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IDENTIFICATION OF ROBUST CROPS FOR THE NAGPUR REGION WITH RESPECT TO PREVAILING CLIMATIC CONDITIONS USING ECO-CROP MODEL

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ABSTRACT:

In Nagpur district all cultivable land comes under one of the three main categories, namely, jirayat (dry crop land), bagayat (watered or garden land) and bhat lands (rice lands). Dry crop lands because of their dependence on the monsoon are further divided into kharif (early monsoon) and rabi (late monsoon) lands. Authors highlighted the considerable opportunity of using EcoCrop to assess global food security issues, broad climatic constraints and regional crop-suitability shifts in the context of climate change and the possibility of coupling it with other large-area approaches. Though the Ecocrop model showed cotton and soybean as best suited crops for the region, it is imperative that further studies involving investigations of crop productivity vis-à-vis crop diseases should be carried out.

Key words: *- Nagpur, Cotton, Ecocrop, climate change and FAO.*

INTRODUCTION:

Nagpur district has been divided into fourteen tahsils for the purpose of administrative conveyance namely Nagpur Urban, Nagpur Rural, Hingna, Kamptee, Katol, Narkhed, Saoner, Kalmeshwar, Ramtek, Parseoni, Mauda, Umred, Bhiwapur, and Kuhi with thirteen Panchayat Samities.

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Agro-meteorological metrics are indicators of weather determined environmental conditions on which agricultural management decisions are made. Metrics derived from an estimated future climate provide an opportunity to characterise the impacts of climate change on a wide range of agricultural systems, land use practices and ecosystem services. Such indications are vital for determining how changes in the biophysical environment can lead to land management and policy adaptations to achieve multiple objectives of financial viability, food security, biodiversity conservation and environmental sustainability. They provide valuable links between probable management adaptation responses and capacity for mitigating greenhouse gas emissions

Ramirez *et.al.,* (2013) integrated the current expert knowledge reported in the FAO-EcoCrop database, with the basic mechanistic model (also named EcoCrop), originally developed by. Authors further developed the model, providing calibration and evaluation procedures. To that aim, they used sorghum (Sorghum bicolor Moench) as a case study and both calibrated EcoCrop for the sorghum crop and analyzed the impacts of the SRES-A1B 2030s climate on sorghum climatic suitability. The model performed well, with a high true positive rate (TPR) and a low false negative rate (FNR) under present conditions when assessed against national and subnational agricultural statistics

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(min TPR = 0.967, max FNR = 0.026). The model predicted high sorghum climatic suitability in areas where it grows optimally and matched the sorghum geographic distribution fairly well. Negative impacts were predicted by 2030s. Vulnerabilities in countries where sorghum cultivation is already marginal are likely (with a high degree of certainty): the western Sahel region, southern Africa, northern India, and the western coast of India are particularly vulnerable. Authors highlighted the considerable opportunity of using EcoCrop to assess global food security issues, broad climatic constraints and regional crop-suitability shifts in the context of climate change and the possibility of coupling it with other large-area approaches.

METHOD AND METHODOLOGY:

Data was collected with the help of an Interview Schedule from the Farmers of Study region.

Survey method was adopted for the purpose of data collection.

In addition to above, the data pertaining to the impact of changes in climatic conditions on the agricultural practices in the study region was generated by using a structured Interview Schedule (questionnaire). The primary data collection in view of the objectives of the study involved preparation of research instrument (interview schedule). Though development and measurement of research constructs is neither simple nor straightforward, instrumentation techniques are available that allows us to construct research instruments that constitute acceptable levels of reliability and validity. The process of developing the research instrument for this study was based on generally accepted principles of instrument design, and was carried out according to the standard methodology.

Climate has been changing in the last three decades and will continue changing regardless of any mitigation strategy. Agriculture is a climate-dependent activity and hence is highly sensitive to climatic changes and climate variability. Nevertheless, there is a knowledge gap when agricultural researchers intend to assess the production of minor crops for which data or models are not available. In view of this the robust crops for the study region were identified on the basis of climatic conditions prevailing in the region with the use of the Eco Crop model of FAO (available at http://ecocrop.fao.org/ecocrop/srv/en/home).

Analysis of data was done with the help of suitable statistical tests. The descriptive statistics, such as mean, standard deviation, mode, frequency, percentage, minimum and maximum, etc. were determined from the collected data. The comparative assessment was done using suitable graphs. The significance level was chosen to be 0.05 (or equivalently, 5%) by keeping in view the consequences of such an error. That is, we wanted to make the significance level as small as possible in order to protect the null hypothesis and to prevent, as far as possible, from inadvertently arriving at false conclusions. The data generated during the study was processed using various statistical tests with the aid of Statistical Package for Social Sciences (SPSS) 18.0 software.

RESULT & DISCUSSION:

This design was chosen because the primary object of the project was to include many species and also include species less well known for which it was not possible to obtain detailed information. In April 1994 the first version of Ecocrop, containing information on 1200 species was released on diskette. The second version of Ecocrop, also developed by AGLL, was released in August 1996. It permitted the identification of more than 1700 plant species whose most important climate and soil requirements could be matched with the information on soil and climate entered by the user. The database was designed to facilitate the comparison of 12-20 different environmental requirements across different groups of species or across species of different use and could be used in all agro-ecological settings of the world. Textual information comprising a brief description of the species, its use, synonyms, common names and notes were also included. The third version of Ecocrop was released by AGLL in the "FAO Land and Water Digital Media Series" in September 1998. The improvement for this release concentrated on the user interface, whereas the information base as such remained the same. In May 1997 the Plant Production and Protection Division of FAO (AGPC) took over the development of Ecocrop and in May 1999 the database went online as the Division developed an Internet version of the program and incorporated it into the "Plant Production and Protection Information System" (PPPIS). In October 2000 Ecocrop went on-line under its own URL www.ecocrop.fao.org. The database now held information on more than 2000 species and 10 new descriptors had been added.

On the basis of the collected data, using an online tool available on http://ecocrop.fao.org/ecocrop/srv/en/cropSearchForm, the most appropriate plant species was determined. The screen shots and the results are presented hereunder.

CONCLUSION:

Pertaining to the climatic conditions of the study region, i.e. Nagpur District, it was observed that specific crops are best suited for the region. Based on the results obtained from the Eco-Crop model, it was observed that Cotton and Soybean are the most robust crops that can sustain the changing climatic conditions. However, the vast amount of literature as well as the field data collected from the study area indicated that different crops get affected by different plant pathogens. Though the Ecocrop model showed cotton and soybean as best suited crops for the region, it is imperative that further studies involving investigations of crop productivity vis-à-vis crop diseases should be carried out.

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www.ecocrop.fao.org.

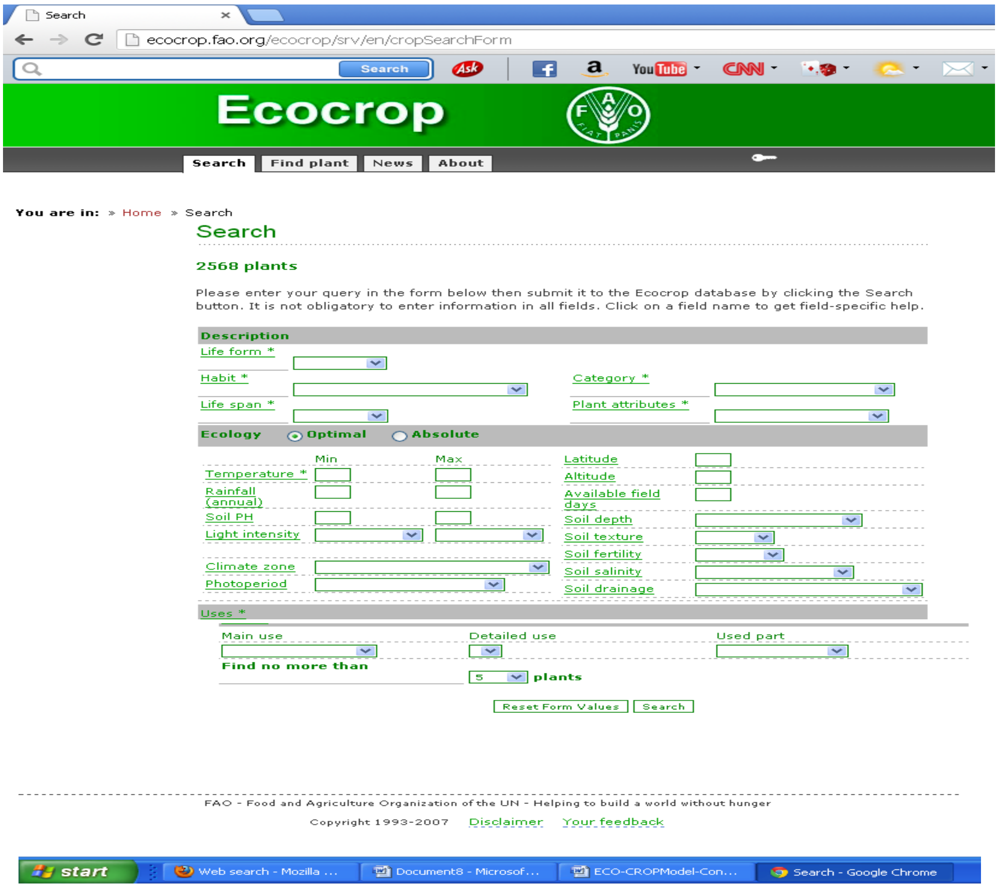

Fig.6.28: Screen shot of the Query Form

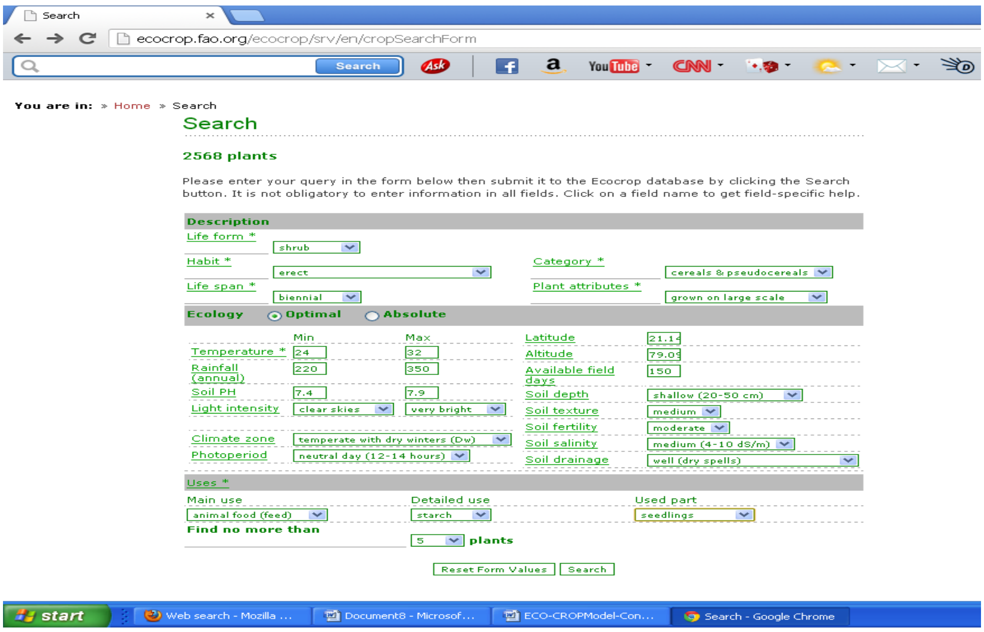

Fig.6.29: Screen Shot of the Query form with data

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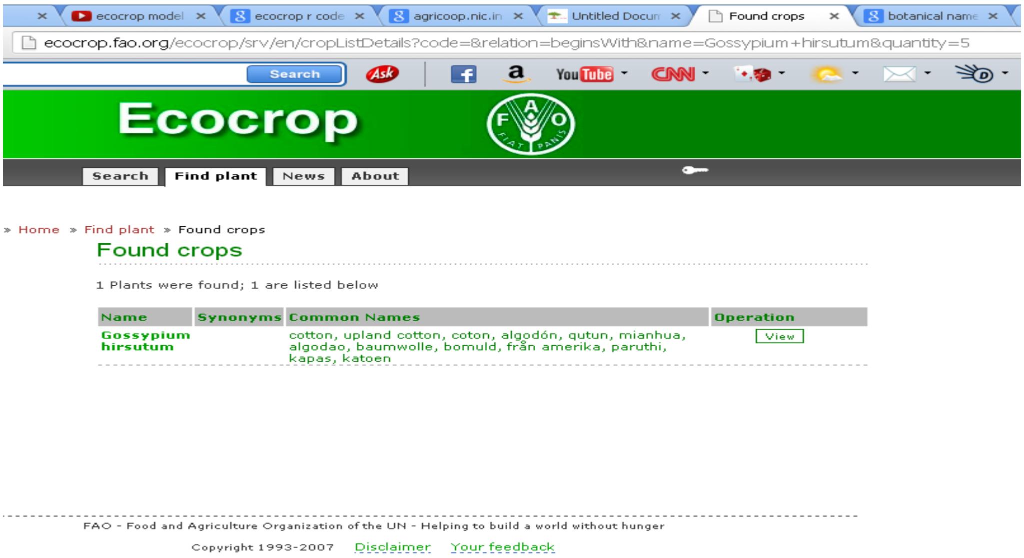

Fig.6.30: Screen Shot of the result page

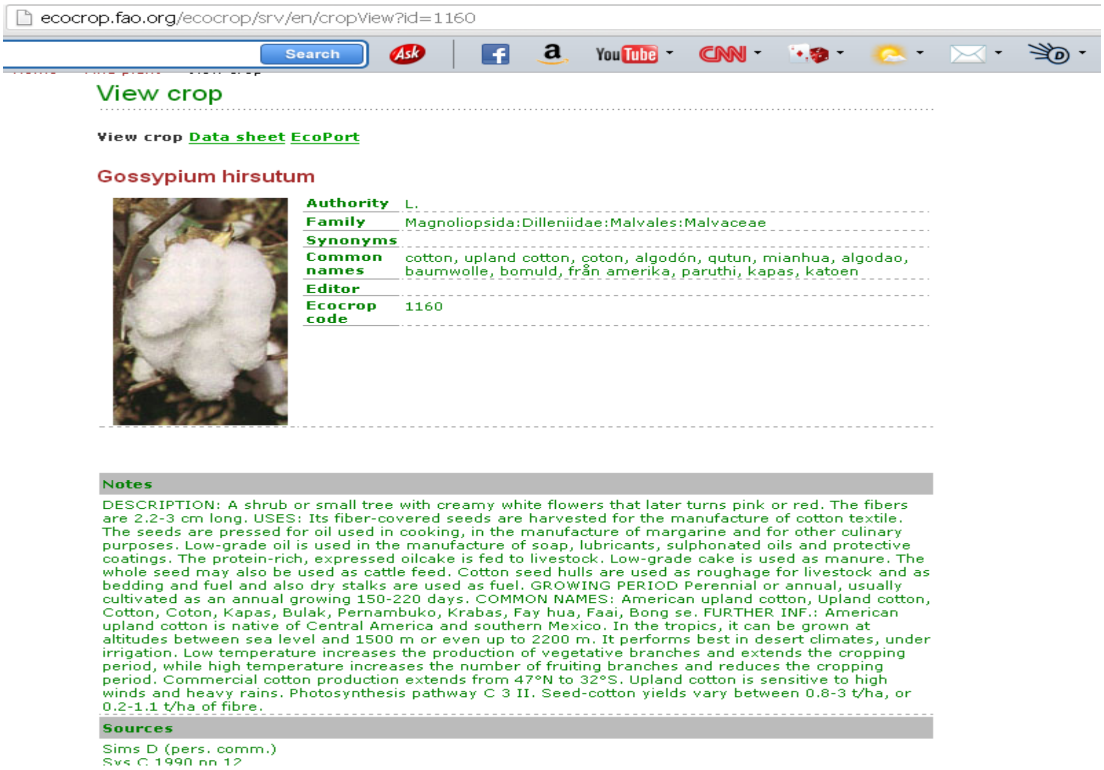

Fig.6.31: Screen Shot of the result page