

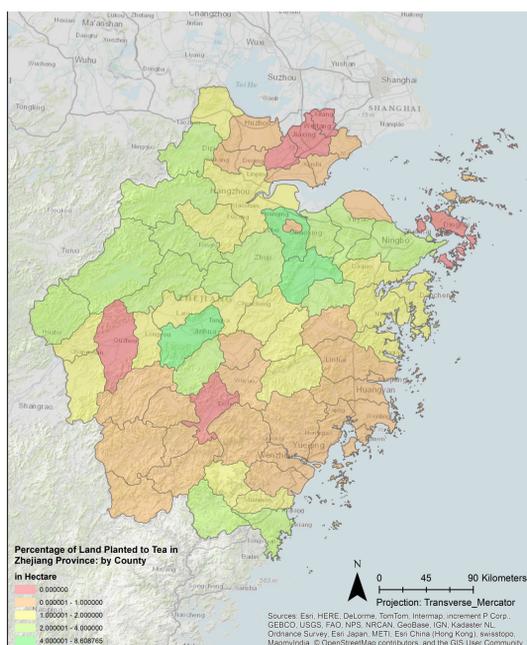
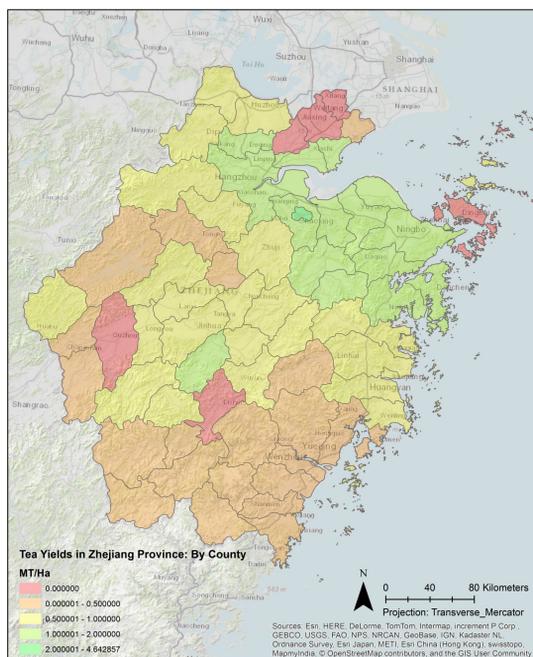
Tea Production and Elevation in Zhejiang Province

Background

How does average elevation relate to tea production? The province of Zhejiang has produced tea for many hundreds of years since being introduced from the west and southwest of the country. The province is famous historically for its tea production and is home to internationally known organizations dedicated to tea research.



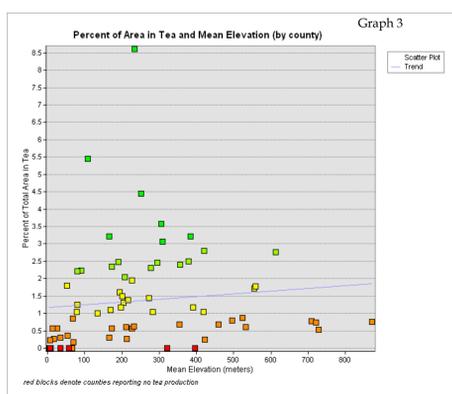
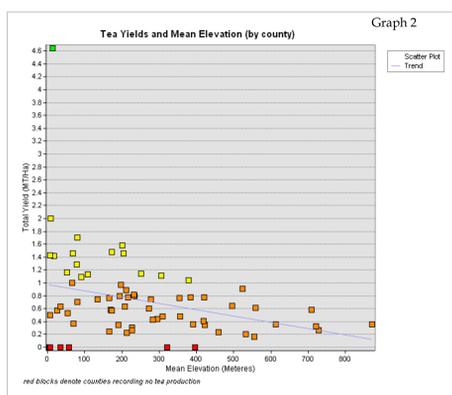
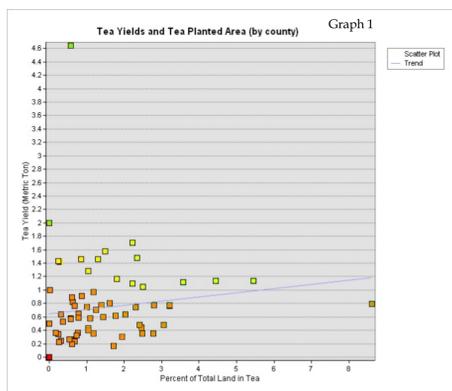
In light of multiple potential uses for finite land resources, understanding the relationship between tea production and elevation could be a step towards greater understanding of what the current practices of tea producers are, suitability of certain environments for tea production, and informing the decisions of agricultural development policymakers to where the greatest opportunities for tea production lie.



Methodology

First data was collected for tea output and area planted to tea, from which yield statistics were produced. Following this, zonal statistics and hillshade geoprocessing procedures were used to calculate mean elevation statistics for comparative analysis between counties and to give greater representation to changes in elevation on the maps. Total land area per county was calculated which was then used to derive percent of total land area planted to tea. Scatterplots were utilized then utilized to model relationships between tea yields, mean elevation, and percent of land area in tea.

Concerning the tea production data: The production data utilized in this model is a small selection from a larger database of historical tea production in the process of being gathered for Zhejiang Province and the whole of China by the cartographer. This work is being done as part of a Tufts collaborative research project on tea and climate change and as part of an individual research project. This data utilized in this particular model includes yield and tea-planted area data for 69 county-level entities in Zhejiang province for the year 1992.



Discussion

Graph 1 represents the relationship between tea yields and percent of total land in tea, showing a positive trend, where a county with higher mean elevation brings higher tea yields.

Graph 2 represents the relationship between tea yield and mean elevation, expressing a negative trend, where a county with higher mean elevation brings lower tea yields.

Graph 3 represents the relationship between percent of total land in tea and mean elevation, showing a positive trend, where a county with higher mean elevation shows higher total percent of land in tea production.

I have emphasized collecting as local-level data as is possible. Counties are a political geographic designation used in China that is smaller than both province and prefecture. More local fine-grained data allows for a more detailed analysis and nuanced understanding of tea production.

As it is, county-level data still represents an overly uniform and homogenous situation. More fine-grained detail to these data would allow our model to more closely resemble reality, avoiding the modifiable aerial unit problem and the artificial patterns that might be observed or implied through data use in spatial models that doesn't accurately reflect reality. In other words, what if all the tea production in a particular county does not actually occur evenly over the area it represents? Other potential sources of error in these data include various types of human error such as error in translation and data input by the cartographer, as well as biased and incorrect gathering and entry by farmers, data gatherers and local officials in China.

How are the model results still useful in the context of making decisions? Despite potential sources of error the results of the model are nevertheless useful fundamentally as guideposts to the development of further questions and research. They invite inclusion of more data in future modeling and allow slightly more focused questions to pursue, increasing the opportunities to productively act on a clearer understanding of the world. For example, graph 2 could lead us to ask questions about whether areas of higher elevation might be poorer, having less access to markets or investment, or whether climatic or soil quality differences are leading to these results.



Bibliography:

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