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Analysis of Changes in The Erosion Level and Sedimentation in The Tempuran Reservoir Catchment Area of Blora Year 2017-2021

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Abstract

Tempuran Reservoir is one of the existing water supply reservoirs in the Jratun Seluna River Basin located in Blora Regency. This reservoir has an important role to store water in the rainy season, provide raw water, and irrigate around 420 ha of surrounding land, so it is necessary to maintain its management so that it can continue to function optimally. However, sedimentation is often the main problem for the reservoir, which occurs as a result of the erosion process in the Tempuran Reservoir Catchment Area which then settles to the bottom of the reservoir. In addition, climatic conditions are thought to be a factor that greatly influences erosion. This is exacerbated by the fact that Blora Regency is an area that often experiences drought due to low rainfall. Therefore, this study aims to determine the development of erosion rates and the level of erosion hazard in the Tempuran Reservoir catchment area in 2017-2021, and to predict the sediment yield flowing into Tempuran Reservoir in 2017-2021. The method used to predict erosion results is the Universal Soil Loss Equation (USLE) and utilizes the Sediment Delivery Ratio (SDR) to predict sediment yield entering the reservoir. The results showed a decrease in the erosion rate of -1773,357 tons/ha/year in 2019 and continued to decrease by -66,694 tons/ha/year in 2021. The most influential factor in reducing the erosion rate in the Tempuran Reservoir catchment area is the rain erosivity factor. Meanwhile, sedimentation carried to Tempuran Reservoir in 2019 decreased by -117,344 tons/ha/year and in 2021 there was also a decrease of -4,413 tons/ha/year.

Keywords

Tempuran Reservoir Catchment Area; Erosion Rate, Sediment, USLE

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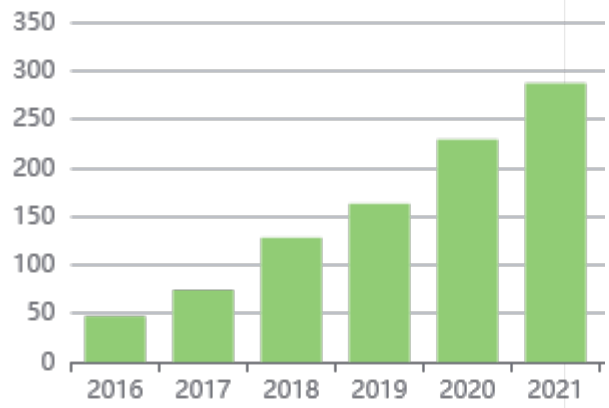

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Analysis of Changes in Erosion and Sedimentation Levels in the Tempuran Reservoir Catchment Area of Blora for the Years 2017-2021

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Abstract. Tempuran Reservoir, located at Blora Regency of Central Java Province of Indonesia, has a vital role in storing water in the rainy season, providing raw water, and irrigating around 420 ha of surrounding land, so it is necessary to maintain its management so that it can continue to function optimally. However, sedimentation is often the main problem for the reservoir, which occurs due to the erosion process in the Tempuran Reservoir Catchment Area, which settles at the bottom of the reservoir. Therefore, this study aims to determine the development of erosion rates and the level of erosion hazard in the Tempuran Reservoir catchment area in 2017-2021 and to predict the sediment yield flowing into Tempuran Reservoir in 2017-2021. The method used to predict erosion results is the Universal Soil Loss Equation (USLE), which utilizes the Sediment Delivery Ratio (SDR) to predict sediment yield entering the reservoir. Data required in USLE include rainfall, soil type, DEM, soil conservation measures, and Sentinel 2. The results showed a decrease in the erosion rate of -1773.357 tons/ha/year in 2019 and continued to decrease by -66.694 tons/ha/year in 2021. The most influential factor in reducing the erosion rate in the Tempuran Reservoir catchment area is the rain erosivity factor. Meanwhile, sedimentation carried to Tempuran Reservoir in 2019 decreased by -117.344 tons/ha/year; in 2021, there was also a decrease of -4.413 tons/ha/year.

Keywords: Tempuran Reservoir Catchment Area; Erosion Rate, Sediment, USLE

INTRODUCTION

The primary source of reservoir water comes from rivers flowing upstream of the reservoir and is accommodated for clean water needs, irrigation, drinking water, and many more. There are 18 reservoirs in the Jratunseluna River Basin, one of which is Tempuran Reservoir. This reservoir is one of the largest water storage reservoirs in Blora Regency. The existence of this reservoir has a vital role in maintaining the balance of life around it, so it needs to be managed so that it can continue to function optimally.

Tempuran Reservoir is one of the reservoirs that experienced sedimentation in 2021 in the working area of BBWS Pemali Juana. Although, sedimentation does not significantly affect the reservoir's water discharge [1]. However, maintenance and monitoring are still crucial to maintain the reservoir's functionality and avoid a lack of water supply. This is because Blora Regency is one of the regencies that often experience drought, with the main factors being the long dry season (low rainfall) and the type of soil [2]. In addition, climatic conditions are one of the factors that affect erosion [3]. Regarding climate, the El Nio phenomenon has been one of the triggers of recent