

**Directorate General of Water Resources
Ministry of Public Works
The Republic of Indonesia**

**THE STUDY
ON
COUNTERMEASURES FOR SEDIMENTATION
IN
THE WONOGIRI MULTIPURPOSE DAM RESERVOIR
IN
THE REPUBLIC OF INDONESIA**

FINAL REPORT

VOLUME-I EXECUTIVE SUMMARY

JULY 2007

JAPAN INTERNATIONAL COOPERATION AGENCY

**NIPPON KOEI CO.,LTD
YACHIYO ENGINEERING CO.,LTD**

FINAL REPORT

Composition of Reports

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VOLUME-II MAIN REPORT
Part I : Master Plan Study
Part II : Feasibility Study

VOLUME-III SUPPORTING REPORT I
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No.2 Geological Condition
No.3 Assessment of Wonogiri Reservoir Sedimentation
No.4 Reservoir Sedimentation Analysis
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EXCHANGE RATE

The exchange rate used in this Study is:	
Master Plan Study	US Dollar (US\$) 1.00 = Indonesia Rupiah (Rp.) 10,035 = Japanese Yen (Y) 119.63 as of December 2005
Feasibility Study	US Dollar (US\$) 1.00 = Indonesia Rupiah (Rp.) 9,050 = Japanese Yen (Y) 118.92 as of December 2006

PREFACE

In response to a request from the Government of the Republic of Indonesia, the Government of Japan decided to conduct the Study on countermeasures for sedimentation in Wonogiri multipurpose dam reservoir and entrusted to the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Minoru OUCHI of Nippon Koei Co., LTD. and consists of Nippon Koei Co., LTD. and Yachiyo Engineering Co., LTD. between August 2004 and June 2007. JICA also established an Advisory Committee headed by Mr. Josuke KASHIWAI, Senior Researcher, National Institute for Land and Infrastructure, which, from time to time during the course of the study, provided specialist advice on technical aspects of the study.

The team held discussions with the officials concerned of the Government of the Republic of Indonesia and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Indonesia for their close cooperation extended to the study.

July 2007

Ariyuki MATSUMOTO,
Vice President
Japan International Cooperation Agency

July 2007

Mr. Ariyuki MATSUMOTO
Vice President
Japan International Cooperation Agency

Letter of Transmittal

Dear Sir,

We are pleased to submit herewith the Final Report of “The Study on Countermeasures for Sedimentation in the Wonogiri Multipurpose Dam Reservoir in the Republic of Indonesia”.

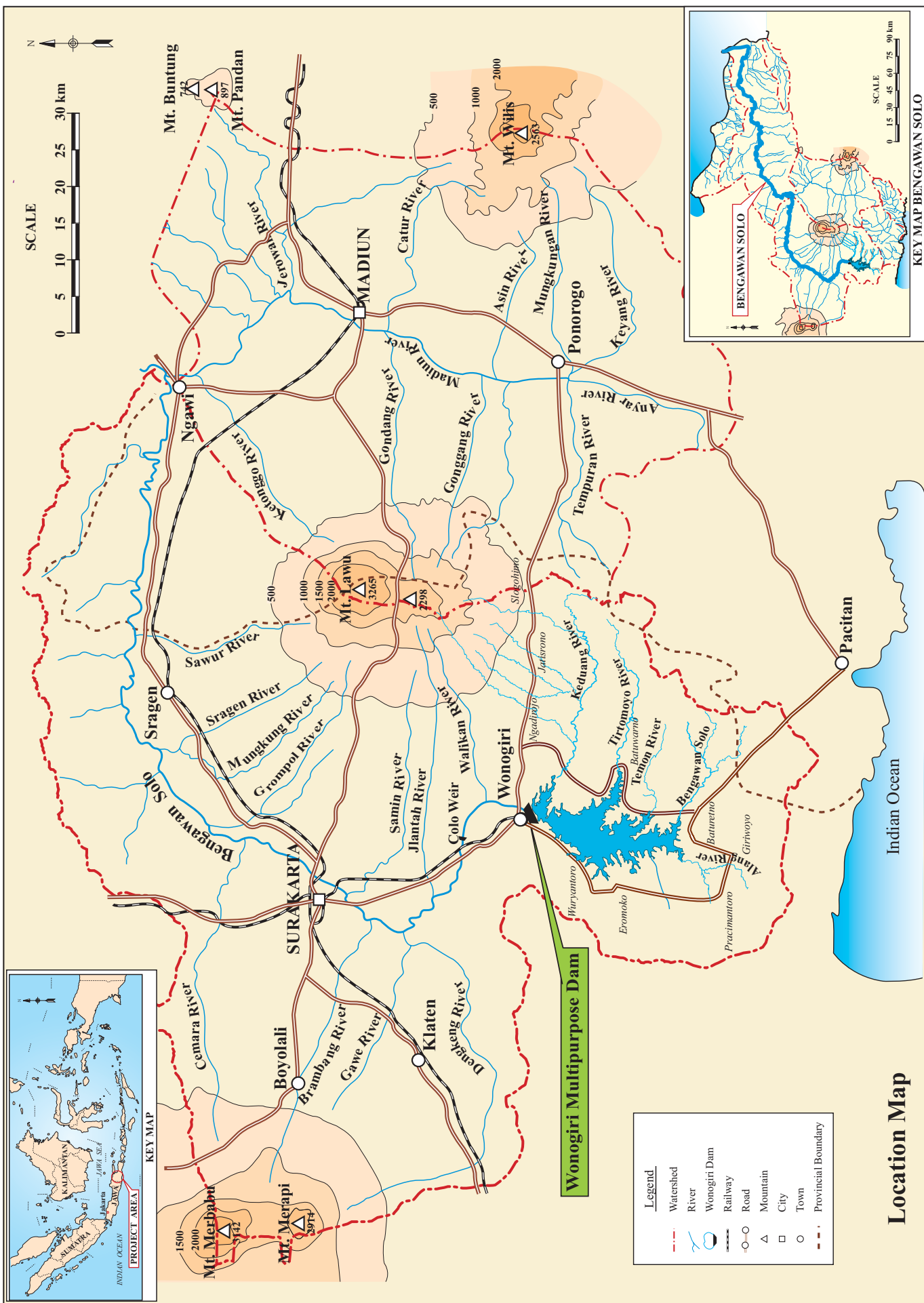
This Final Report has been prepared by Nippon Koei Co., Ltd. in association with Yachiyo Engineering Co., Ltd. in accordance with the contracts with Japan International Cooperation Agency (JICA) in the period from August 2004 to July 2007.

The Study has formulated a master plan for sustainable countermeasures for sedimentation problems in the Wonogiri reservoir and has conducted a feasibility study on the selected priority projects recommended in the master plan. The Final Report presents the outcomes from both the master plan and feasibility studies and consists of Executive Summary, Main Report, Supporting Report I, II and III, Data Book and Photo Book.

We wish to express our sincere appreciation to the personnel concerned of your Agency and Advisory Committee for the guidance and support given throughout the Study period. Our deep gratitude is also expressed to the Directorate General of Water Resources of the Ministry of Public Works, Balai Besar Wilayah Sungai Bengawan Solo (acted as the Counterpart Agency), and other concerned authorities and universities of the Government of the Republic of Indonesia, JICA Indonesia Office, and the Embassy of Japan in Indonesia for their close cooperation and assistance extended during the course of the Study.

Very truly yours,

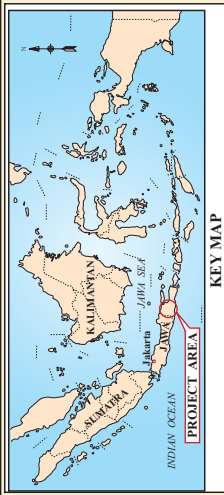
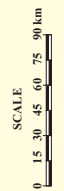
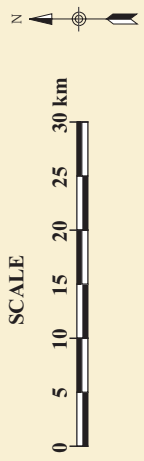
Minoru OUCHI
Team Leader
The Study on Countermeasures for
Sedimentation in the Wonogiri Multipurpose
Dam Reservoir in the Republic of Indonesia



Legend

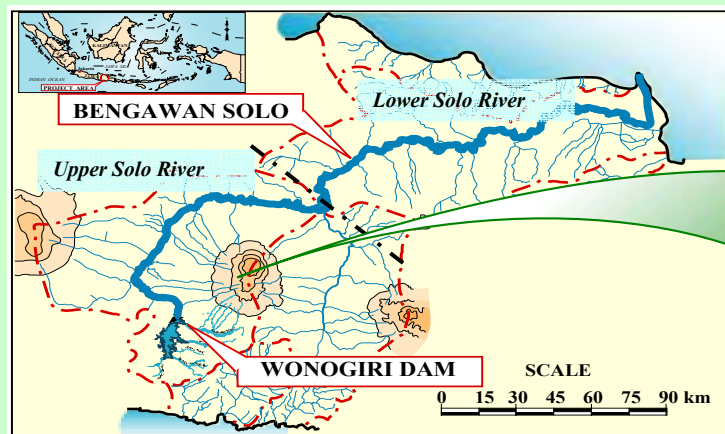
	Watershed
	River
	Wonogiri Dam
	Railway
	Road
	Mountain
	City
	Town
	Provincial Boundary

Location Map

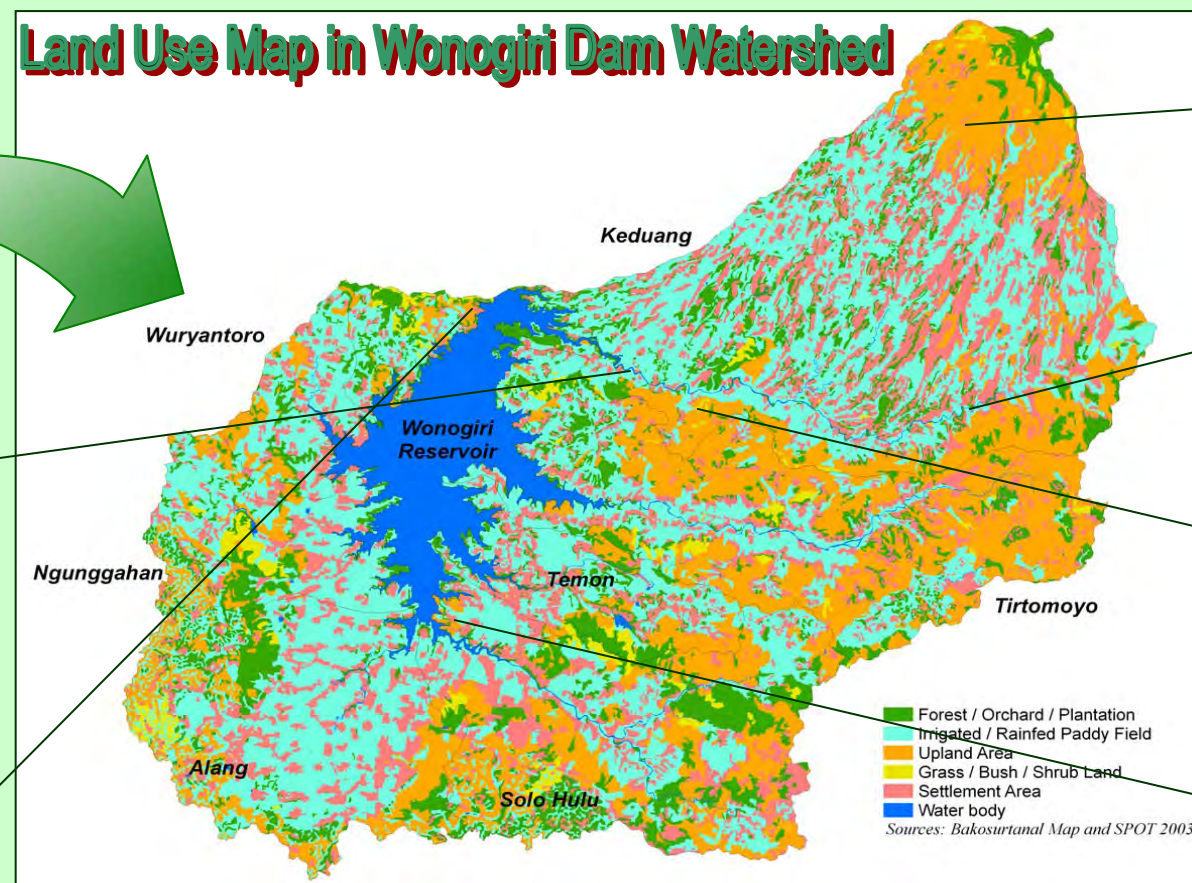


Wonogiri Multipurpose Dam

Sedimentation Issue in the Wonogiri Multipurpose Dam Reservoir



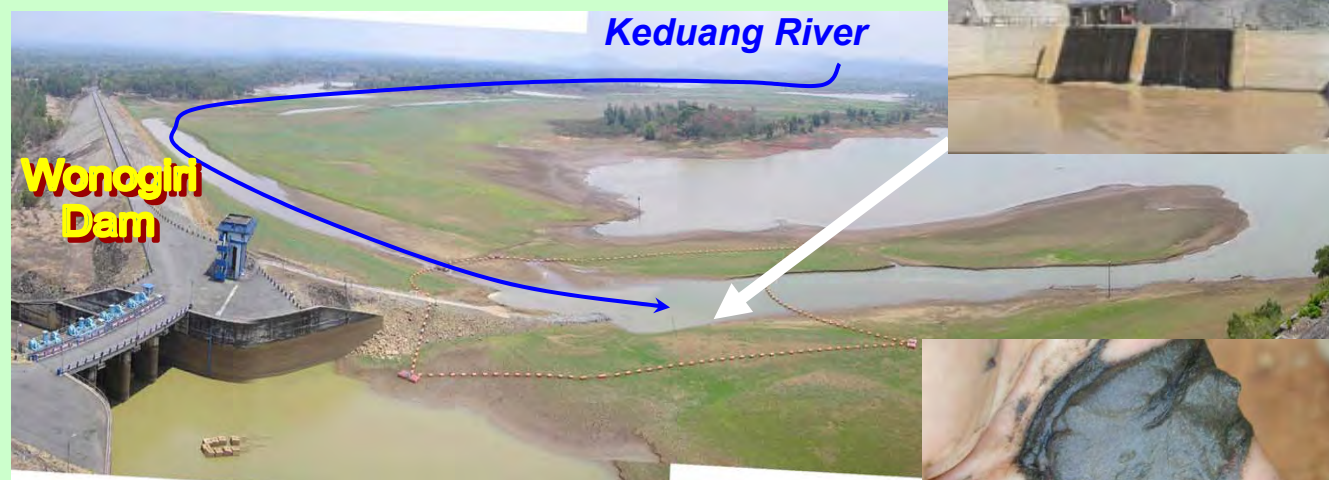
Land Use Map in Wonogiri Dam Watershed



High Soil Erosions in Wonogiri Watershed



Garbage Problems at Intake



Sedimentation around Intake:

The Wonogiri reservoir has been suffering from sediment deposits & garbage at the Intake. The Keduang River is the primary cause of the current sediment related problems.



Intake



Decrease of Effective Storage Capacity:

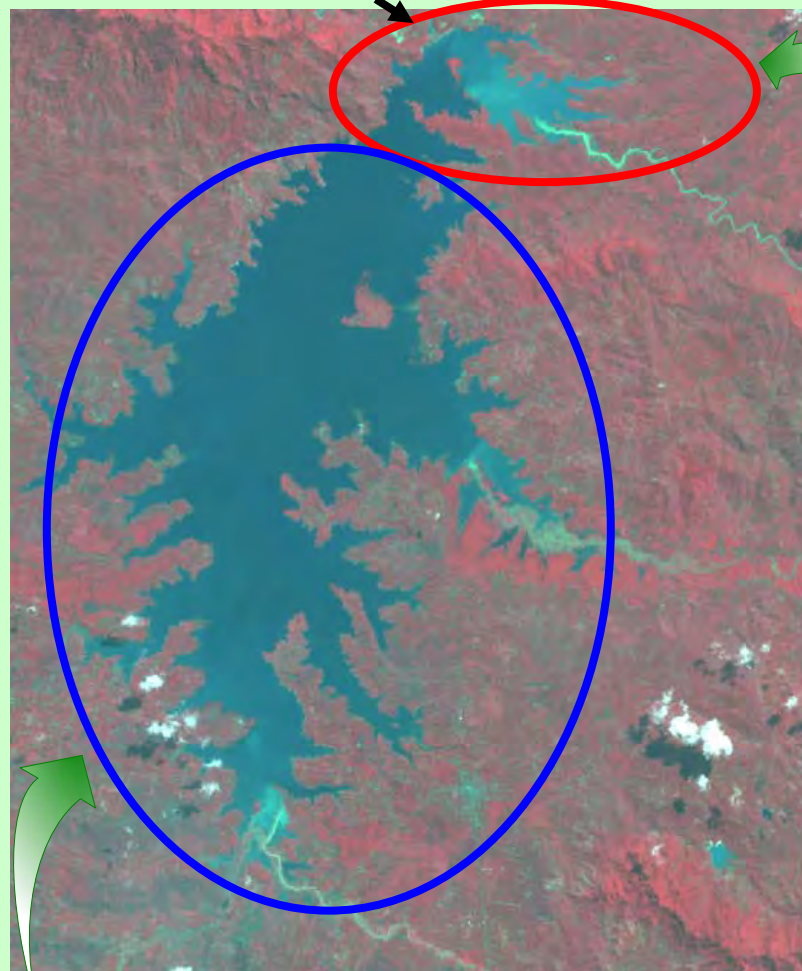
Without countermeasures, the Wonogiri reservoir will lose half of the effective storage capacity by around the year 2062.

Sediment deposits in the reservoir consists of silt and clay.

Master Plan

The Master Plan was formulated to secure the proper function of the intake and to keep in order the Wonogiri reservoir function with provision of combination of structural and non-structural measures.

Wonogiri Dam



Satellite Picture at RWL EL.135.28 m on May 5, 2003

Mid-term Plan:

Countermeasures for sediment inflow from other tributaries

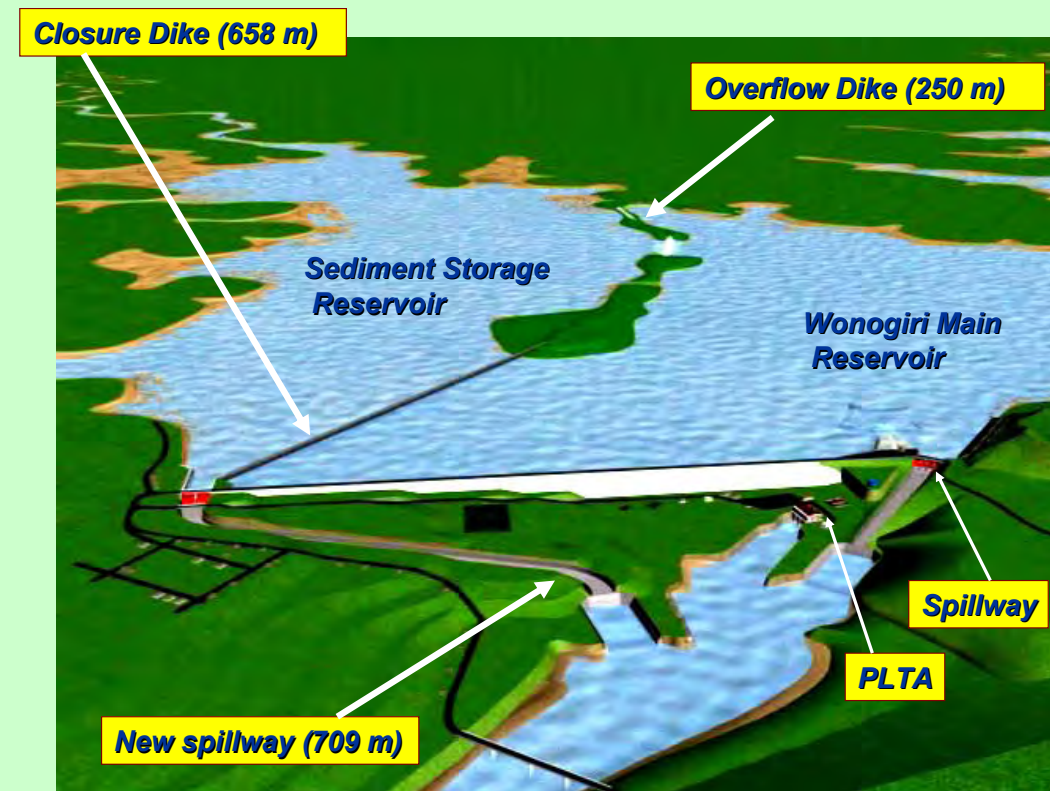
Watershed Conservation in Other Tributaries to reduce the sediment yield rate

Urgent Plan:

Countermeasures for garbage and sediment inflow from Keduang River

- a. Sediment Storage Reservoir with New Gates
- b. Watershed Conservation in Keduang Watershed
- c. Periodic Maintenance Dredging at Intake

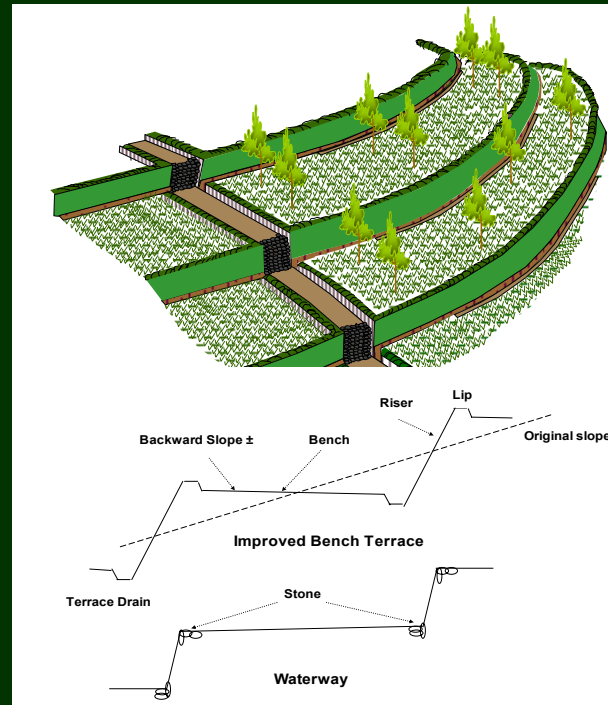
Urgent Plan: Sediment Storage Reservoir with New Gates



	Present	Future	
Beginning of Wet Season (Nov-Jan)			Retaining of sediment and garbage within the sediment storage reservoir
End of Wet Season (Feb-Apr)			Sediment flushing/slucing without using the stored water in the Wonogiri main reservoir

Urgent Plan: Watershed Conservation in the Keduang Watershed

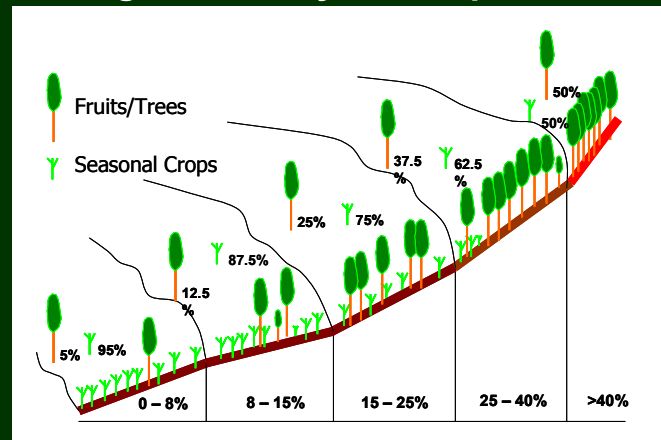
Improvement of Bench Terraces



Well Maintained Terrace , July 2006



Agro-Forestry Development

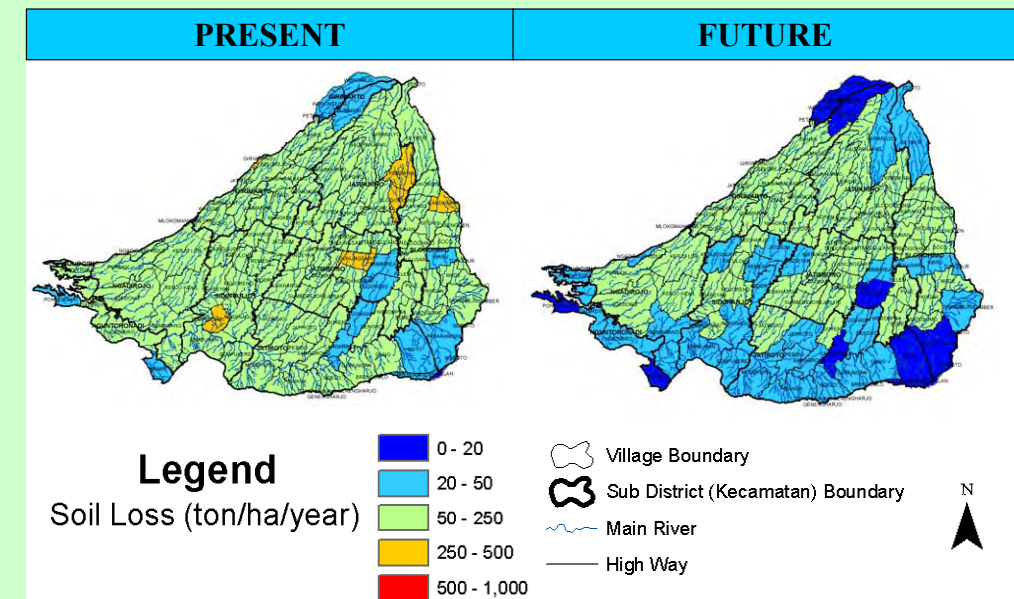


People Participation in Village Assessment Local people / farmer



Components of Watershed Conservation

- a. **Soil Conservation Measures**
 - Physical Measures (improvement of bench terraces, waterways, drop structures and side ditches in the settlement area)
 - Vegetation Measures (stabilization of lip and riser of terraces, and hedge row at fringe of housing yard)
- b. **Agro-forestry Development**
- c. **Support Programs**



Soil Erosion Test (in Keduang watershed in 2006)

	(1) Bare land	(2) Present terrace	(3) Proposed terrace
Jan. 10			
Feb. 19			
Jun. 29			
Rate of Soil Loss per (3) proposed terrace	16.2	9.8	1.0

Note: Conditions of test site; Location: Slogohimo, Land use: Upland, Present terrace condition: Bench terrace, Original vegetation: Maize, Slope: about 2%, Soil: Latosol.