

Geospatial Land Suitability Modeling for Biofuel Crop Using AHP

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Abstract : The biofuel consumption has increased significantly over the decade resulting in the increasing request on agricultural land for biofuel feedstocks. However, the biofuel feedstocks are already stressed of having low productivity owing to inappropriate agricultural practices without considering suitability of crop land. This research evaluates the land suitability using GIS-integrated Analytic Hierarchy Processing (AHP) of biofuel crops: cassava, at Chachoengsao province, in Thailand. AHP method that has been widely accepted for land use planning. The objective of this study is compared between AHP method and the most limiting group of land characteristics method (classical approach). The reliable results of the land evaluation were tested against the crop performance assessed by the field investigation in 2015. In addition to the socio-economic land suitability, the expected availability of raw materials for biofuel production to meet the local biofuel demand, are also estimated. The results showed that the AHP could classify and map the physical land suitability with 10% higher overall accuracy than the classical approach. The Chachoengsao province showed high and moderate socio-economic land suitability for cassava. Conditions in the Chachoengsao province were also favorable for cassava plantation, as the expected raw material needed to support ethanol production matched that of ethanol plant capacity of this province. The GIS integrated AHP for biofuel crops land suitability evaluation appears to be a practical way of sustainably meeting biofuel production demand.

Keywords : Analytic Hierarchy Processing (AHP), Cassava, Geographic Information Systems, Land suitability

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