IDENTIFIKASI PENYEBAB DAN UPAYA NON-STRUKTURAL PENGENDALIAN BANJIR KALI SAMPEAN

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Pada tanggal 16 April 2010

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ABSTRACT

In the year 2002 and 2008, Sampean River experienced flashfloods which took casualties and damaged several property and public infrastructures. The flood was caused by the disruption of hydrological functions in the watershed, several land use changes from high infiltration capability forest into agriculture land, which caused increasing runoff and less rain water recharge. To overcome Sampean River flood problem, it is important to identify the causes of flooding and control efforts, including improved land use pattern and reforestation.

Analysis of the causes of flooding include the impact of land use and rainfall. Effect of land use is obtained by comparing the peak discharge based on 1998 $CN_{composite}$ with the 2008 $CN_{composite}$. Effect of rain was analyzed by processing the daily rainfall data from 1989 to 2008 to an average of maximum daily rainfall of the watershed and noticing flooding time of Sampean River in 2002 and 2008. Hydrologic model simulation of rain transformation into streams is done by using HEC-HMS software version 3.3.

The results showed that the main cause of flooding in Sampean River was the uncontrolled land use changes in the upstream of Sampean Watershed and evenly distributed high rainfall throughout the watershed. Changes in land use for 10 years (1989-2008) increases the peak discharge at several return periods around 4.60% up to 12.69%. Floods in 2002 was the result of rain fall as much as 121.5 mm/day or equivalent to rainfall of 100 years return period and the flood of 2008 was the result of rainfall as much as 106.5 mm/day or equivalent to rainfall of 50 years return period. Non-structural flood control by regulating land use scenario only is ineffective to reduce peak flow of the flood. This land use regulating countermeasures will reduce peak flow of 50 years return period ($Q_{designed}$ = 1575 m^3/s) by as much as 6.51% for Scenario 1 with 30% forest land expansion of the watershed (Scenario 1) and by 9.83% for scenario 2 with 40% forest land expansion of the watershed. Non-structural flood control using Scenario 2 combined with structural by building Taman Dam with a capacity of 7.08 million m^3 storage can reduce peak discharge of Sampean River by as much as 23.89%.

Keywords :
flood, curve number, land use.