

Assessing the Agriculture Sustainability based on Geospatial Technique in a Tropical Mountain Area : A Case Study in Kotmale Catchment in Sri Lanka.

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Sustainable agricultural systems aim at developing new farming practices that do not degrade the environment. It should be catering to the future societal needs for food and feed, ecosystem services and human health, maximizing the net benefit for people, without compromising the ability of future generations to meet their own needs. The agricultural land where located in the tropical mountain area has been becoming a dilapidated situation due to the unplanned agricultural practices coupled with the physical properties of the area and socioeconomic factors. The Kotmale catchment area is located in the central highland of Sri Lanka and covers 572 km² with altitude ranges from 681 to 2,505 meters above mean sea level. It is extended from latitude 7°6'32.80"N to 6°47'33.12"N and from longitude 80°50'21.26"E to 80°34'31.34"E which encompasses in the south-central mountainous. The primary objective of this study is to assess the sustainability of agriculture based on the environmental and socioeconomic indicators in the Kotmale catchment using geospatial techniques. The Analytic Hierarchy Process (AHP) combined with Multi-Criteria Decision Making (MCDM) methods was used as data computation method, and both spatial and non-spatial data were used under the three main criteria, such as environment, social and economic. The results of the analysis show that soil erosion is one of the major issues and it is reported as mean erosion is 9.8 t ha⁻¹ yr⁻¹. The mean annual rainfall in this area has decreased over the study period (1986-2016) while temperature has increased up to 2-3 °C. In view of socioeconomic factors, education level of the farmers, lack of labor force, fluctuation of the unit price of the agricultural production, insufficient income of the farmers was negatively affected to the current agricultural activities of the research area. The result would be an aid and sources for assessing the sustainability of agricultural land and decision makers will be able to use this result for future planning.

Keywords: Kotmale watershed, Soil erosion, Agriculture land sustainability , MCDA , AHP