International Journal of Advanced Research in

Biology and BioTechnology

Volume: 1 Issue: 1 22-Mar-2015,ISSN_NO: xxxx-xxx

Climate Based Crop Advisor for Sugarcane and Pomegranate

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ABSTRACT— *Adoption of crop scheduling techniques in India for sugarcane and pomegranate production has been disappointing. The challenge is to use state of the art technology to provide practical and useful advice to farmers and further to convince farmers of the benefits of crop scheduling by on-farm demonstration. The purpose of this project is to describe: 1. To expose the system to the practical aspects of farming in order to refine it if necessary. 2. To evaluate the accuracy of the system to predict crop growth and health. 3. A high technology system to provide practical, real time cropping advice on climate situations. The system consists of a web-based simulation model that estimates the recent, current and future crop status and yield from field information and real time weather data. The system automatically generates and distributes simple advice by SMS to farmers' cellular phones. The system is evaluated on a small-scale sugarcane and pomegranate scheme at Pandharpur, Maharashtra. Yields are not affected significantly and profitability is enhanced considerably.*

Keywords— Agriculture, Sugarcane, Pomegranate, Weather forecasting System, Crop Advisory

1. INTRODUCTION

Agriculture sector alone represents 49 per cent of India's Gross National Product (GNP). Sugarcane and Pomegranate both the crops has bigger participation in India's Gross National Product (GNP), they plays a crucial role in the country's development and shall continue to occupy an important place in the national economy. [1]

Sugarcane is a long duration crop of 12-14 months and therefor, is liable to attacked by a number of diseases. According to an estimate, sugarcane production decreased by 19.0 % due to diseases. According to the data published by National Horticulture Board of India there is an undersized decrease in the area of pomegranate cultivation in India from 109.00 thousand ha in 2008-09 to 107.00 thousand ha in 2010-11; similarly, the production has decreased from 807.00 thousand tons to 743.00 thousand tons during the same period.[1] The reason behind that are the changes in climate and their effects on production. Farmers

has lack of knowledge about diseases and their solutions which had introduced due to new weather conditions like smog, humidity, heavy rain etc.[2]

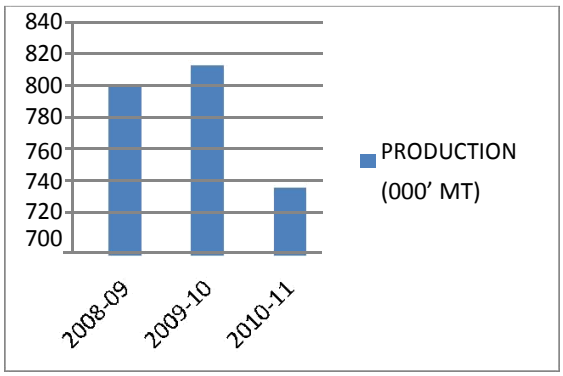

Figure 1: Production of Pomegranate in India

Diseases on pomegranate like Anthracnose, Fruit Rot etc. Anthracnose serves during Aug- Sept when there is high humidity and temperature in between 20 to 27 degree Celsius. The Symptoms are small black spot on leaves and dark brown depressed spot on fruits. Figure 1 shows that there is degradation in the production of Pomegranate due to bad weather changes.

Since climate is a direct input into the agricultural production process, the agricultural sector has been a natural focus for research. This suggests that any changes in climate will affect the market for agricultural goods from the production side[3]. To increase the crop productivity, management of diseases is a great significance. Successful modern day farming requires frequent and complex decision making to make the best of rapidly changing resource and market situations. Tactical and operational decisions in, for example irrigation and fertilizer management, require accurate and up to date information.

2. NEED OF APPLICATION

Agriculture is the most economic activity in India. The effects of climate change is quickly reflects on agriculture economy.The change in climate in terms of exponential increase in average temperature, rainfall which that can be damaging costly for agriculture due to productivity degradation of crop.

The climate change could affect agriculture mainly in several ways:

- Productivity in terms quantity and quality of crops.
- Growth of crops
- Agricultural practices, changes in agricultural inputs such as Insecticides and fertilizers.

- The belief is that farmers are keenly aware of the changes in climate and they immediately select those fertilizers and practices that are most appropriate to the new climate to overcome on the affect[7] [8].

3. EXISTING SYSTEM

The rural area faces lots of problem of climate change on their crops due to lack of technology and proper knowledge. Farmers has lack of knowledge about diseases and their solutions which had introduced due to new weather conditions like smog, humidity, heavy rain etc. Farmers are realized that the disease is infected to his crop only when the symptoms are seen. Then he calls to a professional crop adviser.

Then adviser came to farm and after proper analysis he gave the advice, then farmer bring the required pesticides and other material which required to overcoming the disease. But this is very time consuming process, the disease may be damage the crop very hardly in this time, so the farmer needs the advice within the time so he could take a corrective action on the disease and save his crop.

4. PROBLEM STATEMENT AND OBJECTIVE SCOPE

This paper offers an alternative methodology, based directly on the link between climate and farmers cropping decisions. The modeling and estimation strategies presented here allow us to estimate the damages (or benefits) due to climate change on Sugarcane and Pomegranate. The system consists of a web-based simulation model, which estimates the recent, current and future crop status and real time weather data. The system automatically generates and distributes simple advice on cropping decisions by SMS to farmer's cellular phones.

The aims of this part of the project is,

- To expose the system to the practical aspects of farming in order to refine it if necessary.
- To evaluate the accuracy of the system to predict crop growth and use of pesticides.
- To evaluate the ability of the system to provide useful advice. This pilot implementation also served to create awareness amongst farmers about the importance of climate change [4].

4.2 Proposed System

The system consists of a web-based simulation model that estimates the recent, current and future crop status and yield from field information and real time weather data. The system automatically generates and distributes simple advice by SMS to farmers' cellular phones. The system is evaluated on a small-scale sugarcane and pomegranate scheme at Pandharpur, Maharashtra. Yields are not affected significantly and profitability is enhanced considerably.

4.3 Problem Statement

To develop a system which inform the farmers about adaptive behavior of climate change and its impact on their crop as well as calculate simple advice of that contains which practices should be appropriate in response to such climate.

5. APPLICATION DESIGN AND METHODOLOGY

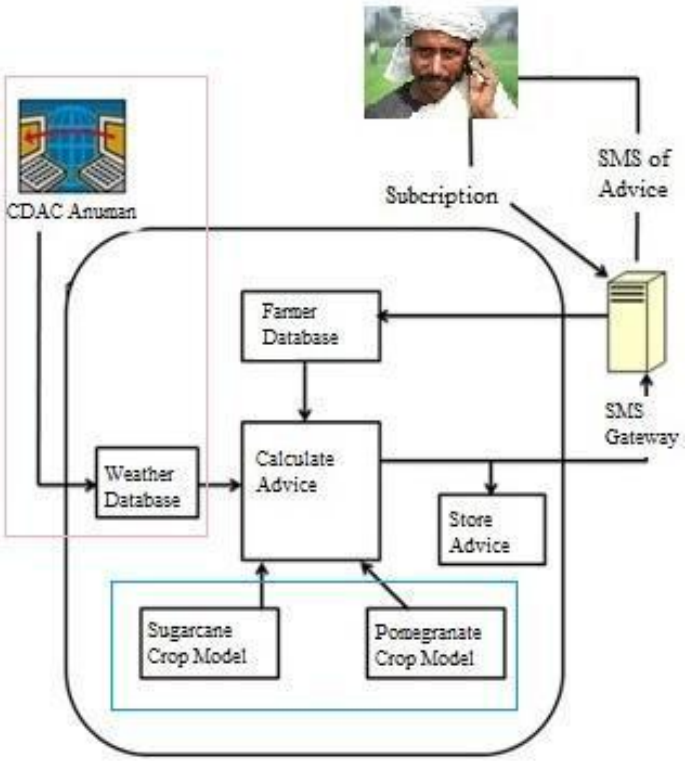

Figure 2: Working methodology of System

Above Figure 2 shows the working methodology of system which includes following models mainly as,

5.1 Weather forecasting data

Weather data is obtained from CDAC Anuman governed site Real-time weather forecasting which contains solar radiation, min and max temperature, wind, humidity and rainfall etc. information of last and next 5 days. The data is downloaded regularly, processed and uploaded into the model database [6].

5.2 Farmer Crop data

Cultivator, row spacing, plantation date and planned harvest date of crop Sugarcane and Pomegranate.

5.3 Crop Model

The following models were developed to evaluate the impacts of changes in climate on crops. A simple sugarcane and pomegranate growth model was developed. The use of this model meant that assessments could be made of the impact of climate change and its variability on incidence for various sugarcane and pomegranate.

Model contains interaction effects of climate changes like temperature rise, rainfall and radiation changes, with some practices. These were used to calculate the actual impact of climate change on agricultural production as well for suggesting agro- and resource management options for sustaining production in India.

5.4 Advice Model

The decision which is generated on the basis of weather data and crop of farmers will be sent as advice to them with help of simple messaging services (SMS). The content, format and timing of the advice were designed according to user preference obtained from subscription information records. A simple messaging services (SMS) is sent to farmer either on a regular basis, or when some quick action is required.

6. CONCULSION

A paper conclude that a centralized, model based system is developed to provide real time, simple weather advice to small-scale sugarcane and pomegranate farmers with cropping decisions. The system employs automatic weather updates from CDAC Anuman. A simulation analysis of cropping strategies indicated that significant benefits could be gained by applying practices, according to a flexible schedule based on a daily crop status as compared to a fixed schedule as is commonly practiced.

This could promote acceptance of advice from the CBCA system. The results suggest that significant benefits could be gained from implementing the CBCA system in small scale sugarcane and pomegranate production schemes and that there is justification to expand the provision of the service. One concern is the reliance of this method on feedback from farmers. Although, it is believed that the advice generated from estimated climate conditions is of value, it could be advantageous to obtain actual weather status applied in practice to ensure that simulations of crop status are more accurate

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