Sensor Analytics based Climate Resilient Agriculture Platform

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***Abstract* — An average farmer faces problems like unpredictable weather, water scarcity, bad quality of crops, low revenue earned and third parties exploiting money. The above stated problems can be further classified into pre sowing, sowing, growing, harvesting and selling zones. Our project is focused on solving problems of farmers which are faced by them in the Pre sowing, sowing and growing zones. Our project is focused on providing farmers a technology that will guide and help them in making smart and intelligent decisions which will be based on the analysis done on the basis of real time and historical data collected by the on-field sensors.**

Our project comprises of two parts:

1). Soil cannister cloud loop

2). Crop-predictor app

Now the first part,

1). Soil cannister cloud loop: It consists of a cannister comprising of our soil moisture sensor, temperature and humidity sensor and methane sensor transmitting their data periodically to the cloud at a central hub and this data can be accessible from the cloud through a server.

2). Crop predicter app: It consists of acquiring the soil nutritions and with the help of available cannister data using AI analyzing this data and predicting the crop to be grown and the amount of fertilizer required.

I. INTRODUCTION

The no. Of registered farmers in Maharashtra go up to 15.3 million and amongst these 60,000 farmers have committed suicide due to mainly two major problems i.e. crop failure and loan and land rent. Now govt. Has introduced schemes that helps them on the financial aspects but our project is concerned with the root cause that is crop failure.

Now the reason this crop failure occurs is due to the following set of issues

>unpredictable weather

>water scarcity

>excessive use of fertilizers

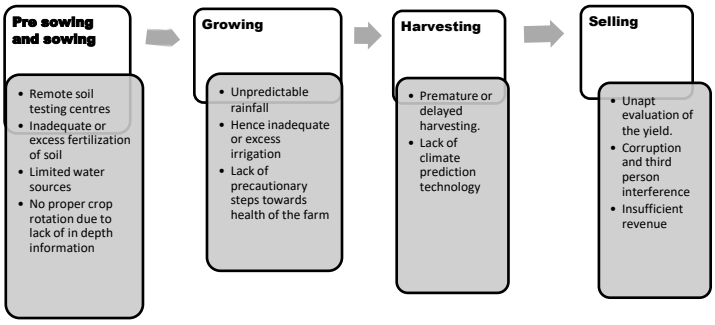
>selecting a wrong crop and adding wrong chemicals in wrong amount

>due to water scarcity the crop do not receive enough amount of water

> is due to ignorance the crop receives too much amount of water, etc.

Our aim is ***"Aiding farmers on making intelligent decisions based on the analysis of historical and real time events so as to improve the success rate of the yield."***

II. METHODOLOGY



Now our project is focused on the root cause and hence our project comprises of the first verticals that being,1. Pre sowing & sowing 2. Growing

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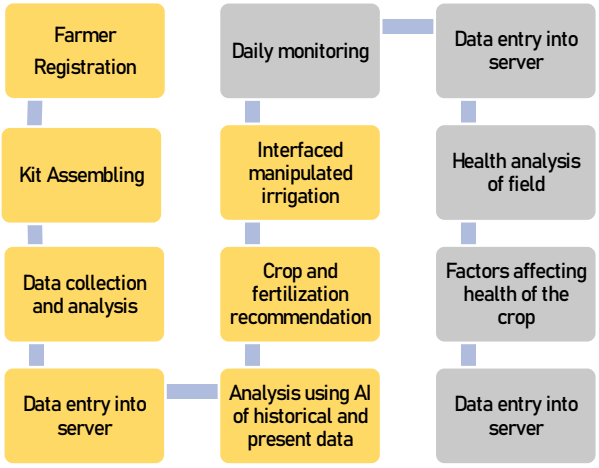


1. **FARMER REGISTERATION**

Login to fill in the personal details[e.g. Name, age, gender, availability of current sources] and also fill the land details [farm location, total area of the farm, soil type, GPS co-ordinates],allocation of registration id along with password.

2. **KIT ASSEMBLING**

Kit will include soil tester, soil cannisters, helium balloons , camera, connecting wires.With the *aerial images* of the field *imaginary grids* and their labelling will be done and *soil cannisters* will be installed in *random grids* and these cannisters will be located with their unique id, cannisters will be powered using connecting wires from power supply.

3. **DATA COLLECTION AND ANALYSIS**

Cannisters will randomly record NPK and pH value and compare *weekly observation with available historical data* and considering the type of soil along with the climatic conditions

4. **CROP AND FERTILIZER RECOMMENDATION**

Crops will be suggested and considering the crop and the nutritional value of the soil the proper amount of fertilizer will be derived.

5. **INTERFACED MANIPULATED IRRIGATION**

This will include , keeping a track of the on field moisture and as per the notifications supplying the water *manually* to the field also as per the weather notifications controlling the water supply.

6. **DAILY MONITORING**

This stage is incorporated with sowing and growth stage where as per the requirement of the crop water supply is managed using *controlled irrigation technique.*

7. **HEALTH ANALYSIS OF THE FIELD**

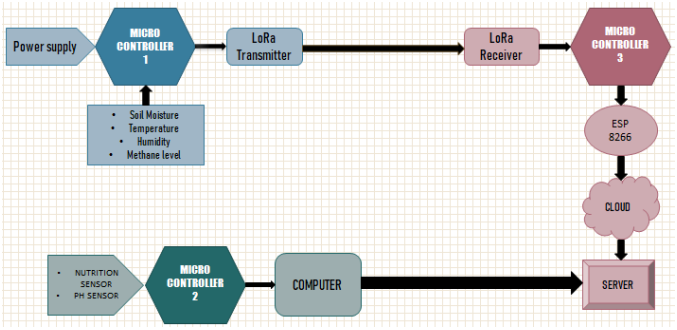
Includes disease detection of sample crop or plant with the help of image processing also maintaining the methane level

8. **PESTICIDE RECOMMENDATION**

As per the results from the health analysis corrective mesurements will be suggested to the farmer through notifications.

9. **DATA ENTRY INTO SERVER**

All the data from the sensors will be transmitted to cloud through LoRa Wan this data will be then sent to server



Now are block diagram shows there are three micro contollers used. The first microcontroller is inside the cannister which is powered by an external power source. The cannister consist of soil moisture ,temperature, humidity and methane level sensor which continuously collects the data for the soil and surrounding ,this real time data is given to the hub side microcontroller with the help of an LoRa transmitter and receiver.Further the data at the hub is sent to the server with the help of esp8266 wifi module. Nutrient and pH data is also sent to the microcontroller which will be shown on the server

III. RESULT

IV. CONCLUSION

a) Before deciding what and how our project will be and how will it function we carried out two farm visits, one in Dahanu where we visited a chickoo farm and one in Nashik where we visited rice and corn farms.

b) While visiting these farms our main aim was finding out the issues faced by the farmers on field, available technologies on their farm, their traditional crops and what technologies are required by them. After all the research conducted we found out the most common problems to be distant soil testing centers, sudden rainfalls, water scarcity and many more issues which have been stated above.

c) Hence we started with understanding the main nutrients required to decide any crop were N P K and their values are the most important along with the pH value of the soil. So we first built a soil tester which could give us the soil nutrient and pH values along with the soil moisture, humidity and temperature of the surrounding. Now this tester was connected to a laptop and we were able to read the values. Hence we thought of making this tester a mobile tester or a cannister which can stay inserted in the soil throughout the cycle and send all the data to the central hub from which we can access it. So we developed a cannister which we connected it to a distant hub with the help of Lo Ra module which helps in sending all the data from a distance. Now this collected data by these cannisters is received by the Lo Ra receiver at the hub and with the help of ESP 8266 wifi module it transmits all the data to cloud.

V. REFERENCE

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