KARAKTERISTIK EROSI-SEDIMENTASI DI KAWASAN LERENG GUNUNGAPI PADA PENGGUNAAN LAHAN BERBEDA (KASUS DI DAS BOMPON, KABUPATEN MAGELANG PROVINSI JAWA TENGAH)

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Intisari

Erosi-sedimentasi pada kawasan lereng gunungapi dengan kondisi tanah super tebal sangat sensitif terhadap bentuk-bentuk penggunaan lahan. Kajian ini bertujuan mengkaji karakteristik erosi-sedimentasi berdasarkan dinamika aliran sedimen pada penggunaan lahan berbeda di *agroforestry*, permukiman dan tegalan di kawasan lereng gunungapi mencakup aspek: pola kesesuaian debit aliran dan debit suspensi; jeda waktu kejadian hujan dan awal pembentukan aliran suspensi; ukuran butir suspensi selama aliran berlangsung; hubungan debit aliran sedimen dan debit aliran; laju debit sedimen dan kehilangan tanah; dan tipe sumber material sedimen selama aliran berlangsung.

Metode penelitian menggunakan metode area kunci dengan melakukan pengukuran aliran sedimen di outlet setiap DAS area kunci pada bulan Februari tahun 2017 hingga Desember tahun 2018. Pengukuran aliran sedimen dilakukan pada setiap kejadian hujan di lapangan dan pengukuran di laboratorium. Karakteristik penutup lahan dan alur aliran air yang masuk ke sistem DAS area kunci didata secara detail melalui pengukuran lapangan.

Hasil penelitian berupa karakteristik erosi-sedimentasi di kawasan DAS gunungapi mencakup: adanya pola hubungan kesesuaian pada puncak debit aliran dan puncak debit suspensi di *agroforestry*, permukiman dan di tegalan; jeda waktu kejadian hujan dan awal pembentukan aliran sedimen yang lebih lambat berturut-turut di *agroforestry* 17,7 menit, permukiman 10,36 menit dan lebih cepat di tegalan 9,7 menit; ukuran butir kandungan suspensi setiap penggunaan lahan dominan fraksi *clay*, bersesuaian dengan fraksi *clay* yang juga dominan pada lapisan tanah permukaan di kawasan *catchment area*; model debit aliran yang terbentuk konsisten pada semua keadaan hujan di semua penggunaan lahan, dan model debit suspensi dari keseluruhan data di semua keadaan hujan konsisten terjadi di *agroforestry* dan tegalan, serta model debit suspensi berlaku konsisten dengan pemilahan atas fase naik dan fase turun di permukiman; laju aliran sedimen terjadi perbedaan pada *sediment yield* berturut turut terkecil di *agroforestry* 0,139 ton/ha/thn dan permukiman 0,97 ton/ha/thn, serta terbesar di tegalan 809,59 ton/ha/thn; tipe sumber material sedimen pada setiap penggunaan lahan di *agroforestry*, permukiman dan di tegalan berasal dari sedimen suspensi yang lebih dominan daripada material sedimen *bed load*.

Kata kunci: Aliran, DAS Gunungapi, Debit, Penggunaan Lahan, Sedimen.

THE CHARACTERISTICS OF EROSION SEDIMENTATION IN DIFFERENT LAND USES ON VOLCANIC SLOPES (CASE ON THE BOMPON WATERSHED, MAGELANG REGENCY, CENTRAL JAVA PROVINCE)

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Abstract

Erosion-sedimentation on the volcanic slope area with thick soil is sensitive towards various land use. The study aims to know the sediment discharge for different land utilization in the volcanic slope area. It covers: flow discharge patterns and suspension flow; time lag of the formation of suspension flow and rainfall events; the grain size during the flow; the relation between sediment transport and flow discharge; sediment discharge and soil loss; and the types of sediment material source during the flow.

The research applied key area method by measuring the sediment discharge at the outlet of a catchment area (micro-catchment) from February 2017 to December 2018. The measurement was conducted to each rainfall event in the field and in the laboratory. The characteristics of land covers and water outlet into the micro-catchment system were observed in detail through field measurement.

The research revealed that: there are suitable patterns between the peak of flow discharge and suspension flow in the land utilization in agroforestry, settlement, and dryland; the time lag from rain event to the formation of sediment flow were 17.7 minutes in agroforestry, 10.36 minutes in settlements, and, the fastest, 9.7 minutes in the dry agricultural area; the grain size of suspensions in all land uses was mainly *clay* fraction, which corresponds to the dominant *clay* fraction in the surface soil of the watershed; flow, water level, and suspended sediments formed a power relationship with the consistent flow discharge model, which applies to a variety of water levels at different rain events. The suspended sediment discharge and water flow discharge correlated differently in each type of land use, provided that the consistency of usage had been tested according to the conditions of the rain; the sediment flow rates, represented by sediment yields, were 0.139 ton/ha/year in agroforestry (the smallest), 0.97 ton/ha/year in settlements, and 809.59 ton/ha/year in the dry agricultural area (the largest); the source of materials in the sediment flow differed by land use. Overall, in agroforestry, settlement, and dry agricultural area, the contribution of suspended sediment was dominant, while that of bed sediment was minor.

Keywords: Flow, Volcanic watershed, discharge, land use, sediment.