

# CHIKUGO RIVER



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The picture on the front cover shows the mouth of the Chikugo River



Construction site of Chikugo Great Weir



The Upper Stream of the Chikugo River (near Hita City)

## I. Outline of the Chikugo River

Since old times, the Chikugo River has many names, for an example, the Chitose River, the Chikuma River, the Ichiya River and so on. In 1636, "Chikugo River" has become a formal name. It is one of the biggest rivers in Japan, and people say the River in east is Tone River (pet name Bando-Taro) whereas the River in west is Chikugo River (pet name Chikushi-Jiro).

The Chikugo River is born in the outer rim of the famous volcano crater named Aso, and gathers water streams from the mountains around Aso. In Hita City, she meets the Kusu River that originates in Kuju Range of Mountains. After passing the narrow valley, named Yoake Ravine, she gathers many tributaries and then flows through the Chikugo and Saga Plain. Finally she empties into the Sea of Ariake which is famous for the reclamation works and the big tidal amplitude.

The Chikugo River basin expands four prefectures (Kumamoto, Oita, Fukuoka and Saga). From ancient days, people have appreciated many favors from the Chikugo River as a result of control and utilization of water.

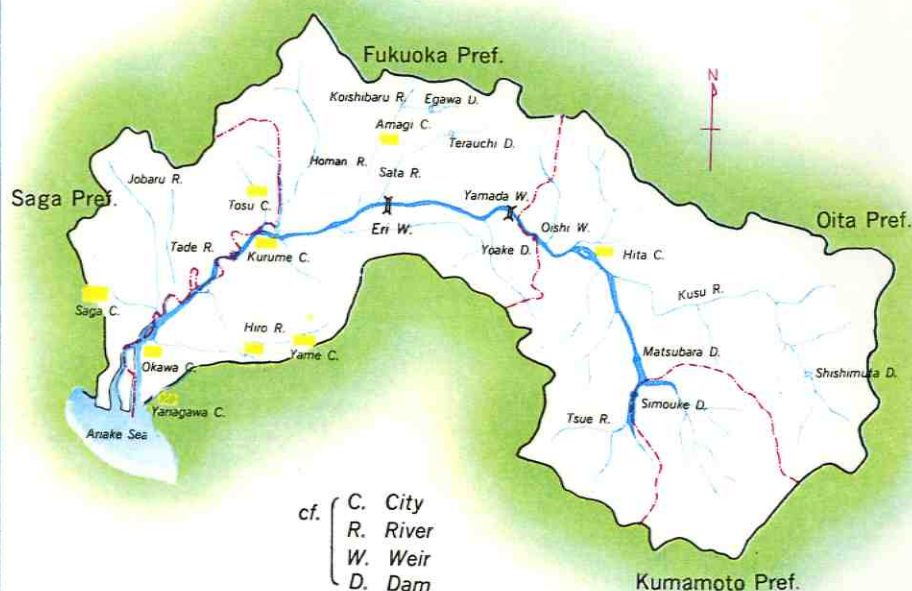


Fig.1-1 Situation

Area of the Chikugo River Basin  
 Length of the Main Stream  
 Total Volume of Runoff  
 Population of Basin Area  
 Irrigated Area  
 Hydro-Electric Power

2,860Km<sup>2</sup> (portion of mountain area: 70%)  
 143Km  
 about  $34 \times 10^8 \text{m}^3$  (annual average of 1950~1980)  
 about  $12 \times 10^6$   
 about  $65 \times 10^3 \text{ha}$   
 $210 \times 10^3 \text{kW}$  (Total of Maximum power)

Fig.1-2 the Chikugo River Basin



## II. History of River Improvement Works.

The Chikugo River was running along feudal borders in the past time. So some facilities, named Mizuhane, were made at various places in order to push out water to the other side. And some equipments, called Arako, were built to keep enough depth for sailing. Most of them have been taken off by river improvement works since the Meiji Era. But a few of them still remain.

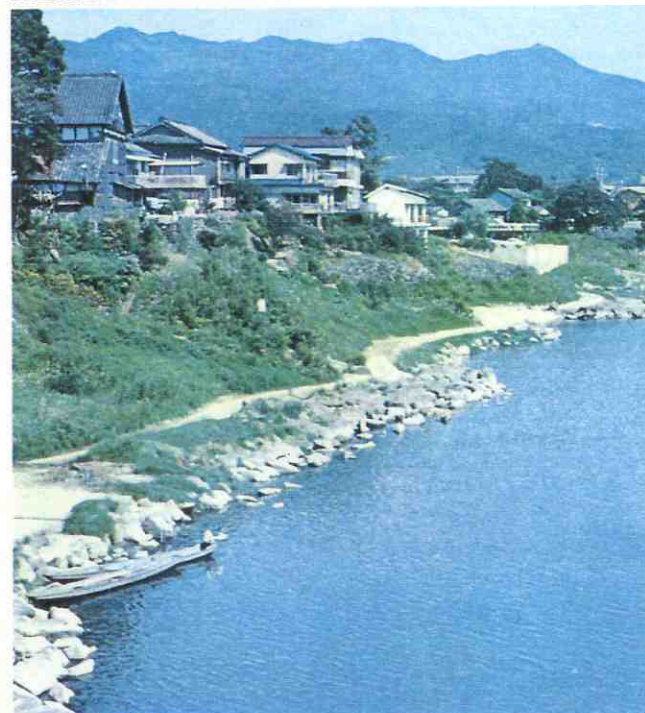


Fig.2-1 Mizuhane (near Showa bridge at Haki-cho, Asakura County)

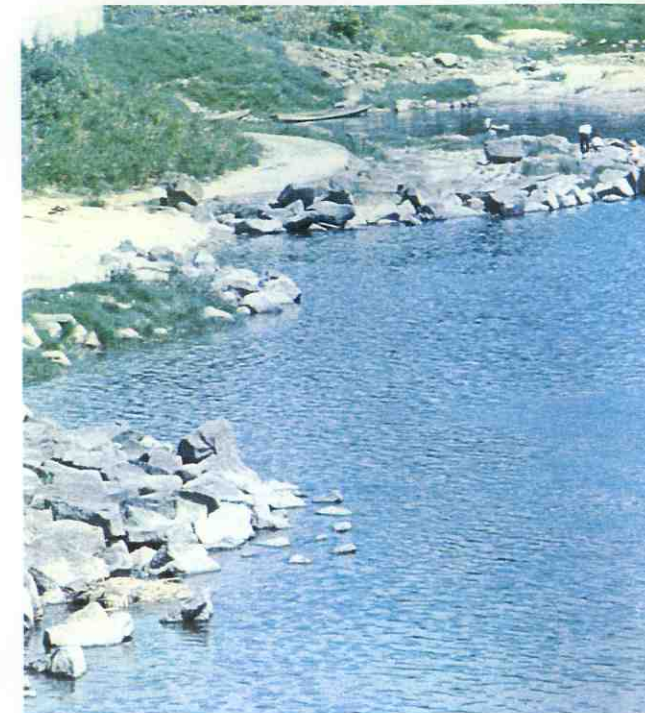
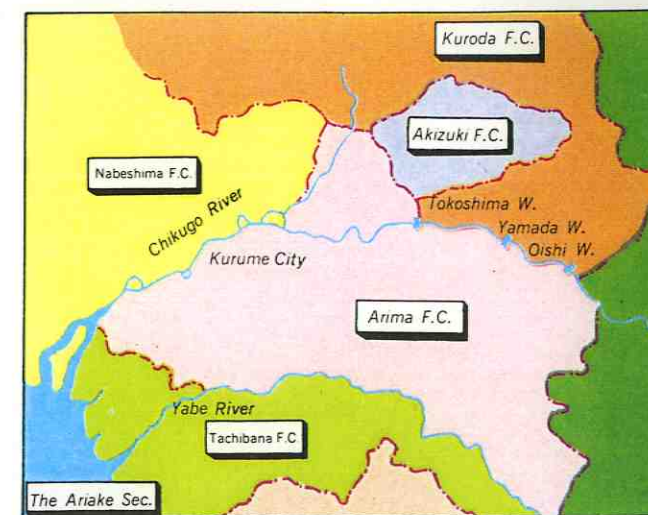


Fig.2-2



Fig.2-3 Arako (Kitashigeyasu-cho, Miyaki County)



cf. F.C. Feudal Clan  
 W. Weir

Fig.2-4

As Chikugo River ran through bound of each clan, there often happened wars between these clans for use of water or protection of their territories.

## II - 1 Chiriku Bank

About three hundreds and fifty years ago (1627), in Nabeshima Feudal Clan (now, Saga Prefecture), Mr. Hyogo Narutomi constructed Chiriku Bank to defend the Saga Plain from floods. It extends about 12km from the foot of Chiriku Shrine to Sakaguchi. Now, some parts of it is used for a prefectural highway which connects Kurume City and Kanzaki-cho.



present Chiriku Bank that is used for a road now.

Fig.2-5

## II - 2 Yasutake Bank

About the same time, when Chiriku Bank was built, in Arima Feudal Clan (now, Kurume City), Yasutake Bank was made near the Yasutake village on the left side of the Chikugo River. It was 4km long and later in 1741, a new bank, which was 1.4km long from Yamaura village to the lower reaches of Sumiyoshi, was connected with the former bank.

It is said that Chiriku and Yasutake Bank were important to defend Nabeshima Feudal Clan and Arima Feudal Clan from a flood.

Fig.2-6



present Yasutake Bank

## II - 3 The Improvement Works in the Meiji Era

In 1887, the first improvement works on a 8 year-plan started, the works extended 88 km from the estuary to Kuma-cho in Hita City, and main works were the consolidation of low waterway. But the very big flood occurred in 1889, consequently the second improvement works on a 8 year-plan was expedited from 1896, the second works spread from the estuary to Haki-cho, putting priority to consolidation of high waterway. At that time Mr. Yohans. E. Dreak, Dutchman civil engineer, planned a training dike to maintain the passage for ship in the estuary. It was built for about 6 km from the railway bridge of Saga Line to the Sea of Ariake. Even now it plays an important roll in the maintenance of a sea route and in the control of sediments floating down from the upper stream.



Fig.2-7

the Training Dike constructed in the Meiji Era

## II - 4 The Improvement Works in the Taisho Era and the Early Showa Era

From 1923, up the stream from Kurume City, we constructed the continuous levee, and extended the width of the river. And at Kanajima, Komorino, Tenkenji and Sakaguchi regions we expedited cut-off works. Also in main tributaries, many gates were constructed. Consequently these works increased the capacity of flood flow and prevented water from running back to tributaries. On the other hand, in the lower stream, dredging works were done to maintain sea routes. Later owing to the flood of June 1945, improvement works of tributaries and drainage works of inner basin was added to the plan of 1923.

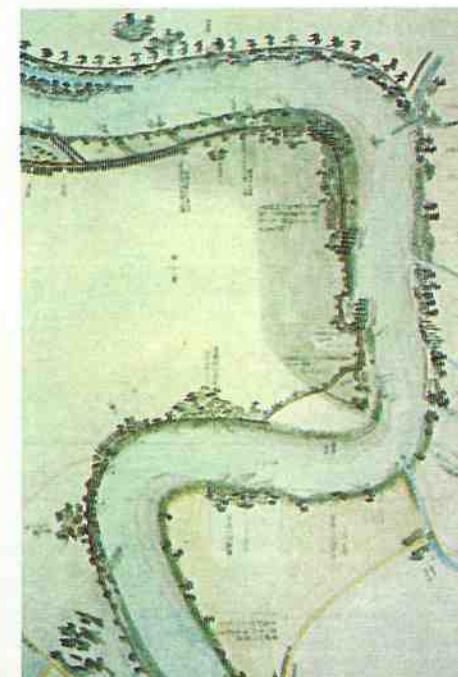


Fig.2-8 map near Komorino



Fig.2-9 Komorino Short-cut (Cut-off) Work

### III Utilization of Water

Since ancient days, water of the Chikugo River has been used for irrigation by construction of weirs. Since 1907 water power stations have been built in various places, Nowadays we utilize river water of industrial usage, domestic usage and so on.

Now, we have thirty weirs in the Chikugo River. Among them, Oishi, Yamada and Tokoshima (Eri) weirs are very big and well-known, and there are many interesting stories about them.

#### III-1 Oishi Weir

In the Edo Era, a severe drought often occurred around Ikuha County. Leaders of five villages in Ikuha County made up their minds to construct a weir. They made a direct appeal to their feudal Lord (Arima Feudal Clan), and in 1663 they got permission of weir construction. Then the leaders and many farmers worked together day and night to complete the weir.

This weir was broken in 1953 by a violent flood. Now it is replaced by a concrete one.



Fig.3-1 Oishi Weir

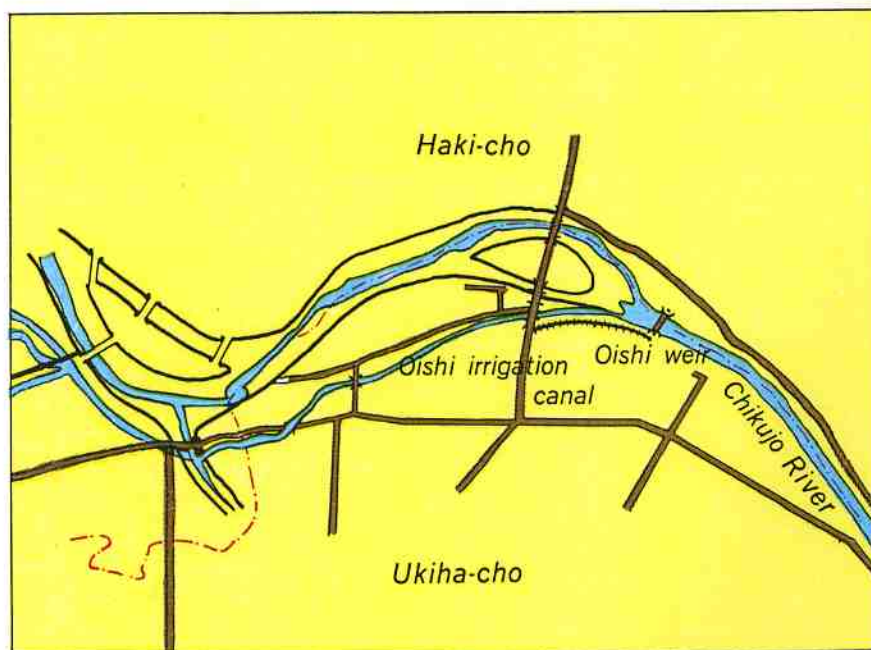


Fig.3-2 Sketch Map of Oishi Weir and Oishi Irrigation Canal

#### III-2 Tokoshima (Eri) Weir

In 1710, a great drought attacked Kagami Village. Mr. Rokuemon, one of the leaders in the village, determined to build a weir. Arima Feudal Clan also ordered Mr. Mataroku Kusano its construction. He was a retainer of Arima Feudal Clan and an engineer of reclamation and irrigation. The village people worked together with him. But it was very difficult to build a weir about 310 meters long across the Chikugo River. At first, big trees and rocks were submerged, but they were carried away just like leaves by floods. At last they found an idea to submerge old ships which were full of stones. Then, the weir construction was accomplished finally.



Fig.3-3 Eri Weir



Fig.3-4 Tokoshima Weir

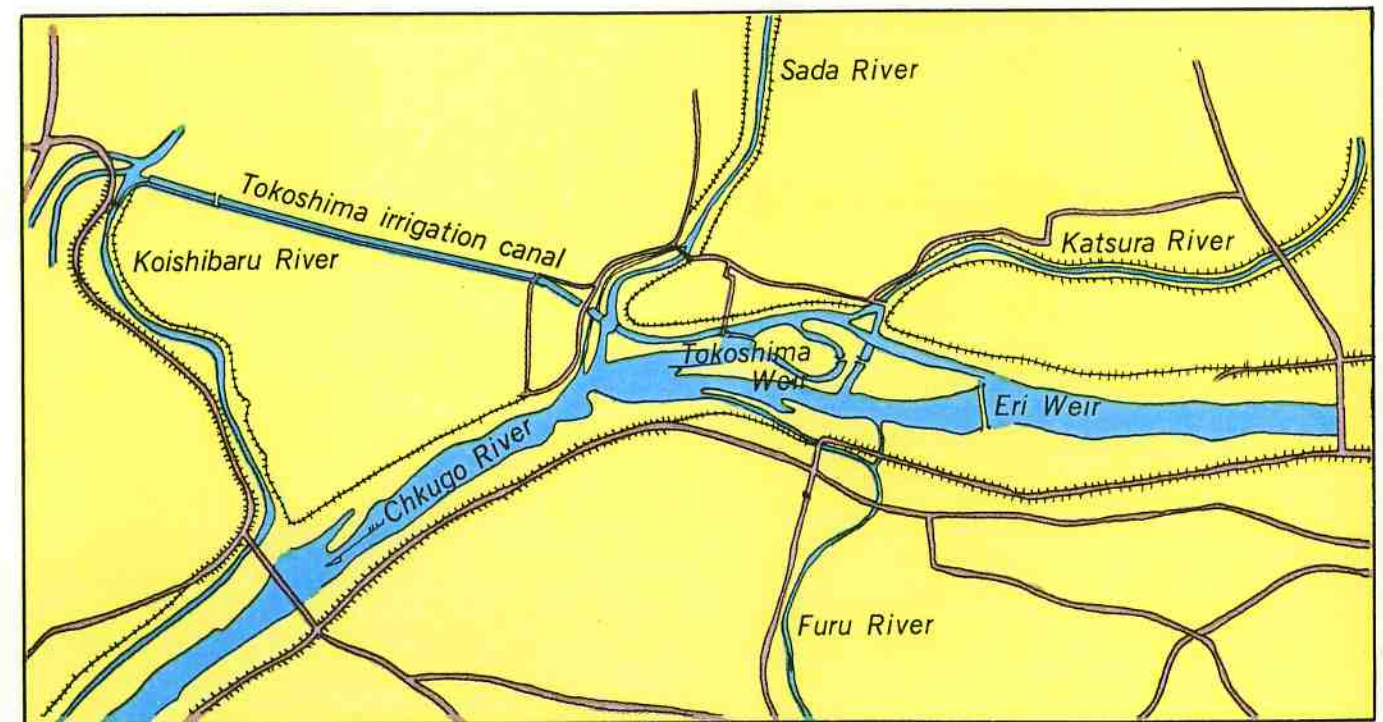


Fig.3-5 Sketch map of Tokoshima (Eri) Weir

### III-3 Hydro-electric Power Generation

Ishii Power Station was completed in 1907, and Onagohata power station was built in 1913.

Yoake dam was completed for the purpose of electric power generation in 1954. Matsubara and Shimooke dams were been constructed for the multipurpose dam in 1970.

Now there are twenty power Stations which generate 210,000 kw (maximam power).



Fig.3-6 Onagohata Power Station



Fig.3-7 Yoake Dam

### III-4 Domestic Water

In recent days, the rate of water service pervasion is increasing, and the standard of our living style is improving. Therefore demand for domestic water is increasing rapidly. In future, we will face the serious lack of domestic water, so we are coping with these problems earnestly.

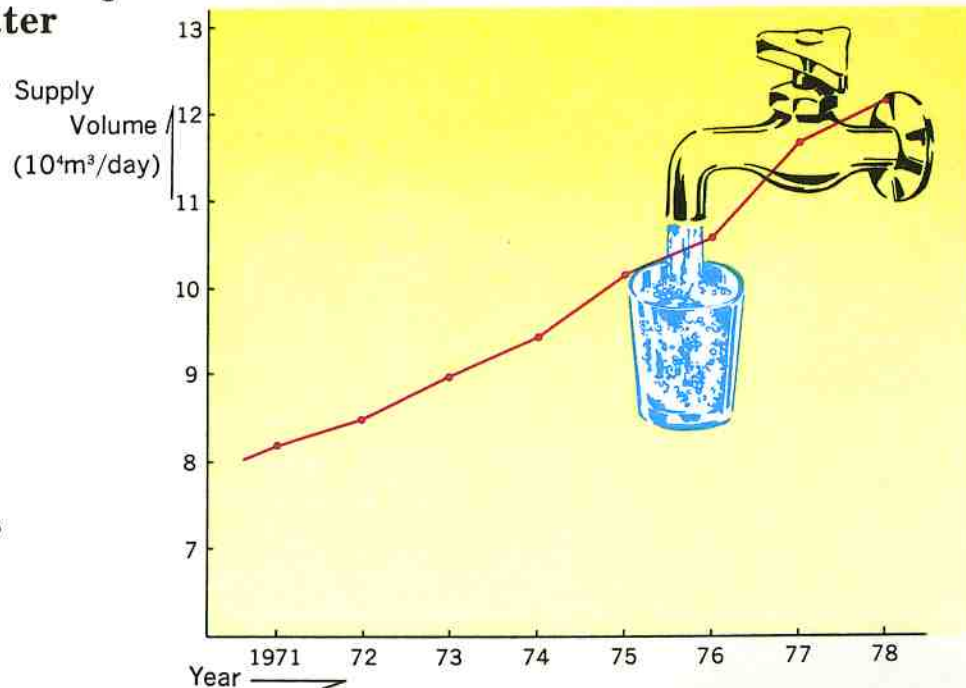


Fig.3-8 Change of Supply Volume of Domestic Water

### III-5 Ao Intake

Around the lower stream of the Chikugo River, paddy fields expand widely. (We call the Chikugo and Saga Plain.) A great number of creeks spread in all directions. In these districts, people have known the special way for irrigation since old times. They call it "Ao Intake and Creek". Ao means pure water which contains little salt.

The tidal amplitude in the Sea of Ariake is very big (about 6 meters). At the flood tide, the tide reaches to Kurume City (25km up from the estuary), pushing up pure water above sea water. Farmers take in these pure water from gates or by pumps, and store it in creeks to irrigate paddy fields.



Fig.3-9 Creeks that spread over around the lower stream of the Chikugo River



Fig.3-10 Ao is being taken in from Terai gate, now



## IV Outline of the Present River Works

In 1923, the Chikugo River Improvement Works Office (now, Chikugo River Construction Office, Ministry of Construction) was established under the jurisdiction of the Interior Department. Up to present, improvement works have been executed for 58 years since then.

Improvement works plan was often revised after violent floods. The present plan has been set up in consideration of the flood in June 1953.

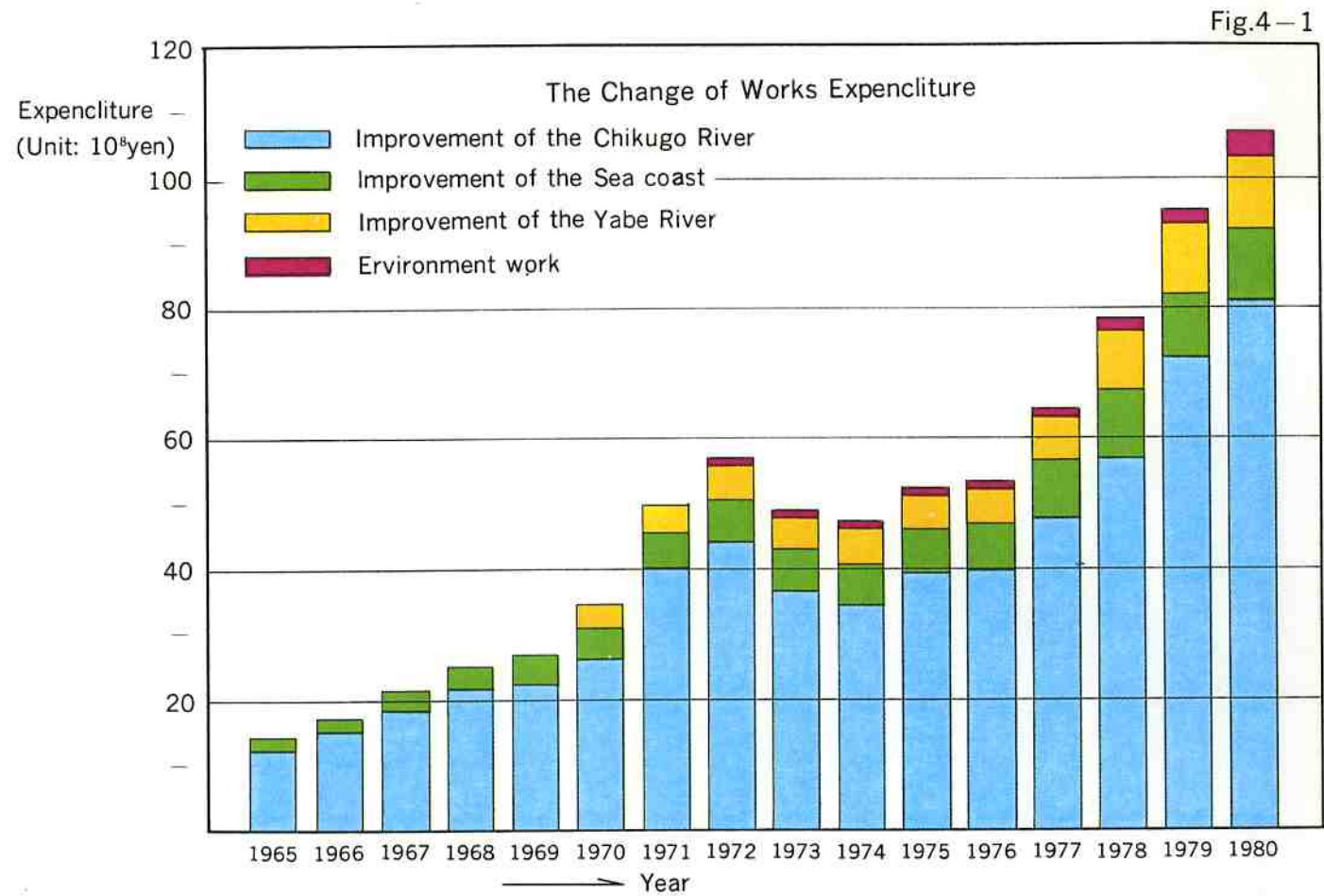


Fig.4-2 Excavation, Banking and Revetment Work in Kojima (Tade River)



Fig.4-3 Banking Work in Kizuka

## IV-1 Basic High-Water Discharge and Channel Design Discharge

To implement River improvement Works effectively, the basic high-water discharge and channel design discharge are determined. In the Chikugo River basic high-water discharge is 10,000m<sup>3</sup>/s at the basic point, Yoake, and we plan to cut it down to 6,000m<sup>3</sup>/s by constructing dams in the upper stream.

the Change of Flood Control Plan

Plan	Basic Point	Basic High-water Discharge	Dam Cut Discharge	Design Discharge
1949 Plan (decided by the committee of flood control study)	Shiba	7,000 m <sup>3</sup> /s	1,000	6,000
1957 Plan (primary flood control plan)	Hase	8,500	2,500	6,000
1973 Plan (Present plan)	Yoake	10,000	4,000	6,000

Fig.4-4

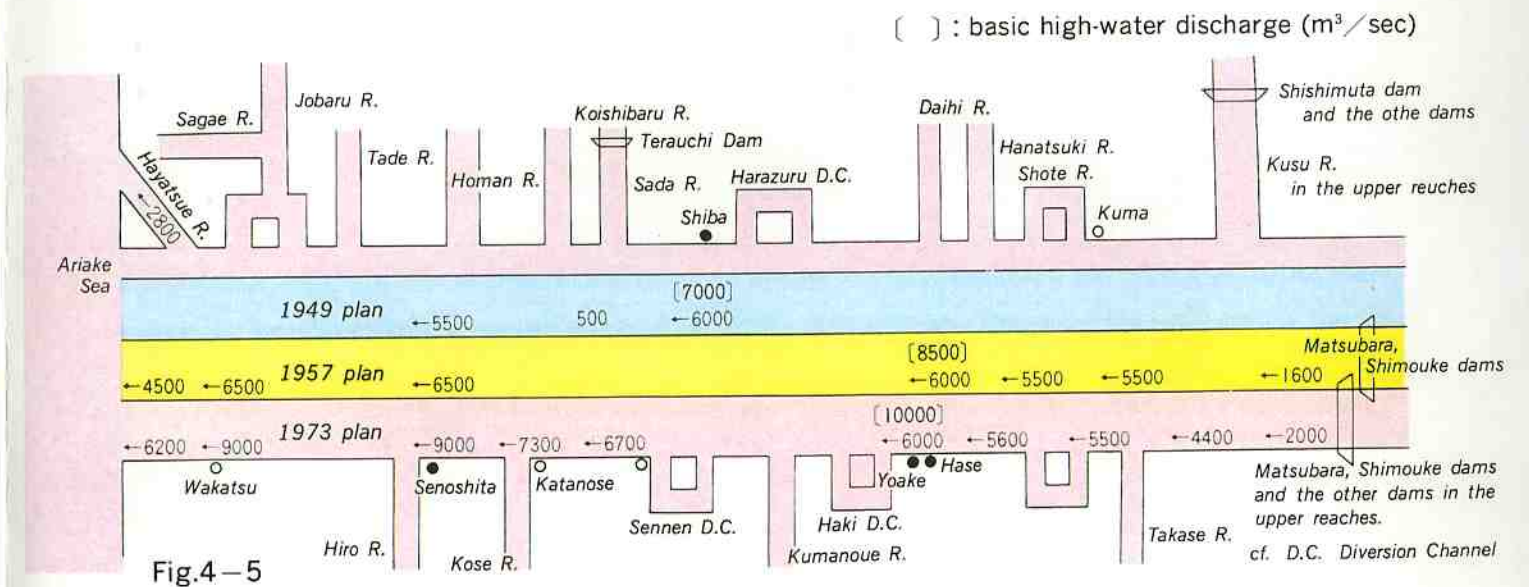


Fig.4-5

Cross-section of Design Levee

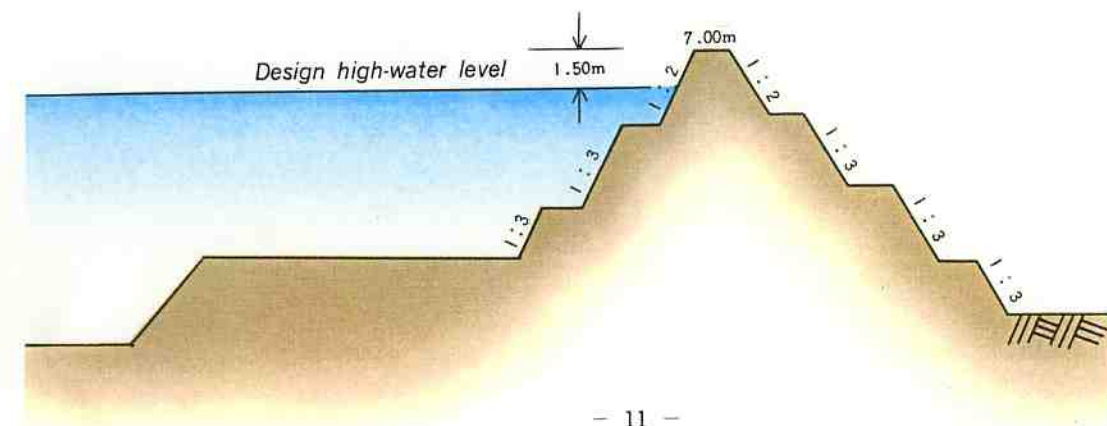


Fig.4-6

#### IV-2 Harazuru Diversion Channel

The river width in Harazuru Region in the middle reaches of the Chikugo River is very narrow. After a big flood attacked Harazuru in June 1953, the diversion channel, 1500m in length and 115m in width, was planned. The plan consisted of embankment works, riparian works and displacement works of bridges and irrigation channels. The Diversion Channel was completed in 1979.



Fig.4-7 Harazuru Diversion Channel

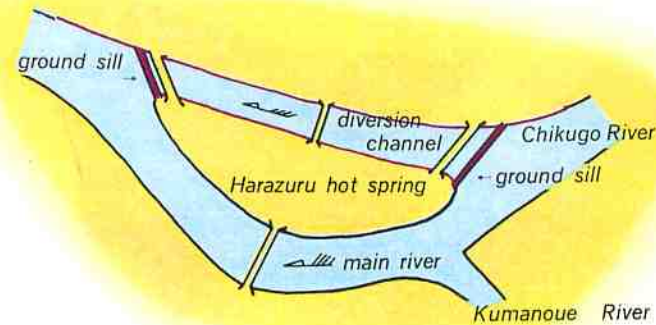


Fig.4-8

#### IV-3 Backward Displacement Works of Levee at Higashikushihara

This project is intended to displace the left side levee of Higashikushihara-district backward with the average width of 45m, in order to obtain sufficient cross-sectional area of the river and to let the design discharge safely flow down. The project includes embankment work (length: 2,350m, quantity of soil: about 420,000m<sup>3</sup>), removal work of former bank (length: 2,350m, quantity of soil: about 680,000m<sup>3</sup>) and raising and extension work of bridges. We will finish these works in 1988.



Fig.4-9 Backward Displacement Works of Levee at Higashikushihara

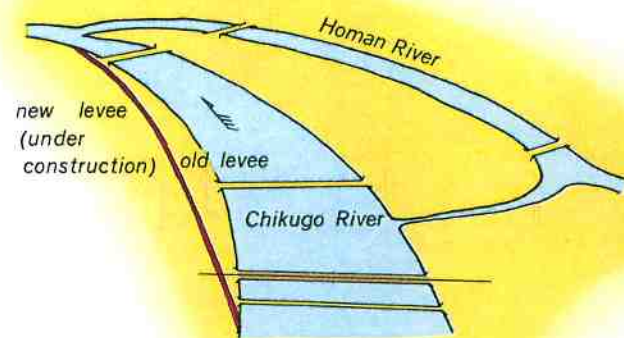


Fig.4-10

#### IV-4 Comprehensive River Development Works (Dam Construction works)

The flood in June 1953 caused great damage to the basin. Taking this opportunity, constructions of Matsubara and Shimouke dams were planned for the purpose of flood control and generating. We spent 14 years (1954~1970) and about 25,000,000,000 Yen (the price of that time) to construct these dams. In addition to the purpose of flood control, preparing the lack of water in the future, we have been carrying out the investigations of multi-purpose dams which are useful for securing water resources for domestic use, agricultural use and so on.

Table 4-1 List of major multipurpose dams in the Chikugo River

Name of Dam	Type	Height (m)	Length (m)	Volume (1000m <sup>3</sup> )	Total Capacity (1000m <sup>3</sup> )	Effective Capacity (1000m <sup>3</sup> )	Power Generation(Max) (Kw)	Year of Completion
Matsubara	Concrete gravity	83	192	294	54,600	47,100	50,600	1970
Shimouke	Concrete arch	98	248	282	59,300	52,300	15,000	1969
Egawa	Concrete gravity	79	298	261	25,300	24,000	—	1973
Terauchi	Rock fill	83	420	3,012	18,000	16,000	—	1978



Fig.4-11-1 Matsubara Dam



Fig.4-11-2 Shimouke Dam



Fig.4-11-3 Egawa Dam



Fig.4-11-4 Terauchi Dam



#### IV-5 Improvement Works to protect and preserve Seacoasts

The Coast of the Ise Bay suffered from the floodtidal waves which was caused by the typhoon in Sept. 1959 named "Ise-wan Typhoon". On this opportunity, we determined to consolidate the coastal area, which was 25.1km long from the right side of the estuary to Kashima.

As the result of the first improvement works, the height of sea banks reached T.P+6.10m. But in many places, sea banks have been sinking for the settlement due to consolidation of the ground. At present, the height of them has become as same as that in 1956. So we have got to reconstruct sea banks. It is expected that about 53,400millionYen is required to complete the plan since 1981. It is about 1.5 times much as the expense which has been invested since 1960 to 1980.

Main works of the coast improvement plan are as follows.

- ① Embankment works
- ② Foundation works
- ③ Ground improvement works
- ④ Gate and Sluice-way
- ⑤ Drainage facilities

Especially most of the expense is required for the ground improvement.



Fig.4-12-1 Hattae Tide-control Gate



Fig.4-12-2 Higashiyoga Tide-control Bank

#### \* IV-6 Improvement Works of River Environment

Regarding the effective utilization of the land and the remarkable developments in the river basin in these days, we are proceeding the Improvement Works of River Environment in order to use a river as the space of recreations effectively.

The Ikemachi River, which flows through a urban region of Kurume City, is uery polluted, so we started purification work of the Ikemachi River in 1977, The purpose of the work is to clean the Ikemachi River by introduction of clean water from the Chikugo River.

We are consolidating the control system of the river in order to make the comprehersive and effective operation of the river.



Fig.4-13 Park of the Chikugo Riverside

#### IV-7 Drainage Works of Inner Basin

As the result of the river improvement works, high levees have been constructed, and dams for the flood control also have been constructed in the upper reaches. So floods can flow down safely in the river channel without overflowing. On the other hand, the higher the rate of effective use of land has become, the more houses and housing lots have increased, and the pattern of run-off has changed considerably, too. In the middle and lower reaches, damages by landside water have become remarkable and grand-scale.

In the Chikugo River basin, the area where landside water often occurs is about 200Km<sup>2</sup>. And, at the head of the whole country, landside water countermeasures by mechanical drainage has been carried out, but present equipments are yet inadequate. So an increase of pump stations and the river regime adjustment projects (which means the discharge of water from a landsi-dewater river to another river.) are planned.



Fig.4-14 East of Saga City covered with landside water (1972)



Fig.4-15 Near Matsubara-cho in Saga City (1972)

## V. Disasters in the Past

183 floods were recorded for 361 years, from 1571 to 1889. During this period, no flood had occurred for 50 years, on the other hand the Chikugo River often flooded twice or thrice a year. On the average, it flooded once for two years.

The above tells how violent the Chikugo River was. The following table shows big floods in the past.

Table 5-1

Year	Summary of damage
1625	Chiriku dike was destroyed in three places.
1659	Incessant rain badly damaged farms and paddy fields. Bad crop. The inspector came down from Shogunate.
1668	Big flood destroyed the Takada watercourse perfectly.
1669	Many people and horses were lost. The national inspector came down to Kurume. On this opportunity some dikes were constructed.
1673	This big flood hadn't been seen those several years. It flooded Senoshita-machi above the floor level, and broke the dikes some in places.
1676	It was bigger than in 1673.
1680	Landsides in various places were occurred. It flooded Senoshita-machi 60cm above the floor level.
1702	Three floods attacked in May, June and August. They flowed many houses away.
1708	Heavy rain and flood. No one could go through the town except by a boat. It damaged farms all over.
1720	Long rain caused landslides a the Mino mountain system. In Hizen district, 116 houses were lost.
1745	The Nagano watercourse. Half was destroyed.
1767	Storm and flood. And water level recorded 6m at Miyachi and the flood flowed into the town of Kurume.
1779	It rained heavily from Aug.3, flooded on 5. The Komorino bank was broken in two places.
1789	It flowed at Ishiba-guchi 5.7m, and flooded many houses.
1802	Water level at Miyachi was over 5.7m, There were 9 houses lost on the down stream.

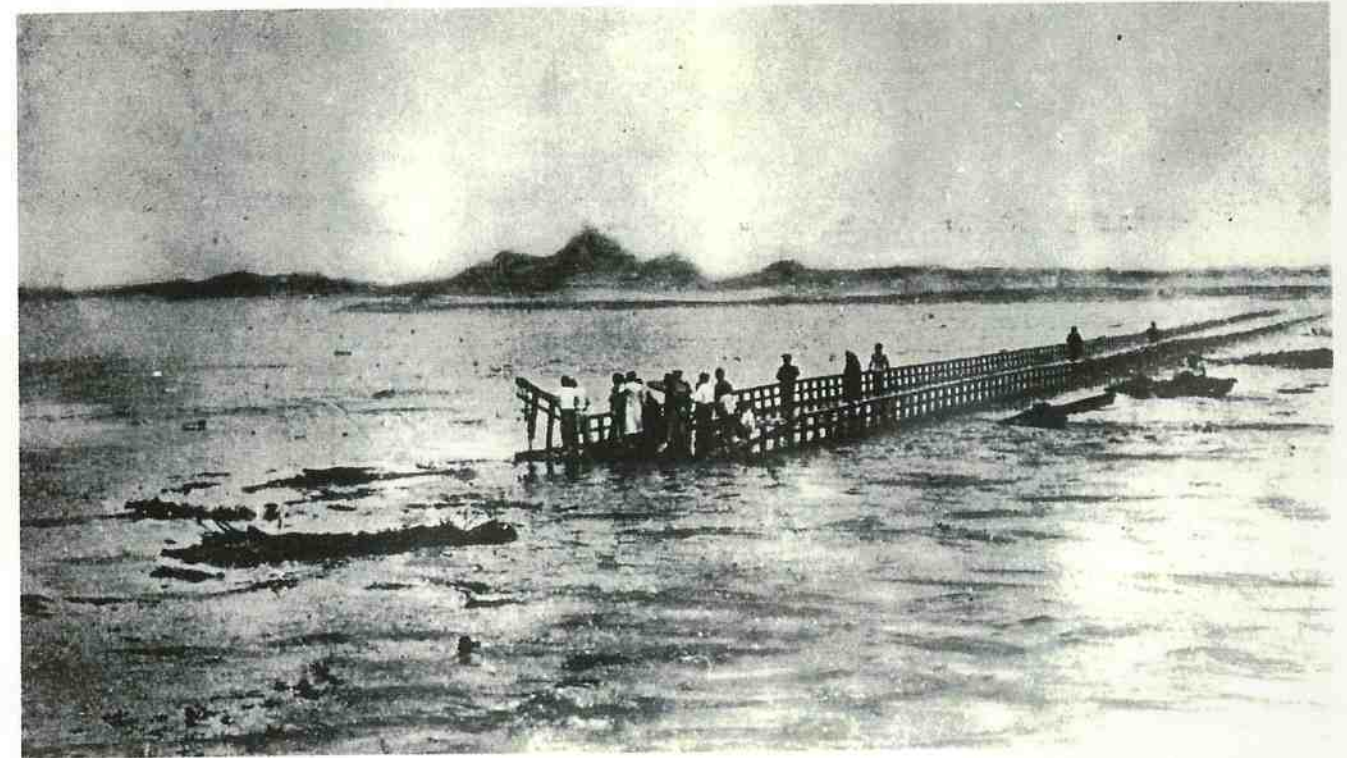


Fig.5-1

Just after Komorino Bridge was flowed away by the flood in June of Showa 28th (1953)

Table 5-2

Year	Summary of damage
1826	Landslides in 23 places. Water level at Kawategodairabansho was 5.4m.
1838 (May)	The flood collapsed the Komorino embankment. Many people and houses were missed. It flowed 50 houses away in Mizuma district, and killed many people and cattles.
1838 (Aug.)	Water level at the village of Takahata reached up to 7.8m. 188 houses were lost. Manny people and cattles were killed and injured.
1850	Water level at Miyachi was 5.4m on 24, 7.5m on 25.
1855	At Senoshita the water level reached to 7.72m. At Hase the volume of discharge was 7,800m <sup>3</sup> per second. This flood was a trigger of making the plan for improvement works of the river.
1889	It was big flood of record-breaking. It assiled the urban area of Kurume.
1921	It flowed away most of bridges. Damaged area was 33,200 ha.
1935	It damaged badly on both of the upper and lower stream. Embankments were broken in 93 places. Damaged area of farmland was 27,663ha.
1953	It recorded the highest water level; 9.02m at Senoshita, 1.4m higher than the level of Improvement plan. It flowed 8,500m <sup>3</sup> /s at Hase. 5,146 people were died, the spoiled land was 45,600 ha. Sum of the damage was 70,000,000Yen. (cf. Adjusted prices of 1969)
1972	Heavy rain concentrated on the West Japan. The river in the down stream and waterways flooded, especially the Saga Plain was damaged.

## V-1 The Three Great Floods of the Chikugo River

July in 1889

After the flood of the Kusu River flowed down, another flood of the Oyama River flowed into the Hita basin, and stayed awhile. 26,238 residences, 19,028ha farmlands were inundated; the many facilities were spoiled.



Fig.5-2



Fig.5-3

To appeal those damages of the flood, Mr. Arinobu Mitani, the mayor of Kurume City, made Mr. Hoan, a painter, draw the series of pictures.

(above and right)

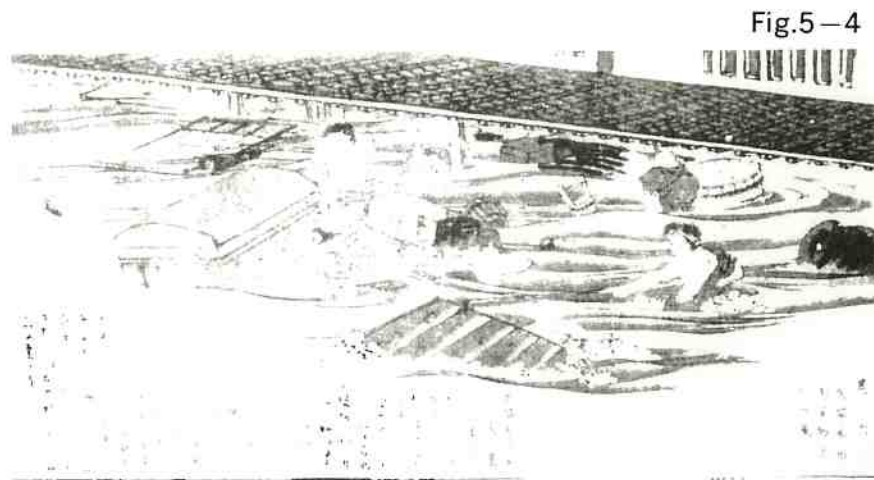


Fig.5-4

June in 1921

The upper stream of the Chikugo River (the Oyama valley) had a torrential rain: the continuous rain-fall reached 641 mm at Oguni, over 500 mm at Handa and Hita. A big landslide occurred at the upper stream. The highest water level of the Mikuma River recorded 3.54m. The violent current of the river entirely flowed away main bridges: Zenibuchi Bridge, Shote Bridge and Kobuchi Bridge.....etc.. Almost all embankments were destroyed. The current rushed into Hita City and inundated 60cm-1.2m over the main street of kuma-machi.

Along the Kusu River, which is the tributary of the Chikugo River, landslides terribly damaged power plants at Onagohata, Yuyama and Nogami. The districts of the middle and lower reaches were badly damaged, too. Especially, in Mizuma County, all towns and villages were inundated. The damaged area ranged all over Mitsui, Ukiha, Asakura and Kurume districts.

Damaged area in the all basin was 33,200ha. Its amount was estimated at 8,050,000Yen at the price of that time.

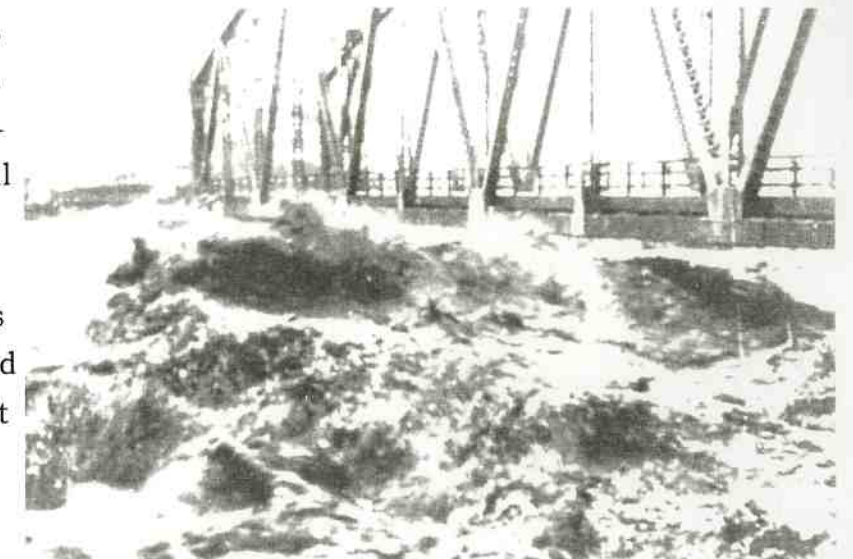


Fig.5-5 Haki-cho Showa Bridge

June in 1953

That year (1953), the West Japan had an unusual rainy season, which had several downpours before and after the end of June.

It also lasted longer than usual. From June 25th to 30th, the seasonal rain front was so active that it rained 960 mm in the upper stream of the Chikugo River, 880mm in the valley of the Kusu, 700mm in the middle and 600mm in the lower stream. At the upper part, rain-fall reached 400mm per day, and 80mm per hour.

The maximum discharge at that time was estimated at 8,500m<sup>3</sup>/s at Hase. The highest water level was 9.02m at Senoshita. This unusual flood brought a great damage all over the basin of the Chikugo River.

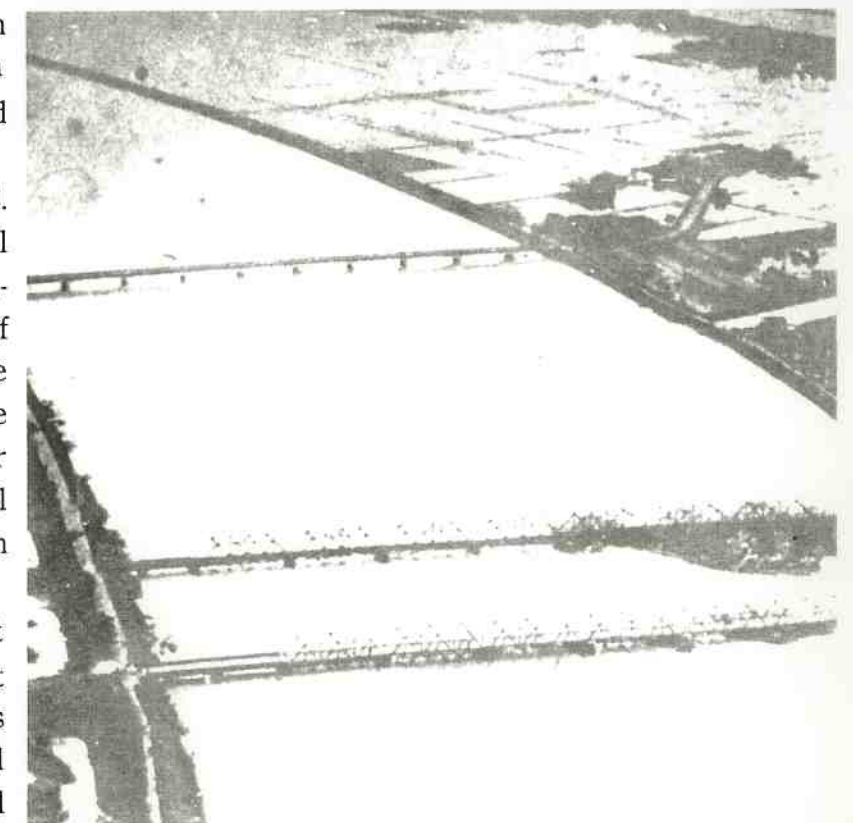


Fig.5-6 View of Miyanojin Bridge, Higashikushiwara-machi Kurume City

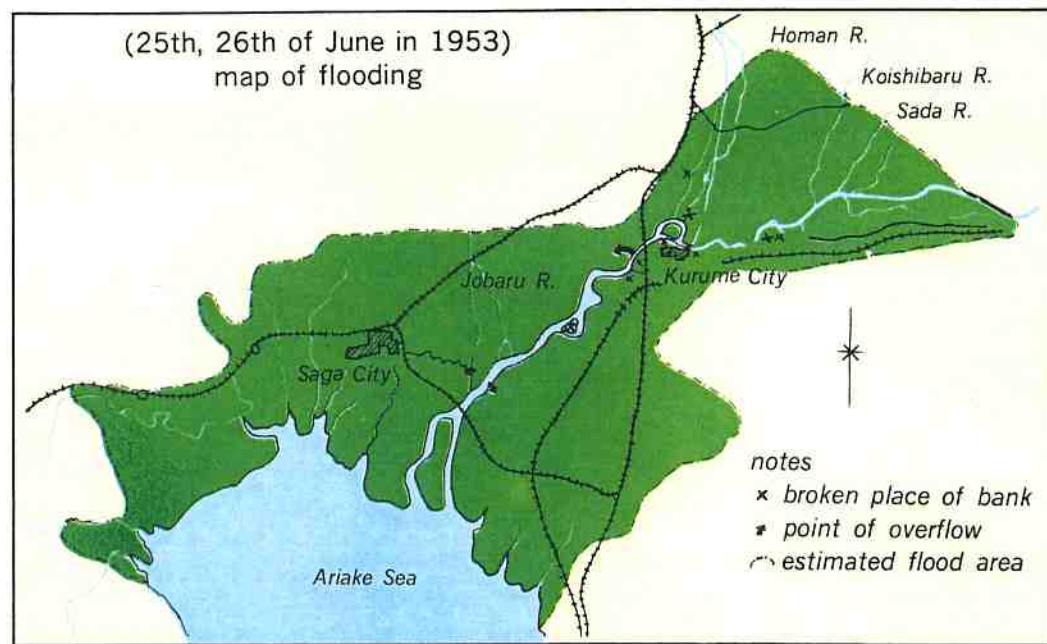


Fig.5-8

Fig.5-7

Turbid water running through Hita City.

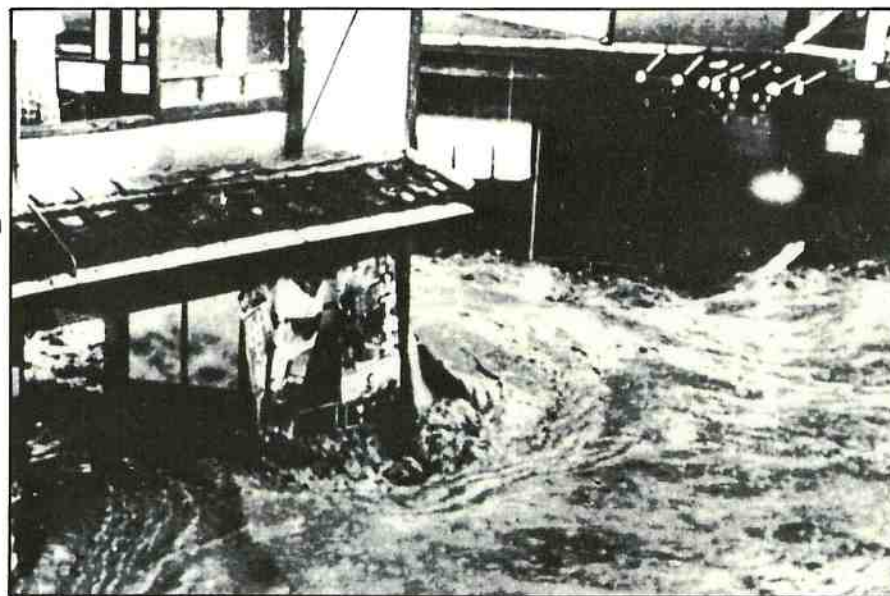


Table 5-3  
Damage by the flood in June of 1953

		Kumamoto	Oita	Fukuoka	Saga	Total	
Casualties	Dead (person)	53	40	47	7	147	
	injured (person)	172	250	4,166	411	4,999	
damage of house	residential	wholly destroyed (number)	369	228	986	79	1,662
		half destroyed (number)	827	565	4,606	3,836	9,834
	house	flowed away (number)	69	491	689	56	1,305
		flooded above the floor level (number)	796	3,790	34,358	10,256	49,201
		flooded lower the floor level (number)	879	7,123	25,850	12,471	46,323
		total (number)	2,940	12,197	66,489	26,699	108,325
	non-residential house (number)	0	170	1,526	38	1,734	
damage of farmland	buried and flowed away (ha)	0	2,350	4,660	509	7,519	
	submerged (ha)	0	3,420	22,900	11,828	38,149	
	total(ha)	0	5,770	27,560	12,338	45,668	
damage of public facilities	railway (place)	0	16	4	8	28	
	road (place)	888	992	1,112	765	3,757	
	embankment (place)	1,480	112	456	518	2,576	

## V-2 Flood Defense

In order to avoid floods in advance and to protect people and property, we check up river facilities (embankments, gates, etc.) and offer information on the safety management method to the managers (local governors) of the facilities. We also give them a flood warning.

The Kyushu Regional Construction Bureau under the Ministry of Construction and Fukuoka District Meteorological Observatory give the flood forecast. These two official institutions cooperate with local governors concerning flood forecasting.

### -Flood Warning-

Flood warning is issued whenever it is needed by the head of the Chikugo River Construction Office to local governors who are in charge of protection activities against floods.

Flood warning has four steps:

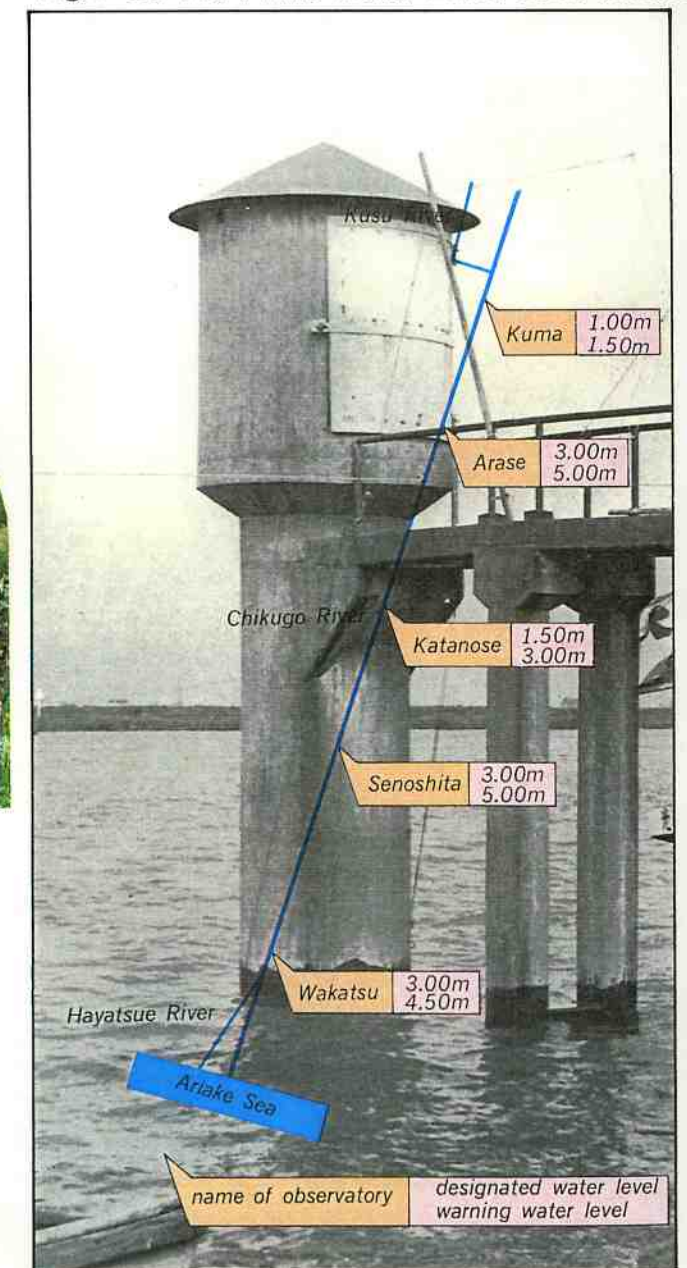
- (1) Wait and watch
- (2) Get ready
- (3) Go out into actions
- (4) Call off

Each warning is given according to the water level of the prime water level observatories.



Fig.5-9 Chikugo River Construction Office

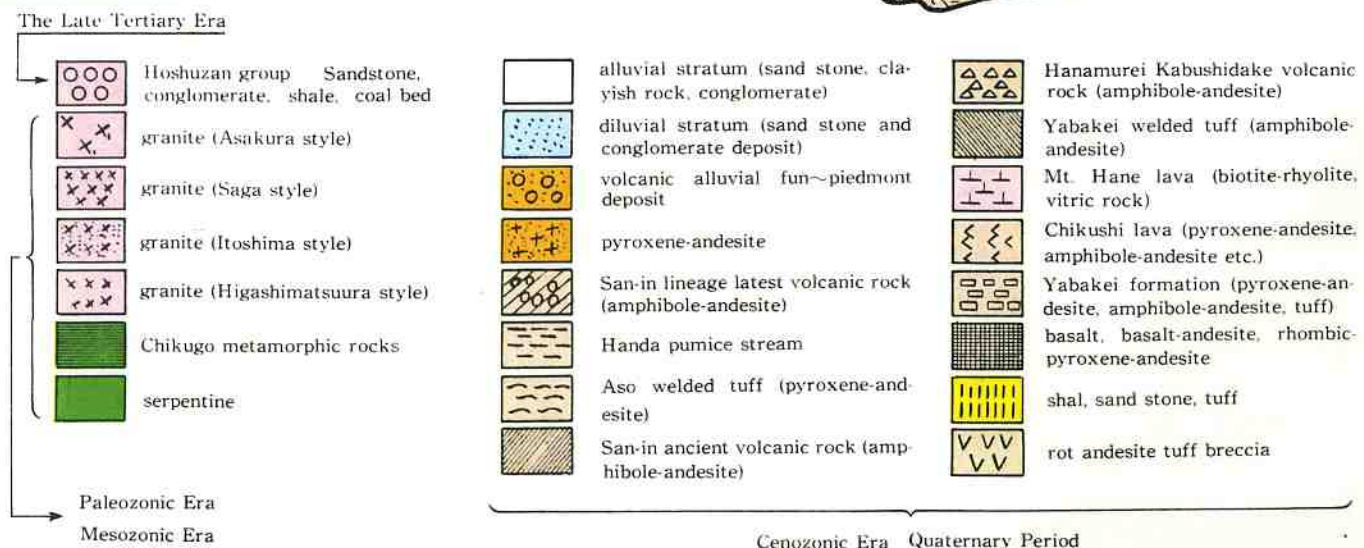
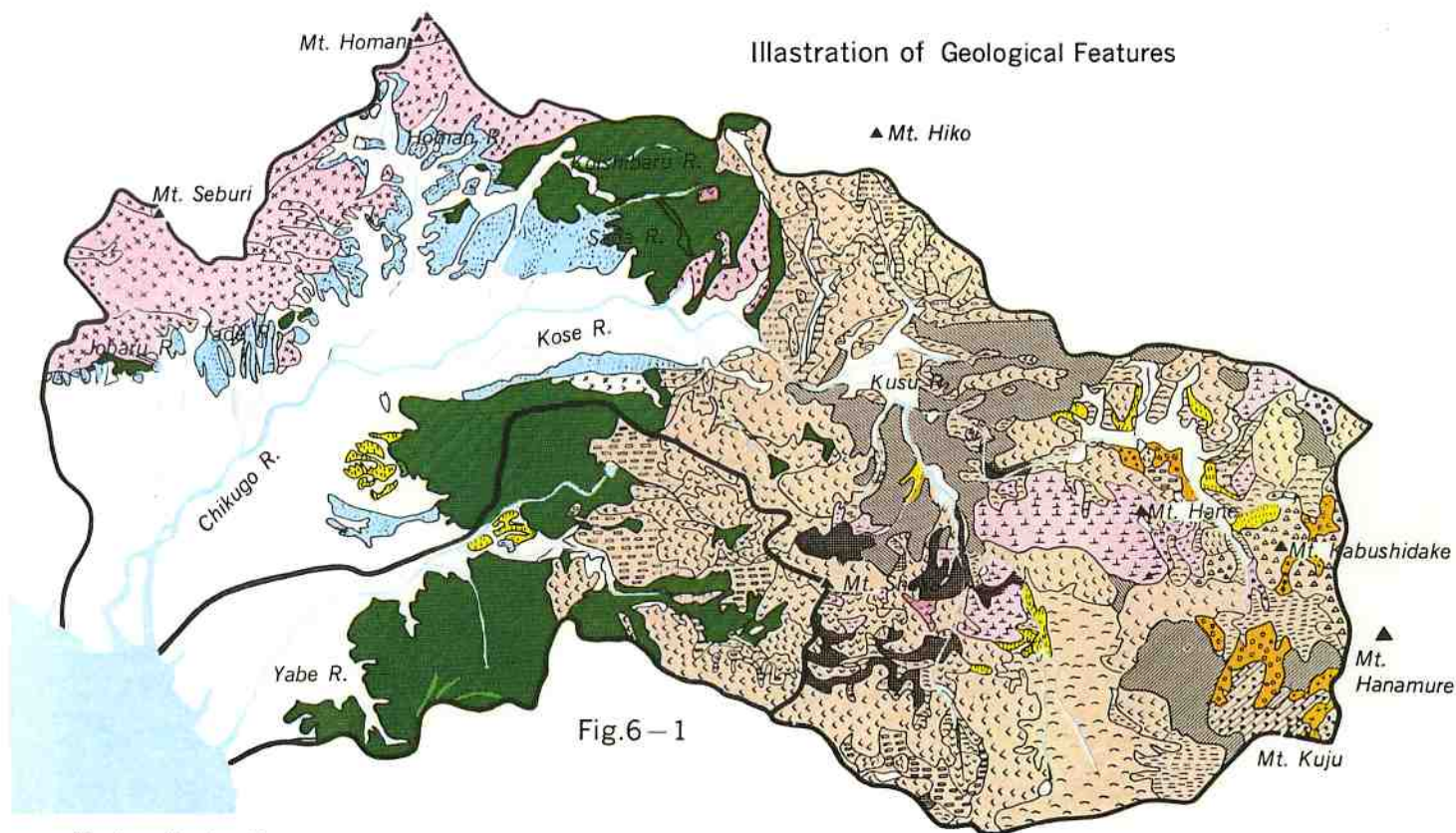
Fig.5-10 The Prime Water Level Observatories



## VI Geological Features of the Chikugo River Basin

Geologically, the Chikugo River basin consists of two parts. One part, the upper area from Haki-machi, is covered with lavas and eruptions in the Tertiary period. One of the typical lavas is named Aso-lava. In this area, we can often see volcanic plateaus and valleys.

Another part, the lower area from Haki-machi, is constituted from three zones. The first zone is the alluvial flatland which spreads in the Chikugo Plain. The second one is diluvial gravel which constitutes a part of the Chikugo and Saga Plain. And the last one is comprehensively old stratum which is composed of metamorphic rocks in the Paleozonic Era and the granite in the Mesozonic Era.



## VII Snaps around the Chikugo River

### - Mt. Kuju -

Mt. Kuju (1787m high) is the highest mountain in the Kuju volcanic zone. And it's highest in Kyushu Island, too. It's relatively easy to climb it from Handa Plateau or Kuju Plateau.



Fig.7-1 View of Kuju from Nishisenri



Fig.7-2 Hatchobaru Power Station

### - Hatchobaru Power Station -

In June 1977, Hatchobaru power station was constructed in the south of Kokonoe-machi in Oita Prefecture. It is the greatest subterranean-heat power station in Japan. This power station introduces the Double Flush System and the method of Two Fluids Transportation. The maximum generating power is 55,000kW and generated energy is about 38,000,000kWh per year. So we can save oil of 90,000kl per year.

### - Hita City -

Hita City, called "Kyoto of Kyushu", is a riverside town symbolized by cormorant fishing and sightseeing boats. And the city is famous for beautiful Hita crypromerias. In these days products of woods and furnitures are very popular. There are many places to visit: Mt. Jigen, Hukiage, Ueno observatory, the Fresh water Fish Center.....etc.



Fig.7-3 Hita City (cormorant fishing)

— Kurume —

Kurume used to be prosperous city as a castle town in the Arima Feudal Clan. It was also famous for rubber industries, Japanese Kimono called "Kurume-gasuri" and military city before World War II. After the War, Kurume City is well known for the cultural city. In various places, we can see azaleas which is a civil flower.



Fig.7-4 Suitengu Shrine in Kurume City



Fig.7-5 Saga-Line Railway Bridge

— The Elevating Railway Bridge —

The railway bridge across the lower stream of the Chikugo River is very interesting. Because the middle part of the bridge is elevated when a big boat passes under the bridge.

—Fishery in the Chikugo River—

The Chikugo River has a lot of fish (sweetfish in the upper stream, carp, crucian, and so on). In spring, sea bass and grall mullet come up from the sea. The lower stream of this river is the only place in Japan where we can see "Etsu fishing" which begins in May.



Fig.7-6 Etsu Fishing

— Seashore of Ariake Sea —

The seashore has 10m~50m deep stratum of soft alluvial clay (mainly silt clay). So there often occur many problems in constructing foundations for embankments on the seacoast; the settlement due to consolidation, sliding failure of foundations and so on.



Fig.7-7 Tideland of the Ariake Sea



Fig.7-8 Popular fish of the Ariake Sea named "Mutsugoro"

The tidal amplitude is so big that 10km-wide tideland appears at a low tide. During spring and summer, many people go to the tideland, digging shellfish or catching "Mutsugoro". In winter many fishermen gather seaweed by boats. Seaweed production of the Ariake Sea occupies about twenty-five percent in all domestic production.



Fig.7-9 Mouth of the Chikugo River (Ariake Sea)



Fig.7-10 Seaweed Farm

— Great people, born around the Chikugo River Basin —

Name	Outline of career
Mr. Shibasabro Kitazato (1851~1931)	Born as a son of a village headman at Kitazato Village in Aso County, Kumamoto Pref. He discovered a pest bacillus. He established the Kitazato Laboratory and devoted himself to the study of bacteria. Mr. Kiyoshi Shiga, who discovered a dysentery bacillus, is one of his students.
Mr. Shigeru Aoki (1882~1911)	Born in Kurume City. He was regarded as one of the leading painters at the age of 21. "Umi no Sachi" is his famous work.
Mr. Hanjiro Sakamoto (1882~1969)	Born in Kurume City. He went to France in 1921. He kept drawing horses after he came back to Japan. When his eye sight became poor later in his life, he tried to paint a still life. "Hoboku San Ba" (Horses with a colt) is his famous work.
Mr. Kojin Shimomura (1884~1955)	He devoted his whole life to education. "The story of Jiro" is his immortal masterpiece.
Mr. Tsunetami Sano (1822~1902)	Born near the Hayatsue port in Kawazoe-machi, Saga Prefecture. He is the founder of "The Red Cross Society in Japan".
Mr. Tanso Hirose (1782~1856)	He is called the father of mathematics in Japan. His private school, "Kangien", still remains in Hita City. Over 4,700 men gathered from all over Japan, and graduated.
Mr. Hisashige Tanaka (1800~1881)	Known as "A man of curious devices." He was born in Kurume City, and invented many devices.

— change of population in the Chikugo River Basin —

Prefecture		1950	1955	1960	1965	1970	1975	1980
Kumamoto	1 county, 4 towns	58,900	62,070	60,449	56,203	51,744	49,303	47,937
Oita	1 city, 2 counties 4 towns, 3 villages	145,156	149,886	147,326	137,981	127,274	120,856	121,056
Fukuoka	8 cities, 5 counties 13 towns, 3 villages	648,721	676,452	667,065	659,556	667,080	689,414	725,885
Saga	2 cities, 3 counties 10 towns, 3 villages	291,011	309,912	307,318	310,774	323,859	339,749	383,576
Total	11 cities, 11 counties 31 towns, 8 villages	1,143,788	1,198,320	1,182,158	1,164,514	1,169,957	1,199,322	1,278,454

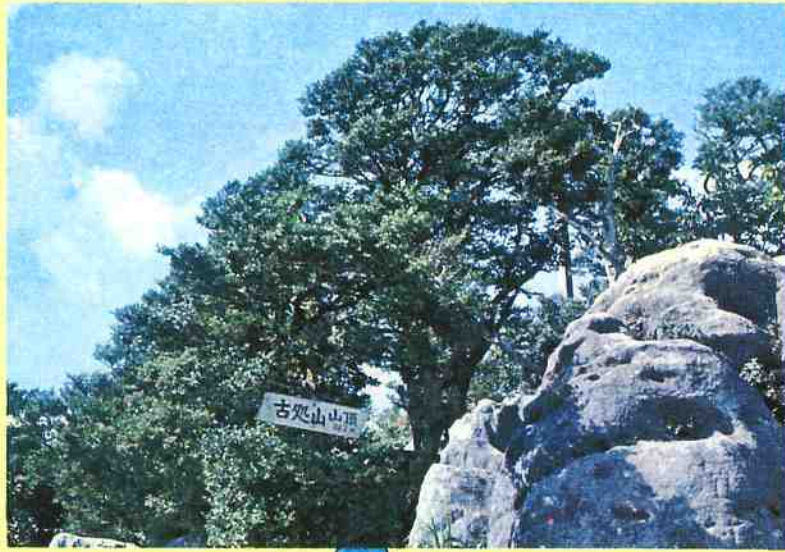
— Famous Hot Springs in the Basin —

Name	Residence	Type of spring	Feature
Hosenji	Kokonoe-cho in Kusu county, Oita Pref	aluminiferous carbonic acid spring	It is near the tributary of Machida River. It is famous for a base camp for climbing Mt. Kuju, Mt. Hane and Mt. Waita.
Harazuru	Harazuru in Haki-machi in Asakura county, Fukuoka Pref.	pure spring	It flows out on the north side of Chikugo River. There are many cherry trees on the river-side.
Tsuetate	Shimojyo in Oguni-cho Aso county, Kumamoto Pref.	mild salty spring	It is in a boundary area between Oita and Kumamoto. Along the deep valley of the Tsuetate River, smoke from the spring makes peculiar scenery.

List of Natural Park in the Basin

Name of Park	Location (Pref.)	Feature of Park
Aso National Park	Kumamoto Oita	It includes the Kuju Mountain System and Aso volcanic zone, which has been active in the middle of Kyushu. The Kuju Mountain System has Mt. Kuju, the highest in Kyushu Island, and is called "the roof of Kyushu". In the Kuju Mountain System, many alpen plants grow up. There are a lot of hot springs around the volcanic zone, very popular place for sightseeing, hiking, and driving.
Yaba, Hita, Hiko-San National Park	Fukuoka Kumamoto Oita	Mt. Hiko, "The mountain of God", Hita, the riverside district and Yabakei with splendid scenery are main places in the park. The largest lava plateau and erosion tableland in Japan make feature of Messa topography. In the seasons of fresh green and autumn tints it is especially beautiful.
Tsue mountain system Prefectural Park	Oita	It has grand sight of Mt. Shaka, Omaedake, Togami and Shutendoji. And the region has deep mountainous trees of beech tree zelkova, serrata, etc...
Chikugo River Prefectural Park	Fukuoka	It locates around the middle stream of the Chikugo River. There are Mt. Kora and Mt. Mino as a recreation area which has azalea in spring, grapes in summer, persimmons in fall ... etc ...
Mt. Seburi Prefectural Park	Saga	Mt. Seburi (1,055m), the Second highest in Saga Pref. is the center of the Park. It has good views along the Jobaru River, and is a resort park for the local people.
Mt. Kiyama Prefectural Park	Saga	There is Mt. Kiyama (400m) which is famous for grass board skiing in spring. We can see Hakata Bay in the north, and Kurume City and Tosu City in the south from the top of it.

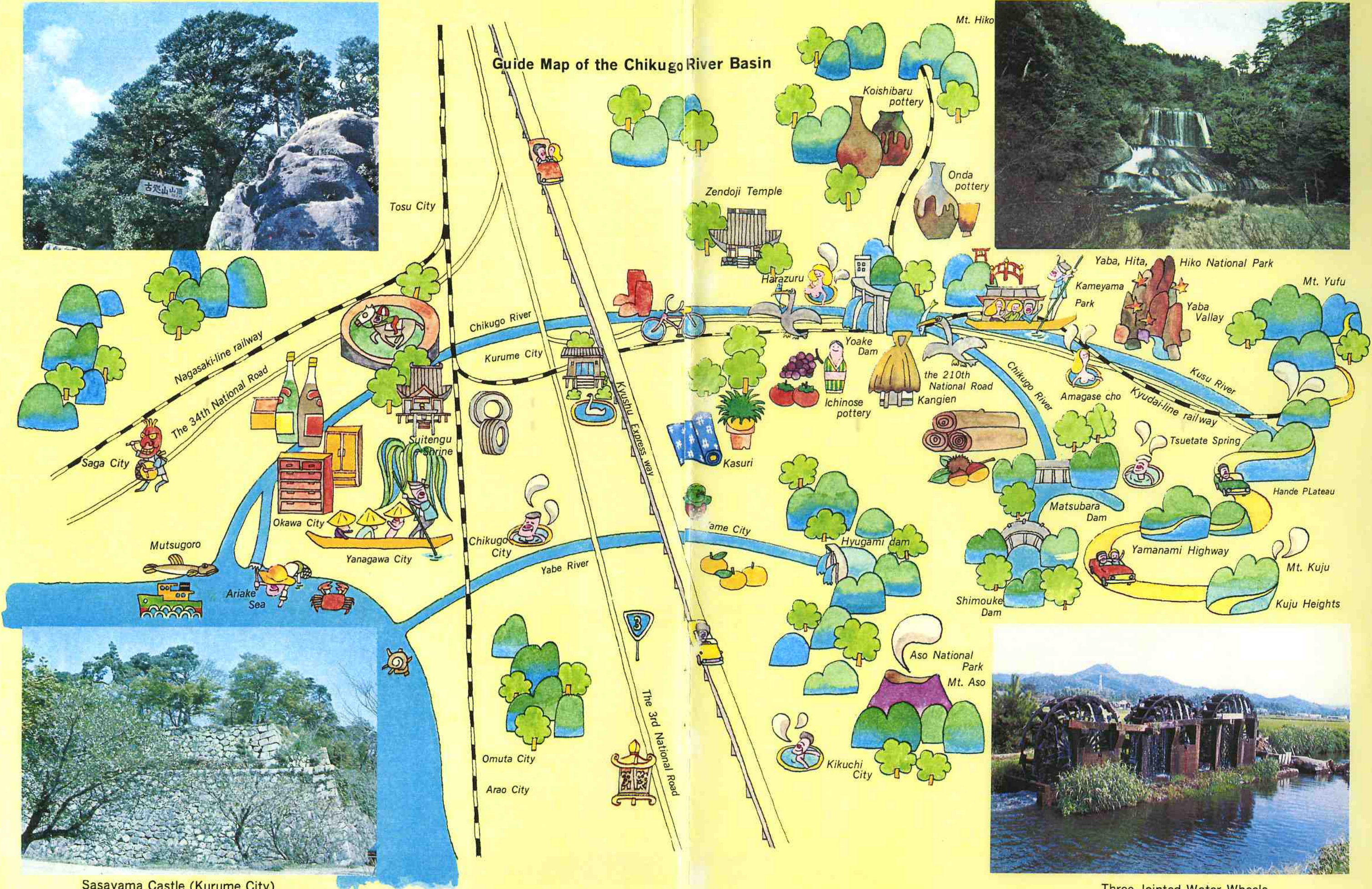
Boxwood Forest (Amagi City)



Ryumon Fall (Kokonoe-cho)



### Guide Map of the Chikugo River Basin



Sasayama Castle (Kurume City)



Three Jointed Water Wheels





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