Scientific Journal of Impact Factor (SJIF): 5.71

e-ISSN (O): 2348-4470
p-ISSN (P): 2348-6406

International Journal of Advance Engineering and Research Development

Volume 5, Issue 05, May -2018

AUTOMATIC RAIN WATER AND CROP SAVING SYSTEM

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ABSTRACT: *Agriculture is a backbone of our country. About almost of our country's revenue comes from agriculture. But during heavy rain falls, the farmers face lot of problems because there cultivated crops get washed off or destroyed. So in order to avoid this problem this project is designed which helps if saving the crops from heavy rainfall and protecting that rain water to use it for other purposes. The saved and stored water can be used for feeding animals, washing, cooking etc. and can also be reused to sprinkle it back to the field when needed. In this system an automatic roof is inculcated which works by taking the signals from the rain and soil moisture sensors and covers the whole field to protect it from heavy rains. Whenever there is rainfall the rain sensor gets activated. Then the controller indicates the DC motor to run which opens the roof automatically to close the field using a polythene sheet. Which is implemented is "Automated irrigation system with partition facility for effective irrigation of small scale farms" (AISPF). But this method has some drawbacks which can be improved and here we are with a method called "Automated irrigation system using weather prediction for efficient usage of water resources" (AISWP).*

Index Terms— *DC motor, PIC microcontroller, Rain sensor, Soil moisture sensor, Solar panel and battry, PH Sensor, motor pump.*

1. INTRODUCTION

Irrigation is the major problem in agriculture in the countries which are in developing stage. In any country which is like India where the income of people depends on agriculture directly or indirectly and the environmental conditions are isotropic still we are unable to use agriculture resources. The main cause low rainfall due to this more land not irrigated. Another very important reason unplanned usage of water resources by this way more water goes waste. By the drip system water supplied to plants zone only remaining area can't get water due to this large amount of water saved. Automatic irrigation system can supply water to plants whenever they need water when power supply intervals. Here no need of turning ON/OFF valves. By this automatic irrigation system watering plants at exact time based on soil condition which will improves crop growth by taking water and minerals from soil when plants needed. The current work aims to sensor network based low cost soil moisture, temperature monitoring system to track the soil moisture and temperature in real time and there by allow water given to plants based on conditions of soil moisture, temperature and type of crop grown in soil. The sensors take the inputs like moisture, temperature and provide these inputs to the microcontroller. The microcontroller converts these inputs into its desired form with the program that is running on it and gives outputs in the mode of regulation of water flow according to the present input conditions. The sensors take the inputs like moisture, temperature and provide these inputs to the micro controller. The microcontroller converts these inputs into its desired form with the program that is running on it and gives outputs in the mode of regulation of water flow according to the present input conditions.

2. SYSTEM ARCHITECTURE

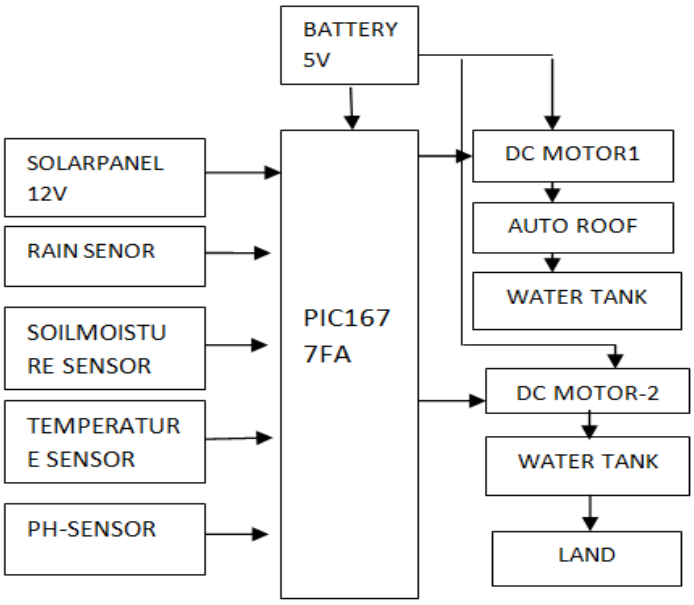

Fig. 1.system architecture

2.1 Microcontroller Unit:

The working of the system is written using program and stored in the microcontroller in its ROM. According to the written program the system operates and do not change its working over the life time until and unless it"s program is changed. The architecture and instruction set of the micro controller are optimized to handled data in bit and byte size. The areas if applications of micro controllers include control process, manufacturing process, medicine, instrumentation etc.

2.2 PIC:

PIC is abbreviated as peripheral interface controller as coined by microchip technology Inc., USA. PIC is a very popular microcontroller worldwide Microchip is the first manufacturer of 8 pin RISC MCU.

2.3 12 V Battery:

A 12 V Battery is used to store the power generated from the solar panel. This power supply is used to control the whole system unit such as microcontroller, DC motor etc.

2.4 Rain Sensor:

A switching device which is activated when rain occurs is called rain sensor or a rain switch. Rain sensors for irrigation systems are available in both wireless and hard-wired versions, most employing hygroscopic disks that swell in the presence of rain and shrink back down again as they dry out — an electrical switch is in turn depressed or released by the hygroscopic disk stack, and the rate of drying is typically adjusted by controlling the ventilation reaching the stack. However, some electrical type sensors are also marketed that use tipping bucket or conductance type probes to measure rainfall. Wireless and wired versions both use similar mechanisms to temporarily suspend watering by the irrigation controller specifically they are connected to the irrigation controller's sensor terminals, or are installed in series with the solenoid valve common circuit such that they prevent the opening of any valves when rain has been sense.

2.5 Soil Moisture Sensor:

Measuring soil moisture is important for agricultural applications to help farmers manage their irrigation systems more efficiently. Knowing the exact soil moisture conditions on their fields, not only are farmers able to generally use less water to grow a crop, they are also able to increase yields and the quality of the crop by improved management of soil moisture during critical plant growth stages Soil moisture sensors measure the volumetric water content in soil. soil moisture sensors measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content. The relation between the measured property and soil moisture must be calibrated and may vary depending on environmental factors such as soil type, temperature, or electric conductivity.

2.6 PH Sensors

Our pH Sensor can be used for any lab or demonstration that can be done with a traditional pH meter, including: acid-base titrations, monitoring pH in an aquarium, and investigating the water quality of streams and lakes. NOTE: Vernier products are designed for educational use. Our products are not designed nor recommended for any industrial, medical, or commercial process such as life support, patient diagnosis, control of a manufacturing

2.7 Water Level Sensor

A Water Level Indicator may be defined as a system by which we can get the information of any water reservoir. Water level indicator system is quite useful to reduce the wastage of water from any reservoir, while filling such reservoir. Water is most essential thing on earth .Safe drinking water is essential to human and other life forms even though it provides no calories or organic nutriants. The total amount of water available on Earth has be estimated at 1.4 billion cubic kilometres, enough to cover the planet with a layer of about 3 km. About 95% of the Earth's water is in the oceans, which is unfit for human consumption. About 4% is locked in the polar ice caps, and the rest 1% constitutes all fresh water found in rivers, streams and lakes which is suitable for our consumption. A study estimated that a person in India consumes an average of 135 litres per day. This consumption would rise by 40% by the year 2025. This signifies the need to preserve our fresh water resources. The sensors take the inputs like moisture, temperature and provide these inputs to the microcontroller.

2.8 DC Motor

Here the DC motor1 used to provide making auto roof based on the field moisture, temperature and rain sensor. The DC motor 2 used to supply the water in the field.

2.9 Solar Panel:

The solar panels are made of solar cells. A solar cell, or photovoltaic cell, is an electrical device that converts the energy of light directly into electricity by the photovoltaic effect. Solar cells are the building blocks of photovoltaic modules, otherwise known as solar panels. The operation of a photovoltaic (PV) cell requires three basic attributes.

3 HARDWARE AND SOFTWARE USED

3.1Hardware used:

1. Solar panel
2. 12 V Battery
3. GSM
4. Rain sensor
5. Soil moisture sensor
6. DC motor

3.2 Software used:

1. Microcontroller
2. PIC 16F877A

4. RESULTS AND DISCUSSION

Fig2. automatic rain water and crop saving result

The system has been designed and simulated by using proteus software. When the rain sensor detects rain and soil moisture detects moisture content, which will be displayed in LCD display. The process of auto roof is intimated by GSM which will be sent through SMS to mobile user. The soil moisture sensor, temperature sensor and rain sensor detects the value that sent to PIC microcontroller. Based on the values. The automatic rain water and crop saving system protects crops from excess amount of rain water and also saves water from wastage. By using these system saves the electricity, maximizes the productivity during both rainy season and sunny season. Here the human power were eliminated by providing auto roof.Irrigation has been the back bone of human civilization since man has started agriculture. As the generation evolved, man developed many methods of irrigation to supply water to the land. In the present scenario on conservation of water is of high importance. Present work is attempts to save the natural resources available for human kind. By continuously monitoring the status of the soil, we can control the flow of water and thereby reduce the wastage. By knowing the status of moisture, CO and temperature through GSM with the use of moisture and temperature sensors, water flow can be controlled by just sending.

5. ADVANTAGES & APPLICATIONS

- Low power consumption and easy to install.
- Remote monitoring is possible from field to farmer‟s home
- By automatic control of DC motor, we can reduce power consumption.
- Wastage of water can be reduced.
- High Humidity and temperature can be detected. And controlled.
- Controlling moisture of soil.

6. CONCLUSION & FUTURE SCOPE

This GSM based agriculture monitoring system serves as a reliable and efficient system for monitoring agricultural parameters.The corrective action can be taken and reduce the human power, but it also allows user to see accurate changes in it.
It is cheaper in cost and consumes less power. The GDP per capita in agro sector can be increased

- Detection of soil moisture level can be added to the system
- Control of water usage by using temperature level and humidity level
- This project can be extended for cattle monitoring

7. REFERENCE

[1]. Vasif Ahmed, Siddharth A Ladhake, “Design of Ultra low cost cell phone Based Embedded System for Irrigation”, 2010, IEEE.
[2]. Cuihong Liu Wentao Ren Benhua Zhang Changyi Lv, The application of soil temperature measurement by LM35 temperature sensors, International conference on Electronic and Mechanical Engineering and Information Technology (EMEIT),2011
[3]. “The 8051 Microcontroller and Embedded Systems” by Muhammad Ali Mazidi and Janice Gillispie Mazidi, Pearson Education.
[4]. DrashtiDivani, PallaviPatil, and Sunil K, “Automated Plant Watering System,” ICCPEIC, 20-21 April 2016
[5]. Zhiwei ZHENG, Yangren WANG, Shaosheng WANG, and Baoyong Zhao, “Research onTomato Water Requirement with Drip Irrigation under Plastic Mulch in Greenhouse,” Agro Geoinfromatics, 18-20 July 2016.
[6]. Vinay Mohan, V.Praveen Kumar, ThejeshKakumani, Dr. T.K. Ramesh, “Automated irrigation system with partition facility for effective irrigation of small scale farms,” Ecology, Environment and Conservation Volume 21, Issue 1, 2015, Pages 369-375.

