The Mark of Cane: Evaluating The Environmental Conditions of HC&S’s Experimental Variety Test Plots Using GIS

By Michael Ross

GIS 180 - Ecosystem Management

Introduction

Company is currently conducting sugarcane variety trials within their Hawaiian plantations. Many of the plots were created as an attempt to move away from the traditional wet farming practice and focus more on the dry farming style since sugarcane has an affinity for dry farming techniques. The higher elevations in each plantation have shown that growing sugarcane using dry farming techniques offers better yield prospects, higher sugar content, and a smaller water footprint. For this reason, the Hawaiian Commercial & Sugar Corporation has set aside specific areas (aka. the experimental fields) to grow their sugarcane varieties. This is where GIS can lend a helping hand since it can provide valuable spatial information that can aid in conducting these experiments.

HC&S’s plantation boundaries are vast and may exhibit microclimates in varying degrees within.

Figure 1

Reveals the soil types of the fields that the experimental plots reside in.

Figure 2

-HC&S’s plantation boundaries in a vector format provided by University of Hawaii at Manoa Department of Geography

Methodology

The experimental cane fields from the soil profile study were mapped. Each experiment field that was mapped was then merged with fields that shared the same soil type. This was done by importing the soil profile study report’s data and overlaying it on the plantation shapefile. Once exported, each field was segmented into its respective soil type’s polygons. The next step was to merge the experimental plots with the soil series’ polygons. This translation to a GIS format for each of the fields with soil type enabled the list to be evaluated during that harvest year. How these soil series could have been isolated include the yield potential and the ability to better the varieties within the experimental test plot program.

Results & Discussion

Once established, sugarcane is a highly adaptable plant that can withstand a variable range of conditions. Soil type, height, slope, rain, and temperature are variables in the environment that correlate with the growth of sugarcane. While the Hawaiian Commercial & Sugar Company’s plantation boundaries are vast and may exhibit microclimates, one specific region within the plantation is to find the optimum genetic conditions and to also maximize yield potential. A key aspect is determining how the experimental cane fields correlate with the yield potential for each of the soil series within the plantation. This translates to a 25% occupation for each of the soil series’ polygons within the plantation during the harvest year. There are a total of 29 different soil series within the plantation. If these soil series could have been isolated to be better the varieties within the experimental variety test plot program.

Acknowledgements

I would like to thank the Hawaiian Commercial & Sugar Company for allowing me the opportunity to take this course and expand my knowledge.

References

Hawaiian Commercial & Sugar Company (2015) GIS Data. (Primary Sources)


Acknowledgements

I would like to thank the Hawaiian Commercial & Sugar Company for allowing me the opportunity to take this course and expand my knowledge.