ANALYSIS OF SOIL MOISTURE RETENTION PROPERTY FOR PRECISION AGRICULTURE

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Introduction:
The rainfall of our country is dependent on the monsoons. Rainfall controls our agriculture. But the agriculture of our country is said to be, "the gambling of the monsoon" as the monsoon rainfalls are uncertain. In areas with unreliable rainfall, watering crops is essential! Imagine if an industry had to depend entirely on the whims of Mother Nature: if it rains, we'll make a profit, if it doesn't, we'll lose. Irrigation ensures a constant supply of water, which is essential not only to crops growing at all, but also to the quality of the crop. You can't really eat potatoes which have received patchy watering, and many other crops would not form properly in the absence of water. Agriculture is the lifeline of our country, and it is through agriculture that India can improve its economy. Even deserted countries like Israel have contributed a lot to the field of agriculture, with little water and poor soil quality it has done enormously well. Agriculture if done with planning and with precision can be extremely profitable. Many of our farmers have little knowledge of using technology for agriculture.

Objectives:
The objective of this project is to develop a system to record soil moisture retention property using Moisture sensor and a Microcontroller. These recorded values can be accessed in tabular form or in the form of graphs to take useful decisions. The various decisions that can be taken depending upon these values are; which crop would be better for this type of soil.

Methodology:
The project will be developed in 3 modules
- The Wireless Module to record the data (Raspberry Pi)
- The Sensor Module to read the moisture values (Arduino)
The User interface module to display recorded data in graph

The Moisture sensor will periodically sense moisture values from the soil and update it into the database with time. These values will be display to the user on a user interface as graphs.

The system can be used to analyze the soil moisture retention property and proper decision as to which crop is better for that soil condition can be suggested to the farmer.
HARDWARE REQUIREMENTS:
- Arduino Controller Board
- Moisture Sensors
- Farm Soil patch model

SOFTWARES REQUIREMENTS:
Language: Python, VB.net, Php
Backend: MySQL database Server
Platform: Windows and Embedded Linux
Tools: Visual Studio, Putty

BLOCK DIAGRAM:

Results & conclusion:
The system was tested on 2 types of soils and the results were very encouraging. Two types of soils (Black and Red) were tested and the system showed gradual decrease of moisture in both the soils, with black soil having more moisture retention quality.

Conclusion:
The system can be used to analyse the moisture retention property of any soil. The recorded data can be used to decide, which would be the best crop for that type of the soil.

Scope for Future work:
In the future the project can be deployed wirelessly, so that there is no need of connecting the system directly to the PC (Present Scenario). By making it wireless we can deploy multiple such systems in various parts of the farm patch, for more precision.