e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:04/April-2022 Impact Factor- 6.752 www.irjmets.com

AUTOMATIC CROP PROTECTION FROM HEAVY RAIN FALL AND PRESERVING RAIN WATER USING IOT

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ABSTRACT

With the ongoing fourth revolution, technology has been growing rapidly day by day. One of the most significant and efficient uses of this has been evident in the farming sector. From a basic water sprinkler system to the requirement of Fertilizer for specific crops, the likes of Artificial intelligence and the Internet of things have brought in great changes. One of the issues which need to be addressed is the protection of crops from heavy rainfall which causes significant damage to the crop production and soil yield, also causing huge mental distress to a farmer. We in our proposed model have given a solution to this problem by giving automated as well as manual control. The motivation behind our paper is to keep the crops protected from these heavy precipitations and preserve the same rainwater for future purposes when water is scarce. We use a Moisture sensor with a NodeMCU module to ensure the covering of the estimated field and LCD display to show status of Field.

Keywords: Nodemcu, Artificial Intelligence, Moisture Sensor, LCD Display, Farming Sector.

I. INTRODUCTION

Farming is the science and art of creating plants and creatures. Agriculture was the key headway in the climb of stationary human advancement whereby the developing of prepared species made sustenance surpluses that engaged people to live in urban regions. The chronicled background of agriculture began an enormous number of years earlier. Consequent to get-together wild grains beginning at any rate 1,05,000 years earlier, early farmers began to plant them around 11,500 years back. Pigs, sheep, and cows were prepared over 10,000 years earlier. Plants were autonomously developed in any event 11 districts of the world. Modern horticulture dependent on the enormous scope of monoculture in the twentieth century came to overwhelm agrarian yield, however around two billion individuals although everything relied on subsistence agribusiness into the twenty-first. The natural impact of agribusiness is the effect that diverse cultivating practices have on the general conditions, and how those effects can be followed back to those practices. The characteristic impact of agribusiness fluctuates reliant on the wide combination of agricultural practices [10] used over the world. Finally, the normal impact depends upon the creative practices of the system used by farmers. The relationship between spreads into the earth and the developing system is convoluted, in this manner it depends upon other air factors such as precipitation and temperature. There are two kinds of markers of natural impact: "signifies based", which relies upon the farmer's creation procedures, and "impact-based", which is the impact that developing strategies have on the cultivating structure or spreads to the earth. An instance of a strategies-based marker would be the idea of groundwater that is impacted by the proportion of nitrogen applied to the earth. A marker reflecting the loss of nitrate to groundwater [10] would be impact based. The techniques based on assessment realize farmers' demonstrations of agribusiness, and the impact-based assessment deliberates the genuine effects of the agrarian system. For illustrations, the methods-based analysis may look at pesticides and treatment. Systems that farmers are using, and impact-based assessment would consider the CO2 which is being released or what the Nitrogen substance of the soil is. The natural effect of agribusiness includes an assortment of components from the dirt, to water, the air, creature and soil assortment, individuals, plants [10], and the nourishment itself. A portion of the ecological issues that are identified with farming is environmental change, deforestation, no man's lands, hereditary building, water system issues, contamination, soil corruption, and waste. These days, during the stormy season the developed harvests get influenced because of

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overwhelming precipitation. The proposed framework includes security of the harvests via auto rooftop which covers the specific region. The downpour sensor is actuated when there is precipitation, and it will offer implications to the farmer through the GSM module [8] by sending SMS. Hence to close the rooftop, the farmer needs to send an SMS to the GSM module. When the downpour is halted, the controller consequently opens the rooftop. This research paper is more acquainted with the objective and motivation behind the proposed method. Collected fields get influenced or demolished because of substantial downpour and shortage issues. Various existing systems are discussed in the literature survey also listed their practical views and explained proposed strategies to defeat the impediments of the current one and give the best outcomes to farmers. The significant objective of this paper is to keep the reaped crops from the overwhelming precipitation and spare the downpour water. The rain sensor is utilized for the working of the rooftop when there is precipitation.

II. LITERATURE SURVEY

We've examined work on similar projects in the past and know how to do research. Agriculture is the backbone of the Indian economy, according to many ways. Agriculture is the primary source of nourishment for us, making life impossible without it. However, in the current situation, finding farm employees is difficult. Modern development is prompted by the computerization of all industries. Up to a certain extent, the agricultural process is automated here.

P. Goutham Goud et al [1] Rain sensor, a sophisticated microprocessor, and a DC motor are used in a system where the deluge is recognised and a protective shield is wrapped around the rooftop. The rain sensor of such a drying shed protects the harvest from rain and wetness. To automate this task, a rainfall detects the downpour and sends the information to the microcontroller. A defensive wrapper is wrapped over the rooftop top, and the microcontroller forms the information and activates the DC motor control circuit.

Dheekshith et al [2] developed a system for identifying precipitation by using a downpour distinguishing sensor. The sensor is connected to a direct actuator motor and a spread job that protects against rain. When the sensor detects rain, it goes to work and pivots the spreading roll, which covers the gathered merchandise and protects the farmer from losses.

Naveen K B et al [3] suggested a framework that was structured using the Proteus programming language. When the rain sensor detects a deluge, the soil moisture sensor determines dampness content, which is displayed on the LCD. . The value sent to the PIC microcontroller is determined by the soil moisture sensor, temperature sensor, and rain sensor. The automatic rainwater and crop saving system protect crops from excessive rainwater by taking into consideration the attributes.

The current work entails preserving the unique resources that are available to mankind. We can limit the flow of water and so eliminate waste by assessing the status of the soil productively. Water stream can be obligated by substantially sending by knowing the state of moistness, and temperature over with the use of unexpectedness and temperature sensors. There are currently no effective frameworks available in the current situation. The farmer must go to the drying region and cover the gathered fields, which is particularly difficult if the farmer's location is distant from the harvest and the entire crop would be pummeled by the downpour before the farmer arrives.

Limitation of Existing Systems:

- The greenhouse has certain limitations such as it cannot be adjusted to climatic conditions and it will not allow the sun to pass through the crop as shown in figure 3.
- Most of the existing systems concentrated on covering the crop from rainfall by providing a roof over the crop rather than focusing on the water level required for a particular crop.
- If the crop needs a certain amount of water in such case farmer needs to permit the rain over the crop and once it's having sufficient amount of water content then he can protect the crop by covering it with a roof.
- Though we preserve the rainwater during rainfall, later if the farmer wants to use it for the crops it consumes more electrical power.
- The rainwater still is a huge cause of soil erosion as the rainwater from the cover still gets immersed in the soil.

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III. PROPOSED SYSTEM

To overcome the limitations of existing systems, we have proposed a framework that covers the harvested crops from heavy precipitation and navigates this water to the nearest storage chamber to avoid soil erosion and have the least impact on crop yield. The method consists of ATMEGA328P Micro-controller, NodeMCU wifi module to control the system from a nearby place, Soil Moisture Sensor, LCD which will give live readings to the farmer.

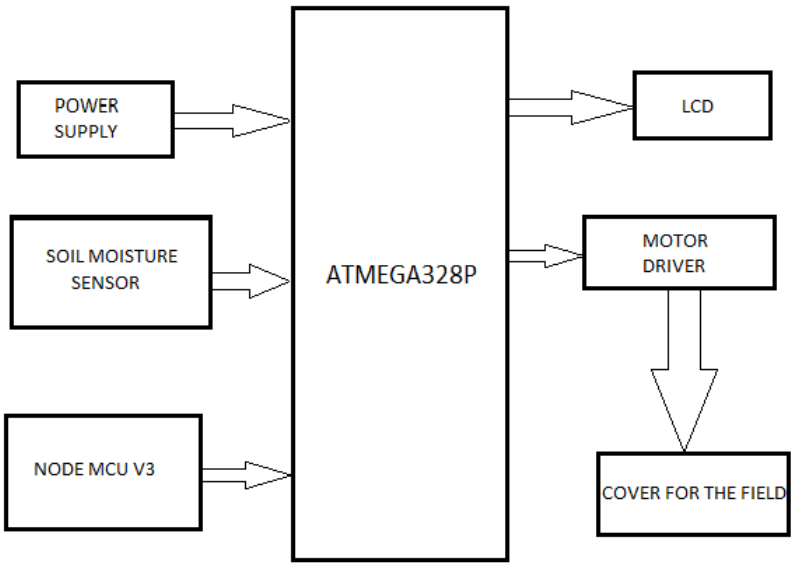

Figure 1: Block Diagram of Proposed System.

IV. CONSTRUCTION AND WORKING

Tables 1: COMPONENT USED

S.No.	Component	Description
1.	ATMEGA328P	It is an open-source stage utilized for building electronic activities. Arduino comprises both a physical programmable circuit board and a bit of programming, or IDE (Integrated Development Environment) that runs on PC used to give orders and control it.
2.	Soil Moisture Detector	The sensor module is used for the detection of moisture in the soil. It gives a signal to the microcontroller to initiate.
3.	NodeMCU V3	It is a low-cost open-source IoT platform. The module is mainly based on ESP8266 a low-cost Wi-Fi microchip incorporating both a full TCP/IP stack and microcontroller capability.
4.	Motor Driver & Relay	A motor driver goes about as an interface between the motors and the control units. Usually, motors work under high current but the control unit requires a low current signal. Relays ensure that the Motor gets adequate current.
5.	Motors	A motor is an electronic device used to transverse electric energy into mechanical energy. They work under the principle of Electromagnetism.

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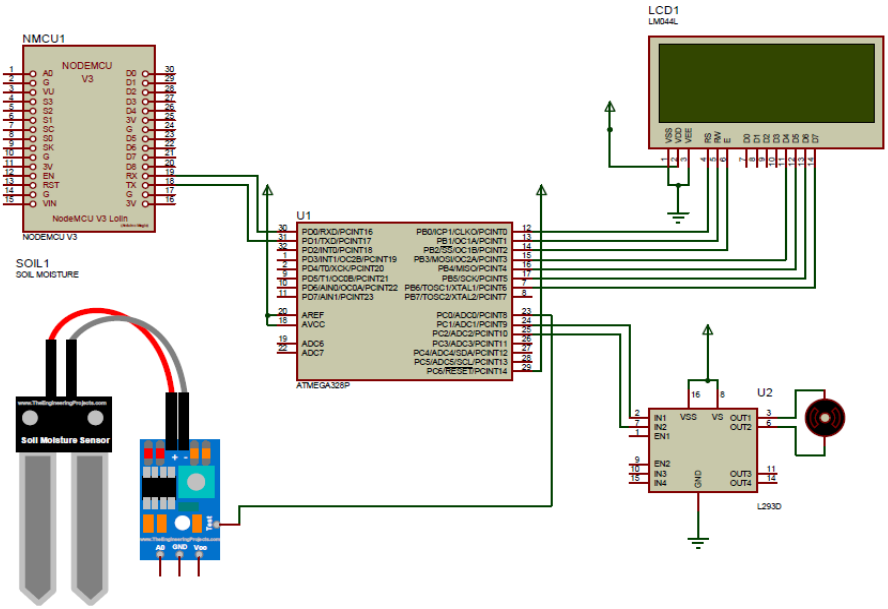

Figure 2: Circuit Diagram

WORKING:

The soil moisture actuates when the circuit between two electrodes is completed due to the presence of water between them and sends the signal to the controller. The controller then sends a signal to the Motor driver to unfurl the cloth/plastic over the designated field area. The NodeMCU module gives precedence to farmers and complete control over the automated system. The module is linked to a browser that shows the live reading of temperature and humidity with an ON/OFF switch to the farmer.

ADVANTAGES:

- Protection of harvested crop from rain.
- Protection of crop from insects.
- The proposed system works for longer period.
- The roof has flexibility to use whenever it is required.
- Preserved rainwater can be used for the crops or household and irrigation purpose.

APPLICATION:

- The proposed framework can be used for drying garments.
- This system can be utilized to save machinery.

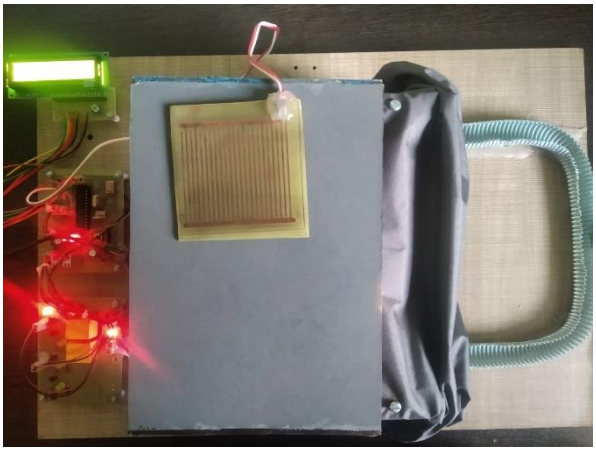

Figure 3: Circuit Diagram (Hardware Project)

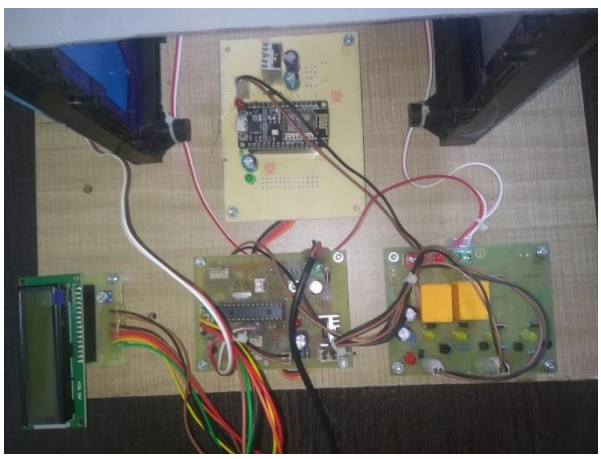

Figure 4: Actual View of Project

V. CONCLUSION

Using Arduino Uno as the controller, the proposed architecture addressed how the field can be automatically protected from rain. With this proposed structure, we can successfully rescue tens of thousands of hectares of farmland from destruction. If the water in the soil is insufficient, the excess rain water can be stored and used for crops, as well as for other needs such as household. As a result, the proposed system's findings show that it is reliable and may be used efficiently by farmers.

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