

Utilizing GIS-Based Suitability Modeling to Assess the Physical Potential of Bioethanol Processing Plants in Western Kenya

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Abstract

Bioenergy has become an economically viable venture both on a subsistence level and on a vast commercial scale, allowing farmers, industries, and villages to attain energy independence. In Kenya, the government has formulated, published, and is now implementing a policy for wind, small hydro energy plants, and biofuels and biomass resource generated energy (MOE, 2008). This research project used siting analysis models to explore potential bioethanol processing plant locations that derive bioenergy from first-generation renewable energy sources from food crops in a province located in western Kenya. The potential economic viability of bioethanol production from crops in Nyanza province in western Kenya was assessed by identifying potential biofuel collection locations to explore future spatial distributions of biofuel sites along major road networks, major cities, and proximity of maize production areas and markets. The spatial distribution of economically viable biomass production was determined using a GIS-based sustainability management and site suitability model. The suitability model evaluated regions in Nyanza province with high maize productivity where potential bioethanol processing plants can be developed to improve economic sustainability of bioenergy.

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