

DAMPAK PERUBAHAN TATA GUNA LAHAN PERTANIAN PADA LIMPASAN PERMUKAAN DI DAERAH TANGKAPAN AIR (DTA) CERENG, KABUPATEN KULON PROGO, D.I. YOGYAKARTA

INTISARI

Oleh:

Leonardus Erdinata
16/395442/TP/11491

Perubahan tataguna lahan pertanian dapat menyebabkan pengurangan luas ruang terbuka hijau sehingga mengurangi infiltrasi dan meningkatkan aliran permukaan. Fenomena tersebut dapat memicu terjadinya banjir pada suatu wilayah. Penelitian ini dilakukan untuk mengetahui dampak perubahan tata guna lahan terhadap sistem hidrologi pada Daerah Tangkapan Air (DTA) Cereng, khususnya karena perubahan luas sawah irigasi hulu DAS Serang. Perubahan tata guna lahan pertanian ditinjau dalam tiga tahun yang berbeda, yaitu 1995, 2008, dan 2018. Dampak perubahan tersebut dikaitkan dengan karakteristik fisik DTA Cereng berupa nilai *curve number* (CN) dan limpasan permukaan langsung (*direct runoff*) pada tahun yang sama. Analisis yang dilakukan mengenai keterkaitan antara hujan efektif rencana dengan respon perubahan tata guna untuk menghasilkan besaran *direct runoff volume* pada kala ulang 2, 5, 10, 20, dan 50 tahunan, masing-masing pada tahun 1995, 2008, dan 2018 menggunakan model HEC-HMS. Hasil penelitian menunjukkan bahwa salah satu fenomena perubahan tata guna lahan pertanian diindikasikan dengan penambahan persentase luas sawah irigasi DTA Cereng 2,31%, 2,94% dan 4,39% berturut-turut pada tahun 1995, 2008, dan 2018. Selain penambahan luas sawah irigasi, penambahan pemukiman serta pengurangan luas lahan perkebunan pada tahun 1995, 2008, dan 2018 juga merupakan fenomena perubahan tata guna lahan di DTA Cereng. Perubahan tata guna lahan di DTA Cereng ini menyebabkan bertambahnya nilai *curve number* (CN) komposit di DTA Cereng yaitu 81,85, 85,82, dan 86,66 masing-masing pada tahun 1995 2008, dan 2018. Kenaikan nilai CN pada ketiga tahun tersebut menyebabkan kenaikan persentase *direct runoff volume* dari tahun 1995 hingga 2018, yaitu mencapai 24,28%, 16,8%, 13,76%, 11,61%, dan 9,53% berturut-turut pada kala ulang 2, 5, 10, 20, dan 50 tahunan. Kenaikan nilai *direct runoff volume* menyebabkan semakin banyak air yang melimpas langsung ke sungai sehingga meningkatkan peluang terjadinya banjir.

Kata Kunci: Tata guna lahan, Pertanian, DTA Cereng, CN, HEC-HMS, *Direct Runoff Volume*

THE IMPACT OF AGRICULTURAL LAND-USE CHANGE TO THE SURFACE RUNOFF IN CERENG CATCHMENT AREA (CA), KULON PROGO REGENCY, SPECIAL REGION OF YOGYAKARTA

ABSTRACT

By:

Leonardus Erdinata
16/395442/TP/11491

The changes in the agricultural land-use can cause a reduction in the area of green open space, there by reducing infiltration and increase surface runoff. This phenomenon can trigger floods in a field. This study was conducted to determine the impact of land-use change on the hydrological system in the Cereng Catchment Area, mainly due to changes in the irrigated paddy fields of the upstream Serang watershed. The changes in agricultural land-use are reviewed in three different years, namely 1995, 2008, and 2018. The impact of these changes is associated with the physical characteristic of the Cereng CA in the form of a curve number and direct runoff in the same year. The analysis conducted on the relationship between effective design rainfall and response to the land-use changes to produce direct runoff volume in the return period 2, 5, 10, 20, and 50 years, respectively, in 1995, 2008, and 2018 using the HEC-HMS model. The result showed that one of the phenomena of changes in agricultural land-use was indicated by the addition of the percentage of irrigation paddy fields in Cereng CA by 2.31%, 2.94%, and 4.39%, respectively, in 1995, 2008, and 2018. Besides the increasing of irrigation paddy fields, the addition of settlement area and the reduction of plantation area in 1995, 2008, and 2018 were also phenomena of land-use change in the Cereng CA. The land-use change in the Cereng CA caused an increase in the composite curve number (CN) that were 81.85, 85.82 and 86.66, respectively, in 1995, 2008, and 2018. The rose in CN value in the three years caused an increase in the percentage of direct runoff volume from 1995 to 2018. Those values were 24.28%, 16.8%, 13.76%, 11.61%, and 9.53%, respectively, at the 2, 5, 10, 20, and 50-years return period. The increase in the value of direct runoff volume causes more water to run directly into the river so that there is a high possibility of flood.

Keywords: Land-Use Change, Agriculture, Cereng Micro Catchment, Curve Number, HEC-HMS, Direct Runoff Volume