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Nama Penulis dan Peneliti : Aflizar, SP.,MP.,Ph.D

Judul Konferensi Internasional: " Effect of soil erosion and topography on distribution of Cadmium (Cd) in Sumani watershed, West Sumatra , Indonesia. MATEC Web of Conference 229,03001(2018. ICDM 2018, 2016:49-66.

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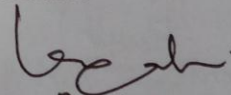
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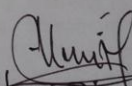
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5.	Struktur Kalimat dan Bahasa	10%	40	4
	TOTAL	100%		31

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Effect of soil erosion and topography on distribution of cadmium (Cd) in Sumani watershed, west Sumatra, Indonesia

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Abstract. The purpose of this study was to characterize and present the distribution of heavy metals especially Cd on agricultural and non-agricultural lands and river sediments in relation to soil erosion and topography status in watersheds. The study was conducted for a detailed soil survey by collecting 146 soil sample based on land use, soil family and topography position and 23 river sediments sample. The Cd was extracted by 0.1 M HCl and determined by ICP. The result showed that the concentration of Cd in soil and river sediment were low in toxicity based on FAO recommendation (Cd 0.4 mg/kg) with only 4 out of 169 sampling sites contained Cd exceeding the toxicity level. Volcanic ash from Mount Talang Volcano is a natural source of Cd in Sumani watershed. Cd concentration was low in areas with high soil erosion, which indicate material translocation caused by high soil erosion that accumulates sediment in plains and rivers. Agricultural soil was found to be low in soil pH and clay accompanied by high R factor and upland topography hence the increase in Cd concentration of the soil. The study concluded that Cd abundance in soils may be influenced by soil pH, texture, total carbon, erosion factors, and topography.

1 Introduction

Sumani Watershed landscaped has been subjected to intensive agricultural practices in West Sumatra province and under intensive chemical fertilizers and pesticides use since introduction of Green Revolution in 1974 in Indonesia. Sumani watershed as shown in Fig 1, is used for rice production (24%), vegetable garden (25%), mixed garden (14%), settlement (12%), coconut production (2%), slash and burn bush (6%), tea plantation (0.1%) and forest reserve (16%) [1,3].

Farmers generally provide Urea, KCl, and SP-36 for vegetable gardens, mixed gardens and rice production with the aim of increasing soil nutrients to increase agricultural production. Due to population growth in watersheds, there has been an expansion of agricultural land by cutting down the forest for new agricultural land. Therefore, the watershed is under an accelerated erosion [2] reported that soil erosion results in agricultural land prone to serious environmental problems and loss of agricultural production. Therefore, understanding the erosion process is very important to ensure food security. Indonesia as a tropical region with high rainfall throughout the year. Soil erosion in Indonesia is one of the most serious sources of environmental degradation problem with call for special attention [4].

Java Island soil was formed from volcanic soils and was reported in 1989 to have an average erosion of 6-12 Mg/ha/y resulting in economic loss of US \$ 340-406 million. Farmers in this region suffered eighty percent of the loss as a result of the decline in agricultural productivity [5]. To measure soil erosion on a watershed where there are methodological limitations, estimation based on a model approach tailored to the research objectives should be adopted for accurately measuring erosion on small plot experiments [6]. Universal soil loss equation, USLE [7], which requires only few and tested input parameters can be used as a tool to make land and water conservation plans which have been used throughout Indonesia with little adjustment in factor values in relation to case at hand [1,2,8].

In determining soil erosion models, USLE was used to estimate the level of soil erosion on the plot scale but however, expanded to the watershed scale by integrating USLE with Surfer or GIS tool. Erosion rate estimated by USLE, proved to be more reliable than that measured at the watershed outlet [9]. This can however be improved using Sediment Delivery Ratio (SDR). SDR which is a 3D Erosion (E3D) integrated with surfer or GIS tool, is a raster-based physical soil erosion model predicts the distribution of spatiotemporal erosion and also estimate the soil loss location on the watershed scale and traceable coordinates for field checking [10,11].

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Author Profile



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