yodobee's Dictionary

Crest length..... length of the top of the dam
Flood Control... to release the water gradually during heavy rain
Urban water..... domestic and industrial water

NUNOME DAM

River name : Nunome River, a tributary of Kizu River
Location : Nara City,Nara Pref.
Drainage area : 75 km²
Effective Storage capacity : 15.4 million m³
Type : Concrete Gravity Dam
Dam height : 72.0m
Crest length : 322.0m
Completion : March,1992
Flood Control : 460m³/s→150m³/s
Urban water : tap water for Nara City1.08m³/s
tap water forTsuge and Yamazoe Villages 0.056m³/s

HINACHI DAM

River name : Nabari River, a tributary of Kizu River
Location : Nabari City,Mie Pref.
Drainage area : 75.5 km²
Effective Storage capacity : 18.4 million m³
Type : Concrete Gravity Dam
Dam height : 70.5m
Crest length : 355.0m
Completion : March,1999
Flood Control : 1,300m³/s→300m³/s
Urban water : Nabari City 0.3m³/s
Kyoto Pref. 0.6m³/s
Nara City 0.6m³/s

MUROU DAM

River name : Uda River, a tributary of Nabari River
Location : Murou Village,Uda County,Nara Pref.
Drainage area : 169 km² (Direct 136km², Indirect 33 km²)
Effective Storage capacity : 14.3 million m³
Type : Concrete Gravity Dam
Dam height : 63.5m
Crest length : 175.0m
Completion : March,1974
Flood Control : 1,100m³/s→300m³/s
Urban water : domestic water for Nara Pref. 1.6m³/s

TAKAYAMA DAM

River name : Nabari River, a tributary of Kizu River
Location : Minamiyamashiro Village, Soraku County, Kyoto Pref.
Drainage area : 615 km²
Effective Storage Capacity : 49.2 million m³
Type : Concrete Gravity Arch Dam
Dam height : 67.0m
Crest length : 208.7m
Complection : August,1969
Flood Control : 3,400m³/s→1,800m³/s
Urban water : tap water for Hanshin area 5.0m³/s

SHORENJI DAM

River name : Shorenji River, a tributary of Nabari River
Location : Nabari City,Mie Pref.
Drainage area : 100 km²
Effective Storage capacity : 23.8 million m³
Type : Concrete Arch Dam
Dam height : 82.0m
Crest length : 275.0m
Completion : Decembert,1970
Flood Control : 1,100m³/s→450m³/s
Urban water : domestic water for Hanshin area 2.3m³/s
domestic water for Nabari City 0.19m³/s
Agricultural water supply: specific irrigation for Nabari area 1.86m³/s

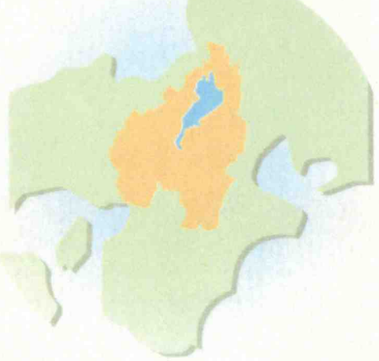
CONTENTS

What kind of river is Yodo River?

Yodo River basin is located in the Middle Area of the Kinki region and its origin is the Takatoki River in the North of Lake Biwa.
After flowing from the Lake Biwa, Seta and Uji Rivers, it joins the Kizu and Katsura Rivers at the border of Kyoto and Osaka Pref. forming the Yodo River.
With a drainage area of 8,240km^2(including the 959km^2 of the Inagawa Basin), the Yodo River basin is a basin of big scale.
Its main river, the Yodo River, flows through Osaka Plain and, on its way, bifurcates into Kanzaki and Okawa (formerly called Yodo River) Rivers to flow into the Osaka Bay.
The basin extends over 6 prefectures, Osaka, Kyoto, Hyogo, Shiga, Nara and Mie.
A population of 10 million people live in this area, corresponding to the largest population of that among the Japanese representative basins.
Thus, the Yodo River basin is in the core of social, economic and cultural development in the Kinki area.
The yearly average precipitation in Yodo River Basin is 1,600mm.
The precipitation is very high in the rainy season from June to July and in the typhoon season in September, causing severe floods.
On the other hand, due to the thawing of the snow accumulated during winter on the mountains in the Northern part of Lake Biwa, a steady flow is assured in early spring.
In the Yodo River basin, due to the existence of narrow gorges, such as, Hozu Straights in Katsura River, Shishitobi Valley in Uji River and the Iwakura Straights in Kizu River, occasional floods occur in the upper stream areas, while downstream, flood damages are reduced in the down stream.
However, in the downstream in Osaka Plain, the ground level is lower than the river elevation.
In particular, in central parts of Osaka, where the city have developed over areas having ground level lower than the Yodo River, severe damages are caused by floods in the Yodo River.

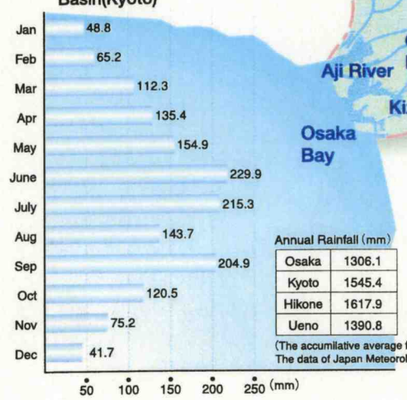
Hozu-kyo (Katsura River)


Shishitobi Valley (Seta River)



Iwakura-kyo (Kizu River)

■Precipitation in the Yodo River Basin(Kyoto)



Annual Rainfall (mm)

Osaka	1306.1
Kyoto	1545.4
Hikone	1617.9
Ueno	1390.8

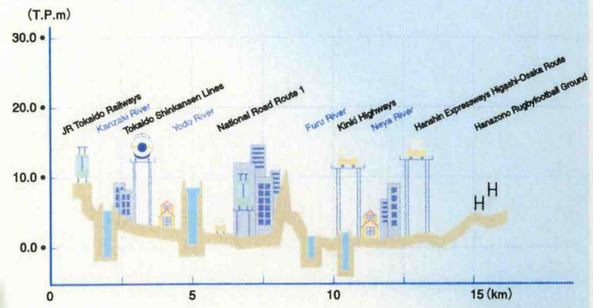
(The accumulative average from 1971 to 2000)
The data of Japan Meteorological Agency

Flow Regime in Hirakata Point
The average from 1952 to 2001

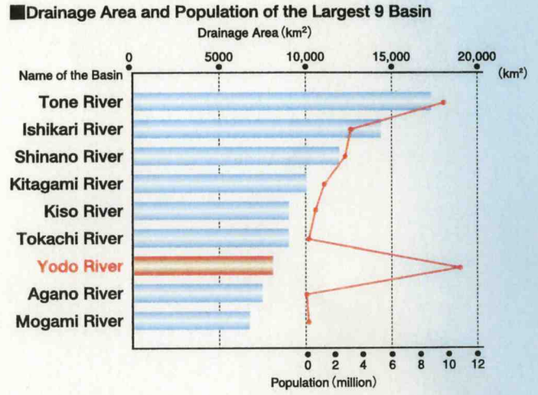
Maximum discharge	7,970.00m^3/s
75-days discharge	280.70m^3/s
185-days discharge	193.98m^3/s
Low water discharge	147.94m^3/s
355-days discharge	107.66m^3/s
Minimum discharge	42.54m^3/s
Average discharge	270.54m^3/s

(from the Annual Table of Discharge,2000)

■Scheme of a Typical Cross-section of Downstream Yodo River



■Drainage Area and Population of the Largest 9 Basin



■Table of Drainage Area

River Nam	Drainage Area (km^2)	Percentage of Mountainous and Plain area		Percentage of the Total Area
		Mountainous area	Plain area	
Lake Biwa	3,848	59	41	52.9
Uji River	506	87	13	6.9
Kizu River	1,596	92	8	21.9
Iga River	514	86	14	
Nabari River	616	97	3	
Others	466	92	8	
Katsura River	1,100	82	18	15.1
Katsura River	944	83	17	
Kamo River	156	73	27	
Yodo River Mainstream	231	31	69	3.2
Total	7,281	71	29	100.0

※The drainage area corresponds to the catching area down to Hirakata, in the left bank and Akutagawa, in the right bank.
※Inagawa drainage is not included.

Yodobee's Dictionary

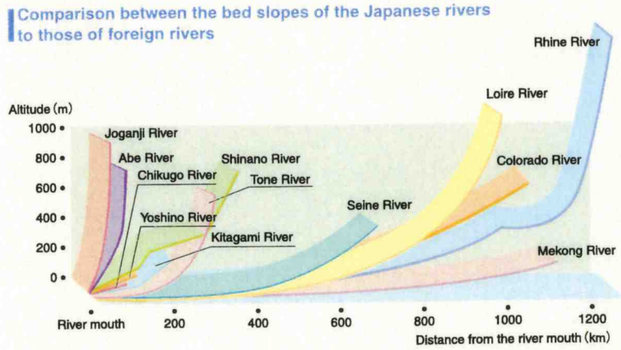
Discharge..... volume of water flowing in a river per second
Flow regime... changes in the condition of a river flow due to variation of the discharge

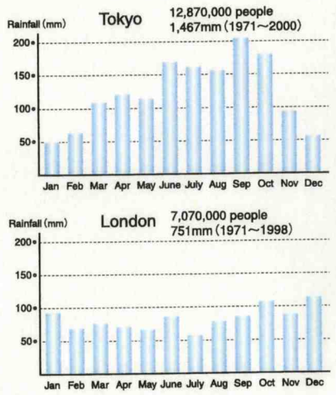
Why are dams necessary?

Due to the mountainous geography of Japan,
the country is prone to flood in the rainy and typhoon seasons
when it rains torrentially in a short time.
On the other hand, however,
continuous sunny days cause shortage of water.
In Japan, 51% of the population and 75% of the assets are
concentrated in the flood prone area
that corresponds to the 10% of the national territory.
Dams not only prevent flood in case of heavy rain,
but also play an important role storing water,
when there is shortage of rain.
Dams and forests surrounding the
water resources are important assets
that protect our daily lives.

The bed slopes of Japanese rivers, compared to those of foreign rivers, are steep. Water from the rain flows at once from the mountains to the sea.

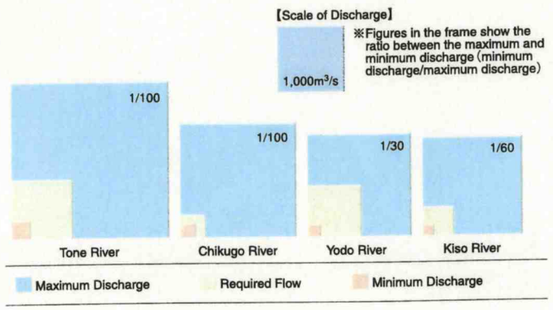
Comparison between the bed slopes of the Japanese rivers to those of foreign rivers





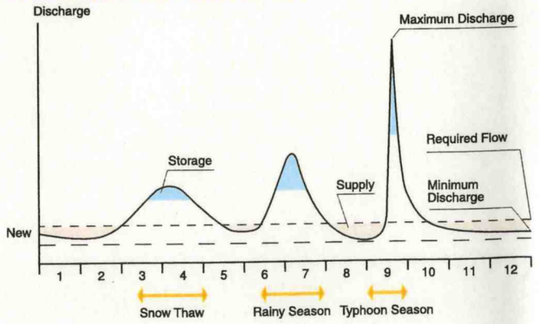
The ratio between the maximum and minimum discharge is high in the Japanese rivers. As the required volume of water is far higher than the minimum discharge, it is necessary to store water.

Maximum and Minimum Discharge and Required Water



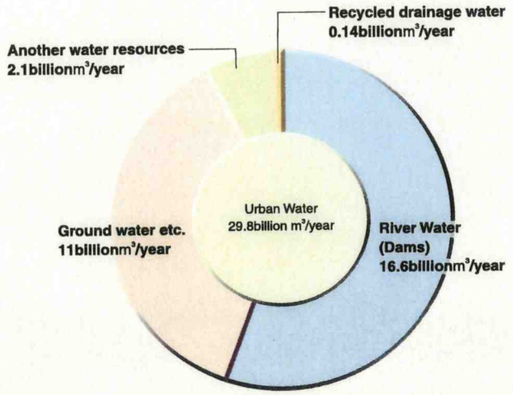
The discharge gradient in the Japanese rivers is high. Use the stored water when there is not sufficient water.

Outline of Water Resources Development



Almost all the urban water in our country depends on dams.

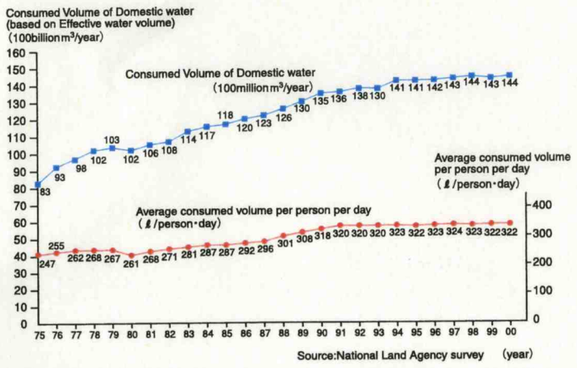
Breakdown of the water resource supply



Reference"Ministry of Land, Infrastructure and Transport,Water Resources Department,Land and Water Bureau"

The increasing required domestic water

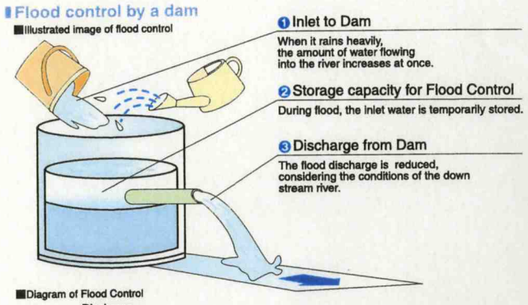
Transition of the consumed Volume of Domestic water

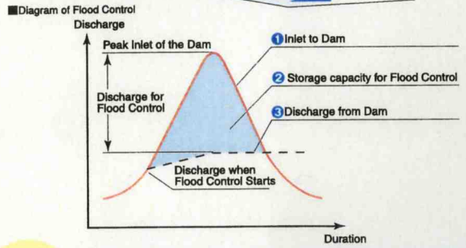


Reference"Ministry of Land, Infrastructure and Transport,Water Resources Department,Land and Water Bureau"

In case of heavy rain, the dam gradually releases the stored water

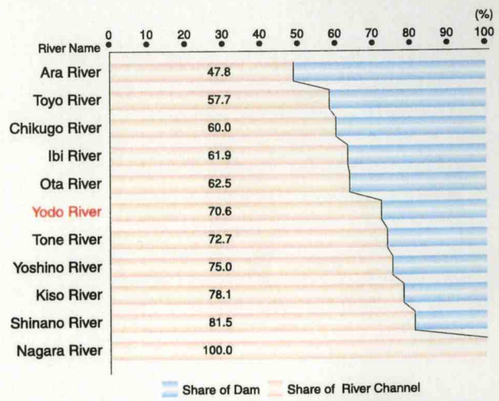
Flood control by a dam





In Japan, dams and river channels play their respective roles in flood prevention.

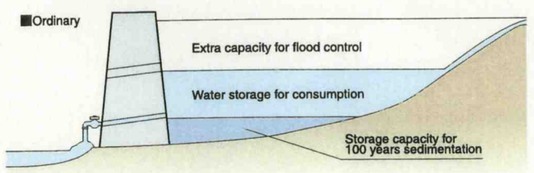
Share of dams and river channels in the main Japanese rivers

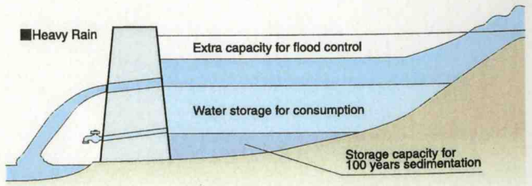


It is not possible to prevent flood without dams, relying solely on dikes.

Dams have a capacity of storing water for supply and an extra capacity to retain temporarily the water of occasional heavy rain.

Capacity of the dam



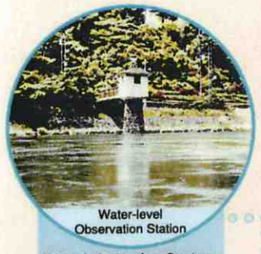


Control the flow of abundant water

In the Yodo River Dam Control Center, water management is permormed by connecting the dams and weirs (9 facilities) of the Yodo River Basin.
For this purpose, the condition of the Yodo River is monitored 24 hours a day through the various data from the Meteorology Agency, as well as total information provided by the River Information System and Radar Rainfall System, on the rain volume and on the water level of each river of the Yodo River area, together with information on each dam.
The system that collects and processes the information on the Yodo River (Water Flow Management System) also plays the role of an information center, providing various data concerning the dams and their offices.
In case of flood, inlet of the dam, as well as water level and volume of each river at the reference point are predicted.
Then, information and instructions concerning flood control are sent to each dam administration office.
On the other hand, in case of drought, long-term water volume of the dams and of the Lake Biwa are predicted and an efficient water supply is carried out.

Yodo River Water Management

Collection of Information → Processing of Information → Predicting → Examination of the Operations



Water-level Observation Station

River Information System
Data of Rainfall
Data of Staged-discharge
Data on the Dam Properties

Radar Rain Gauge Station

Radar Rainfall Information System
All-Japan Radar Network

Satellite GMS

Weather Information System
AMEDAS Data (figures)
G.P.V Data (figures)

Processing
Supervision

Flood
Drought

Rainfall Prediction System
Short-time Rainfall Prediction
Short-term Rainfall Prediction
Weekly Rainfall Prediction
Typhoon Courses Prediction
Selection of Typhoons of similar type

Low Water Level Simulation
Low Water Level Simulation of Lake Biwa

Flood Control Plan
Drought Prediction Plan

Hirakata Supply Culculation

Flood Prediction System
Runoff Prediction Simulation

Determination the Predicted Rainfall

Rainfall Prediction System

Kinki Regional Development Bureau

Integrated Operation Request

Approval

Instruction

Yodo River Dam Control Center

Instruction

Amagase Dam Management Office → Operation → Amagase Dam

Japan Water Agency

Hiyoshi Dam Management Office → Operation → Hiyoshi Dam

Kizu River General Dam Management Office

Operation → Takayama Dam
Operation → Shorenji Dam
Operation → Murou Dam
Operation → Nunome Dam
Operation → Hinachi Dam

Provide Information

Kizugawa-Jouryu River Office

Biwako Office of River → Operation → Seta River Weir

Yodogawa River Office → Operation → Yodo River Great Weir

※In case of Individual operation, each dam manager operates independently.

Yodobee's Dictionary

Dam Properties
Figures, such as storage water level, inlet, discharge and storage volume of dams.

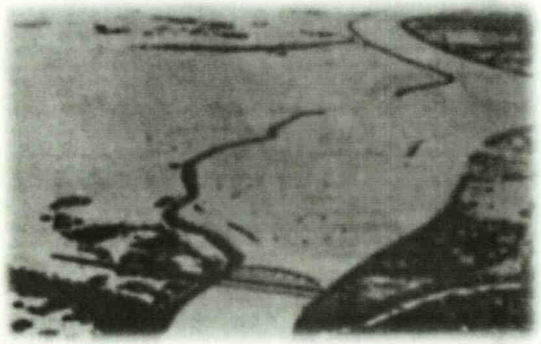
High Water Management & Low Water Management

High Water Management

The word "high-water" refers to flood and inundation.
Simulation of the transition from ordinary conditions to rainfall is performed and flood control studies, such as investigation of the dam discharge is carried out in various ways.
When there is an actual danger of flood, along with permanent monitoring, the collected data are sent to the concerned authorities, and flood warning or alarm is announced in joint with the Meteorology Department.
Based on the information collected during flood, prediction calculations are performed and the control of flood is carried out.

Low Water Management

The word "low-water" refers to drought.
Damages due to drought are reduced by supplying the water efficiently, after performing a drought simulation from the long-term rainfall prediction, that is based on data such as the river conditions and dam storage volume in the past.



Failure of Mukojima Levee, in Uji River(Fushimi Ward, Kyoto City,1953)

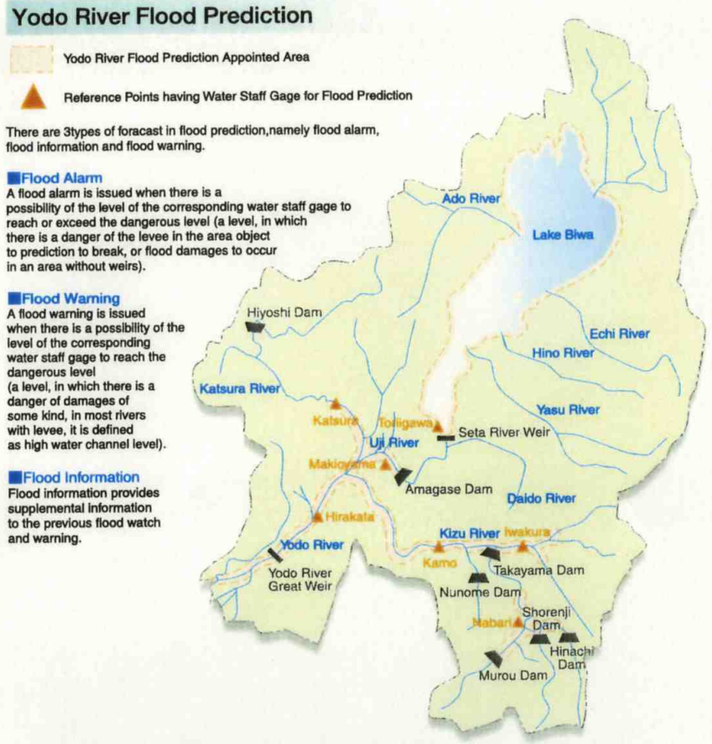
Recent Big Scale Inundations in the Yodo River

Date of occurence	Meteorological Cause	Maximum Discharge(m^3/s) Yodo River(Hirakata)
1953. 9.25	Typhoon No.13	※7,800
1956. 9.21	Typhoon No.15	4,610
1958. 8.27	Typhoon No.17	4,030
1959. 8.14	Front & Typhoon No.7	6,800
1959. 9.27	Ise Bay Typhoon	※7,200
1960. 8.30	Typhoon No.16	3,840
1961.10.28	Cyclone & Front	※7,800
1965. 9.17	Typhoon No.24	6,870
1972. 9.17	Typhoon No.20	5,230
1982. 8. 2	Typhoon No.10	6,260

※Exceeding the design high water discharge during 1953 to1971
from Outline of Yodogawa River Office,1999

Yodo River Flood Hazard Map

Yodo River Flood Prediction



There are 3types of foracast in flood prediction,namely flood alarm, flood information and flood warning.

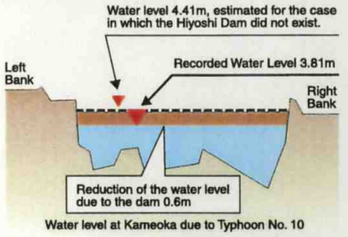
■Flood Alarm
A flood alarm is issued when there is a possibility of the level of the corresponding water staff gage to reach or exceed the dangerous level (a level, in which there is a danger of the levee in the area object to prediction to break, or flood damages to occur in an area without weirs).

■Flood Warning
A flood warning is issued when there is a possibility of the level of the corresponding water staff gage to reach the dangerous level (a level, in which there is a danger of damages of some kind, in most rivers with levee, it is defined as high water channel level).

■Flood Information
Flood information provides supplemental information to the previous flood watch and warning.

Flood Control in Hiyoshi Dam (The Typhoon No.10)

From 16 to 17 October, 1998, a front stopped over Kinki area, and in the night of 18 October, the Typhoon No. 10 landed.
340 ㎥/s out of 490 ㎥/s the maximum discharge caused by the flood was controlled at the Hiyoshi Dam, which stored about 14,000,000 ㎥ of the water.
Downstream, at Kameoka point, a water level 0.6m higher than the 3.8m recorded then was estimated for the case in which the dam did not exist.
In this case, the water level would rise close to the warning level of 4.5m, and at areas where the weir height is low, flood counter measures would have been necessary.
In the summer of the same year, the Katsura River, due to shortage of rain was in prone to drought.
Agricultural water and navigation of the Hozu River was assured by the 10,000,000 ㎥ of water discharged from the Hiyoshi Dam.



Water level at Kameoka due to Typhoon No. 10

Cross-section scheme of Katsura River

Why is a flood prediction alerted even when it is sunny?

Flood alarm or warning for Uji River may be alerted even in fine weather.
This is because the water stored in Lake Biwa is discharged to reduce the water level, after the risk of flood has been cleared.

Recent Droughts in the Yodo River Basin

When the rainfall is extremely low, there is shortage of water and a restriction on intake water must be adopted.
In the Yodo River, during the record making 1984 and 1994 Droughts, the water intake was restricted for a long period of time.
During the 1994 Drought, the water level of the Lake Biwa reached the recorded lowest level.
In 2002, the water supply from Lake Biwa was rationed for 100 days due to decrease in the water level.

Year		Restriction on Intake water	Restriction Days	Percentage of Restriction on Water Intake		Minimum Water Level of Lake Biwa	Minimum Daily Volume at Hirakata, in Yodo River
				Drinking Water	Industrial Water		
1973	Primary	31.July ~ 15.Aug 15.Aug ~ 4.Sep 5.Sep ~ 5.Nov	95	10%	15%	-54cm 2.Sep	75.47m^3/s 13.Aug
	Secondary	15.Aug 4~5.Sep	2	20%	25%		
1977	Primary	26.Aug ~ 1978.7.Jan	134	10%	15%	-58cm 29.Nov	75.51m^3/s 30.Oct
1978	Primary	1.Sep ~ 1979.8.Feb	160	10%	15%	-73cm 29.Nov	65.59m^3/s 30.Oct
1984	Primary	8.Oct ~ 6.Nov 1.Mar ~ 12.Mar	42	10%	12%	-95cm 26.Jan	58.30m^3/s 10.Dec
	Secondary	6.Nov ~ 1.Mar	115	20%	22%		
1986	Primary	17.Oct ~ 27.Nov 1987.27.Jan ~ 1987.10.Feb	56	10%	12%	-88cm 14.Nov	58.96m^3/s 14.Dec
	Secondary	28.Nov ~ 1987.26.Jan	60	20%	22%		
1990						-69cm 12.Sep	89.30m^3/s 11.Sep
1994	Primary	22.Aug ~ 3.Sep	12	10%	10%	-123cm 15.Sep	60.75m^3/s 14.Sep
	Secondary	3.Sep ~ 10.Sep 27.Sep ~ 29.Sep	9	15%	15%		
	Tertiary	10.Sep ~ 16.Sep 19.Sep ~ 27.Sep	14	20%	20%		
2000	Primary	9.Sep ~ 11.Sep	3	10%	10%	-97cm 10.Sep	——
2002	Primary	30.Sep ~ 2.Oct 4.Oct ~ 2003.8.Jan	100	10% 10%	10% 10%	-99cm 29.Oct	60.04m^3/s 4.Jul

Uki-Mido Temple ordinary(2002)

Uki-Mido Temple during a drought (1994)

Management of the Amagase Dam

The Amagase Dam is located in the Uji River.
The Uji River, called the Seta River in the upperstream, joins the Kizu and Katsura Rivers downstream to flow into the Osaka Bay as the Yodo River.
In 1953, during of typhoon No.13 the area along the Uji River banks was flooded, and which motivated the construction of the Amagase Dam in 1964.

■Prevention of Flood

The inundation of the Uji River is prevented by reducing the design high water discharge of 1360m³/s to 840m³/s at the dam location, and flood in the downstream area is prevented by reducing the discharge to 160m³/s when the Yodo River main river reaches it's peak flow.

■Generation of Electricity

The Amagase Power Station generates a maximum electric power of 92,000kw (electricity for a population of 100,000) and the Kisenyama Power Station, utilizing the Amagase Dam Lake as a regulation pond, generates a maximum of 466,000kw (electricity for a population of about 500,000) of pumping-up type power generation.

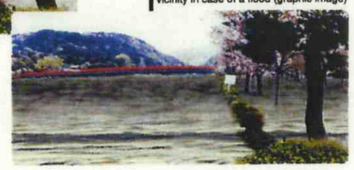
■Providing Tap Water

The water supply area covers Uji City, Joyo City, Yawata City and Kumiyama Cho.
A maximum of 1.104m³/s of tap water is supplied to a population of 350,000.
In Amagase Dam, various services such as discharge alarm and operation of gates are carried out during flood. Also, under normal conditions, several management services such as the proper management of the dam and dam lake, are carried out.
Due to the large intake volume from the Lake Biwa located up stream to Amagase Dam, the dam is the busiest gates in Japan 50 to 80 days in a year.

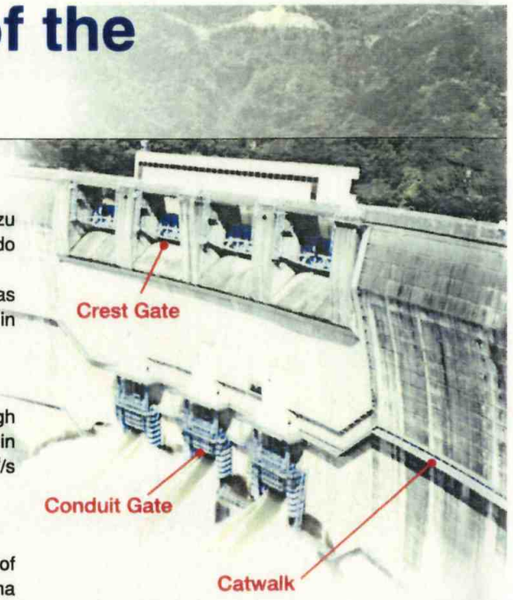
■Simulation of Flood in the Yodo River Upper Stream Area (Uji River) (If the Uji River dike breaks ….)

Let's perform a simulation of flood to see its consequences in case the Amagase Dam did not exist, considering that a typhoon of the same scale as that of the No.10 of 1982 hit the area and the Uji River Dike breaks.

[Tounoshima]
vicinity under normal conditions.



[Tounoshima]
vicinity in case of a flood (graphic image)



Outlines of the Amagase Dam Services

Management of the Dam in Ordinary Situation

- Knowing the dam properties
- Low water management
- Monitor the discharge
- Surveying of sedimentation
- Patrol of the storage reservoir and the surroundings
- Inspection of the monitoring equipment of the dike
- Monitoring items such as uplift pressure of the whole dike
- Inspection of the discharge facilities
- Inspection of telemeter facilities
- Patrol of warning board
- Disposal of driftwood
- Management of the office buildings
- Inspection of electric facility
- Maintenance
- Water quality management
- Permission / Approval service

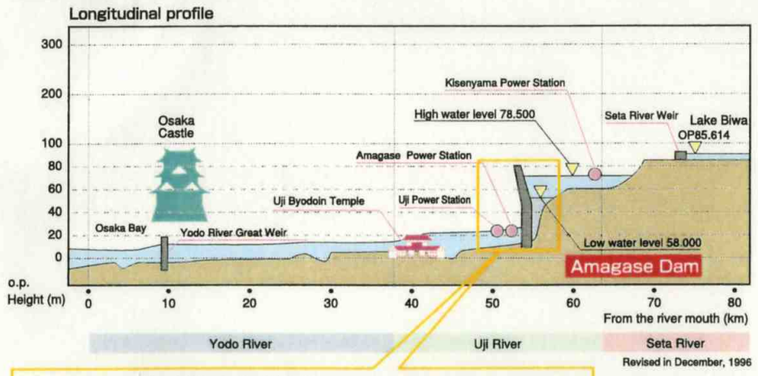
Management during flood

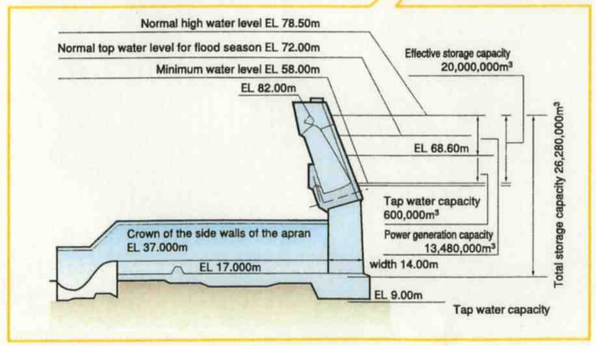
- Inflow prediction
- Inspection of discharge facilities
- Patrol of storage reservoir
- Notification of outflow
- Monitoring of inflow at upper stream monitoring point
- Sound the alarm
- Downstream patrol
- Gate operation
- Dealing with press and mass media

Dimension of the dam and reservoir

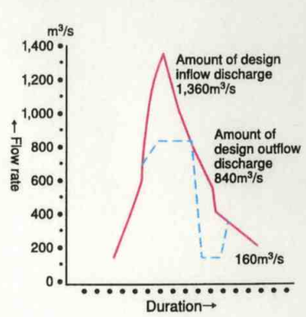
River Name	Yodo River, Yodo River basin (Uji River)
Location	[Left Bank] Rokkokku, Makishima-cho, Uji City [Right Bank] Makioyama, Makishima-cho, Uji City
Drainage area	Lake Biwa drainage area 3,848km² (Lake area 680km²) Amagase Dam drainage area 352km² Total (whole river basin area) 4,200km²
Type	Dome type Arch type
Crest length and dam height	Crest length 254m Dam height 73m
Volume	Dam main structure 121,500m³ Counter-dam apron 42,500m³ total 164,000m³
Geology	Sandstone,Slate
Conduit Gate	3 gates Outflow discharge 1,100m³/s (capacity) 840m³/s (design maximum discharge)
Crest gate	4 gates Outflow discharge 680m³/s (capacity)
Reservoir area	1.88km²
Normal water level	O.P. +78.5m
Normal top water level for flood season	O.P. +72.0m (16,～15, Oct)
Minimum water depth	O.P. +58.0m
Available water depth	20.5m
Reservoir capacity	26,280,000m³(about 70 times the volume of Koshien Stadium)
Effective storage capacity	20,000,000m³

■Storage Distribution





■Plan for Flood Control



The dam is crying!

[Inlet of garbage]
When it rains, a large amount of driftwood and garbage flows into the Amagase Dam.
Although the driftwood and garbage are removed, it had totaled an yearly amount of 2,058m³, an equivalent of 10,000 barrels, in 1998.
When the garbage is left in the reservoir, not only the aesthetic is spoiled, but also the dam operation and the water quality is badly affected.

To protect the environment, the drifting bodies are collected from the Amagase dam.

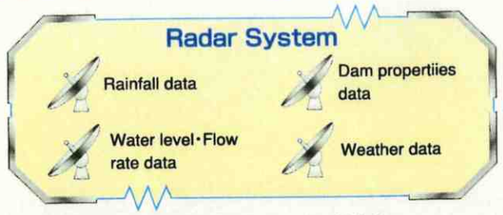
Yodobee's Dictionary

Conduit Gate
Located in the middle level of the dam and used as the main gate.
Coaster Gate
Used in case of maintenance inspection of the main gate and as auxiliary gate in case the main gate does not work.
Crest gate
Emergency gate located on the top of the dam and used in case of extreme floods.
Catwalk
Path, installed for inspection and for going to the discharge gate room.
It is called cat-walk because it is as narrow as a passage for cats.

Collect and provide information

To prevent damages of flood and drought, various telecommunication systems are installed so that information on the rivers and climate are collected and monitored.

●We have the following telecommunication systems.



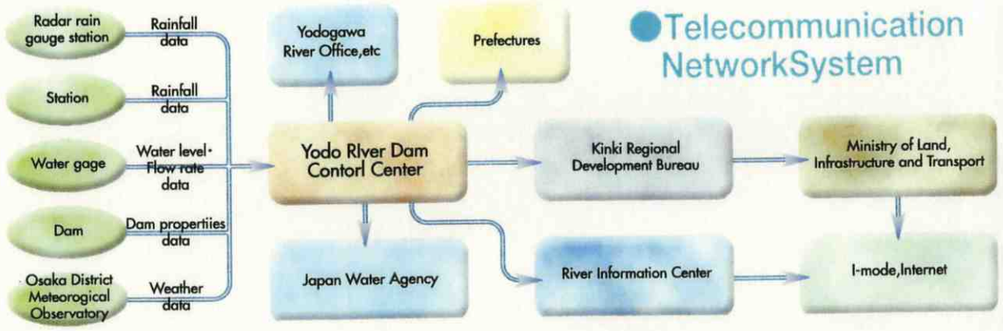
Double circuits are installed for the case in which the main routes are interrupted by a disaster.

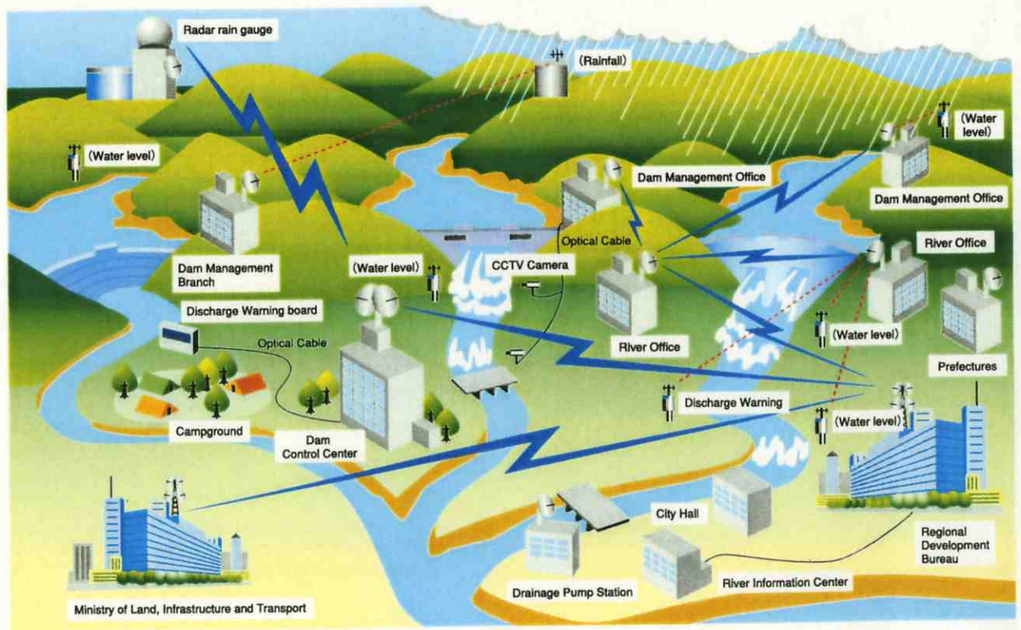
Mobile radio circuit
It's used as communication media during patrol and in disaster areas.

Discharge warning radio circuit
Audible warning and siren are activated during the discharge.

Optical fiber telecommunication network
Acquisition of graphic data such as that of CCTV is possible.

●Telecommunication NetworkSystem



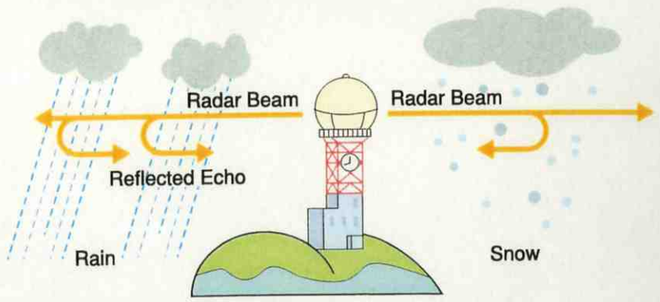


●Radar Rain Gauge System

Radar rainfall monitoring is carried out in Miyama at the border between Osaka Prefecture and Kyoto Prefecture,and Jyogamoriyama,Wakayama Prefecture, not only to get detailed information on heavy local rain in the whole Kinki area, but also on the rain condition of a wide area, together with its extension,direction of travel,speed and intensity of the rain.
At Miyama Rainfall Radar Station, dropper radar (an equipment capable of measuring data such as wind direction, and wind speed, every 5 min.) was introduced, improving the precision of short-term prediction of rainfall.
The data of these 2 Radars and the radar data of other areas are assembled and processed by computer and information are provided to the internal offices and the main office.

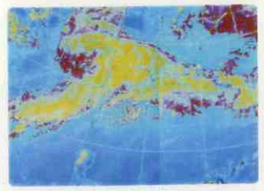
Miyama Radar Rain Monitoring Station

Outline of Radar Rain Gauge

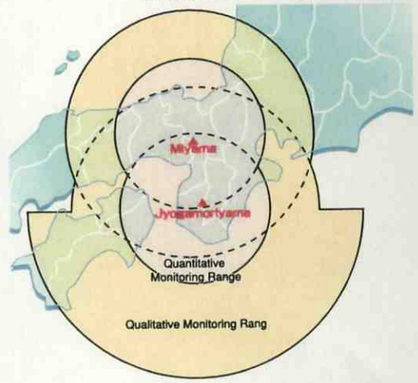


The Radar rain gauge launches an radiowave pulse while rotating its antenna.
The radiowave is reflected when it hits a raindrop or snow particle, and the amount of the reflected radiowave and its return time are measured. Through its direction and distance the rainfall is measured on an area.

Radar Rain Gauge Data
(Indication of West Japan Rainfall)



Radar Monitoring Coverage



●Computer system

Information data on the basin (rainfall, water level, amount of intake, dam, weir properties, snowfall and water quality) is collected and the computer performs the data-processing and the computation for prediction.
The processed information is provided to the concerned disaster prevention-related organizations to be widely applied.

●Short-term Rainfall Prediction System

In the Yodo River Dam Control Center, various systems are being developed aiming a perfect dam management.
As one of these systems, there is a system that predicts the rainfall for 1 to 4 hours ahead.
This system, using the Rainfall Radar data from the Ministry Land,Infrastructure andTransportation and the data monitored by the Meteorology Agency, calculates automatically the predicted rainfall for every hour, for 1 to 4 hours ahead.

※altitude of 3.5km