GIS Application to Impact of Precipitation on Oil Palm Production at Chumphon Privince, Thailand

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Abstract

Thailand being an agricultural country, crop production plays a vital role in its national income. A major determinant for a better crop production is the timely rainfall as the growth responses of crops is often a compromise between photosynthesis and transpiration. Oil palm is considered as an important crop for the production of edible oils, as a raw material for the production of cosmetics and detergents and also for biodiesel production. The variation of oil palm production is largely attributed to climatic variability. Even though a lot of climatic factors affect the production of oil palm, precipitation is the most dominant factor due to it high variability.

Thai government has set its policy on producing palm oil-based biodiesel as a renewable energy. However, the government has provided farmers with funding, raw materials and other inputs in order to increase the production of oil palm. It is therefore necessary to expand oil palm plantation to increase production. Farmers found it difficult in finding suitable area for oil palm production. It is against this background that we undertook the study. The main objective of this study is to find suitable area of oil palm plantation by examining the impact of precipitation and soil fertility on oil palm production at Chumphon province in the southern region of Thailand during 1999-2012.

The study was conducted using geographical information systems application to develop weighted overlay to find land suitable for the production of oil palm and to interpolate spatially referenced data to predict value of precipitation for arbitrary points in the area of interest. Regression analysis was used to develop linear trend to examine the precipitation impact on the oil palm production.

The results of the weighted overlay revealed high oil palm production potential at Tha Sae, Muang Chumphon, Sawi, Thung Tako, while other areas like Pathiu, Lang Suan showed relatively low suitability for oil palm production. Besides, the developed isohyets map showed that, the level of precipitation at Tha Sae, Muang Chumphon, Sawi, Thung Tako was relatively higher (between 1720 mm-1870 mm) with less variation as compared with that of Pathiu, Lang Suan. The trend analysis conducted on precipitation and oil palm production revealed a positive linear trend in most areas at Chumphon Province.

Key words: Geospatial Analysis, Oil Palm Production, Precipitation, Soil Fertility