JASA TIRTA I PUBLIC CORPORATION INDONESIA

a. An outline of your organization

Jasa Tirta Public Corporation was established as a state-owned company with a specified concensus in rendering water services and performing O&M activities based on water service fee abstracted from the users. The corporation was established under the Government Regulation No. 5 of 1990. To adapt further to the responsibilites and assignments, the regulating basis of Jasa Tirta I Public Corporation (PJT I) was twice ammended. Firstly, in 1999, by the Government Regulation No. 93 of 1999, in order to strengthen the organization and permit its jurisdiction to extend to other basins; and recently by the Government Regulation No. 46 of 2010.

The objective and goal of PJT I is take part and support the Government policy and program on economic sector and national development in general, and particularly on business of water resources and its management, as well as optimization of PJT I's resources to produce goods and services based on healthy corporation management principles.

In order to achieve the objective and goal, PJT I conducts main business activities: (1) services to provide bulk water for drinking water, industry, agriculture, flushing, port, electric power generation and others; (2) provide water power to generate electricity for the State Electricity Company; (3) generate and distribute electric power and drinking water, perform consulting in water resources fields, heavy equipment rental and water quality laboratory services, and (4) develop other water-related services including piped domestic supply at specified scales.

PJT I in-charged in managing the water resources in 40 rivers (including the Brantas River) of the Brantas River Basin and to operate, maintaining, and managing the major infrastructure in these rivers. In 2000, the corporation was authorized to undertake water resources management activities within 25 rivers of the Bengawan Solo River Basin (an inter-provincial river basin lying in Central and East Java Provinces). In 2014 the corporation was authorized to undertake water resources management activities including controlling of water destructive forces, in Serayu Bogowonto and Jratunseluna River Basins in Central Java and Toba Asahan River Basin in North Sumatera.

Besides the tasks and responsibilities mentioned above, PJT I also conducts excellent and adequate public utilization of water resources to fulfill people needs for social services, welfare and safety of the public within the working area of the corporation. Those includes providing surface water supply to fulfill daily basic needs, providing irrigation water for public agriculture within the existing irrigation system, controlling flood hazards, conducting water resources conservation and performing the development of Drinking Water Supply System and sanitation for domestic.

PJT I however has no policy power in areas of enforcement, basin planning, basin infrastructure development and investment for public services, off-stream water quality improvement, tariff fixing. In these areas where it is not permitted to make policy decisions, the corporation works through the administrative and consultative channel to influence decisions. As a River Basin Organization, PJT I has to be an accountable and effective organization in most aspects of the water resources management process, coordination, improving resource base, and working with other agencies and stakeholders by adopting a proactive management style and having a good working relationship with both formal and informal institutions.

b. A summary of your organization's most important recent research achievements explaining how those research achievement connect back to actual disaster risk reduction goals.

1. Research on the Formulation of Roadmap for Sediment Management in the Brantas River Basin in 2015-2019

a) Objective of the research

- to promote water and reservoir conservation for optimum reservoir and water utilization to meet water demand.
- to improve environment capacity and to reduce disaster risk in accordance with the policy of national and provincial government on development.

b) Goal of the research

The roadmap will become guideline for river basin organization, Central, Provincial and Local Governments, concerned agencies and community in conducting sediment management in the Brantas River Basin.

c) Scope of the research

- Studying reservoir sedimentation process that includes changes in reservoir capacity, the volume of sediment, reservoirs bed elevation changes of and sediment grain size.
- Studying and evaluating reservoir sedimentation management activities that have been carried out which includes sediment and soil erosion control, dredging reservoirs, and flushing.
- Evaluating the earlier studies related to the management of reservoir sedimentation.
- Studying the reservoir sediment balance, profit and loss of reservoir dredging and flushing, and its impacts.
- Develop sediment management program implementation for a period of 5 years to come.

d) Summary

Prior to the water resources development took place in the Brantas River Basin, flood disaster occurred every year in the basin due to riverbed agradation caused by volcanic eruptions. The First Master Plan prepared in 1961, emphasized on flood control by developing dams at the upper reaches and river improvements in the middle and lower reaches to increase flood relief capacity. Because of a large amount of sediment inflow and sedimentation problem, the principal reservoirs in the basin are rapidly losing their gross storage capacities, ranging from 30 to 50 percent of the original storage capacities. In some of smaller reservoirs, such as the Sengguruh, Wlingi and Lodoyo Reservoirs, their effective storage capacities were reduced to around 60% of original capacity. The largest Sutami Reservoir had a large-scale storage loss in the past 31 years since its construction. The decrease of reservoirs' capacity has diminished the function of reservoirs to control flood. Therefore the flood disaster risk will increase in the Brantas River Basin as increases in magnitude and frequency of extreme events are already being observed in the basin. Figure 1 depicts the damages due to flashflood in the Lower of Konto River, a tributary of Brantas River in 2006.

Figure 1 - The Damages Due to Flashflood in the Lower of Konto River in 2006

The roadmap contains sediment management plan activities in each reservoir and its catchment area which includes: 1) catchment management plan (vegetative conservation and structural measures, 2) river channel management plan (sabo dam construction and rehabilitation), 3) reservoir sedimentation management (sediment dredging and flushing), and 4) monitoring and evaluation plan.

2. Study on Countermeasures for Sedimentation in Selorejo Reservoir Using Sabo Technology in Konto River

a) Objective and goal of the study

This study is intended to determine the implementation of appropriate sabo technology in the Konto River, one of the main tributaries of the Brantas River. The goal is to plan the typical design of sediment control structures corresponding to the situation in the Konto River and to analysis the stability of sediment control structures built across the Konto River.

b) Scope of the study

- Studying the literatures related to sabo structure planning and construction, and sedimentation rate in the Selorejo Reservoir.
- Collecting the data for sabo hydraulic structure planning and construction.
- Planning and constructing sabo hydraulic structure according to National Standard (SNI 2815: 2004).

c) Summary

The study recommends closed type sabo (conventional sabo) with consideration of the results from laboratory test on sediment grain gradation. A new 6 m high closed type sabo with the capacity of 15,494 m^3 should be constructed at P6 cross section located in Lebaksari Village, Pujon District, Malang Regency. The study provided recommendations to monitor sediment transport, to review the geological conditions, and to have hydraulic model test.

c. A summary of what your organization sees as the major research challenges for the future

The number, scale and cost of water related disasters are increasing nowadays. Many water related disaster hazards are becoming more frequent as a result of climate change. In the Brantas River basin, one of our organization's working areas, increases in magnitude and frequency of extreme events are already being observed. The increased extreme rainfall causes increased flood risk in the basin. In the late December 2007 until early January 2008, persistent heavy rains took place throughout Indonesia and led to flooding and landslides. Figure 2 shows rainfall totals from the Tropical Rainfall Measuring Mission (TRMM) based, near-real-time, multi-satellite Precipitation Analysis (MPA) produced at NASA's Goddard Space Flight Center for December 24, 2007 to January 2, 2008. The highest rainfall totals for the period (shown in dark red) were over 250 millimeters (about 10 inches). Although the highest amounts were over water, parts of Java received in excess of 6 to 8 inches (orange and red areas) (NASA Earth Observatory, 2008).

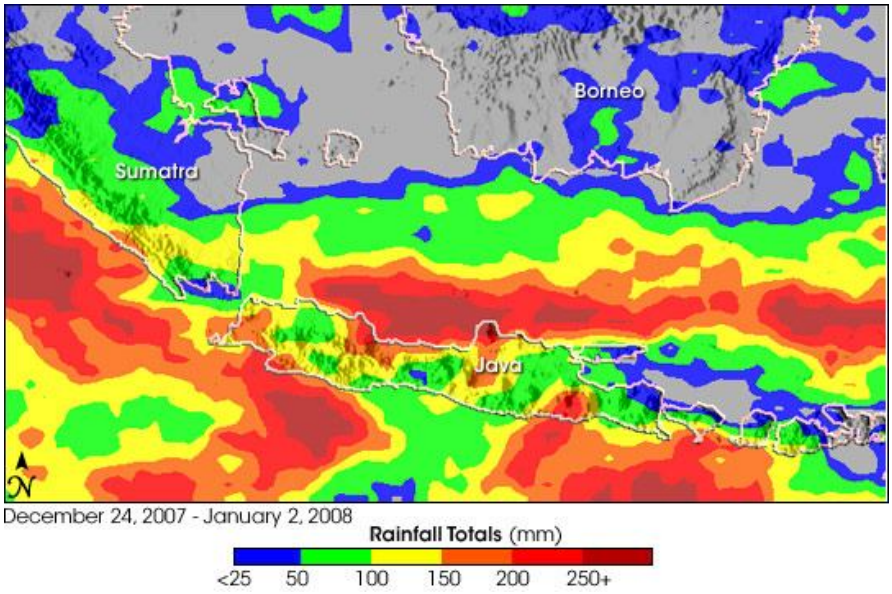

Figure 1 Rainfall Totals in Some Parts of Indonesia from the TRMM-based for December 24, 2007 to January 2, 2008 (Source: NASA Earth Observatory)

There is also a significant changing of hydrological pattern in Brantas River Basin. The average intensity of 50-100 mm daily rainfall in the Sutami-Lahor Catchment Area during 1955 - 1989 is 6.5 times, with maximum of 12 in 1970. During 1990 - 2011, the average daily rainfall increase 12.5 times with maximum of 21 in 1998. For average intensity of daily rainfall > 100 mm during 1955 - 1989 is 0.6, with maximum of 2 in 1987, during 1990 - 2011, is 2.1 with maximum of 4 in 2007. The average frequency of daily rainfall per year during 1955 - 1989 is 100 days with maximum of 143 days in 1970. During 1990 - 2011, the average becomes increase with 146 days daily rainfall per year, with maximum of 193 days in 1998.

Important information provided by JICA Study in 2014 on the Project for Assessing and Integrating Climate Change Impacts into the Water Resources Management Plan for Brantas and Musi River Basins. The study has provided preliminary analysis of climate change impacts in Brantas and Musi River Basins, Indonesia. The study reveals

that in the Brantas River basin, all GCMs predicts the air temperature will rise about $1,5^0$C towards future, causing annual rainfall will be increase slightly in whole area, and intensity of the extreme rainfall will be stronger about 1.1 - 1.2 times of present.

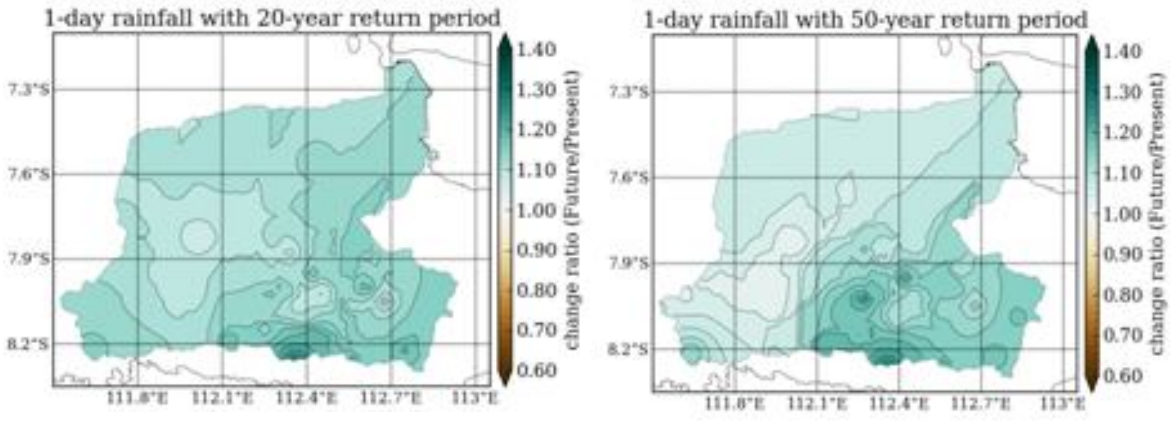

Figure 4 Changes in rainfall frequency in the Brantas River basin (JICA, 2014)

From the case in the Brantas River Basin, for the future, our organization still sees the difficulty to relate the observed data (both from land and sattelite), climate change projection and mitigation measures during the extreme events take place. Therefore we consider that the impact of climate change on disaster risk management is the major challenge of future research on water related disaster risk reduction.

d. Tell us what you/ your organization would like to see included in the disaster research roadmap for the next 10 years.

Within the disaster research roadmap for the next 10 years, in particular for water related disaster, our organization would like to have more intentions from all of us to promote knowledge and information gained from research on water related disaster applied into actions done by agencies like our organization, who having task and responsibility to manage river basins. We know that scientific and technical work frequently requires the participation of practitioners and other intermediaries in addition to scholars and scientists.

We should put greater priority on sharing and disseminating scientific information resulted from our research and translating it into practical methods that can readily be integrated into policies, regulations and implementation plans in the field concerning water related disaster risk reduction. We should strengthen the capacity of organizations concerned, education on all levels, comprehensive knowledge management, and involvement of science in public awareness-raising, media communication and education campaigns. Specific innovations should be developed to facilitate the incorporation of science inputs in policy-making.

In the disaster research roadmap for the next 10 years, we also would like to see water related disaster risk reduction programs are accommodated, including extreme weather forecasting, flood forecasting and warning, improving flood control structure design and urban planning, and exercising of disaster plans. Water related disaster risk reduction requires strategic planning and implementation as well as technical and scientific expertise. It locates at the areas of policy making, engineering and scientific research, and requires a close and continuous cooperation and exchange among these fields in order to provide effective and robust solutions.