

Spatial Analytic Hierarchy Process for Ranking Potential Algal Cultivation Sites in the Philippines

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ABSTRACT

Microalgae have the potential to produce multiple high-valued products such as algal meals, nutraceuticals, aquaculture feeds and biofuels. The archipelagic nature, tropical climate and abundance of microalgal strains in the Philippines make it a promising setting for a microalgal industry. The current study develops a multi-criteria decision analysis (MCDA) model, using spatial analytic hierarchy process (AHP), for ranking potential algal cultivation sites in the Philippines for the production of biomass-based products. AHP is the most widely used MCDA approach for applications involving energy systems. The main criteria utilized in the model are the following: availability of natural resources, social aspects, geographic location of related industries and ports, and regional cost. The input to the decision structure model is a predetermined product mix scenario from microalgae. A scenario assuming 100% of microalgal biomass in producing biofuels is analyzed to demonstrate the model. Results show that Region IV-A is the preferred algal cultivation site primarily because of the presence of biofuel processing plants in the area. Future studies involve varying scenario analysis on different algal product mix.

KEYWORDS: Analytic hierarchy process; microalgae; algal cultivation; Philippines; regional analysis