

## Soil Erosion Prediction Using GIS and RUSLE: Study at Sampean Watershed

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### ABSTRACT

**Soil Erosion Prediction Using GIS and RUSLE: Study at Sampean Watershed (A Faisol and Indarto):** Erosion is one factor that cause soil degradation in Indonesia. RUSLE (*Revised Universal Soil Loss Equation*) is widely used to predict average annual rate of soil erosion. This research integrate the Revised Universal Soil Loss Equation (RUSLE) and Geographic Information System (GIS) to predict potential soil erosion losses. Study was conducted at Sampean Watershed where located in Eastern part of East Java. Firstly, GIS layer was obtained from available database that cover East Java Province. All treatment of GIS layer was done using Mapwindows GIS. Furthermore, RUSLE method was used to predict rate of soil erosion from GIS layer treated previously. Results showed that up to 82% (102,921 ha) area of the watershed have tolerable soil erosion rate.

**Keywords:** Erosion, Geographical Information Sistem, RUSLE, Sampean watershed

### INTRODUCTION

Soil erosion is one of main factor that stimulate soil degradation. Land management and land exploitation for different land use (agriculture, urban settlement, industries, etc.) were sometimes less consider the soil conservation practice that accelated the damage. USLE (Universal Soil Loss Equation) was presented primarily by Wischmeier and Smith (1978). USLE is applied around the world and upgraded by RUSLE (Revised Universal Soil Loss Equation) (Milward and Mersey 1999; Stone and Hillborn 2002; Lorito and Vianello 2006). Furthermore, RUSLE method has been widely used around the world as practical tool to predict rate of soil erosion. Development of GIS (Geographic Information System) (Burrough 1986; Sutopo 1999) and possible integration with RUSLE accelerates the use of this practical tool for prediction of soil erosion. This study integrated GIS and RUSLE to estimate rate of soil erosion in the watershed. In this case,

Mapwindow was used as a platform for GIS treatment of the data.

### MATERIALS AND METHODS

#### Study Site

Study was conducted during 2008, at Sampean Watershed ( $\pm 700$  km<sup>2</sup>). The watershed was located in Eastern part of East Java Province (Figure 1).

GIS layer and other data used for this study were provided from Database available at Research Centre for Water Resources Development, Research Institute, University of Jember.

#### Research Procedure

Research was conducted by integrating GIS and RUSLE using flowchart as shown in Figure 2. Pincipal steps were: (1) preparation of input layer, (2) calculation component factor of RUSLE, and (3) overlaying and finishing.

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