IARJSET
ISSN (Online) 2393-8021
ISSN (Print) 2394-1588
International Advanced Research Journal in Science, Engineering and Technology
ISO 3297:2007 Certified
Vol. 4, Issue 5, May 2017

Cultivated Plant Production Detection Model for Fertality of Land

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Abstract: In this, paper we analyses the productivity of land of certain region of the country by taking data through Remote Sensing. Productivity of land depends on a lot of factor, certain factors, which are dominant factor, are included in this analysis. This paper also tries to explain the cost related to production of certain area of Land and net Profit related to the agriculture. By analyzing the productivity of land by taking different data for input and related output. We are trying to predict most favorable combination of input for certain region of hectare of land. This result as a reference is useful to increase the productivity of land.

Keywords: Remote Sensing, Electromagnetic Energy, Fertilizer, Pesticides, Irrigation.

I. INTRODUCTION

Remote sensing now-a-days has lots of application, by taking some data through remote sensing we can analyze about the land which can give very useful result. Remote sensing has also the application in analysis of productivity of land of certain region by taking images of that region through satellite. Remote sensing data processing can be done on such platforms as aero plane, satellites, rockets, space ships, etc. Inside or on-board these platforms, we use sensors to collect data. Sensors include aerial photographic cameras and non-photographic instruments, such as radiometers, electro-optical scanners, radar systems etc. The platform and sensors will be discussed in detail later. EMW energy is transmitted, reflected by the target and stored by the sensors. Because energy travels through the medium of the earth's atmosphere, it is modified such that the signal between the target and the sensor will differ..

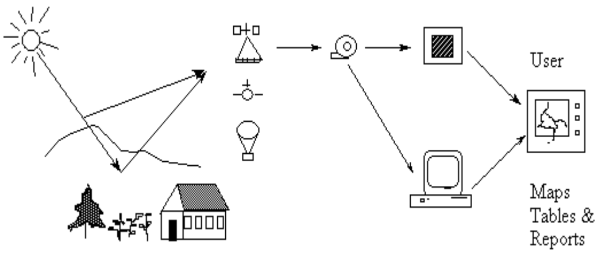

Fig. 1: The Energy & Information Flows in Remote Sensing

Analysis practices require a broad range of information on all scales. Parameters of importance include:
(a) Land-cover, land-use, and vegetation state;
(b) Crop yield, land degradation, and desertification;

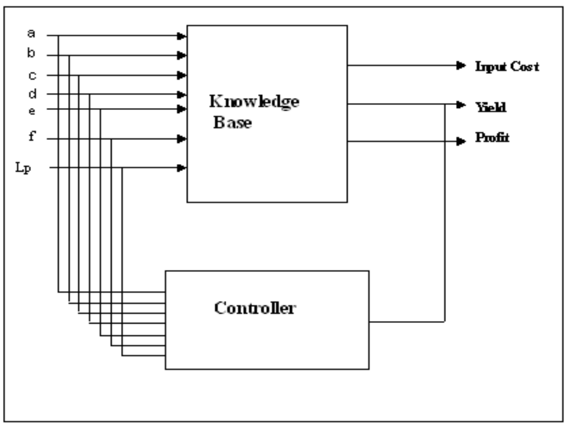

Fig. 2: System Model to determine Agriculture Yield

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(c) Soil characteristics such as fertility and moisture levels;
(d) Freshwater availability including from rainfall, fluxes in small water bodies, and groundwater resources;
(e) Total irrigated area;
(f) Population distribution, production intensity,
(g) Other important parameters

II. ANALYSIS OF MODELING PARAMETERS

1. Man Power: According to a general study in spite of using any technology either traditional or modern the manpower required for computing agriculture work vary from 70 to 110-man power. It is assume that one manpower means one man working for 8 hours. MP is the symbol used for manpower using fussy logic and general data taken by remote sensing. Man power effect the productivity as follow, if a is effect due to man power on productivity
a=(MP/90)*2000,
when 70<=MP<=90 OR
a=(-1)(MP/90)*2000,
when 90<MP<=110

2. Land: Soil properties and tillage practices have a significant impact on soil quality and levels of soil erosion. Soil erosion reduces soil productivity, and agricultural runoff contaminates surrounding ecosystems with sediment, fertilizer and pesticide loadings. Crop residue cover and soil tillage also impact the flux of greenhouse gases from agricultural land. Knowledge of crop residue cover can provide valuable information for identifying areas susceptible to erosion. Analysis is done on the cultivated land. Productivity of land also depends on the type of land used. L is the factor depending on the type of land. Here we consider three type of land. If Lp is effect on the productivity, then
Lp = (1/10)*2000, for L=1
Lp = (1/10)*2000, for L=2
Lp = (1/10)*2000, for L=3
Where L=1 (fertile soil), L=2 medium fertile soil, L=3 land of mountain area.

3. Fertilizer: It is assumed, Fertilizer used for one hectare of Land varies from 150 kg to 500kg. If fr stands for fertilizer, b is its effect then
b= (fr*2000)/(250), for 150 <fr<=250
b= (-1)*(fr*2000)/(250),
for250 <fr<=500

4. Pesticides: Pesticides is used to reduce the effect of disease produce by insects and Pests, it is assume that P varies from 1 liter to 3 liter.
d = (P/2)*200, for 0<P<=2
d = (-1)*(P/2)*2000, for 2<P<=3

5. Seed: Generally 100Kg of seed is sufficient for 1-hectare cultivation. If S is the symbol used for seed then let us assume it vary from 50 Kg to 150 Kg.
If c is the effect then,
c = (s/100)*2000, when 50<S<=100
c = (-1)*(s/100)*2000, when 100<S<=150

6. Irrigation: Water is an essential factor in plant growth, and the dominant factor in the development of canopy leaf area. Too much or too little moisture results in a progressive decline in the rates of cell and leaf expansion, resulting in lower leaf area and green leaf duration, limiting total dry matter accumulation and yield potential.
Let It is denoted by I, I varies from 0 to 40 unit per hectare under normal monsoon condition. If e is effect then,
e = (I/20)*2000, when 0<I<=20 e =(-1)* (I/20)*2000, when 0<I<=20

7. Technology: T is the symbol used to show the effect of technology on the cultivation of land,
f = (T/20)*2000 , for T=1
f = (T/10)*2000 , for T=2

8. Cost: Costs for the different parameters is as follow:
MP=Rs. 30 per unit
F=Rs. 7 per Kg
P=Rs. 100 per liter

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S=Rs. 15 per Kg
I=Rs. 40 per unit
T=500 for T=1
=1000 for T=2

9. Yield: Ground surveys and crop models using meteorological and remote sensing derived parameters are currently used to predict crop yield. Models driven by meteorological data are limited by the sparse location of weather stations over a large area. Remote sensing provides continuous spatial coverage and complements meteorological based methods.

III. GRAPHICAL ANALYSIS OF YIELD FOR VARIOUS INPUT PARAMETERS

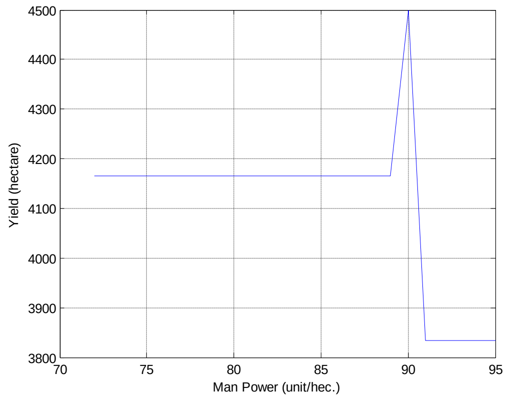

Fig. 3: Graph between Man power Vs Yield

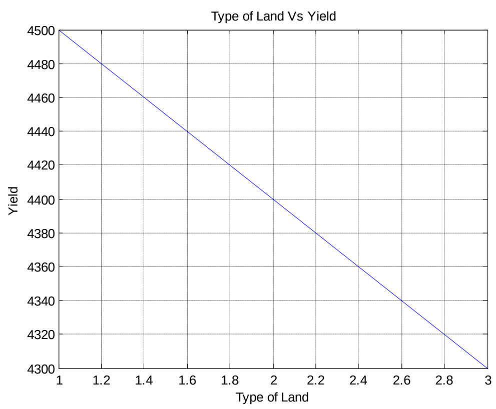

Fig. 4: Graph between Type of Land Vs Yield

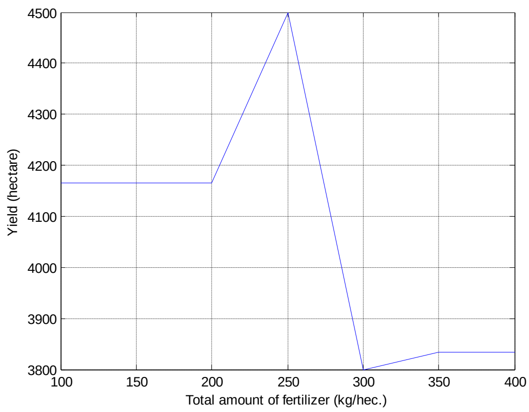

Fig. 5: Graph between Total amounts of Fertilizer Vs Yield

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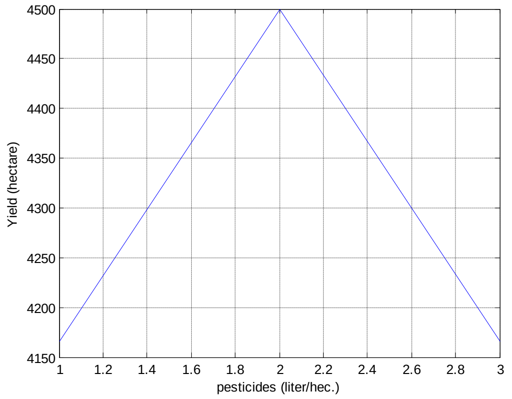

Fig. 6: Graph between Pesticides Vs yield

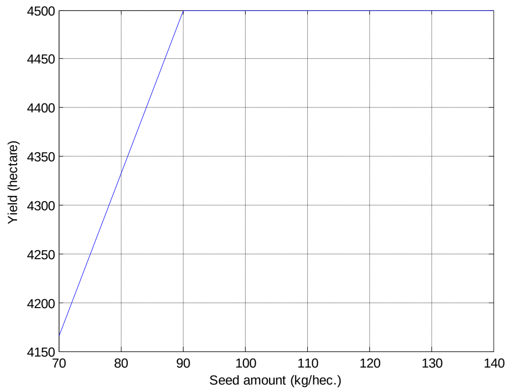

Fig. 7: Graph between Seed amount Vs Yield

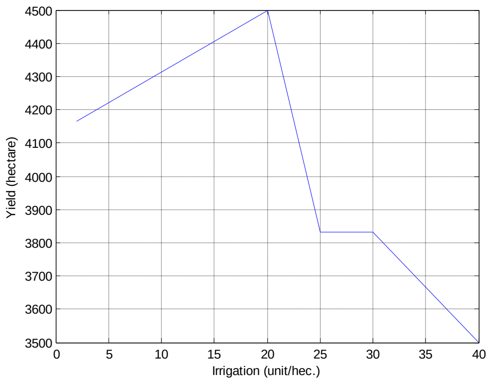

Fig. 8: Graph between Irrigation Vs Yield

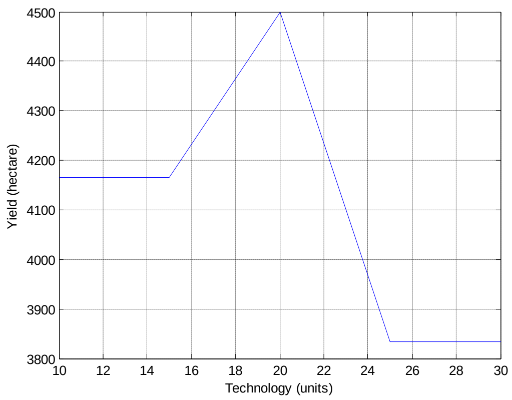

Fig. 9: Graph between Technology Vs Yield

IV. CONCLUSION

The methodology presented found to be encouraging that provides an opportunity to plant physiologist, a modeler and GIS user a common ground to discuss simulation results and further potential research directions. Simulated crop yield and other maps generated under different scale dependencies within India can be used to better communicate model predictions. Hence, using this methodology a region/nation can be modeled for any crop productivity, which help researchers and decision-makers understand the status and extent of climate, soils and crop cum field management.

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