

# Climate Change Impacts on the Water Balance of Cidanau Watershed in Banten Province, Indonesia

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## ABSTRACT

This research aims at identifying and quantifying how deep the climate change in a local context gave impacts on the discharge of the Cidanau River in Banten Province, Indonesia. The water is diverted, treated, and supplied to serve heavy industries and the public in the Industrial Estate in Cilegon City. Detailed weather information, such as temperature, relative humidity, rainfall, and evapotranspiration, were collected from a climatology station for 41 years (1978 - 2018), while the discharges of the river were collected from the water treatment company since 1996. A linear model and the Mann-Kendall method were applied to analyze the climate trend and its significance, and water balance model was formulated to relate the river discharge with rainfall and evapotranspiration. It was found that 1) dry season started from April to September, 2) the driest condition was in 1997 with annual rainfall 1115 mm, 3) the wettest condition was in 2013 with annual rainfall above 2914 mm, 4) the daily averaged temperature changed about 0.79 °C, 5) the annual rainfall decreased 5.443 mm/year, and 6) the daily water discharge was 0.51 – 89.65 m<sup>3</sup>/s with a total volume of 32 - 89 million m<sup>3</sup> in a year. In conclusions, Cidanau Watershed has experienced significant temperature rise and rainfall decline. The water stock and discharge were also declining but until this time not too substantial. A linear relationship existed between changes of the water stock versus rainfall minus potential evapotranspiration, which could estimate the cumulative discharge. Significant gaps between the maximum and minimum discharges existed. Therefore, reducing this gap by increasing the base flow in the dry period is very important to secure rising water demands in the future.

**Keywords:** *climate change, temperature, rainfall, water balance, water discharge*