



28 3 2004

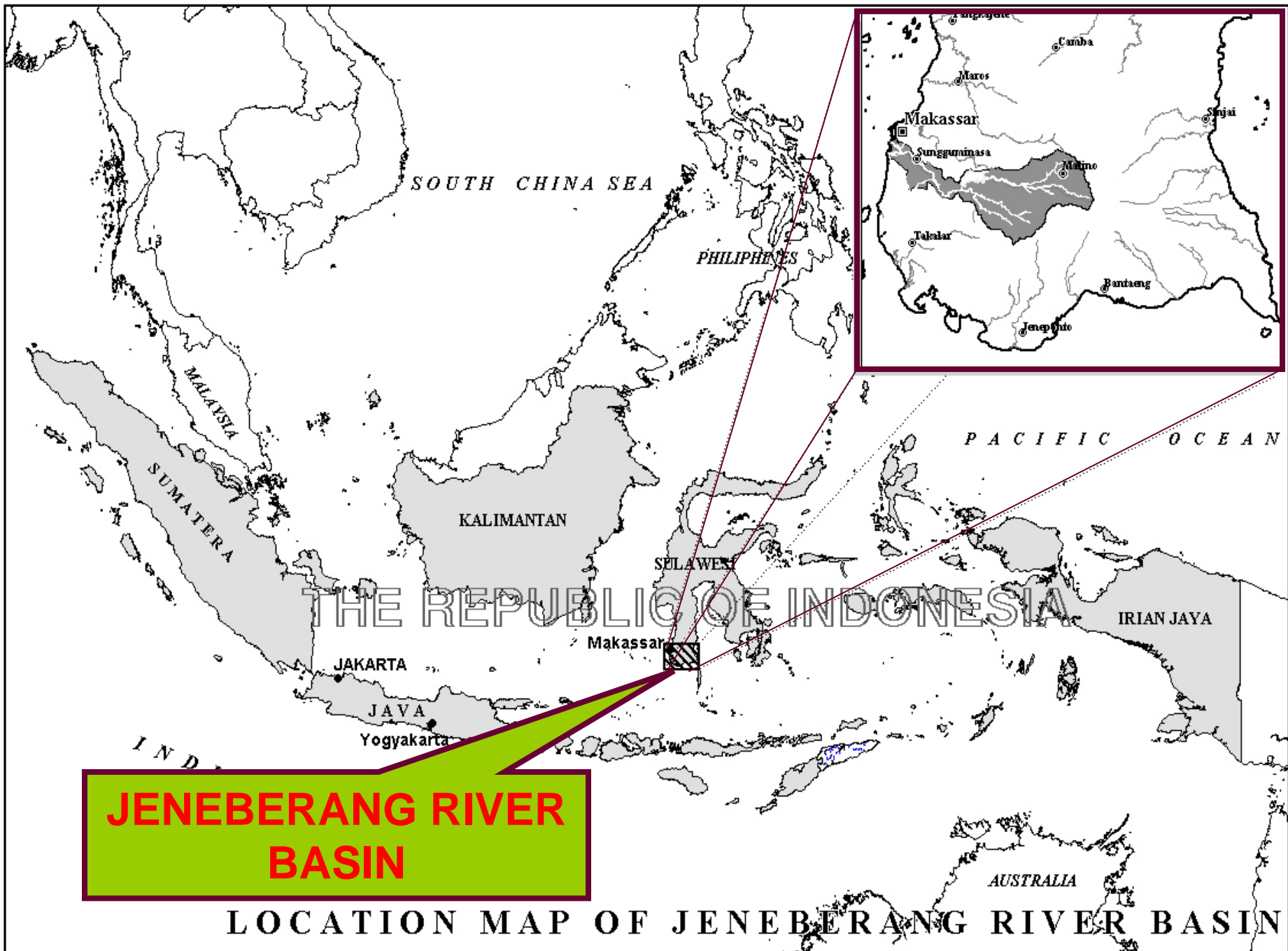
BAWAKARAENG CALDERA COLLAPSE

**THE ROLE OF SABO COMMUNITY IN NON-
STRUCTURAL DISASTER MITIGATION
MEASURE AGAINST BAWAKARENG
CALDERA COLLAPSE IN SOUTH SULAWESI,
INDONESIA**

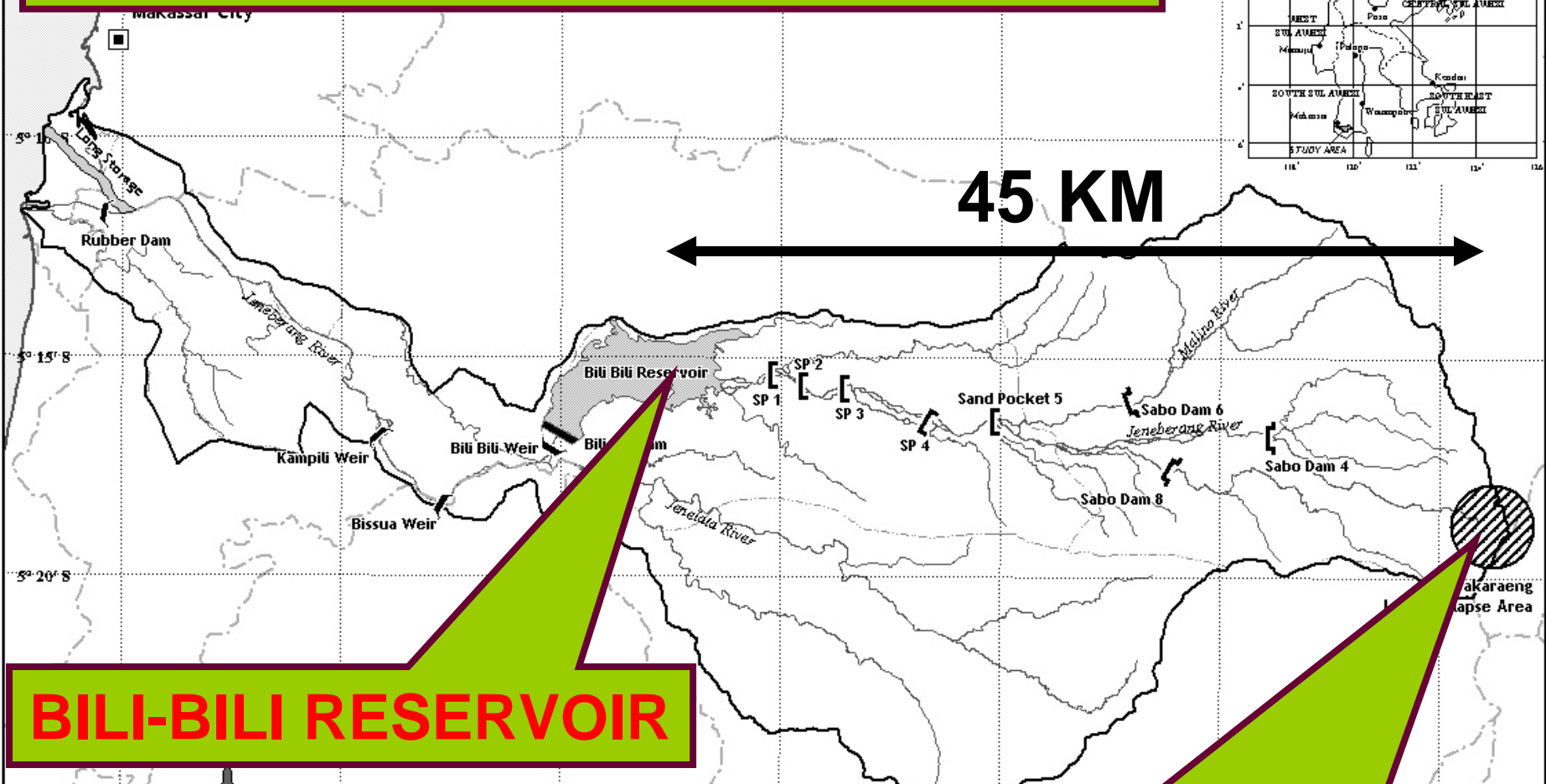
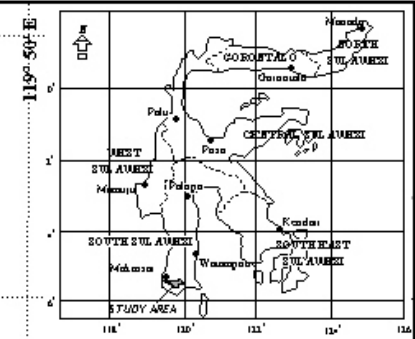
BAMBANG HARGONO

GENERAL MANAGER OF JENEBERANG WATER RESOURCES
DEVELOPMENT PROJECTS

28 3 2004

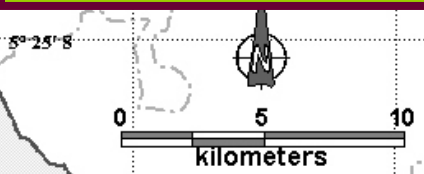


JENEBERANG RIVER BASIN



BILI-BILI RESERVOIR

BAWAKARAENG CALDERA, 2830 m





DEVELOPMENT OF JENERBERANG RIVER BASIN

BILI-BILI DAM



RESERVOIR VOLUME
375.000.000 m³

DEAD STORAGE
29.000.000 m³

POTENTIALLY FLOODED AREA OF MAKASSAR

Flood in 1976: 37.0 km²

Probable flood of 50 yrs return period: 58.5 km²



MAKASSAR FLOODED



PAMPANG REGULATING POND



PAMPANG DRAINAGE PUMP



MAKASSAR DRAINAGE FACILITIES

WATER RESOURCES UTILIZATION



**WATER SUPPLY FOR
MAKASSAR CITY
3.3 m³/detik**



BILI-BILI DAM



**BILI-BILI POWER PLANT
20.1 MW, STARTS
OPERATION IN 2006**

POWER GENERATION



LONG STORAGE



BILI-BILI WEIR

BILI-BILI RESERVOIR



BISSUA WEIR



KAMPILI WEIR

IRRIGATION
23.650 ha

BAWAKARAENG CALDERA COLLAPSE

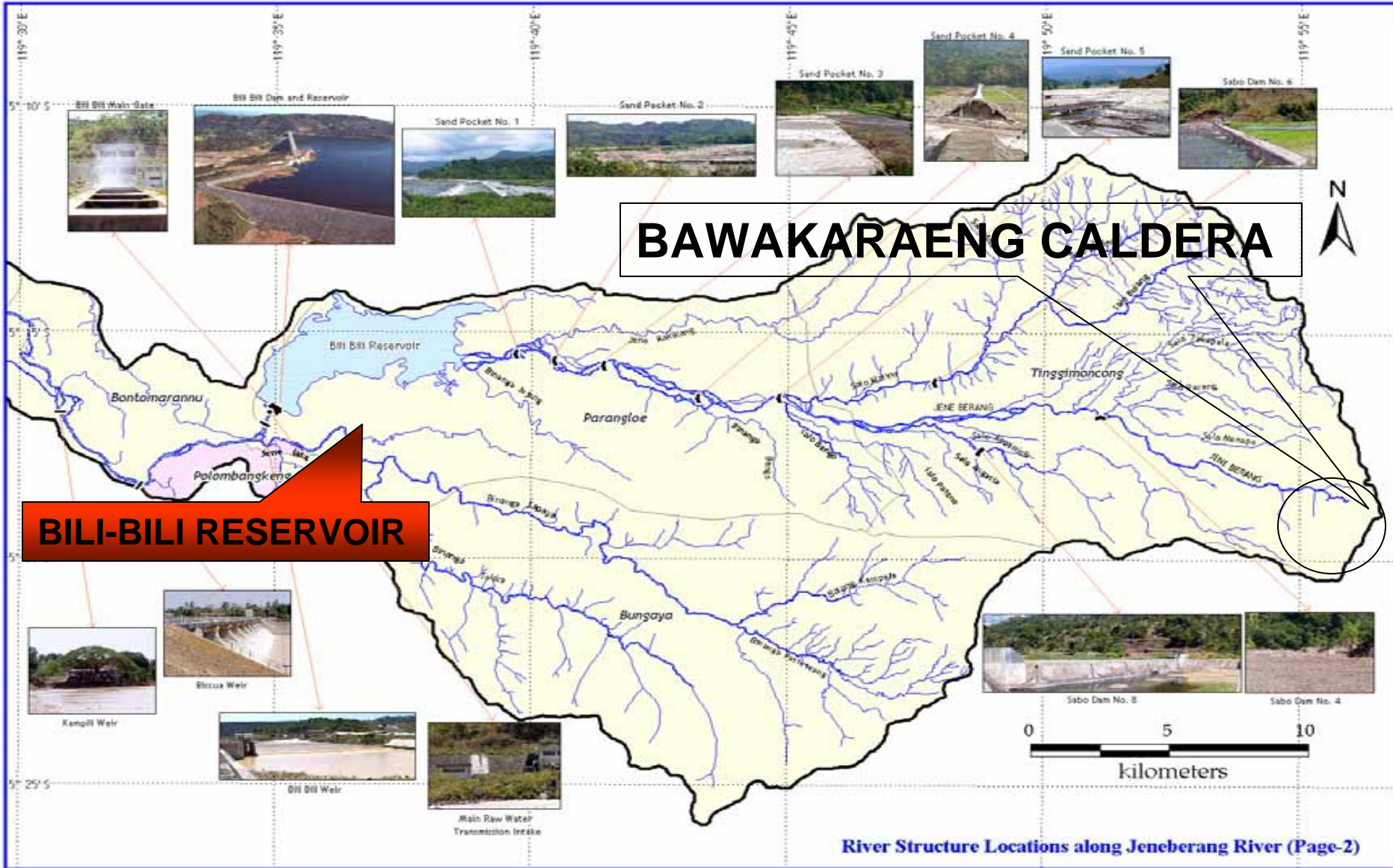


1500 m HEIGHT

250.000.000 m³ of
SEDIMENT MATERIAL

28 3 2004

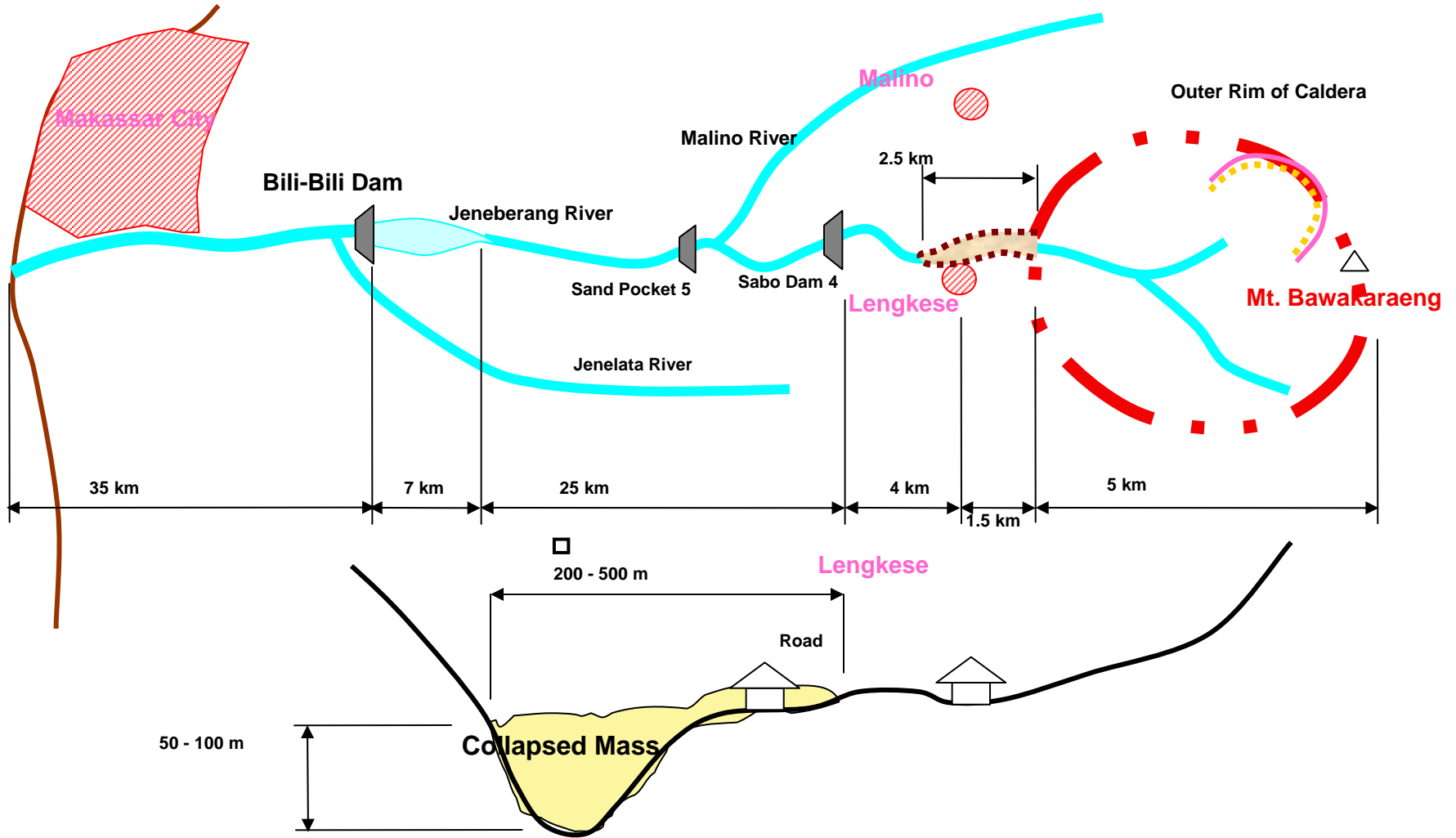
BILI-BILI RESERVOIR WATERSHED



BAWAKARAENG CALDERA

BILI-BILI RESERVOIR

BAWAKARAENG COLLAPSE SCHEME





IMPACTS OF BAWAKARAENG CALDERA COLLAPSE





18/04/2005



18/04/2005

WATCHING DEBRIS FLOW



29/11/2004

DEBRIS FLOWS INUNDATE FARM LANDS



29/11/2004

GULLEY AFTER 9 MONTHS



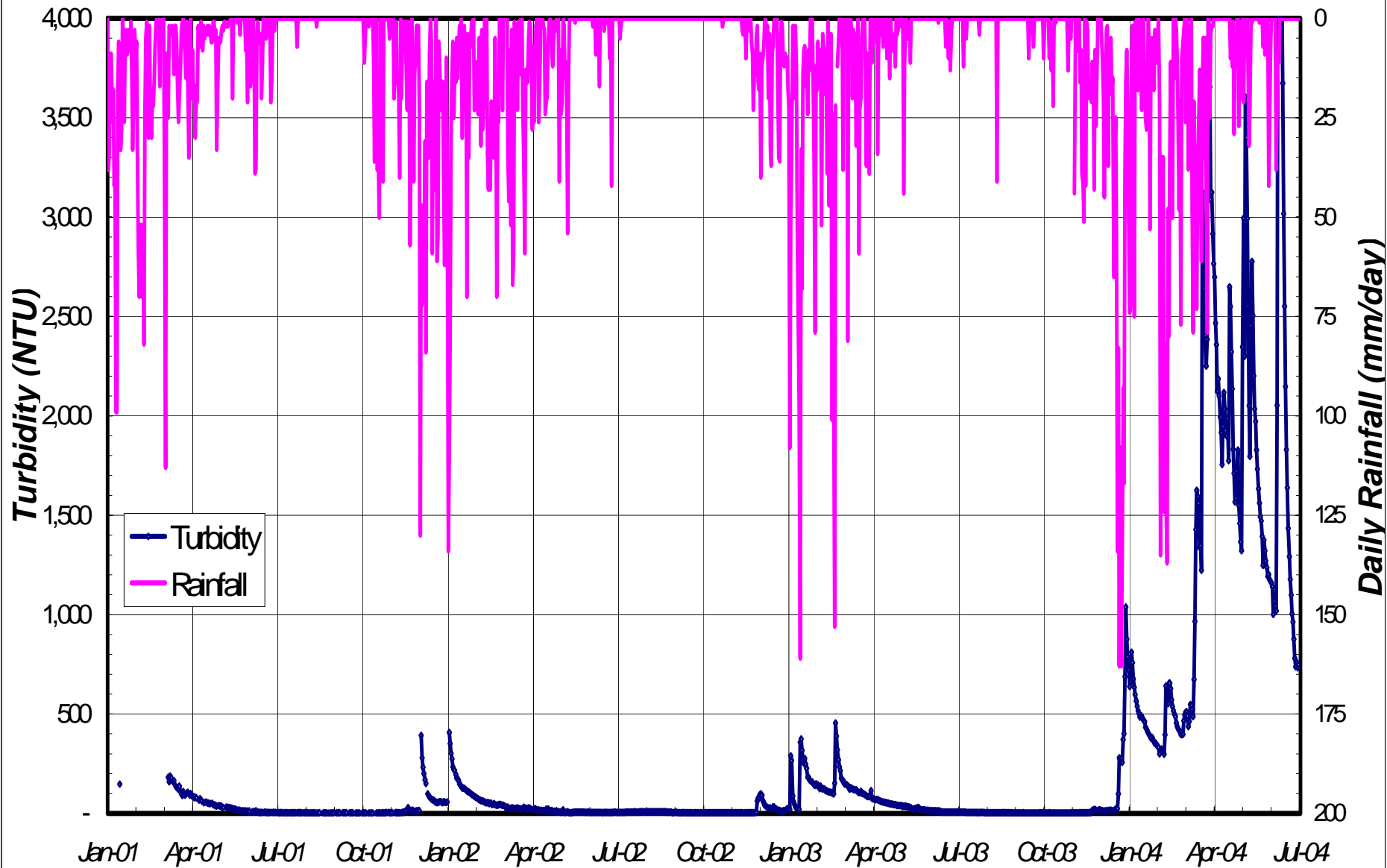
Lengkese, Januari 2005

BILI-BILI DAM



| | |
|--------------------|---------------------------|
| Height | : 73 m |
| Crest length | : 1800 m |
| Surface water area | : 18.5 km ² |
| Reservoir volume | : 375 juta m ³ |
| Dead storage | : 29 juta m ³ |

Turbidity of Raw Water at Bili-Bili Dam and Daily Rainfall at Malino



MITIGATION MEASURE

ISDM CONCEPTS

- COORDINATION AMONG GOVERNMENT AGENCIES (CENTRAL AND LOCAL), LOCAL ORGANIZATIONS, NGO,
- COMBINATION OF STRUCTURAL AND NON STRUCTURAL MEASURE.
- LOW COST TECHNOLOGY AND APPROPRIATE TECHNOLOGY

FOCUS ON LOCAL PEOPLE

- PARTICIPATION OF LOCAL PEOPLE,
- IMPROVEMENT OF SELF-HELP PROCEDURE FOR SAFETY AGAINST THE DISASTER.
- ENHANCING PEOPLE'S WELFARE THROUGH ASSISTANCE IN RECOVERING THEIR EARNINGS

COMMUNITY BASED DISASTER MANAGEMENT

- AWARENES IMPROVEMENT OF LOCAL PEOPLE,
- ESTABLISHMENT OF HAZARD MAP,
- MAINTENANCE OF EVACUATION ROUTE AND PLACE,
- EVACUATION DRILLS.

DANGER SIGN, PROVIDED BY LOCAL INHABITANTS



UNDERSTANDING HAZARD MAP





**KENTONGAN / KATTO-KATTO
IN PARTICIPATORY WARNING AND
EVACUATION SYSTEM**

2005/03/26



2005/03/26

EVACUATION DRILL

EVACUATION DRILL



2005/03/26

AN OBSERVATION SPOT BY LOCAL PEOPLE



RECONSTRUCTION EFFORTS

1. COMMUNITY DEVELOPMENT
2. REGIONAL DEVELOPMENT
3. SEDIMENT CONTROL AND DISASTER MITIGATIONS

1. COMMUNITY DEVELOPMENT

PROBLEMS AS PERCEIVED BY LOCAL PEOPLE

- DANGER OF DEBRIS FLOWS WHEN THEY WORK IN THEIR FIELDS,
- WATER SUPPLY,
- LAND OWNERSHIP,
- JOB PROBLEMS.

2. REGIONAL DEVELOPMENT

OVERCOMING PEOPLE'S PROBLEMS

- WATER SUPPLY,
- IRRIGATION FACILITIES,
- AGRICULTURAL GUIDANCE
- IMPROVEMENT OF ROADS AND EVACUATION ROUTES,
- BRIDGE REPLACEMENT.

3. SEDIMENT CONTROL AND DISASTER MITIGATION

- COMPREHENSIVE SABO PLANNING,
- EXCAVATION OF SEDIMENT IN SABO DAMS AND SAND POCKETS,
- EXTENSION OF TELEMETRY SYSTEM,
- CONSTRUCTION SABO DAMS,
- IMPROVEMENT OF EXISTING SEDIMENT CONTROL STRUCTURES,

MONITORING

- RAINFALL
- SEDIMENT MOVEMENT
- DEBRIS FLOW, POND FORMATION AND BREACHING

ROLE OF SABO COMMUNITY IN MONITORING

- MONITORING DEBRIS MOVEMENT AND FLOW,
- CURRENTLY ACTIVE IN 8 MONITORING POINTS,
- 30 VOLUNTEERS FOR MONITORING,
- RECORDING AND CONVEYING INFORMATION TO DOWNSTREAM PEOPLE AND AUTHORITIES RESPONSIBLE.

JENERANG TENTATIVE PLANNING MAP

CONCLUSION

- Bawakaraeng Caldera Collapse has changed the environment, the river morphology, and threaten the function of Bili-Bili reservoir.
- ISDM Concept is implemented; coordination of government agencies, local organizations, local residents, and NGO's; combination of structural and non-structural measure.
- The collapse and debris flows triggered participation of local people to increase awareness on the sediment related disaster.
- The reconstruction effort is aimed at the welfare of the people, comprises community development, regional development, and sediment control and disaster mitigation.



**THANK YOU
SO MUCH**