

COORDINATION FOR INTEGRATED WATER QUALITY MANAGEMENT IN INDONESIA: THE BRANTAS BASIN MODEL

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BACKGROUND AND CHALLENGE

Indonesia's rivers face common threats of pollution from domestic, industrial, agricultural, and other non-point sources. Poor water quality increases the costs of drinking water supply and irrigation, threatens public health, and compromises critical ecosystems and long-term environmental sustainability. One of Indonesia's National Strategic Rivers, the 320-km long Brantas River in East Java, faces such challenges but is also a potential model for strengthened and coordinated approaches to improving river health. A clean Brantas depends not only on water quality monitoring, but also on cross-sector planning and service provision to control and reduce pollution. This includes programs to effectively collect and treat domestic wastewater, the greatest contributor to elevated pollution in the Brantas in terms of biochemical oxygen demand (BOD). Increased attention must also be paid to effects of agricultural runoff, plastic and organic solid waste in waterways, pollution from livestock, and impacts of land use and urban and industrial development. As such, improved water quality management requires routine and formalized coordination to support planning, water and pollution source monitoring and data management, and implementation of pollution control across sectors.

ROLES AND RESPONSIBILITIES IN WATER QUALITY MANAGEMENT

Many agencies are involved in water quality and water pollution source management in DAS Brantas. KLHK, DLH Jatim, and municipal DLH agencies in the sixteen kota and kabupaten are tasked with industrial pollution control and water quality monitoring, but overall responsibility for water resources management is the joint responsibility of BBWS Brantas (Kementerian PUPR) and Perum Jasa Tirta I. Key sources of water pollution, including domestic wastewater, agriculture, livestock, and small industry, are the responsibility of other agencies.

River water quality management involves a range of tasks and functions performed across sectors and levels. Key tasks and functions include:

- Water quality monitoring and data management,
- Planning (water resources, environmental, spatial, source-related),
- Pollution control,
- Community participation, and
- Conservation and restoration.

Table 1 summarizes key stakeholders and their responsibilities for water quality management.



BRANTAS RIVER
LENGTH: 320 KM
DAS AREA: 12,000 KM²
POPULASI: 18 JUTA



DOMESTIC WATER SUPPLY: 40% JAWA TIMUR
IRRIGATION: 25% INDONESIA RICE CROP

- HULU
- Kota Batu
 - Kabupaten Malang
 - Kota Malang
 - Kabupaten Blitar
 - Kota Blitar
 - Kabupaten Tulungagung
 - Kabupaten Trenggalek
 - Kabupaten Kediri
 - Kota Kediri
 - Kabupaten Nganjuk
 - Kabupaten Jombang
 - Kabupaten Mojokerto
 - Kota Mojokerto
 - Kabupaten Sidoarjo
 - Kabupaten Gresik
- ▼ HILIR
- Kota Surabaya

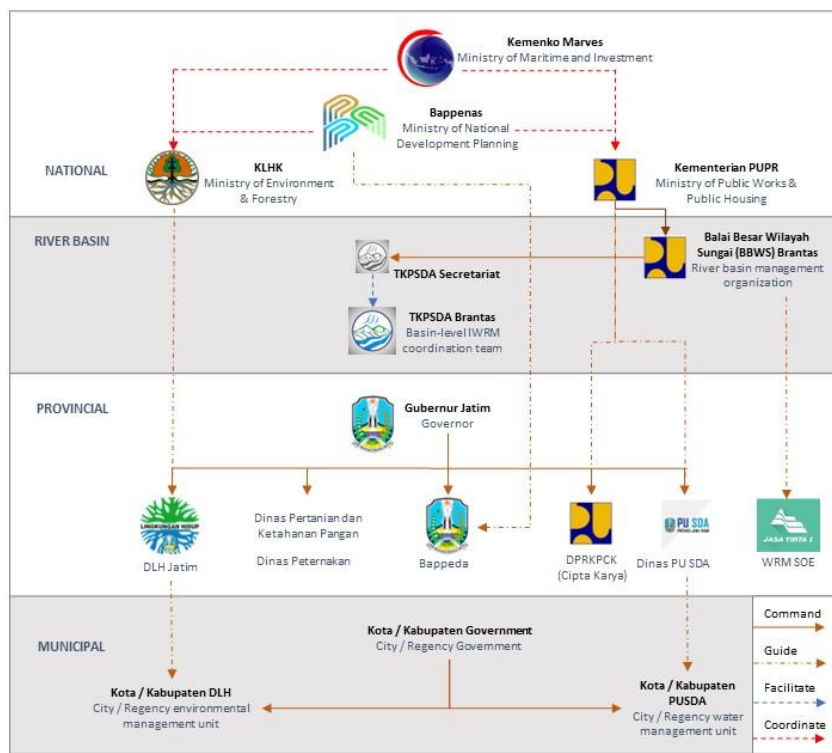


Table 1. Responsibilities in water quality management

Primary Function	Sub-function	Implementing Agencies	Non-governmental
Water quality and data management, analysis, and reporting	Water Quality Monitoring and data management	KLHK, BBWS Brantas (PUPR), PJT I, DLH Prov/Kab/Kota, PU SDA (outside WS Brantas)	Academia, LSMs
	Analysis (incl. calculation of carrying capacity)	KLHK, DLH Prov/Kab/Kota	Academia
Planning, including water resources and spatial planning	Formulation of Water Quality Protection and Management Plan (RPPMA)	KLHK	
	Spatial planning (RTRW)	Bappeda Prov/Kab/Kota, Cipta Karya, DPRKPCK	
	Water resources planning (Pola and Rencana)	BBWS Brantas (PUPR)	
	Development planning (RPJMD)	Bappeda Prov/Kab/Kota, Disperindag	
Pollution control	Identification (inventory) and evaluation of point and non-point sources of pollution	KLHK, DLH Prov/Kab/Kota	Academia, LSMs
	Standard-setting, permitting, and licensing for development and discharge of wastewater	KLHK, DLH Prov/Kab/Kota	
	Enforcement of discharge standards	KLHK, DLH Prov/Kab/Kota	
Service provision to reduce pollution from terrestrial sources	Domestic wastewater management (development)	BPPW Jatim, Dinas Cipta Karya Jatim	
	Domestic wastewater management (O&M)	Desa government	Individual, Businesses, Schools
	Solid waste management	DLH Jatim/Kab/Kota, desa government	LSMs
	Management of agricultural runoff	Dinas Pertanian dan Ketahanan	
	Management of livestock runoff	Dinas Peternakan	
	Riparian area control	BBWS Brantas (PUPR)	
Community engagement, public awareness, and education		BBWS Brantas (PUPR), DLH Prov/Kab/Kota	Academia, LSMs
Restoration and conservation		KLHK, DLH Jatim, desa government	Academia, LSMs
Coordination ¹		Bappeda, Bappenas, TKPSDA, Dewan SDA	

Responsibilities dispersed across sectors and levels of government. Relationships amongst select agencies are illustrated in Figure 1.

Figure 1. Relationships amongst key agencies in Brantas River WQM

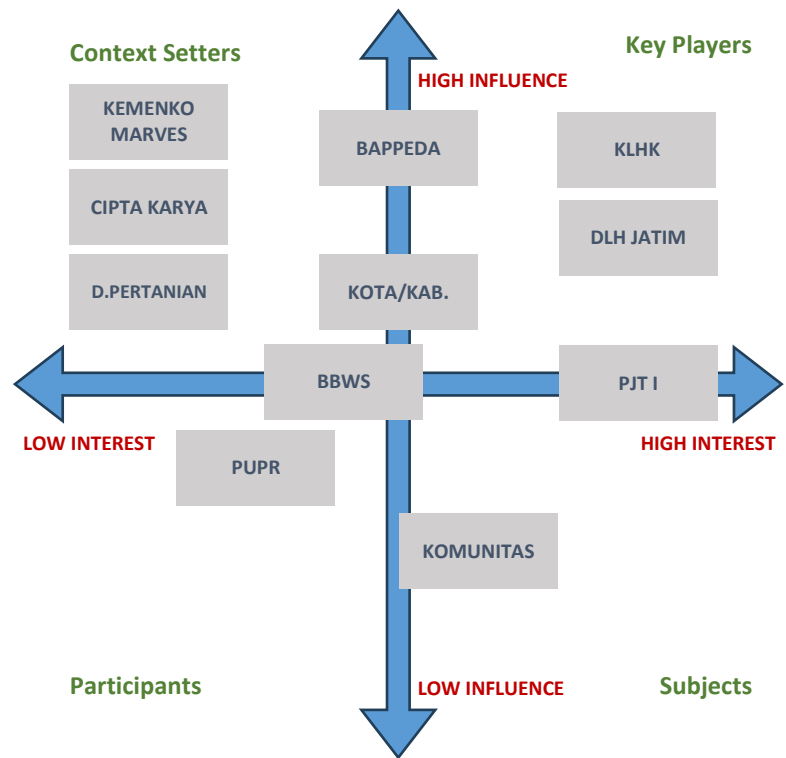


¹ TKPSDA had a temporary working group on water quality, but it is not a permanent mechanism.

STAKEHOLDER MAP

Stakeholder mapping is a common approach to frame interest in and influence over a policy issue. A stakeholder is a person or organization that has an interest, control, or influence over an issue. Stakeholders with high influence and high interest are considered Key Players, who are central to addressing the issue and may assume a leadership role. Stakeholders with high control but lower interest are Context Setters whose participation is key and should be actively engaged. Actors with high interest and lower influence are Subjects that should be actively consulted. Stakeholders with low influence and interest are Participants that can be informed and consulted, as needed.

This stakeholder map was constructed to support discussion. Here, interest refers to the level of importance water quality has to stakeholder agency's overall mandate and what role water quality plays with respect to its stated strategic priorities. Influence refers to an organization's capacity to control water quality management or pollution source management at a basin (DAS) level.



NEED FOR COORDINATION MECHANISM

Effective water quality management in the Brantas requires a coordinated planning, monitoring, and evaluation and pollution management and control. Coordination is needed because multiple agencies (a) collect water quality and pollution source data, (b) perform subfunctions of water environmental management, and (c) manage pollution sources.

PLANNING

Peraturan Pemerintah 22 Tahun 2021 tentang Penyelenggaraan Perlindungan dan Pengelolaan Lingkungan Hidup assigns KLHK responsibility to formulate and manage a Rencana Perlindungan dan Pengelolaan Mutu Air (RPPMA) for the Brantas. The effectiveness of such a plan depends on inputs and support from the many stakeholders who perform functions of water quality management, pollution source management, and conservation, across levels of government. Inputs include key data for planning and knowledge regarding feasible policy options. Support is also required so that implementing agencies take on planned programs and activities in their strategic and work plans. The ongoing and coordinated participation of these organizations is paramount to the successful formulation and effective implementation of the RPPMA. A key recommendation of Brantas Harmoni is the establishment of a regularized and sufficiently-funded coordinating body to:

- Facilitate the sharing of key data for planning, adjustment, and oversight (water quality and pollution source data);
- Coordinate implementation; and
- Monitor and evaluate progress.

Plans for managing water quality must be synchronized with SKPD strategic and work plans and the Pola.

ADDITIONAL COORDINATION NEEDS

In addition to planning coordination, there is a need for coordinated water quality monitoring and data management and horizontal coordination across DLH units at the kota / kabupaten levels for upstream-downstream pollution control. There are also opportunities available to coordinate public information campaigns and education programs to more effectively engage communities in safeguarding river water quality and reducing pollution. These are described further in Appendix 1.

DLH Jatim has recently taken a significant step to coordinate and integrate water quality data collection and reporting through a new system called “WQMS”. Moreover, upstream-downstream coordination across kota and kabupaten DLH agencies could easily be facilitated by a regular meeting organized by DLH Jatim or KLHK. As such, these sub-functions require lesser coordination across sectors.

PILOT COORDINATION BODY: TKPSDA POKJA KUALITAS AIR

As stipulated in UU 17 of 2019 (Chapter XII, Article 66), coordination at the river basin level is to be carried out by TKPSDAs. While TKPSDA WS Brantas has a strong coordinating role for utilization, conservation, and flood control, water quality management is a development area. Recognizing the unmet need for water quality coordination, a Pokja Kualitas Air was established in 2019, under TKPSDA WS Brantas Komisi III “*Daya Rusak Air,*” on a trial basis with support from the Brantas Water Quality Project.² The Pokja was established to harmonize programs; discuss and evaluate plans; support integrated data; discuss community participation; and provide input to the Ministers, Governor of Jawa Timur, and regents and mayors. The Pokja met quarterly from 2021-2023. As the Brantas Water Quality project nears completion, the project team and Pokja Kualitas Air recommend continued coordination. BBWS Brantas indicates that it cannot organizationally or financially facilitate the Pokja under TKPSDA and that another organization should assume responsibility. Select options for coordination mechanisms are summarized in Appendix 2.

RECOMMENDATION

Considering administrative feasibility and current activities, **Option 2A is recommended: establish a Pokja Kualitas Air to coordinate planning, monitoring, implementation, and evaluation under the leadership of KLHK or Bappeda Jawa Timur.**

Recommendations are summarized as follows:

Mechanism:	Pokja Kualitas Air Brantas
Tasks and functions:	<ol style="list-style-type: none"> 1. Facilitate data-sharing for planning, monitoring, and evaluation (water quality and pollution source data) 2. Support formulation of RPPMA 3. Track progress on RPPMA and make recommendations for adjustment during implementation 4. Evaluate RPPMA 5. Coordinate pollution response / make recommendations for key issues between regular planning cycles
Basis:	<p>Routine (planning cycle) <i>plus</i> Ad hoc</p> <ul style="list-style-type: none"> • Regular planning meetings during formulation of RPPMA • Annual progress review meetings for RPPMA • Regular evaluation meetings during evaluation cycle of RPPMA • Annual or semi-annual meetings on key pollution issues (analysis and recommendations) • Ad hoc meetings in the case of significant environmental issues raised to KLHK or DLH Jatim
Lead:	KLHK, DLH Jatim, or Bappeda Jatim
Participants:	KLHK, BBWS Brantas, DLH (prov/kab/kota), PJT I, Dinas Pertanian, Cipta Karya, Dinas Peternakan, Dinas Perindustrian, Bappeda, PU SDA Jatim, communities, academia, private sector
Funding:	APBN (via KLHK) or APBD (via Bappeda Jatim)

This is recommended over Option 3, as a fully-fledged coordination body would require greater administrative requirements and coordinating costs. Moreover, there are already established actions to coordinate water quality monitoring and industrial pollution response, led through the efforts of DLH Jatim.

² The multi-stakeholder project “Fostering inclusive growth, health and equity by mainstreaming water quality in River Basin management in the Brantas River Basin, Indonesia” (Brantas Water Quality Project) is a 5-year (2019-2024) Indonesia-Netherlands partnership to strengthen water quality monitoring, wastewater management, and integrated water quality management (IWQM) in the Brantas River basin.

APPENDIX 1. COORDINATION CHALLENGES AND NEEDS

At an activity level, several subfunctions require coordination (Table 2). Several coordination mechanisms related to water management include TKPSDA Brantas (facilitated by BBWS Brantas) and Dewan SDA Jatim (facilitated by PU SDA), and Bappenas and Bappeda provide coordination across sectors at the national and subnational levels. But the ongoing format for water quality coordination is an unsolved challenge.

Table 2. Coordination needs for water quality management subfunctions

Subfunction	Observed challenges	Observed coordination needs	Stakeholder agencies
Planning, monitoring, and evaluation	<ul style="list-style-type: none"> - RPPMA formulation challenged by lack of access to relevant data, including water quality data and pollution source data - Limited understanding of stakeholder activities, programs, and priorities - Implementing agencies not actively involved in plan formulation 	<ul style="list-style-type: none"> - Sharing data for planning, monitoring and evaluation (water quality, pollution source, spatial) - Joint formulation / evaluation of RPPMA (actions, targets, progress indicators) - Joint development of infrastructure 	KLHK, BBWS Brantas, DLH Jatim, DLH kota / kabupaten, Dinas Pertanian, Dinas Cipta Karya, Dinas Peternakan, Dinas Perindustrian, Bappeda, PU SDA Jatim
Water quality monitoring and data management	<ul style="list-style-type: none"> - Insufficient data integration 	<ul style="list-style-type: none"> - Standardized collection and reporting - Synchronization / harmonization of updates to data collection and management 	KLHK, DLH Jatim, DLH kota / kabupaten, BBWS Brantas, PU SDA
Pollution control and response	<ul style="list-style-type: none"> - Limited interaction / coordination amongst kota / kabupaten upstream to downstream - Similar capacity-building needs 	<ul style="list-style-type: none"> - Coordinate response in case of cross-regional incidents - Coordinate spot-checks / oversight - Coordinated response to specific pollution sources (e.g., diaper waste, livestock runoff) - Coordinated response to industrial violations - Joint capacity-building 	KLHK, DLH Jatim, DLH kota / kabupaten, PU SDA Jatim, private sector, communities, law enforcement agencies
Public information and community participation	<ul style="list-style-type: none"> - Low public interest in water and environment - Low demand for improved domestic wastewater and solid waste management 	<ul style="list-style-type: none"> - Unified public campaign - Support information-sharing and learning across river care communities 	KLHK, DLH Jatim, kota / kabupaten, Gubernur, PU SDA Jatim, academia, media, communities

APPENDIX 2. OPTIONS FOR COORDINATING WATER QUALITY MANAGEMENT

Many options for formal coordination mechanisms are possible, depending on lead agency, membership, functions, and budget source. Some select options are summarized below, in order from least to highest coordination / integration.

OPTION 1. BASELINE (NO COORDINATION MECHANISM)

OPTION 2. ESTABLISH SEPARATE COORDINATION MECHANISMS FOR SUB-FUNCTIONS

Mechanism:	A. Pokja Kualitas Air	B. Water Quality Data Management Team	C. Pollution Response Coordination Meeting	D. Healthy Brantas Action Committee
Function / activities:	<p>Planning, monitoring, implementation, and evaluation</p> <p>Facilitate data-sharing for planning, monitoring, and evaluation (water quality and pollution source data)</p> <p>Support formulation and evaluation of RPPMA</p> <p>Coordinate pollution response / make recommendations for key issues between regular planning cycles</p>	<p>Water quality monitoring and data management</p> <p>Coordinate water monitoring (standardized collection, analysis, reporting)</p>	<p>Pollution control and response</p> <p>Coordinate pollution control and incident response</p> <p>Facilitate joint oversight</p> <p>Identify shared issues (upstream to downstream) and negotiate responses</p>	<p>Public information and community participation</p> <p>Implement unified campaign for river health</p> <p>Facilitate knowledge and community action networks</p>
Basis:	Routine (planning cycle) <i>plus</i> Ad hoc	Routine (annual)	Routine (4 x per year) <i>or</i> Ad hoc	Routine
Lead:	KLHK or Bappeda Jatim or DLH Jatim	KLHK or DLH Jatim	KLHK or DLH Jatim	Gubernur
Participants:	KLHK, BBWS Brantas, DLH (prov/kab/kota), PJT I, Dinas Pertanian, Cipta Karya, Dinas Peternakan, Dinas Perindustrian, Bappeda, PU SDA Jatim, communities, academia, private sector	KLHK, DLH Jatim, DLH kota / kabupaten, BBWS Brantas, PU SDA	KLHK, DLH Jatim, DLH kota / kabupaten, PU SDA Jatim, private sector, communities, law enforcement agencies	KLHK, DLH Jatim, kota / kabupaten, Gubernur, PU SDA Jatim, academia, media, communities

OPTION 3. ESTABLISH COORDINATION BODY WITH SUBCOMMITTEES

Clean Brantas Commission / Pokja Kualitas Air

- Commission to facilitate coordination, provide policy direction, monitor and evaluate overall water quality strategy and coordination
- Routine (annual) meetings led / facilitated by Bappeda *or* KLHK *or* DLH Jatim
- Broad membership, funded by APBN (KLHK) *or* APBD (Bappeda)

Sub-committee:		Chair:	Participants:
Planning	Facilitate data-sharing for planning, monitoring and evaluation, make recommendations for planning, evaluate RPPMA	KLHK <i>or</i> Bappeda Jatim	KLHK, BBWS Brantas, DLH Jatim, DLH kota / kabupaten, Dinas Pertanian, Dinas Cipta Karya, Dinas Peternakan, Dinas Perindustrian, Bappeda, PU SDA Jatim, communities, academia, private sector
Water Quality Monitoring and Data Management	Coordinate water data standards, formatting, management, updates	KLHK <i>or</i> DLH Jatim	KLHK, DLH Jatim, DLH kota / kabupaten, BBWS Brantas, PU SDA
Pollution Control	Identify critical river pollution issues, recommend action plans, coordinate pollution control and response, facilitate joint oversight	Bappeda <i>or</i> Gubernur <i>or</i> KLHK <i>or</i> DLH Jatim	KLHK, DLH Jatim, DLH kota / kabupaten, PU SDA Jatim, private sector, communities, law enforcement agencies
Community Action	Implement public campaign, facilitate community action network	Gubernur	KLHK, DLH Jatim, kota / kabupaten, Gubernur, PU SDA, academia, media, communities