

## WWCH 2017 PROBLEM DESCRIPTION

### Problem Title

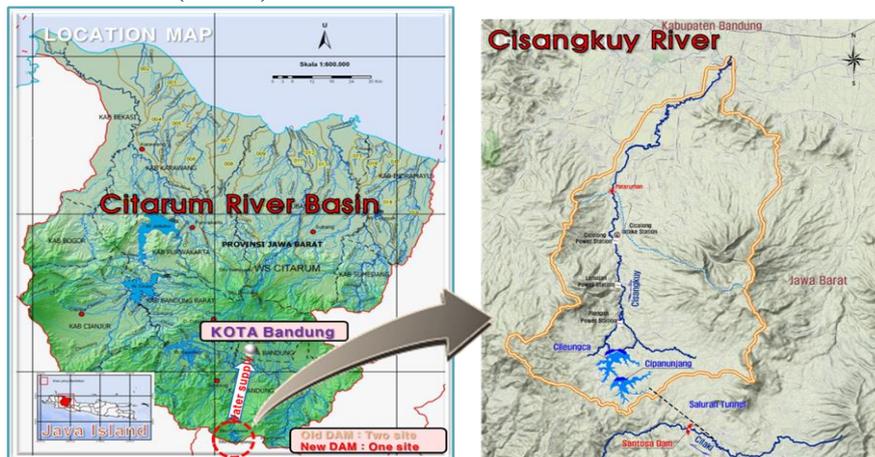
Water Management Crisis in Cisangkuy River and Bandung Mega City, Indonesia

### Contact Information

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### 1. Basic information

- The Cisangkuy river is located in the upstream of the Citarum river in the West Java Province, Indonesia. The catchment area of the river is 283.7 km<sup>2</sup>. Water flows from south to north. The river is an important source of water supply to the Bandung Metropolitan nearby. Among the total cropping land with 154.3 km<sup>2</sup> in the basin, 28 km<sup>2</sup> is for dry field (18.1%), 19.7 km<sup>2</sup> is for rice paddy (12.8%), and 70.4 km<sup>2</sup> is for forests (45.6%).

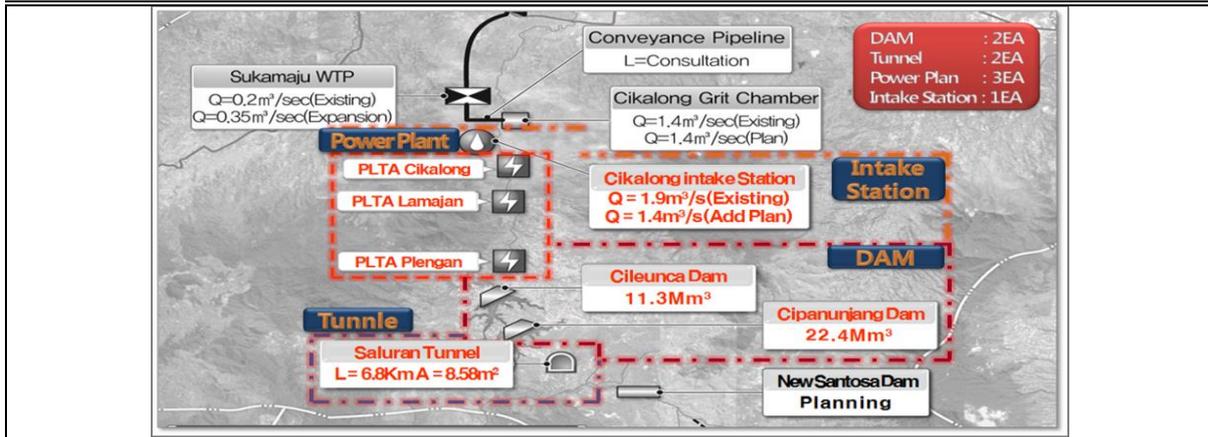


- Monthly average temperature is 23.3°C, (maximum 32.3°C and minimum 16.7°C), and the percentage of sunshine is 58.1% in the region.

- Two flow measurement stations (Pataruman and Kamazan) are operated by BBWSC in the Cisangkuy basin. The average drought flow (2003~2012) in the Pataruman station is 3.18m<sup>3</sup>/s, and 95% flow is 3.37m<sup>3</sup>/s.

### 2. Water Infrastructure Circumstances

- In this area, two existing hydropower dams and reservoirs (Cipanunjang, Cileunca), three micro hydropower plants (Plengan, Lamajan, Cialong), two tunnels (Plengan, Lamajan, Cialong) and one water intake (Cikalong) are operated as shown in the Figure. In addition, new dam construction (Santosa and Cikalong) is under planning to increase water supply capacity to Bandung region.



- Maximum 5.5m<sup>3</sup>/s of water is released from Cipanunjang to Cileunca reservoir through gate installed in the water intake. From Cileunca reservoir, maximum 6 m<sup>3</sup>/s is supplied to the three micro hydropower plants (Plengan, Lamajan, and Cikalong).

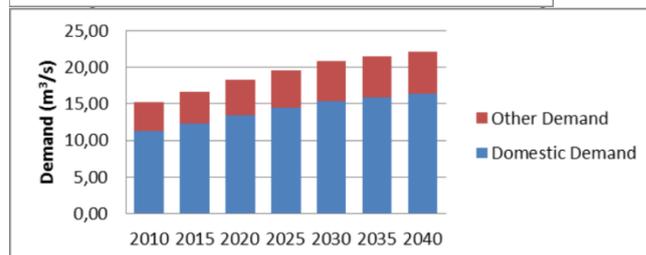
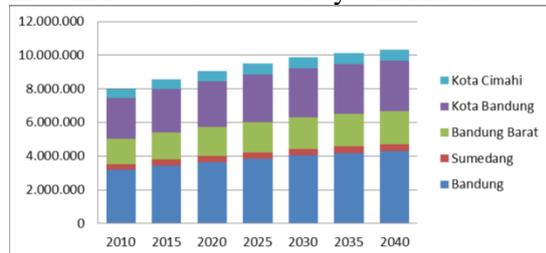
### 3. Problem description

#### [Unfavorable Climate Pattern]

- 85% of the average annual rainfall occurs in region during wet season (October to March). Huge variation of rainfall is to be aggravated due to the increasing risk of extreme hydrology from global warming and climate change.

#### [Huge Population Density and Water Deficit]

- Urbanization in this rapidly developing river basin causes extreme challenge for sustainable water management. Bandung Metropolitan has already stressed with dense population of **2,500/km<sup>2</sup>**.  
 - The population of Bandung Metropolitan will exceed **10 million in 2040**. The corresponding domestic, municipal and industrial water demands are to increase from **16.6 m<sup>3</sup>/s in 2010 to 23.4 m<sup>3</sup>/s in 2040**. Water security will hinder sustainable growth and welfare of the residents.



<Population Projections in Bandung Area>

<Water Demand in Bandung Area>

- In 2010, the entire Bandung Metropolitan suffers from water deficit **14.2 m<sup>3</sup>/s**. About **85%** of the total water use in Bandung area depends on **groundwater abstraction**, and **only 15%** of the water use is based on **surface water**.

- Furthermore, limited water resources **need to be shared with other uses**, including **hydropower** which is vital for electricity supply to urban households and industries, and **irrigation** which is also critical for agricultural production and food security in the region.

#### [Adverse Geographical Conditions]

- Too much **groundwater abstraction** traps the sustainability of water environment in the region,

Reshaped water management to stop **severe land subsidence should be prepared**. Land subsidence in Bandung Basin reaches **4 to 5 cm per year**.

- **Deforestation and rapid land use changes add further challenges**. Average annual erosion rate in the area is about **146.5 ton/ha** causing high sedimentation yield in the downstream.

**[Limitation of Structural Measures Implementation]**

- Structural measures such as building dam are **costly and time consuming due to land acquisition, resettlement** of people and **relocation** of businesses and livelihood. A new dam (Santosa) has been **under planning for over 30 years** as ever.

**[Fragmented Water Management]**

- **Fragmented water management governance with poor water facilities operation capacity** deteriorates conflict among stakeholders in water resources management. **Sharing data and information** among stakeholders still challenges. Building innovative science and institutional setting for ICT based integrated basin water resources management is urgently required to overcome water crisis in the region.

