DEVELOPMENT OF THE BRANTAS RIVER BASIN

Cooperation of Japan and Indonesia

JAPAN INTERNATIONAL COOPERATION AGENCY

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1998, Printed in Japan

Published by :
Second Development Study Division
Social Development Study Department
Japan International Cooperation Agency (JICA)
Shinjuku Maynds Tower Building 7th Fl
1-1, Yoyogi 2-chome
Shibuya-ku, Tokyo, Japan

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Brantas River Basin Profile

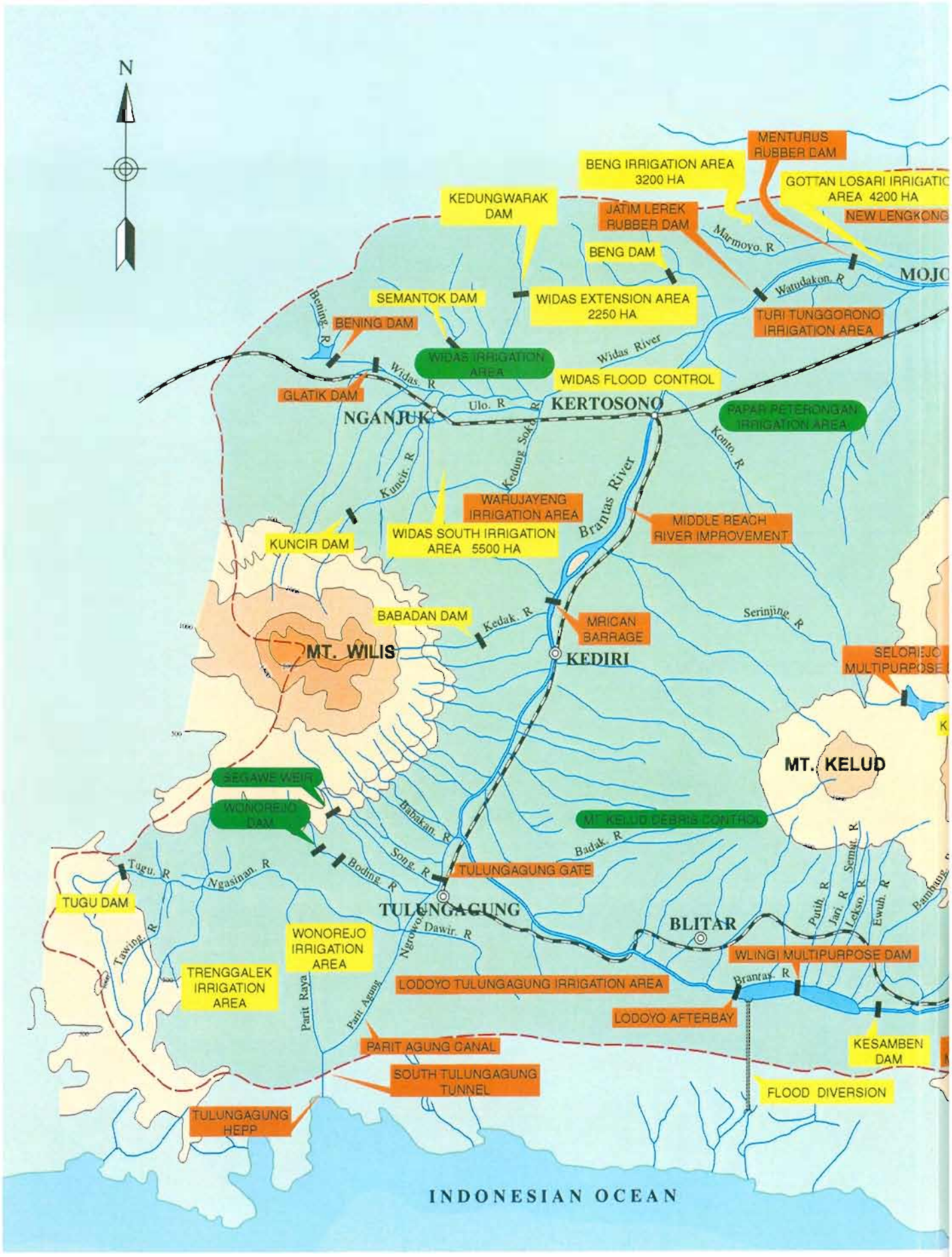
▼ Surabaya was a city of closely standing two-and three-story shops until the early 1980's; now it is modern with large buildings and extended roads. Surabaya has developed into Indonesia's second largest city after Jakarta. (1996)

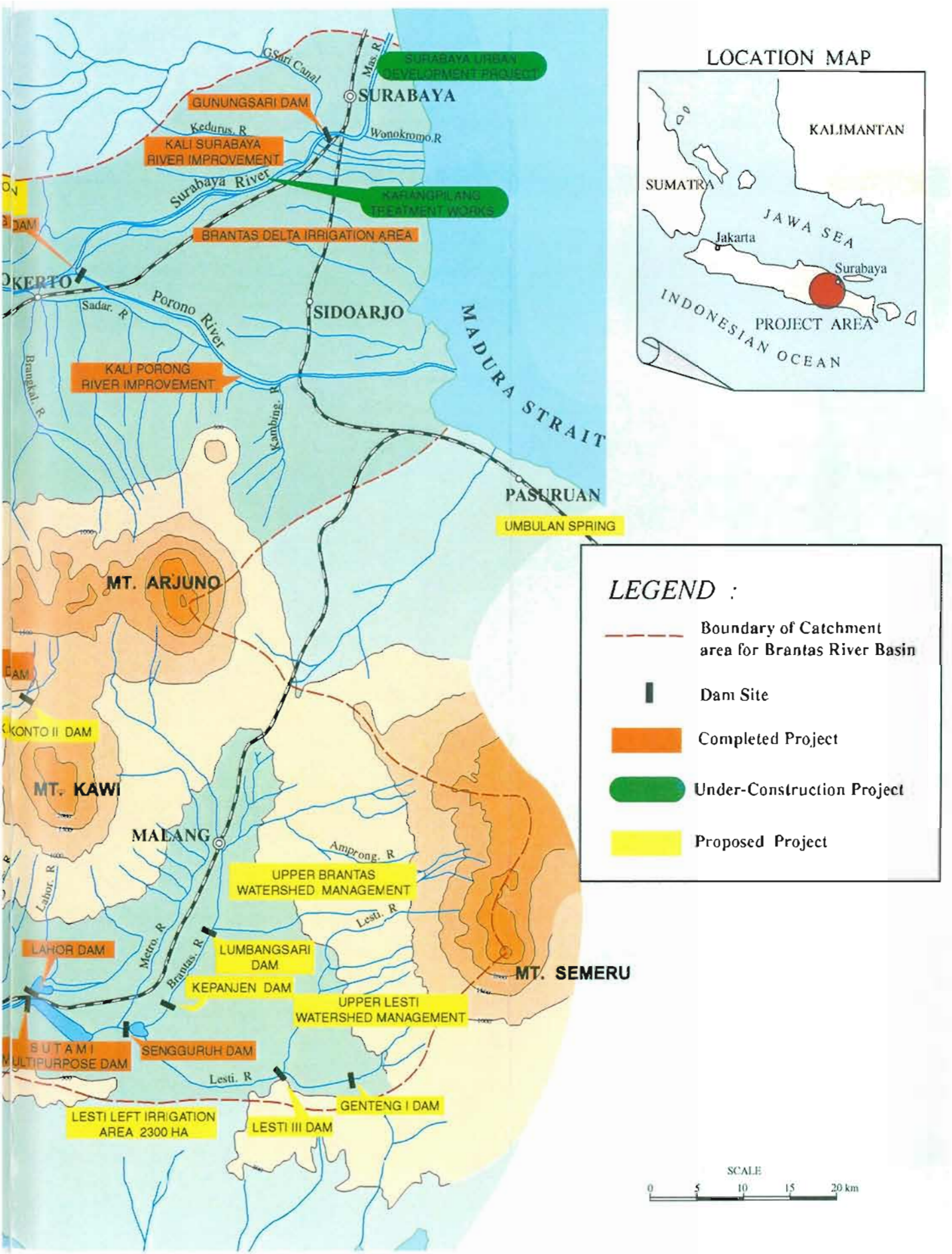
▲ Upper-class residential street lined with palm trees in Malang, a highland city, which remains practically unchanged. The Brantas River Basin Development Executing Office formerly stood in one corner of this area. (1996)

▶ Mount Kelud ceased erupting after gushing out about 90 million m^3 of volcanic ejecta. The Brantas River flows around the foot of this active volcanic range before emptying into the Madura Strait. (1966)

▲ A village girl – separating husk and unhusked rice. The Brantas Basin is a large granary producing over 30% of East Java's rice yield. (1974)

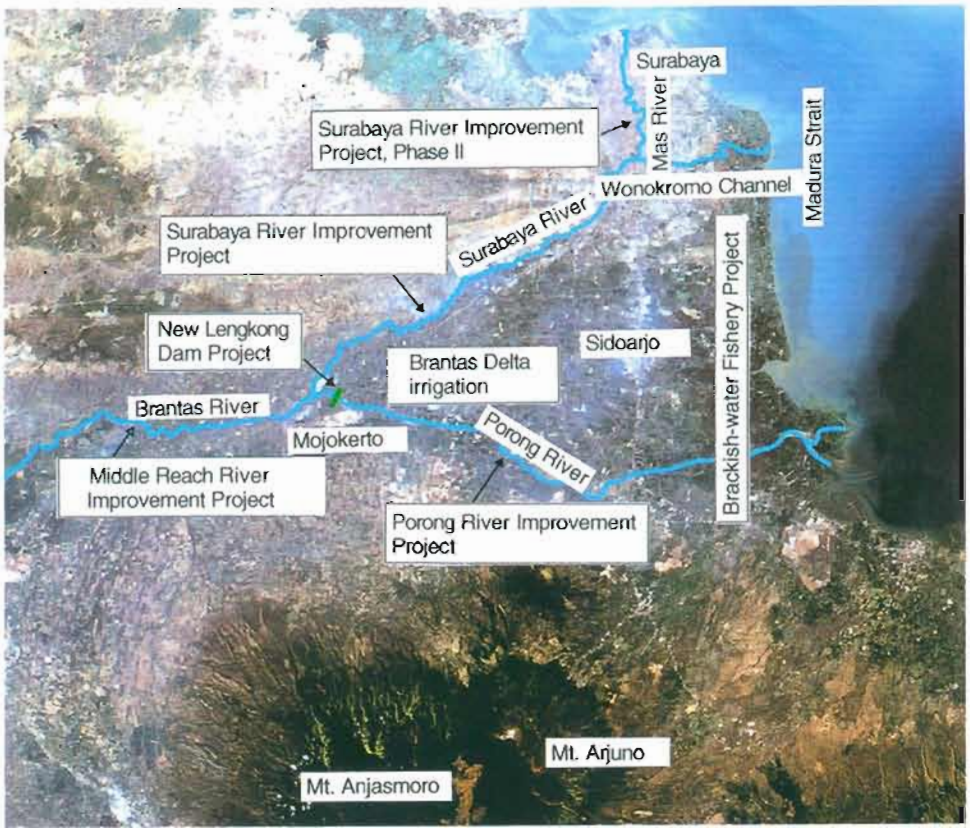
▼ Rainy season near Kediri City on the Brantas River. In the dry season the river bed appears, thus revealing the great difference in flow between the two seasons. (1973)


N
MENTURUS RUBBER DAM
BENG IRRIGATION AREA 3200 HA
GOTTAN LOSARI IRRIGATIC AREA 4200 HA
NEW LENGKONG
KEDUNGWARAK DAM
JATIM LEREK RUBBER DAM
Marmoyo. R
BENG DAM
MOJO
Watudakon. R
SEMANTOK DAM
WIDAS EXTENSION AREA 2250 HA
TURI TUNGGORONO IRRIGATION AREA
Bening. R
BENING DAM
WIDAS IRRIGATION AREA
Widas River
WIDAS FLOOD CONTROL
Widas. R
GLATIK DAM
Ulo. R
KERTOSONO
NGANJUK
PAPAR PETERONGAN IRRIGATION AREA
Kedung Sokel. R
Konto. R
Kuncir. R
WARUJAYENG IRRIGATION AREA
Brantas River
MIDDLE REACH RIVER IMPROVEMENT
KUNCIR DAM
WIDAS SOUTH IRRIGATION AREA 5500 HA
BABADAN DAM
Kedak. R
MRICAN BARRAGE
Serinjing. R
MT. WILIS
KEDIRI
SELOREJO MULTIPURPOSE
MT. KELUD
SEGAWE WEIR
WONOREJO DAM
MT. KELUD DEBRIS CONTROL
Brabakan. R
Badak. R
Song. R
Bodng. R
TULUNGAGUNG GATE
Tugu. R
Ngasinan. R
TUGU DAM
TULUNGAGUNG
BLITAR
Putih. R
Jari. R
Semgt. R
Lekso. R
Ewuh. R
Tawing. R
WONOREJO IRRIGATION AREA
Ngrowo. R
Dawir. R
WLINGI MULTIPURPOSE DAM
TRENGGALEK IRRIGATION AREA
LODOYO TULUNGAGUNG IRRIGATION AREA
Brantas. R
Parit Raya
Parit Agung
LODOYO AFTERBAY
KESAMBEN DAM
PARIT AGUNG CANAL
SOUTH TULUNGAGUNG TUNNEL
FLOOD DIVERSION
TULUNGAGUNG HEPP
INDONESIAN OCEAN


LOCATION MAP
KALIMANTAN
SUMATRA
JAWA SEA
Jakarta
Surabaya
INDONESIAN OCEAN
PROJECT AREA
SURABAYA URBAN DEVELOPMENT PROJECT
SURABAYA
GUNUNGSARI DAM
KALI SURABAYA RIVER IMPROVEMENT
KARANGPILANG TREATMENT WORKS
BRANTAS DELTA IRRIGATION AREA
SIDOARJO
MADURA STRAIT
KALI PORONG RIVER IMPROVEMENT
PASURUAN
UMBULAN SPRING
MT. ARJUNO
MT. KAWI
MALANG
UPPER BRANTAS WATERSHED MANAGEMENT
LAHOR DAM
LUMBANGSARI DAM
KEPANJEN DAM
MT. SEMERU
UPPER LESTI WATERSHED MANAGEMENT
SENGGURUH DAM
GENTENG I DAM
LESTI III DAM
LESTI LEFT IRRIGATION AREA 2300 HA
LEGEND :
Boundary of Catchment area for Brantas River Basin
Dam Site
Completed Project
Under-Construction Project
Proposed Project
SCALE
0 5 10 15 20 km

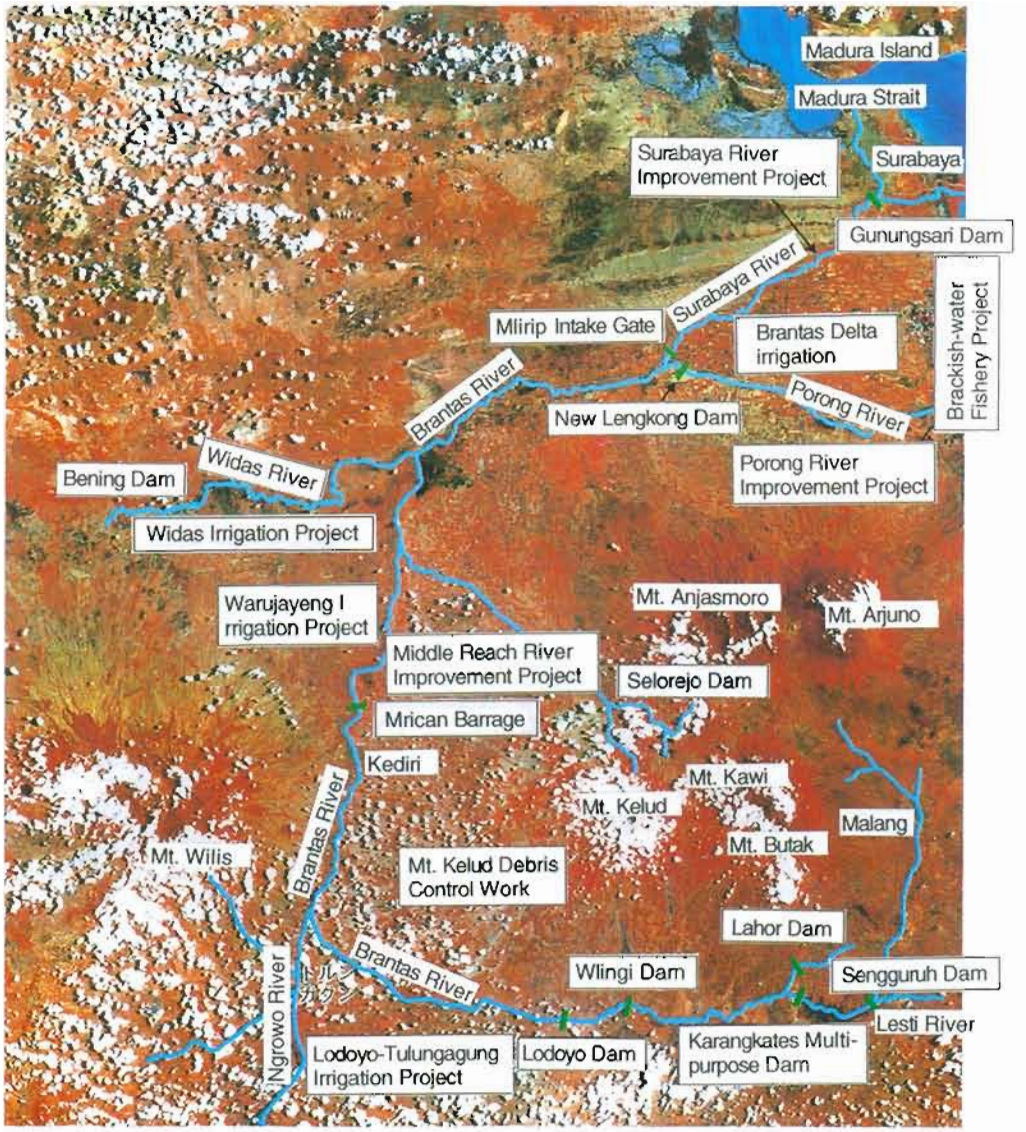
Landsat image of Brantas River Basin

Lower reaches



July 1994

Entire basin



October 1973

First Phase of Development

◀ Karangkates Dam, having the largest storage capacity in the basin of 250 million m^3 and installed capacity for power generation of 105 MW. It can be said that the history of technological transfer began with the construction of this 100 m high, fill dam. (1979)

▲ Lahor Dam shown discharging flood water down a spillway. This dam allows a Brantas tributary, Lahor River, to change its course using a connecting tunnel to Karangkates Dam. (1977)

▲ Selorejo Dam was the first dam to be constructed on a Brantas tributary. (1972)

▲ New Lengkong Dam, a pivot point for water distribution to the basin's lowest regions. Constructed with the half river closure method, which later became a common construction method for this type of dam in Indonesia. (1974)

Second Phase of Development

◀ Wlingi Dam was completed after overcoming the water seepage problems. It is typical of a multi-purpose dam, providing water supply to Lodoyo irrigation area, flood control, peak power generation, and volcanic disaster prevention. (1979)

▲ Lodoyo Dam, intended as the after bay for flow control from peak power generation of Wlingi Dam. Typical of power stations, it was constructed with a low head and large capacity. (1983)

▼ Lodoyo irrigation area, a vast 7,400 ha. of developed fields. Due to the height of the land, it was previously farms or wasteland, but completion of Wlingi Dam has turned it into rich paddy fields. (1985)

◀ Retaining wall of a river near Kediri City. It was constructed during the middle reach river improvement project, in which approximately 10 km of revetments were provided. (1993)

Third Phase of Development

▲ In the rainy season the flow of the Ngrowo River is discharged through the No. 2 Nejama Tunnel into the Indian Ocean. The Tulungagung Power Station was constructed to utilize the power created by this large amount of falling water. (1991)

▲ Mas River,a branch of Surabaya River, runs through Surabaya City. Closely constructed houses line both banks; securing the site for river improvement was a difficult task. (1985)

▲ Jatimlerek rubber Dam, which was constructed downstream of Kertosono City for the integrated intake of irrigation water. It has a large span, one of the advantages of a rubber dam. (1993)

◀ Sengguruh Dam Power Station located on the uppermost regions of the Brantas. Its construction was the first project where Indonesia took the initiative in carrying out the planning and design. (1996)

PREFACE

JICA began the Study on the Comprehensive Management Plan for the Water Resources of the Brantas River Basin in September 1996 at the request of the Republic of Indonesia, and it is scheduled to be completed in July 1998.

The purpose of this study is to review the master plan formulated in 1985, and to draw up a comprehensive river basin water resources management plan, including proposals for the "soft" aspects such as organizational and institutional reform, a human resources development plan, and so on.

Although the development of the Brantas River is a well known and often cited example of the success of Japan's international cooperation among Japanese aid organizations, it is considerably less well known to the Indonesian people and international aid agencies.

For 40 years since cooperation for the development of the Brantas River basin began in 1959 as a part of postwar reparations, the Japanese government has been providing capital grant aid, yen loans, technical cooperation and all other types of cooperation in a comprehensive manner.

Over these four decades, JICA, and its predecessor, the Overseas Technical Cooperation Agency (OTCA), have conducted development studies three times for the formulation and revision of master plans, dispatched experts, accepted trainees, and carried out project-type technical cooperation, and we are very proud of the fact that through this cooperation, we have transferred important technologies to Indonesians, and made a significant contribution to the training of many Indonesian engineers.

We are especially proud the fact that the Indonesian engineers who were engaged in the Brantas Development Plan have taken advantage of their training in the project and gone on to play a central role in the industrialization and nation building of Indonesia. The Indonesian engineers take pride in the education they received from Japanese engineers as the "spirit of Brantas." Today, a slogan penned by President Suharto himself — "Let's spread the spirit of Brantas throughout the nation" — can be found at the Karangkates hydroelectric power plant, the largest dam in the Brantas basin.

In this light, at the completion of the study we decided to compile a report detailing the study results, and the history and achievements of Japan's cooperation in the Brantas River basin development as a means of deepening understanding among the Indonesian people and foreign aid agencies about Japanese international cooperation. The report includes a translation of the section dealing with the "BURANTASUGAWA NO KAIHATS" (Development of The Brantas River Basin; published by Sankaido, prepared and edited by Nippon Koei Co., Ltd., Koei Research Institute, January 1997), and the

study results.

In closing, I should like to take this opportunity to express my appreciation to Nippon Koei and the many others involved for their help in preparing this report.

March 1998

Kimio Fujita
President
Japan International Cooperation Agency

Foreword

The need for better water resources development and management in most countries in the world is apparent. Water shortage are becoming more widespread every year and competition between different uses is increasing. Water quality is deteriorating, water ecosystems are being irreversibly disturbed, and watersheds seriously degraded. Water demand is growing unabated with the increasing population, and is further boosted by changing use patterns associated with economic development and urbanization. These problems are also faced by the Brantas River Basin as one of the major water resources in Indonesia.

The Brantas River plays an important role in the economic development not only in East Java Province but also for national wide. The more holistic approach to the water resources development and management has been successfully developed in Brantas River Basin. The Brantas River Basin Development Executing Office has constructed more than 20 major structures in the basin since the last 30 years. A state owned company namely Perusahaan Umum Jasa Tirta was established in 1990 to facilitate the operation and maintenance of the Brantas River Basin and implement water resources management. All of efforts in water resources development and management in the basin are aimed for the well being of the people.

The involvement of Japan International Cooperation Agency (JICA) has given a significant contribution to the water resources development and management in Brantas River Basin. On behalf of the government of Republic of Indonesia, I would like to express my grateful to the Japanese Government for all assistance and particularly to JICA for the grant of the Study on the Comprehensive Management Plan for the Water Resources of the Brantas River Basin and the issuance of this book.

I believe that the outcome of this study will be useful not only for Brantas Basin but also for the purposes of comprehensive management plan in other river basins in Indonesia.

Jakarta, March 1998

Budiman Arif
Director General of Water Resources Development
Ministry of Public Works