ISSN XXXX XXXX © 2019 IJESC

Research Article Volume 9 Issue No.3

Smart Agricultural Farm using IOT (Internet of Things)

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Abstract:
Agriculture is the back bone of our country. Challenge in agriculture is to cultivate the crops in the farm and to deliver the crop to the end consumer with best possible price monitoring the environmental cause play a vital role over the last few decades. In most country's economy agriculture has played a vital role. A traditional approach is measuring this factor manually by an individual and this manual measurement being checked each and every day. In this paper, we use IOT sensor to monitor soil fertility, temperature, humidity for betterment of agricultural yield. With combination of IOT and android application we can find out crop to be cultivated. It will promote the development of agriculture and also realize effective way to solving issues concerning agriculture.

Keywords: Arduino UNO, Moisture sensor, Temperature sensor, Display, PH Three way Meter, Battery.

I. INTRODUCTION

Agriculture is the backbone of our country. Challenge in agriculture is to cultivate crops in the farm and to deliver the crops with economic price. The environmental climate play a vital role in crop cultivation and yield. From ancient days to 20 century the soil fertility of the agricultural land is tested and measure by manual methods. The analyzing of soil fertility for different types of soil may vary with respect to climate and weather condition of particular area (atmosphere). And then we use primitive methods for collecting the soil sample and it has been tested in the laboratories. We cultivate the crops depending upon the result given by the laboratories.

The major consequences experienced by the farmers to evaluating soil and its fertility towards cultivation crops due to inaccurate reports and inadequate amount of minerals and chemical contents present in different types of soil. Our team members find a innovative solution for this problem here it is, we initialize with the moisture, ph and temperature sensor with IOT technology to measuring and exposing amount of nutrient present in the soil and we also planned to create android application to integrated with IOT to show sufficient crops to be cultivate and lead towards new revolution. More over use of this technology to increase crop yield with farmer's economic strategy and helps in easy forecast the weather and the climatic condition of cultivable land.

II. LITERATURE SURVEY

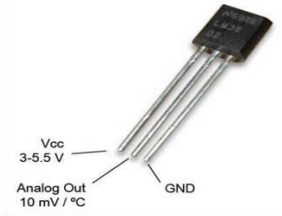
The present scenario the world trending towards new technologies and implementations it is necessary goal to trend up in agricultural field too. However, use of technology in the field of agriculture plays a important role in increasing the production as well as choose the suitable crops for the suitable field to increase yield production. In our project we provide betterment use of technologies for farmers, we use moisture sensor, temperature sensor, ph three meter by using program we make a change in increasing yield production for our country. Interface Arduino uno. Also we create android application to display suitable crops as a result to bring solution for yield production. In future our project

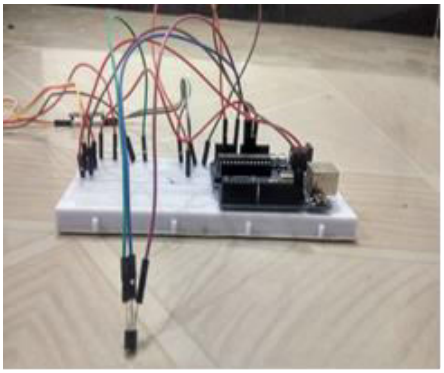
III. SYSTEM OVERVIEW

A. ARDUINO UNO PINOUT

The Arduino uno board is a microcontroller based on the ATmega328. It has 14 digital pins in which 6 can be used as PWM outputs, a 16 MHZ ceramic resonator, an ICSP header, a USB connection, 6 analog inputs, a power jack and a reset button. The above given is the pin out configuration diagram for the Arduino unoR3.This is used as a reference to connect sensors to the system.

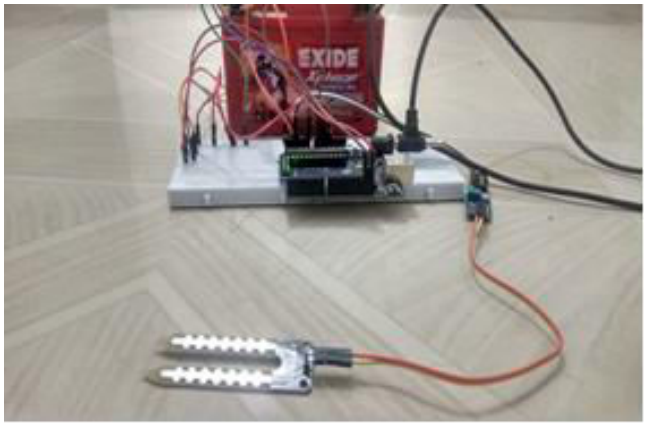
B. TEMPERATURE SENSOR CONNECTION





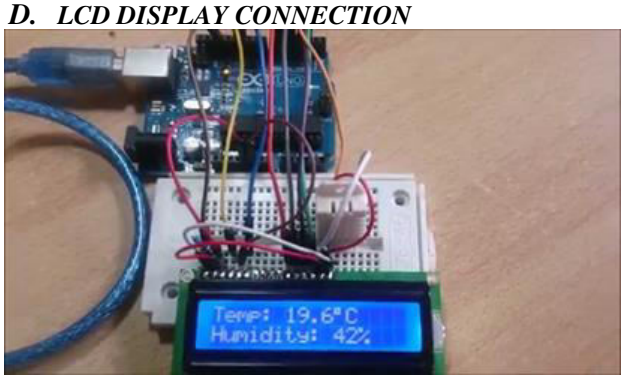
The first pin of the LM35 temperature sensor is connected to the 5v supply of the Arduino uno, the center pin is used for output and it is connected to the A0 analog reader pin for measurement purpose. The last pin is connected to the ground of the Arduino. Now, the output can be found in the serial monitor of the Arduino software after uploading the sketch.

C. MOISTURESENSOR CONNECTION



The connection for the Moisture sensor is a made with the help of the diagram above. the output is read through the analog pin A5 of the Arduino.

D. LCD DISPLAY CONNECTION



The connection for the LCD display is made through the I2C connection.i.e., Using SDA, SCL connection lines with the help of LCD I2C module and all the sensors are connected to the Arduino and the sketch is uploaded to get the value of temperature and moisture in the lcd display.

E. SKETCH FOR ARDUINO

First a library called Liquidcrystal_I2C is installed to the Arduino software and the following sketch is used:

```
#include<Wire.h>
#include<LiquidCrystal_I2C.h>

LiquidCrystal_I2Clcd(0x3F ,2,1,0,4,5,6,7,3,POSITIVE);
void setup() {
Serial.begin(9600);
lcd.begin(16,2);
lcd.clear();
  // put your setup code here, to run once:
}

void loop() {
int temp=analogRead(A0);
intsensorValue=analogRead(A3);
temp=temp*0.48828125;
delay(1000);
lcd.clear();
lcd.print("Temperature:");
lcd.setCursor(13,0);
lcd.print(temp);
lcd.setCursor(0,1);
lcd.print("Moisture:");
lcd.setCursor(13,1);
lcd.print(sensorValue);

  // put your main code here, to run repeatedly:

}
```

F. pH Meter

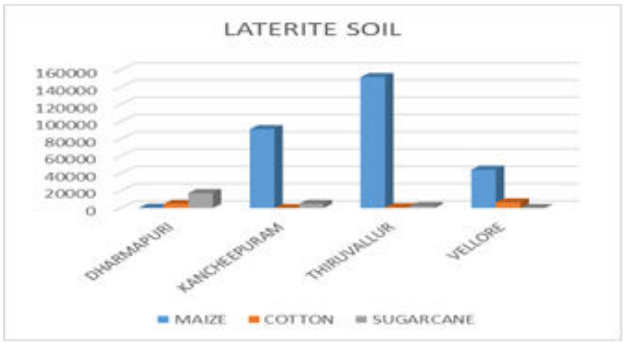
The pH meter is used as a three way meter. It consists of readout scale with pH, moisture and light sensor. It differentiates the PH values initially by various colors. The pH values is 3.5 to 7 it denotes in red color. If the pH values is 7 to 8 if denotes in green color. The meter is shown in figure:

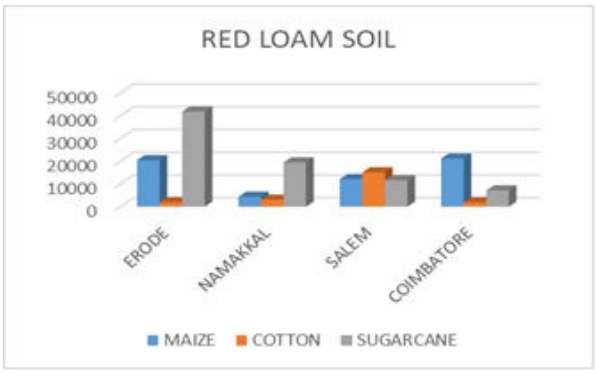
IV. SOIL CLASSIFICATION

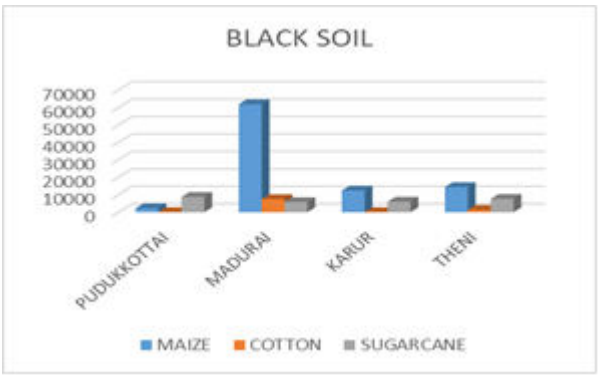
TYPES OF SOIL	AREAS IN TAMILNADU
Red loam	Erode, Namakkal, Salem, Dindigul and Coimbatore.
Laterite soil	Dharmapuri, Kancheepuram, Thiruvannamalai, Thiruvallur and Vellore.
Black soil	Pudukkottai, Madurai, Trichy, Karur, Theni, Namakkal and Salem.
Sandy coastal Alluviam	Perambur, Thanjavur, Dindigul and Madurai.
Red Sandy soil	Coimbatore, Trichy, Karur and Madurai.
Reddish brown sandy loam	Kancheepuram, Thiruvannamalai, Thiruvallur and Vellore.

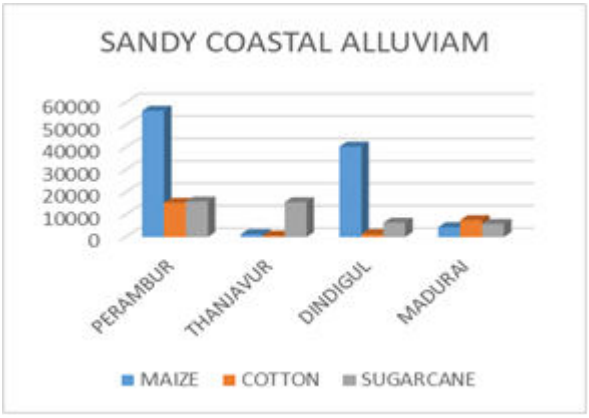
V. GRAPHICAL REPRESENTATION

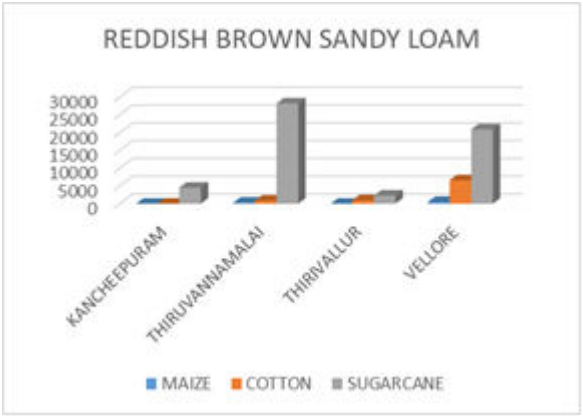
Districts	Maize	Cotton	Sugarcane
Erode	**20473**	**1983**	**41906**
Namakkal	**4377**	**3058**	**19450**
Coimbatore	**21203**	**1997**	**7174**
Salem	**12150**	**15128**	**11610**
Theni	**8665**	**1364**	**7658**
Karur	**801**	**114**	**6042**
Madurai	**4359**	**7477**	**5827**
Vellore	**511**	**6625**	**20938**
Perambalur	**56337**	**15267**	**15803**





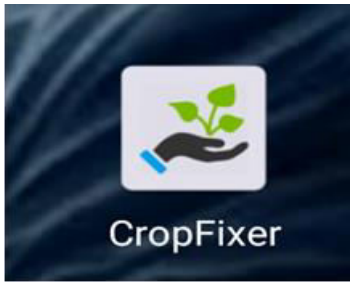


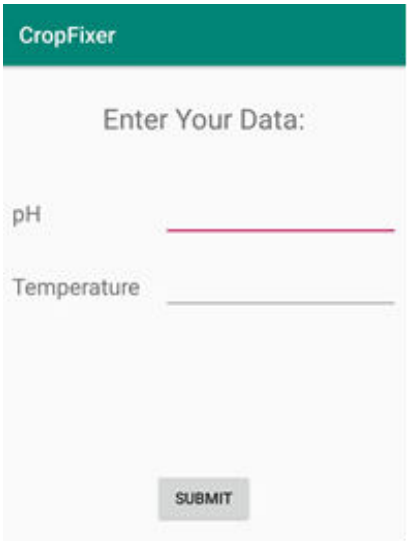


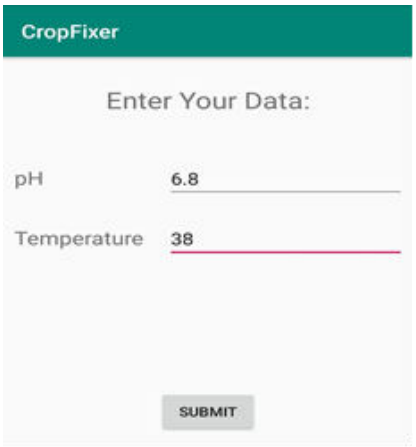


VI. ANDROID APPLICATION

The android app is used to get the crops that suite the current test results. Below given is the Screenshot of specialized android app developed to serve the purpose:







The values successfully displayed in LCD display we tested in cultivation farms with help of Arduino uno interfaced with temperature and moisture sensor. Take the pH value and temperature values feed into android application. Finally, get the result of sequence of Crops suitable for cultivable lands as per requirement of soil.

VII. CONCLUSION

The sensors are successfully interfaced with Arduino uno with help of program. All our experiment successfully gets a complete result in testing the pH value and the temperature of soil. Finally uploading the values in android application to suitable results are successfully complete. Implementation of our project to improve yield production and overall growth in agricultural field.

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