

# **EVALUATION OF SUSTAINABILITY OF AGRICULTURAL LAND-USES- A CASE STUDY IN A TROPICAL SUB-WATERSHED**

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## **ABSTRACT**

This study aimed to assess agricultural land-uses for sustainability in a sub-watershed integrating biophysical and socioeconomic factors. A step by step approach of estimating current level of carbon sequestration, plant diversity, soil erosion, land suitability and productivity was adopted and based on which sustainability of present land-uses was studied. A quadrat sampling technique was used to estimate the biomass and plant diversity of different land-uses. A household survey of the farmers managing the respective fields used for quadrat sampling was also conducted in order to collect household information including land management practices. The secondary data, such as the soil map, land-use map, climate and crop data were also used. Land suitability classification was performed following FAO framework of land evaluation. For each of the criteria of sustainability, namely, modeled soil carbon, plant diversity, land suitability, soil erosion and benefit-cost ratio a threshold was set. As these criteria were measured in different scales, to facilitate the compilation each criterion was scaled up to 1. Multi criteria index overlay technique was used to evaluate the sustainability of land-uses. According to the analysis, 7.6% of the agricultural land-uses was long-term sustainable. However, 75.39% of agricultural land-uses in the watershed were medium-term sustainable. The percent of agricultural land-uses that were short-term sustainable and slightly unstable, was 16.6 and 0.39 respectively. On the other hand 0.02% of agricultural land-uses in the study area were moderately unstable. None of the parcel of agricultural land-uses in the study area was highly unstable. The study highlights the contributing factor/s for loss of sustainability, thus provide valuable information to plan appropriate management practices