

# Agriculture Land Maintains By Arduino

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**Abstract**— Monitoring of environmental factors is very important over the last few decades. In particular, monitoring agricultural environments for various factors such as temperature, moisture, humidity along with other factors can be of more significance. A traditional approach to measure these factors in an agricultural environment meant individuals are taking measurements manually and checking the mat various times. In India, every state around 9 to 10 lakes soil samples have been reviving in laboratories and it is very difficult to test all the soil sample in the stipulated. But soil analysis is the major role for farmers to cultivate and produce to the proper crop. In this paper the soil condition and nutrients level in soil are analyzed by arduino.

**Key words:** Arduino, wireless Trans-receiver, Sensor, ADC, LCD

## I. INTRODUCTION

Automated Soil Testing Device is an electronic device, which can be used to measure N(Nitrogen) P (Phosphorous) K(Potassium) and pH(Potenzhydrogen) values to ensure the fertility of soil in the field of agriculture to select the suitable crop and also the type of fertilizer to be used. The ionic particles present in the soil sample are sensed by the sensor and the output of the sensor is processed by signal conditioning circuit. The Arduino is used to compare the pre-stored value with the actual values and the measured values are displayed on the LCD. The wireless trans-receiver transmits the data to a remote location or designated authority in the agriculture department for further analysis and suggestions.

Automated Soil Testing Device is a portable device which can be used either in laboratories or on the identified spot selected for farming so that the farmer need not take the pain of visiting the soil testing laboratories which are normally located in district head quarters. Automated Soil Testing Device is a simple and user friendly device so that any person can test the soil with out the presence of an operator, it is an economical device and thus a common man can easily afford it.

## II. AGRICULTURAL MONITORING SYSTEM

Nowadays, awareness about implementing technology for agricultural environment has increased into the industries. Manual collection of data for desired factors can be sporadic, not continuous and produce variations from incorrect measurement taking. This can cause difficulty in controlling environmental important factors. Wireless distinct sensor node scan reduce time and effort required for monitoring the environment. The logging of data allows for reduction of data being lost or misplaced. Also it would allow placement in critical locations

without the need to put personnel in hazardous situations. Monitoring system scan ensures quicker response times to adverse factor sand conditions, better quality control of the produce and a lower labor cost. the utilization of technology would allow for remote measurement of factors such as temperature, humidity, atmospheric pressure, soil moisture, water level and light detection. Different organizations and researchers find the root causes for decrease in yield and tried to develop the efficient system that will help to increase the production.

## III. ARDUINO BASEDSYSTEM

A arduino based system was developed and tested satisfactorily. The schematic diagram of the system is shown in fig.1. the system consists of sensor, wireless trans-receiver, arduino kit.

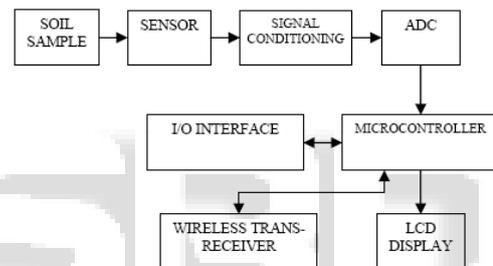


Fig.1:Schematic of Arduino based system for Automated Soil Testing System for Agriculture

### A. Arduino:

The arduino controller operates at 40 MHz at 5V D.C. The arduino plays a key role in processing data received from the sensor, where it compares the data already pre-stored with the sensor output signal.

### B. LiquidCrystalDisplay:

A Liquid Crystal Display is a low cost, low power device capable of displaying text. The LCD controller receives control words from the arduino; it decodes the control word and performs the corresponding actions on LCD. Once the initialization sequence is done, it displays the soil parameters.

### C. ADC:

Arduino requires input in digital form, For this Purpose analog to digital converter is used to convert the output of signal conditioning, which is in analog, to digital signal.

### D. Signal Conditioning:

Signal conditioning converts output signal from the sensor, which is a weak signal, into a strong signal.

### E. Sensor:

Sensors are hardware devices that produce a measurable response to a change in a physical condition like

temperature or pressure. Here copper electrodes are used as sensor which measures the ionic particles present in the soil and converts it in to electrical signal.

#### IV. WORKING PRINCIPLE

Whenever a farmer wants to analyze the soil fertility, the needs to take the soil sample of about 150g and 60ml of water should be added to the soil sample, and allowed the sample to settle down. The sensor will be placed in the sample. Here copper electrodes are used as sensor which measures the ionic particles present in the soil and converts it in to electrical signal. The electrical signal is amplified using signal conditioning and this amplified signal is sent to arduino in the form of digital signal from ADC. The arduino plays a key role in processing data received from the sensor, where it compares the data already pre-stored with the sensor output signal. The arduino after comparison gives the output and the values are displayed on the LCD display.

The output not only provides the information on fertility present in the soil but also suggests crops to be grown on that soil. The wireless trans-receiver transmits the data to a remote location or designated authority in the agriculture department for further analysis and suggestions. The electrical parameters that are obtained during testing of this device for different type of soil samples.

#### V. USER INTERFACE

##### A. Initial Display:

Automated Soil Testing System for Agriculture

##### B. Input:

Dip sensor in to the soil sample.

##### C. LCD:

Displays the N P K & pH Values of the soil sample along with the crops can be grown for the obtained N P K & pH. If switch is pressed it displays other type of crop can be grown along with the amount of N P K to be added.

#### VI. CONCLUSION

Soil Testing Device has been developed for soil testing of agricultural farm. The N P K & pH values vary from one type of soil to others. N P K & pH values of soil sample are measured in real-time and compared with the pre-stored values received from the agricultural department. The system also provides the information about the crops that can be grown in respective soils. Wireless communication system has been incorporated for interacting with the experts.

#### REFERENCE

- [1] N.ShahandI.Das,“PrecisionIrrigation Sensor Network Based Irrigation”, a book on Problems, Perspectives and Challenges of Agricultural Water Management ,IIT Bombay,India, pp. 217–232, April2008.
- [2] Y.Kim, R.Evans and W.Iversen,“Remote Sensing and Control of an Irrigation System Using a Distributed Wireless Sensor Network”,IEEE Transactions

onInstrumentationandMeasurement,pp.1379–1387, July2008.

- [3]Q.Wang, A.Terzisand A.Szalay ,“A Novel Soil Measuring Wireless Sensor Network ”,IEEE Transactions on Instrumentation and Measurement, pp. 412–415, August 2010.
- [4]I.Aziz,M.Hasan ,M.Ismail, M.Mehatand N.Haron,“Remote Monitoring in Agricultural Green house using Wireless Sensor and Short Message Service” ,International Journal of Engineering Technology, vol. 9, pp.1–12, September 2010.
- [5] G. R. Mendez, M.A.Yunus and Dr.S.C.Mukhopadhyay,“A Wi-Fi based Smart Wireless Sensor Network for an Agricultural Environment”, Fifth International Conference on Sensing Technology, pp. 405–410, January 2011.
- [6] Soil Testing in India”, Department of Agriculture & Co-operation, Ministry of Agriculture, Government of India, New Delhi, January, 2011
- [7] Soil Electrical Conductivity- a tool for precision farming”, Journal of the Instrument Society of India, March 2012, Vol.42, No.1