



5th General Meeting

Network of Asian River Basin Organizations

Chiang Mai, Thailand • 15–18 May 2013

“WATER RESOURCES MANAGEMENT OF BENGAWAN SOLO RIVER BASIN”

(Related to ADB Technical Assistance (TA) – 7547 Supporting Investment In Water Security in River Basin)



MINISTRY OF PUBLIC WORKS - REPUBLIC OF INDONESIA
DIRECTORATE GENERAL OF WATER RESOURCES

BALAI BESAR WILAYAH SUNGAI BENGAWAN SOLO
(Bengawan Solo River Basin Organization)



DESCRIPTION OF BENGAWAN SOLO RIVER BASIN

Bengawan Solo River Basin is located on East Java and Central Java Province, Indonesia. It is comprised of 17 Regencies and 3 Cities, which has characteristics as the following:

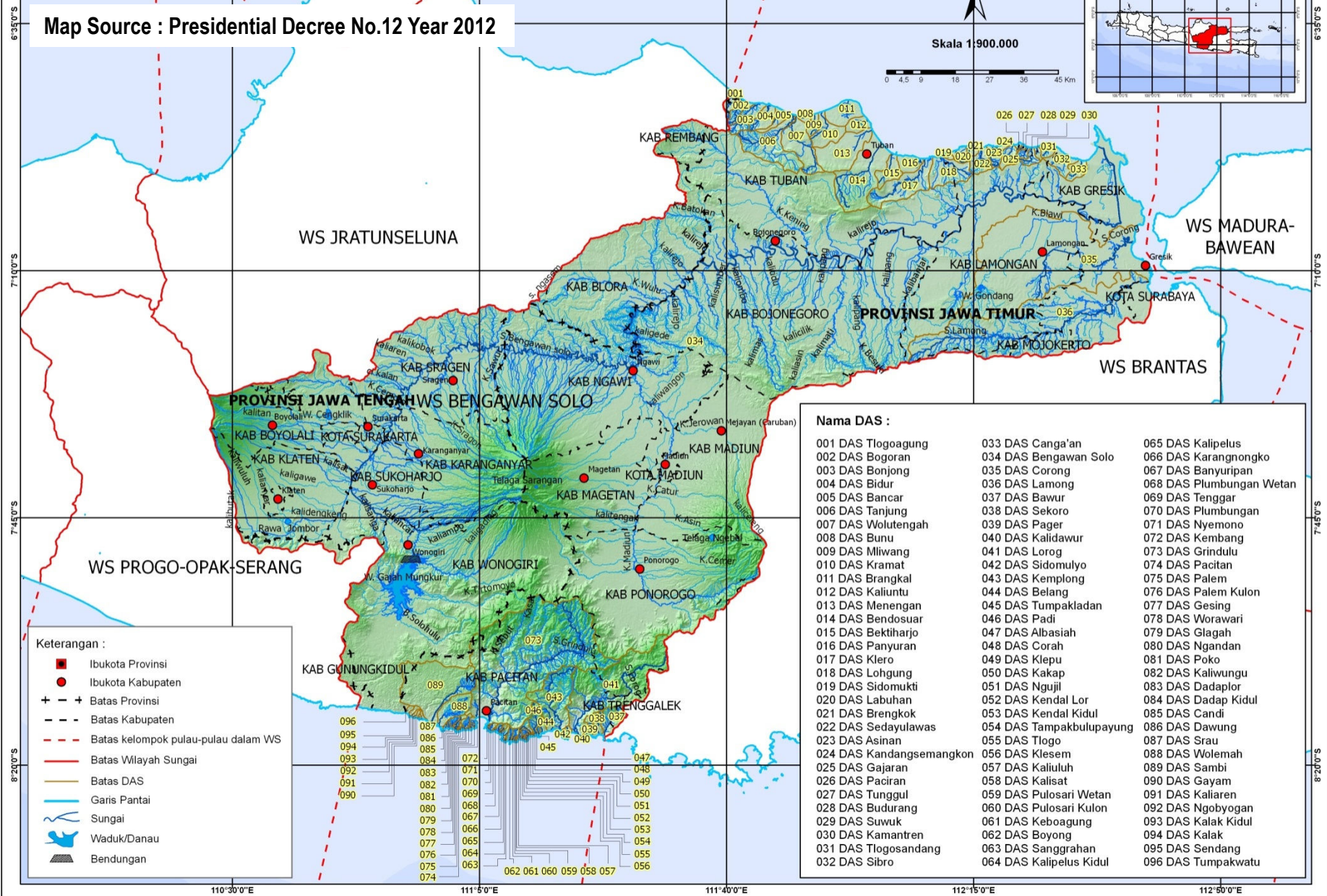
Area	± 19.778 km²
River Length	± 600 km
Average River Width	200 – 300 m
Surface Water Ability	± 18,4 billion m ³ /year
Ground Water Ability	± 3,01 billion m ³ /year
Average Rainfall (Yearly)	± 2.100 mm

MAP OF BENGAWAN SOLO RIVER BASIN

Kode WS : 02.18.A2
112°50'0"E

Map Source : Presidential Decree No.12 Year 2012

Skala 1:900.000



Nama DAS :

001 DAS Tlogoagung	033 DAS Canga'an	065 DAS Kalipelus
002 DAS Bogoran	034 DAS Bengawan Solo	066 DAS Karangngonko
003 DAS Bonjong	035 DAS Corong	067 DAS Banyuripan
004 DAS Bidur	036 DAS Lamong	068 DAS Plumbungan Wetan
005 DAS Bancar	037 DAS Bawur	069 DAS Tenggara
006 DAS Tanjung	038 DAS Sekoro	070 DAS Plumbungan
007 DAS Wolutengah	039 DAS Pager	071 DAS Nyemono
008 DAS Bunu	040 DAS Kalidawur	072 DAS Kembang
009 DAS Mliwang	041 DAS Lorog	073 DAS Grindulu
010 DAS Kramat	042 DAS Sidomulyo	074 DAS Pacitan
011 DAS Brangkal	043 DAS Kemplong	075 DAS Palem
012 DAS Kaliuntu	044 DAS Belang	076 DAS Palem Kulon
013 DAS Menengan	045 DAS Tumpakladan	077 DAS Gesing
014 DAS Bendosuar	046 DAS Padi	078 DAS Worawari
015 DAS Bektiharjo	047 DAS Albasiah	079 DAS Glagah
016 DAS Panyuran	048 DAS Corah	080 DAS Ngandan
017 DAS Klero	049 DAS Klepu	081 DAS Poko
018 DAS Lohgung	050 DAS Kakap	082 DAS Kaliwungu
019 DAS Sidomukti	051 DAS Ngujul	083 DAS Dadaplor
020 DAS Labuhan	052 DAS Kendal Lor	084 DAS Dadap Kidul
021 DAS Brengkok	053 DAS Kendal Kidul	085 DAS Candi
022 DAS Sedayulawas	054 DAS Tampakbulupayung	086 DAS Dawung
023 DAS Asinan	055 DAS Tlogo	087 DAS Srau
024 DAS Kandangsemangkun	056 DAS Klesem	088 DAS Wolemah
025 DAS Gajaran	057 DAS Kaliluh	089 DAS Sambi
026 DAS Paciran	058 DAS Kalisat	090 DAS Gayam
027 DAS Tunggul	059 DAS Pulosari Wetan	091 DAS Kaliaren
028 DAS Budurang	060 DAS Pulosari Kulon	092 DAS Ngobyogan
029 DAS Suwak	061 DAS Keboagung	093 DAS Kalak Kidul
030 DAS Kamantren	062 DAS Boyong	094 DAS Kalak
031 DAS Tlogosandang	063 DAS Sanggrahan	095 DAS Sendang
032 DAS Sibro	064 DAS Kalipelus Kidul	096 DAS Tumpakwatu

- Keterangan :**
- Ibukota Provinsi
 - Ibukota Kabupaten
 - + - + Batas Provinsi
 - - - Batas Kabupaten
 - - - Batas kelompok pulau-pulau dalam WS
 - Batas Wilayah Sungai
 - Batas DAS
 - Garis Pantai
 - Sungai
 - Waduk/Danau
 - Bendungan

HISTORY OF WATER RESOURCES MANAGEMENT PLANNING IN BENGAWAN SOLO RIVER BASIN



Notes:

1. Pola Pengelolaan SDA WS Bengawan Solo : Water Resources Management Strategic Plan of Bengawan Solo River Basin
2. Rencana Pengelolaan Sumber Daya Air WS Bengawan Solo : Water Resources Management Plan of Bengawan Solo River Basin

THE HISTORY



Since 18th Century, when Dutch Colonial Government exist in Indonesia, water resources infrastructures of Bengawan Solo River Basin were started to be developed by composing plan on Solo Vallei Werken and Floodway. Construction of Floodway was then executed by Government of Indonesia through Ministry of Public Works in 2002.

Year	Activities by Ducth Government in Indonesia
1880	Bengawan Solo River Creek was moved from Madura Strait to Ujung Pangkah to avoid sedimentation on Tanjung Perak Port
1916	Construction of Prijetan Dam in Lamongan Regency
1935	Construction of Pacal Dam in Bojonegoro regency

Water Resources Management

(Based on UU No. 7 / 2004 & PP No. 42 / 2008)

Water Resources Conservation

- Control of water source utilization
- Water recharge for water source
- Arrangement of sanitation infrastructure
- Protection of water source
- Control of upstream land utilization
- Rehabilitation of forest and land
- etc

Water Resources Utilization

- Water resources supply (including for irrigation and basic needs)
- Water resources usage
- Water resources development
- Water resources exertion

Water Destructive Force Control

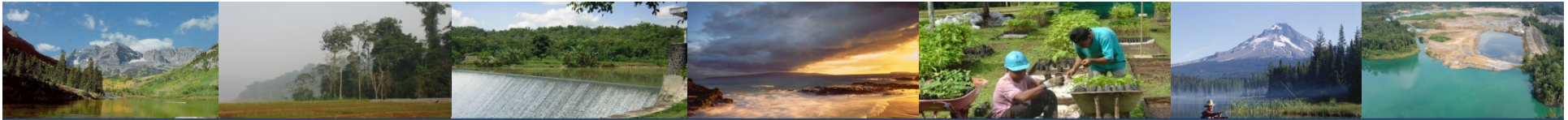
- Prevention before disaster (particularly by non-structural measures)
- Protection during disaster
- Recovery after disaster

Data and Information System

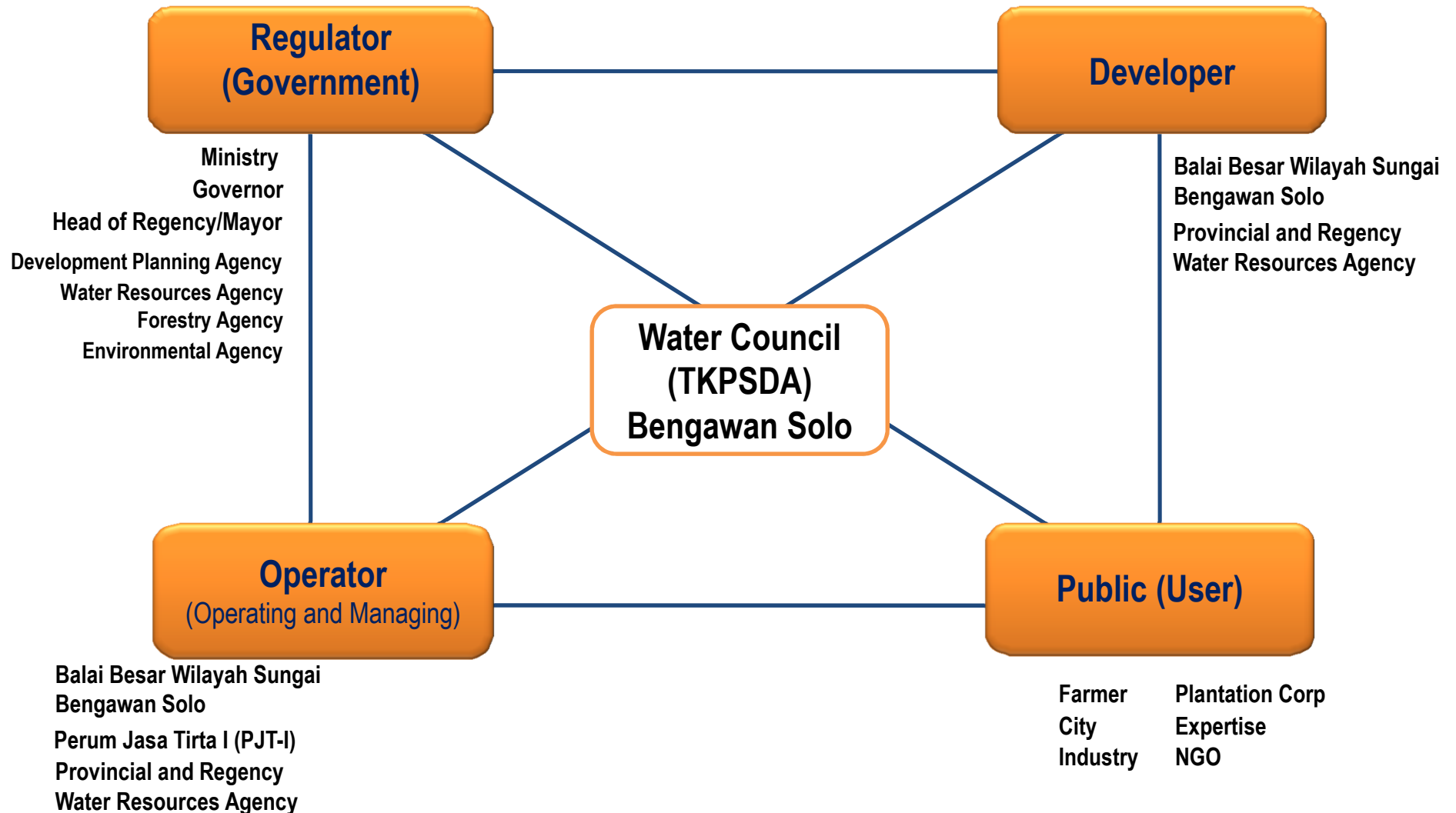
- Water resources information
- Infrastructure information system
- Institution

Stakeholder Empowerment

- Public Participation
- Coordination



Stakeholders of Water Resources Management for Bengawan Solo River Basin



WATER COUNCIL OF BENGAWAN SOLO RIVER BASIN TKPSDA (Tim Koordinasi Pengelolaan Sumber Daya Air)

The Water Council was founded based on Minister of Public Works Decree No: 247/KPTS/M/2009, which is consisted of 64 members (32 members are from Government Institution and 32 members are from Non Government Organization).

Bengawan Solo Water Council conducts a meeting for each three months to discuss on issues of bengawan solo water resources management.

This organization is comprised of three commission as the following:

1. Commission of Water Resources Conservation
2. Commission of Water Utilization
3. Commission of Water Destructive Control (Flood Control)



Stage of Implementing Water Resources Management

(Based on UU No. 7 / 2004)

Pola Pengelolaan SDA WS Bengawan Solo
(Water Resources Management Strategic Plan of Bengawan Solo River Basin)



Rencana Pengelolaan Sumber Daya Air WS Bengawan Solo
(Water Resources Management Plan of Bengawan Solo River Basin)



Programme



**FS, DED, EIA
(SIDLACOM)**



Implementation

Notes:

1. FS : Feasibility Study
2. DED: Detailed Engineering Design
3. EIA : Environmental Impact Assessment (AMDAL)
4. SIDLACOM: Survey, Investigation, Design, Land Acquisition, Construction, Operation and Maintenance

POLA PENGELOLAAN SUMBER DAYA AIR WILAYAH SUNGAI BENGAWAN SOLO

(Minister of Public Works Decree (KepMen PU) No. 266/KPTS/M/2010)

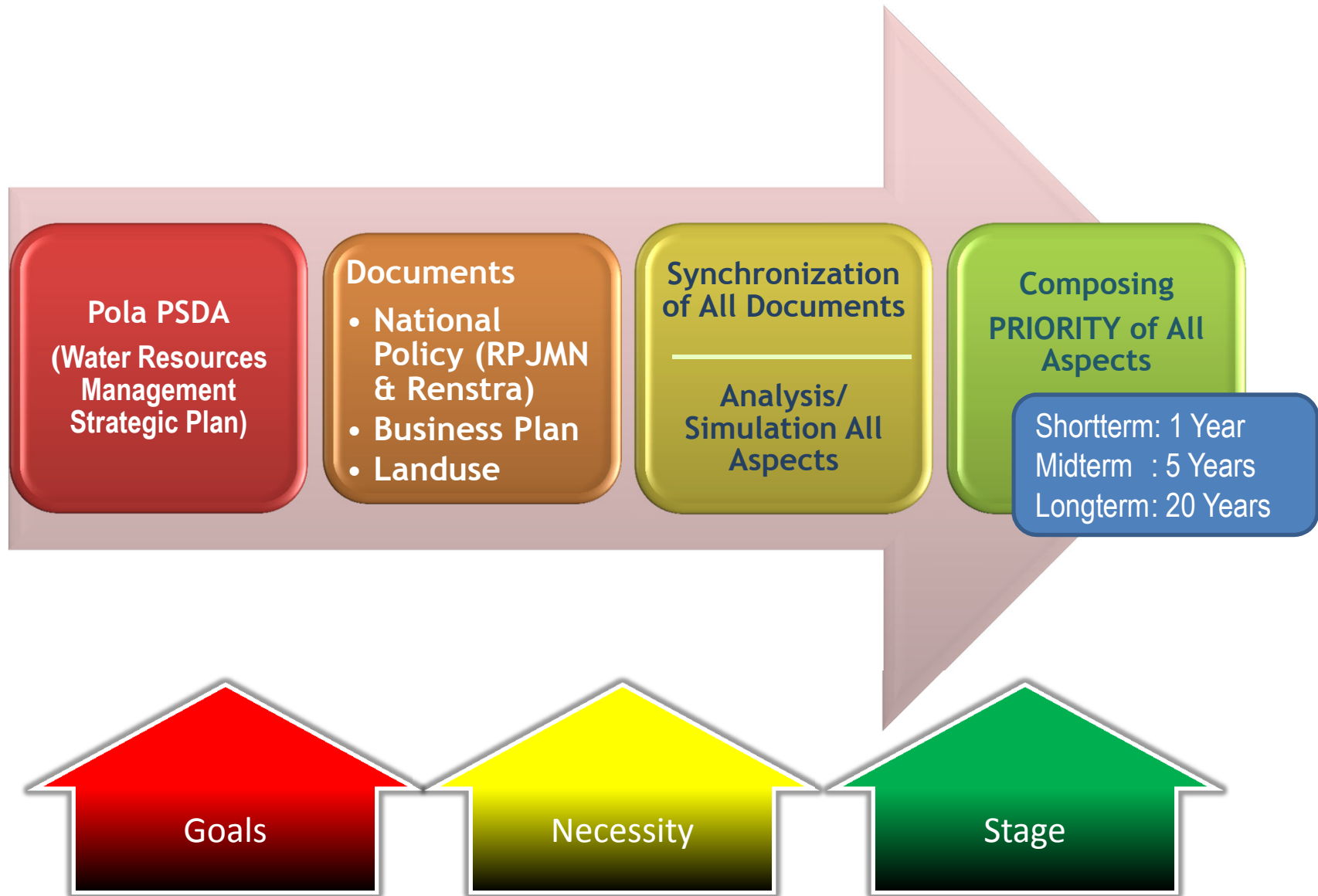
Pola pengelolaan sumber daya air (*Water Resources Management Strategic Plan*) is a basic framework on planning, monitoring and evaluating water resources conservation, water resources utilization and water destructive force control activities (UU RI No. 7 Tahun 2004)

RENCANA PENGELOLAAN SUMBER DAYA AIR WILAYAH SUNGAI BENGAWAN SOLO

Rencana pengelolaan sumber daya air (*Water Resources Management Plan*) is a necessary comprehensive and integrated planning results for conducting water resources management (UU RI No. 7 Tahun 2004, based on Pola Pengelolaan Sumber Daya Air)

RENCANA PENGELOLAAN SUMBER DAYA AIR WS BENGAWAN SOLO

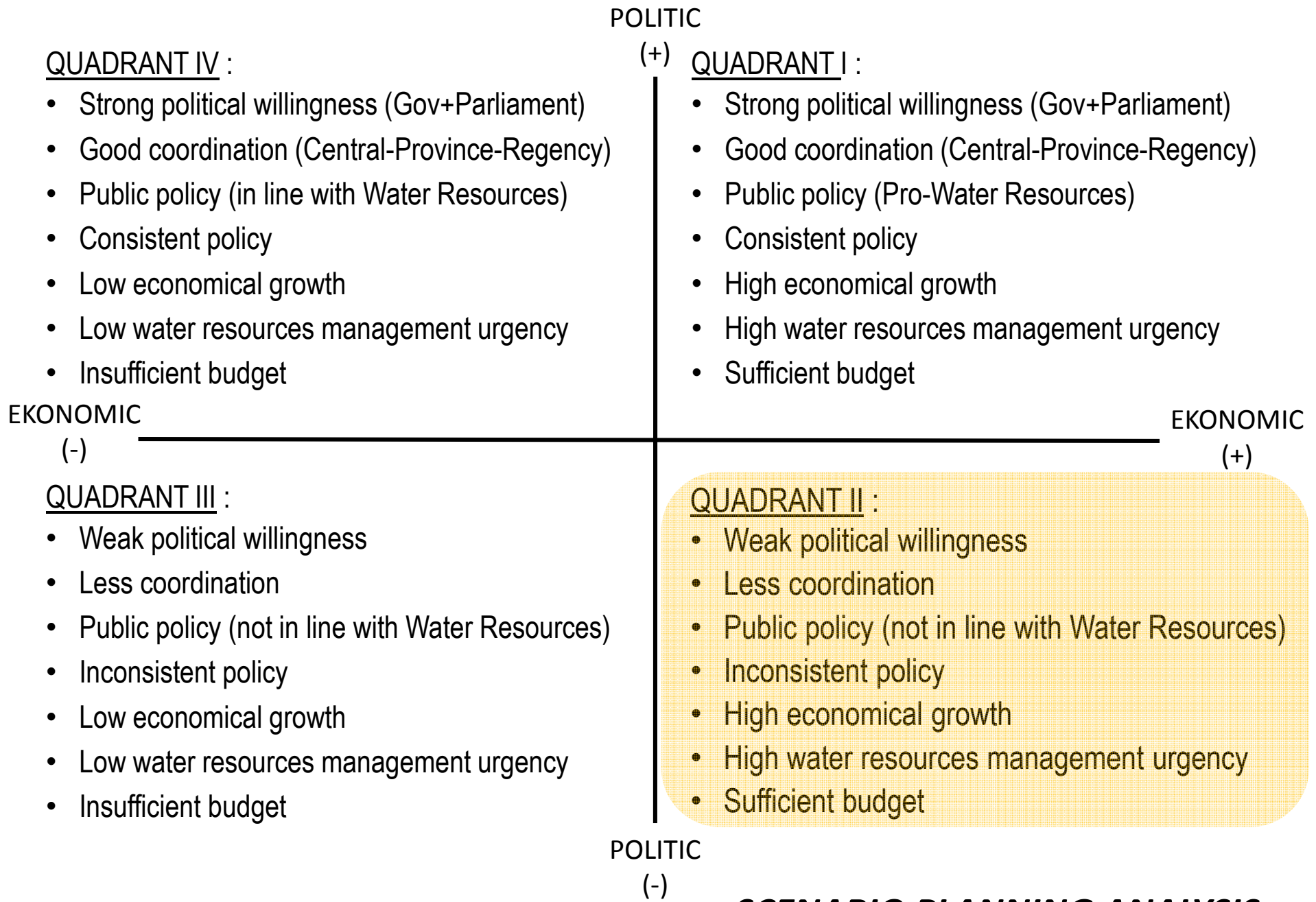
(Water Resources Management Plan of Bengawan Solo River Basin)



PLANNING SCENARIO FOR WATER RESOURCES MANAGEMENT IN BENGAWAN SOLO RIVER BASIN

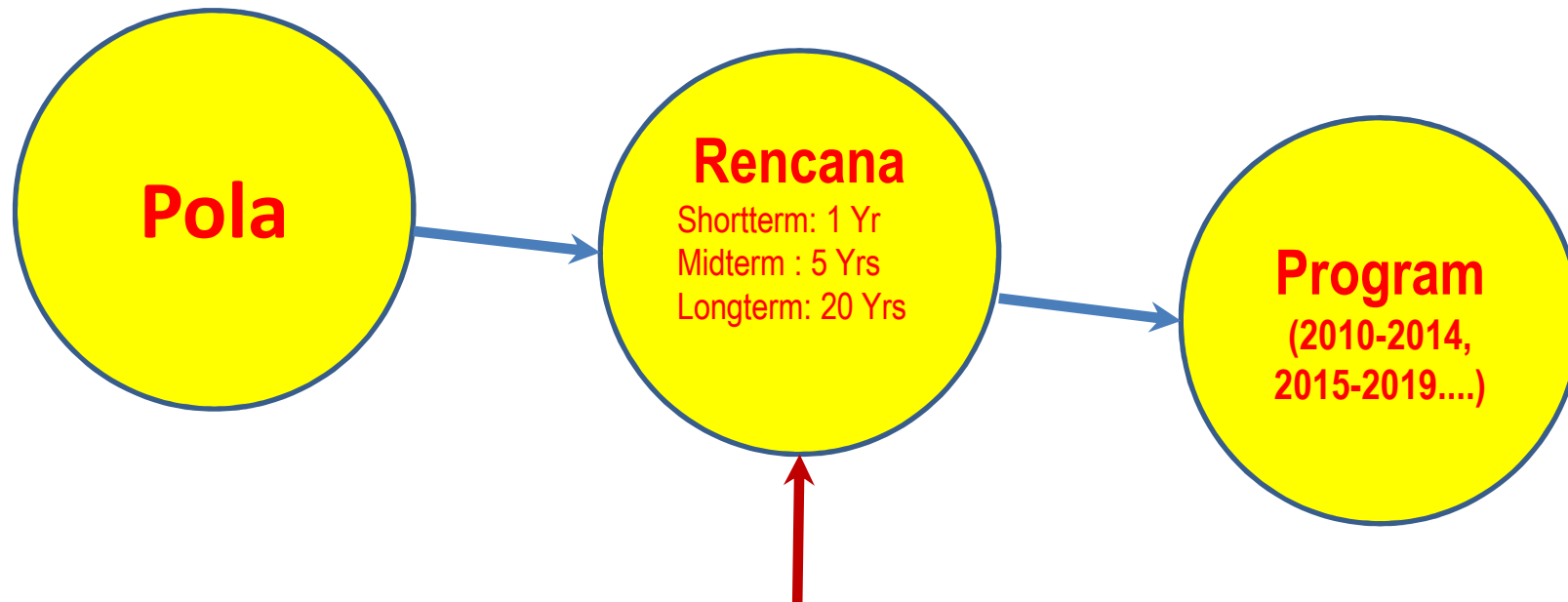
FOCAL CONCERN : Water resources management to provide benefit for communities on the Bengawan Solo River Basin

CRITICAL DRIVING FORCE : • Political Condition
• Economic Growth



SCENARIO PLANNING ANALYSIS

Relation between Pola Pengelolaan Sumber Daya Air and ADB TA -7547



TA Activities (JWA):

1. Improvement of water distribution (intake, canals, gates in pilot area)
2. Effective reservoir operation manual in a pilot tributary
3. Flood mitigation and watershed conservation
4. Capacity development for implementation activities related above key areas

KEY AREA AND KEY ISSUES

General Issues on Water Security:

1. Flood Control
2. Water Distribution Management
3. Water Scarcity
4. Conservation

Risks	Opportunity
Flood occur annually	To construct river protection To develop concept of living in harmony with flood
Water scarcity due to inefficiency of water distribution	To control and maintain irrigation infrastructure To develop appropriate system on water distribution
Sedimentation on dam and river	To conduct dredging To conserve land
Deforestation on upstream catchment area is causing sedimentation on the dam and river	To conduct conservation based on public participation
Land use changing	To implement law enforcement on controlling land use

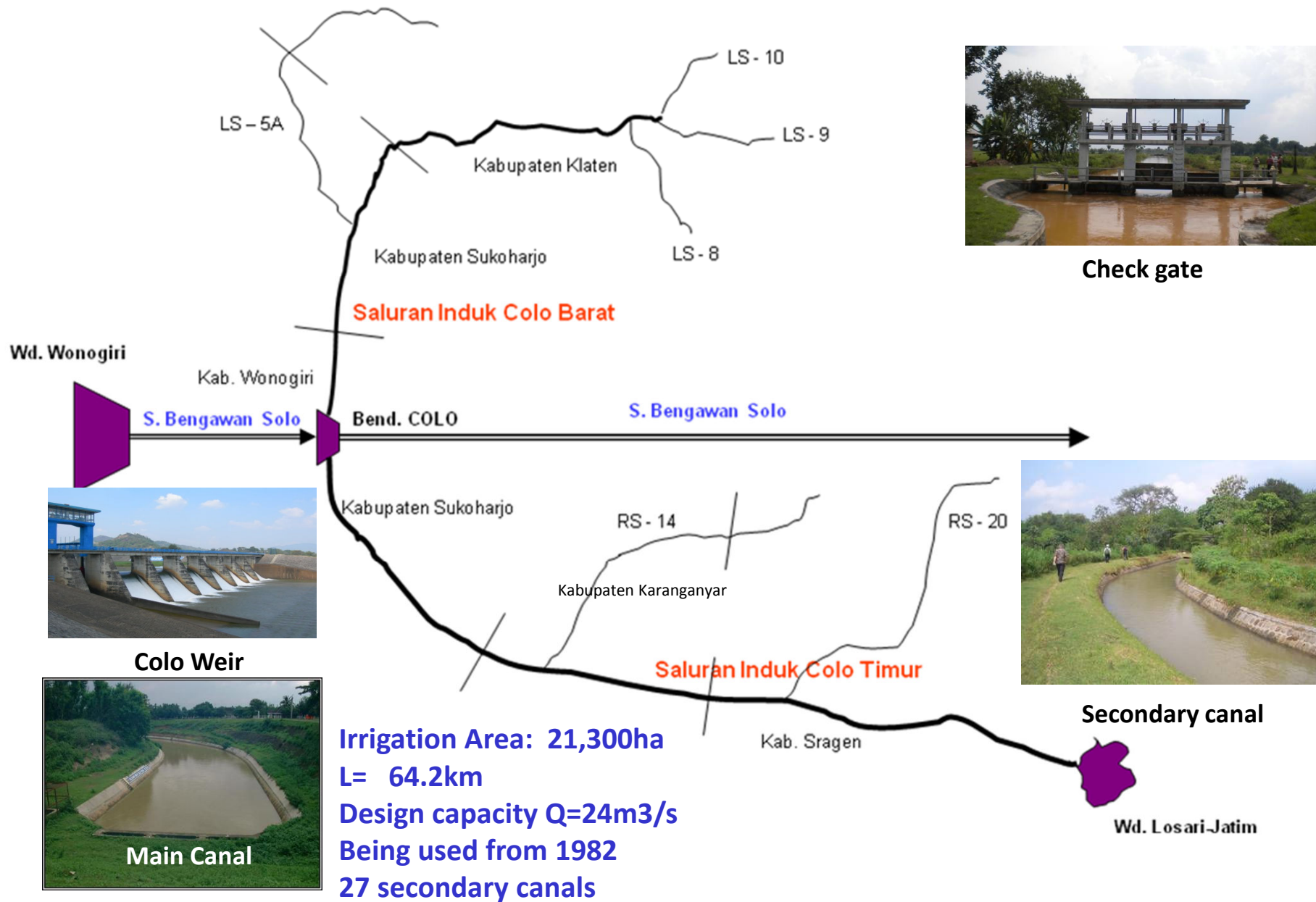
Issues on ADB TA-7547

Supporting Investment in Water Security in River Basin

From the beginning of this ADB TA-7547 program, BBWS Bengawan Solo, Directorate BPSDA, and Japan Water Agency (as the implementing agency) had already discussed on the activity plan in order to avoid overlapping with the existing government programs and to synchronize with the Water Resources Management Strategic Plan of Bengawan Solo River Basin.

No.	Topics	Issues
1.	Water Distribution Management	<ul style="list-style-type: none">a. Limited monitoring and reporting on water allocationb. Non-proportional water distribution along the canalc. Several farmers did not follow cropping pattern which is stipulated by the Head of Regency (Bupati)
2.	Dam operation and safety management	<ul style="list-style-type: none">a. There was no operation and safety manual of Dawuhan Dam in Madiun Regencyb. Dam operator conducts operation based on approximate value depend on his own estimation
3.	Flood mitigation and watershed conservation	<ul style="list-style-type: none">a. Flood occurred frequently during the rainy season on Pacal-Soko Watershedb. Limited coordination between water sector and forest sector

Improvement of water distribution management in canal system (East Colo Canal)



Stakeholder Workshops in 3 Regencies (Sragen, Karanganyar, Sukoharjo - Central Java - Indonesia)



Participants: Water User Association (P3A, GP3A), farmers group, Gate operators, Local governments (agriculture, water), PJT-1, BBWS, etc

Field Surveys to main canal and secondary canal Interview with TOR Gate Operators, GP3A, and Local Gov.



Conclusion and Recommendations

- ***Cluster system on priority rehabilitation plan, service determination
--- One irrigation area, one plan, one intergates management---***
- ***Upgrading of service with operation manual for caluculation of gate discharge,
recording, and monitoring***
- ***Request for improvement of facility operation and maintenance***

Identified points to be improved / implemented

to strengthen effectiveness, efficiency, sustainability and impact of activities along
Pola & Rencana

➤ **Management of water supplier's task**

- ✓ Management of water discharge volume of main canal
- ✓ Management of water intake volume to each secondary canal

➤ **Facility maintenance**

- ✓ Tentative response against the leakage trouble in the field
- ✓ Rehabilitation planning (prioritization & approach)
- ✓ Countermeasures against sedimentation

➤ **Institutional functions**

- ✓ Role/responsibility of each organization & each staff
- ✓ Communication among organizations/personnel
- ✓ Regulation of main canal operation
- ✓ Maintenance and rehabilitation

➤ **Future studies / analysis**

Proposed priority actions for improvement

Priority actions : hard components

- Rehabilitation related to water volume control of main canal and intake to secondary canal (gates, monitoring facilities)
- Countermeasures for sedimentation at critical points

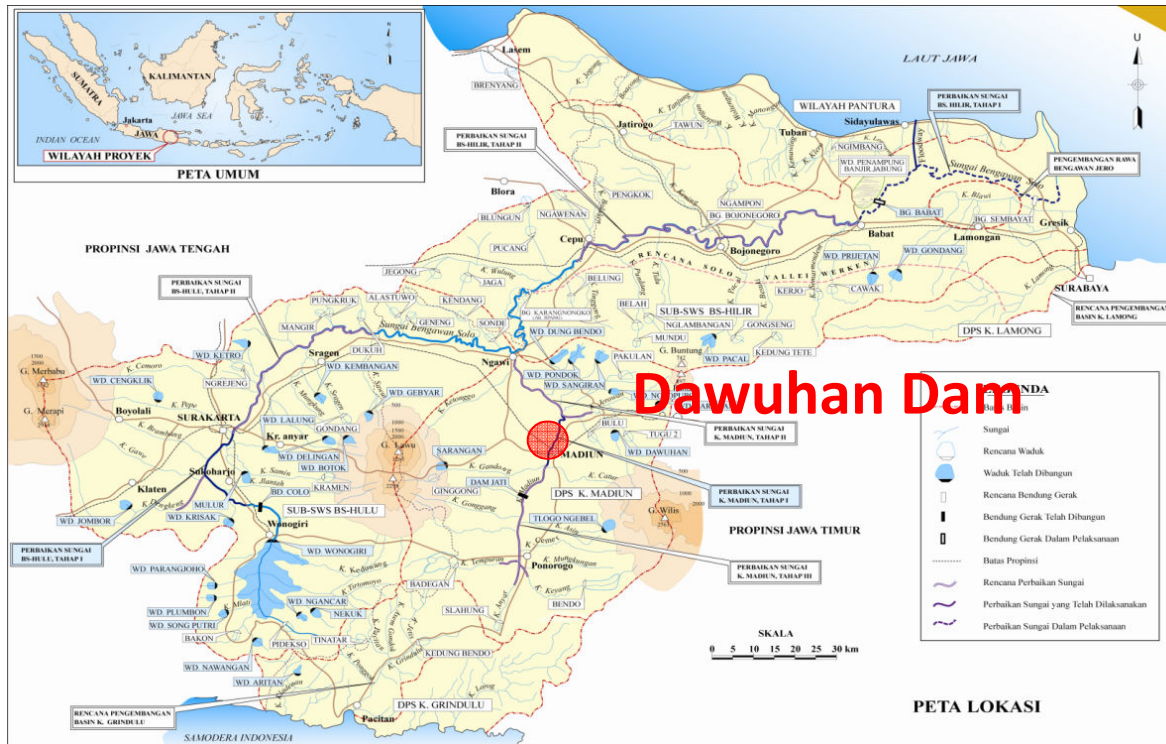
Priority actions : soft components

- Utilize / develop simple guidance for capacity development of field level staff
- Improving management of routine task for proper response
- Establish / keep good relation with water users
- Study for next step (approach for rehabilitation coordination, less water use agriculture, etc)

Dam management in tributaries (Dawuhan Dam)



Operation from 1963
 Height: 14m (earthfill)
 Crest length: 860m
 Reservoir water volume:
 5,000,000m³ (original)



Field Survey and interview at Madiun and Dawuhan Dam



Interview to UPT



Intake Tower of Dawuhan dam



Gate operation Room



Seepage Monitoring Weir

Seminar on Dam Safety; Information Sharing



Opening Remarks from BBWS-BS



From PUSAIR, in charge of dam O&M



From UPT Madiun with Inspection Report

Identified points to be improved

➤ **Management of O&M**

- ✓ Operation level is low and need firmer governance
- ✓ Improve practical management scheme (reporting, evaluation, instruction, etc)
- ✓ Prepare O&M manual for the Dam

➤ **Dam safety monitoring & evaluation**

- ✓ Inproper Monitoring, and awareness raising is necessary
- ✓ Practical works such as monitoring, reporting, instructing need to be improved
- ✓ Prepare Dam safety manual and Pocket Booklet

Establishment of Dawuhan Dam Working Group for manual formulation



Flood mitigation and watershed conservation

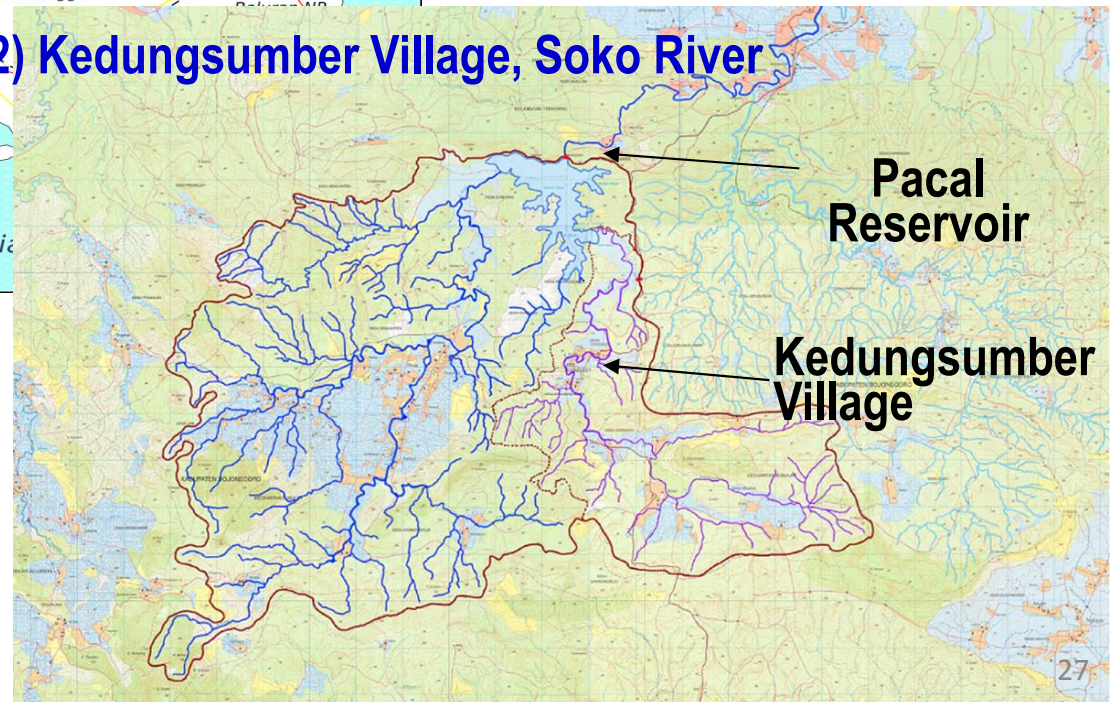
Pacal and Soko River

1) Location of Soko River in East Java



Soko River

2) Kedungsumber Village, Soko River



Condition of upstream area



- The pilot area is located at the bottom of the valley, and surrounded by the bare mountains because of deforestation.
- It is suspected that their mountains don't have water-holding capacity well, and the runoff of water to the Soko River is very sharp. And it causes serious erosion problems

Condition of upstream area



Typical view of Soko river catchment area after illegal logging in 1999-2000's



After 2000's flash flood occurs every year



Identify issues

Vulnerable to flash flood



- Inhabitants suffered by flash flood frequently. There was a biggest damage on March 3, 2008. The maximum depth of inundation was 1.5m. About 200 houses were inundated.
- The damage by flash flood is recently getting larger and larger after 1999.

Workshop on Water Conservation



From PU, lecture on Spatial planning



BUMN Hijau Lestari participated



Identified points to be improved

➤ **Coordination among stakeholders**

- ✓ Coordination scheme between water sectors & forest sectors
- ✓ Common consensus (issue, trend, target, process of improvement)



Starting series of multi-stakeholder workshops at pilot tributary

Stakeholder workshops in Bojonegoro



- **Bappeda (Agency for Development Planning)**
- **BPBD (Agency for Local Disaster Prevention)**
- **DISHUTBUN (Forestry and Plantation Office)**
- **DISTAN (Agricultural Office)**
- **DUWRMT (Dissemination Unit of WR Management and Technology)**
- **LSM (Non Government Organization)**
- **Villagers of Pacal-Soko Watershed**
- **UPT SD AIR (Technical Implementation Unit for WR Management)**
- **PJT 1 (Public Company for Water Services 1)**
- **Perhutani (State Forest Company)**
- **BBWS BS and others**

Proposals from stakeholder workshop

- ◆ Reforestation
- ◆ Community empowerment (early evacuation with early warning system (TA 7276, ICHARM))
- ◆ Public involvement (e.g. supported by forest sector, BBWS)
- ◆ River works (repairing bank protection, etc)
- ◆ Additional early warning system
- ◆ River & reservoir maintenance (check dam, etc)

 **Need to be developed & authorized**

Another proposal from pilot tributary

- ◆ **Collaboration scheme (Watershed platform)**

(chaired by Planning Section of Regency & supervised by BBWS)



THANK YOU