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1. INTRODUCTION

Economic conditions of an area are influenced by the local climatic conditions. For example, locations endowed with plentiful rainfall and moderate temperatures on a consistent basis tend to support larger and more prosperous populations. In contrast, marginal lands where the populations may be impacted by drought and flash floods tend to support smaller and more impoverished populations. Unfortunately, the relationship between climate and the economic status of a population across much of the world is complex and has been difficult to quantify, in part because of the limitation of observations. Most surface measurements are made in geographic areas that have the infrastructure and can afford the expense of maintaining a network of stations, while the surrounding area may provide few observations. This has severely limited the ability to quantify the relationship between climatic condition and economic status across a large area.

Fortunately, polar orbiting satellites observe the entire globe and can provide reliable climatic measurements at a scale that identifies the spatial gradients of climatic conditions. Specifically, the climate products of surface wetness and land surface temperature provided by the Special Sensor Microwave Imagers (SSM/I), have been observing the earth's surface since 1987. Therefore, we have been able to produce a 15 year climatology of land surface wetness and temperature at 1/3 degree latitude and longitude for the vast majority of the globe. We use the Vegetation Health index (derived from the Advanced Very High Resolution Radiometers) to monitor the growing conditions of crops in each district. Moreover, monthly standard deviations of these two products are calculated for each district, providing a measure of spatial and temporal variability of climatic conditions. This variability may influence the economic status in rural sectors.

2. APPLICATION

The World Bank funded a pilot study to investigate the influence of climate factors on rural income. This study uses satellite derived climate information and socio-economic data to identify relationships between climate and rural poverty. The goal of the study is to analyze the economic responses to climate conditions in regions that are predominantly agrarian. Currently, we have investigated these relationships over two large developing countries, Brazil and India. Both of these countries have a broad spectrum of climate regimes, significant agricultural dependence, and high levels of poverty. The majority of the rural poor in developing countries depend on subsistence agriculture, and their economic well-being is significantly influenced by climate, since it is a driving force in determining successful cropping patterns, agricultural productivity, prices and ultimately the economic status of the rural population. Findings from the study will demonstrate the correspondence of climate factors (such as availability of surface moisture and temperature) to crop yields and the mean income in an area. Statistical results will identify which climatic factors have the strongest correspondence to the economic data, and we will postulate why certain relationships exist. These climate parameters are believed to correlate well with average district household income and crop yields. Findings provide insights into the impact of spatial and temporal climatic variability and its correspondence to the economic status of an area.

3. INTENDED GOAL

This information may be used to influence development schemes funded by the World Bank. The goal is to quantify the influence of climatic factors in the World Bank's strategies and provide insight in establishing policies to effectively reduce poverty in more than 40 developing countries. Results of this study are intended to indicate to the World Bank how to effectively use climatic factors in development policies, and how to effectively integrate climatic variability into the design of a program to alleviate rural poverty.

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