DESIGN OF AUTOMATED IRRIGATION SYSTEM USING SOIL MOISTURE SENSOR AND RTC TIMER

BENZIGAR ANTONY F[1], RATHI B[2]

[1]Lecturer, Department of Computer Science, College of Applied Science, Vadakkencherry

[2]Assistant Professor, Department of Computer Science, College of Applied Science, Vadakkencherry

---*****---

Abstract - India is the second largest producer of wheat and rice, the world's major food staples. India is currently the world's second largest producer of several dry fruits, agriculture-based textile raw materials, roots and tuber crops. The development of crops for a better yield and quality deliver is exceptionally required. So suitable conditions and suitable moisture in beds of crops can play a major role for production. Mostly irrigation is done by tradition methods of stream flows from one end to other. Such supply may leave varied moisture levels in field. The administration of the water system can be enhanced utilizing programmed watering framework. This paper proposes a programmed water system with framework for the terrains which will reduce manual labour and optimizing water usage increasing productivity of crops. For formulating the setup, Arduino kit is used with moisture sensor with Wi-Fi module. Our experimental setup is connected with cloud framework and data is acquisition is done. Then data is analyzed by cloud services and appropriate recommendations are given.

Key Words: development of crops, irrigation, moisture sensor

1. INTRODUCTION

The Economic Survey of India 2020-21 report stated that in FY20, the total food grain production in the country was recorded at 296.65 million tonnes—up by 11.44 million tonnes compared with 285.21 million tonnes in FY19. The government has set a target to buy 42.74 million tonnes from the central pool in FY21; this is 10% more than the quantity purchased in FY20. For FY22, the government has set a record target for farmers to raise food grain production by 2% with 307.31 million tonnes of food grains. In FY21, production was recorded at 303.34 million tonnes against a target of 301 million tonnes.

India is a horticultural nation, where population is over 1.2 billion, out of which around 70% of the population relies upon horticulture.

Agriculture is a major source of earning of Indians and agriculture also has made a big impact on India's economy. Agriculturists have an extensive variety of assorted variety to choose reasonable products of the soil crops. Be that as it may, the development of these crops for ideal yield and quality deliver is exceptionally specialized. It can be enhanced by the guide of innovative bolster. The administration of the water system can be enhanced utilizing programmed watering framework This paper proposes a programmed water system with framework for the terrains which will reduce manual labour and optimizing water usage increasing productivity of crops. Presently the computerization is one of the critical parts in the human life which gives comfort as well as lessen burden and helps us to save time We plan to develop a framework that helps the farmerto automatically provide water to the plant according to its need and current water moisture present in the soil. A keen water system is developed with the help of moisture sensors and Arduino chips.

In the system, We bury moisture sensor into the soil which would notify the system about amount of water present in the soil. With the help of a program, coded in C language, system will check the amount of water required by a plant, with predefined values in the program. If the moisture level is less than the amount of water needed by the plant, the program automates the flow of water from a submersible pump unless a threshold value is reached. This ensures that crop has been provided optimum amount of water without any manual labour or wastage. It improves efficiency of water usage, reduced cost of irrigation water, Intellegent irrigation.

2. RELATED WORKS

[1] This work done by Domenic T. Sanchez*, Larry B. Peconcillo Jr. and John V. De Vera **"**Effects of Natural and Home-made Bio-inoculants on Containerized Okra Plants (Abelmoschus esculentus) " in the year 2022.

The study focused on growing okra plants (Abelmoschus esculentus), one of the most popular vegetables that can be grown in containers, with composted chicken manure, vermi compost, and home-made liquid bio-inoculants such as fish amino acid (FAA), fermented fruit juice (FFJ), and calcium phosphate (CALPHOS). The scope was to determine which of these natural amendments could improve the growth performance of containerized okra plants during the vegetative stage, as well as to reveal the significant difference in the mean height of the containerized okra plants at two-time points, Week 1 and Week

8, as well as the significant difference in the mean growth rate among the three treatments. Composted chicken manure and vermicompost were applied directly to the soil, whereas bio-inoculants were used as a foliar or direct fertilizer application to the leaves. To compare the mean difference between groups, the Paired Samples t-test, and One-way Variance Analysis were used concurrently to compare height differences and weekly growth rates. The experiment revealed that okra plants fertilized with liquid bio-inoculant outperform significantly those fertilized with composted chicken manure and vermicompost. Furthermore, the disparity in mean growth rates in containerized okra plants is most likely the result of experimental manipulation rather than random occurrence. The efficacy of vermicompost is related to the nutrient content of substrates, which in this study had a low growth effect on the specific okra plants. Bio-inoculants, on the other hand, have a greater impact on containerized okra plants as a foliar fertilizer.

3. PROPOSED SYSTEM

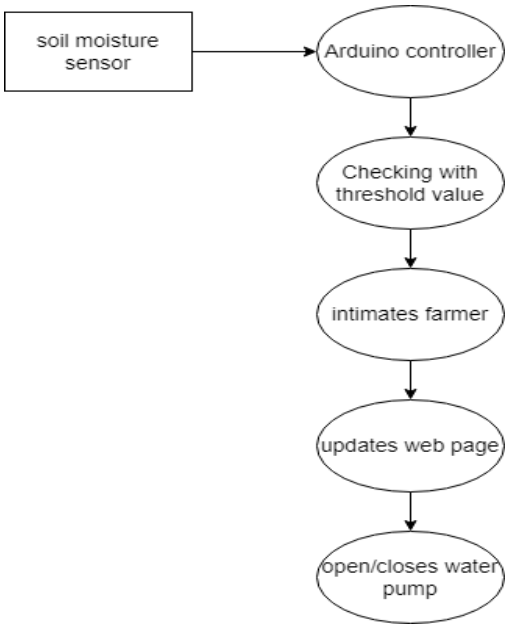
The aim of this system is to modernize farming innovation by using programming segments and constructing necessary parts for the frame work. In the proposed work, instead of the normal irrigation type we use drip irrigation method. The frame work is focuses the right condition of paddy field. where the water can be directed to the root zone in sufficient amount so that water as well crop management can be improved. Using IOT the drip irrigation method is automated with the help of sensors and pipe tubes. Various sensors such as soil moisture sensor, pH sensor, Humidity sensor and temperature sensors are used in field monitoring.

This prototype monitors the amount of the soil moisture. A predefined range of soil moisture is set and can be varied with the soil type or crop type. In case moisture of the soil derivates from the specified range, the watering system is turned ON/OFF. Whenever system ON/OFF, a message is send to the user via GSM module updating the status of the water pump and soil moisture, it will activate the irrigation system, pumping water for the plants. In system consist of Arduino uno which is the brain of the system. The soil moisture sensor is connected to the input pin of the controller. The water pump, GSM modules and the relay are coupled with the output pins. Sensors are placed inside of the soil. sensors uses two probes which senses the moisture level in the soil. Moisture level readings are sent to the arduino controller. Arduino now alert the motor to supply the required of water to the soil. The motor is programmed to rotate, The rotating platform is attached to the motor to provide a base moment of pipe. If the soil is dry the moisture sensor

value will be less than the predefined threshold value, So the pump is on using a relay and switched off when the value reaches threshold.

4. DATA FLOW DIAGRAM

4.1. LEVEL 0



4.2. LEVEL 1

5. RESULTS AND OBSERVATION

Once you send data to ThingSpeak from your devices, you can create instant visualizations of live data without having to write any code. It offers the capabilities of real-time data collection, The collected data in the form of charts, Ability to create plugins and app for collaborating with webservice, Social networks and other APIs. The core of Thingspeak is a 'Thingspeak channel'.To use Thingspeak, We need to signup and create a channel. Once we have a channel, We can send the data, Allow Thingspeak to process it also retrieve the same

6. CONCLUSION

It may check the moisture content levels of soil in farm and can generate moisture level data through sensors. Accordingly irrigation based decisions are taken by system automatically to start water pump and to divert the flow of pump motor for irrigation. Designed system can irrigate field with lesser amount of water. Crop can be maintained with its suitable threshold moisture levels for better yields The aim of this system is to modernize farming innovation by using programming segments and construct the

necessary parts for the framework. The framework is ceaseless based and focuses the right condition of paddy field. There is one central centre used which to control another centre. The key limit of RF module is to pass the message to the centre point and work the system. This prototype monitors the amount of soil moisture. A predefined range of soil moisture is set, and can be varied with soil type or crop type. In case the moisture of the soil deviates from the specified range, the watering system is turned on/off. Whenever system swiched on/off, a message is sent to the user via GSM module updating the status of water pump and soil moisture, it will activate the irrigation system, pumping water for the plants.. The farmer will be intimated about the current field condition and this information is displayed on a web page. So that the farmer can access the details about the condition of the field anywhere, anytime.

REFERENCES

[1] Abbast S.A. (2001): Water resource Projects and their environment impact". Himalaya publishing house, New Delhi. Pp 89-92.

[2] Biswas Asit K. (1993): "Water for sustainable development in 21st century – A Global perspective Oxford publisher, Delhi. Pp 73-75.

[3] Mishra H.N. & Singh Vijai P. (1998): "Research Methodology in Geography", Rawat Publication, Jaipur. Pp 35-39.

[4]. Grigg Nell's (1985): "Water Resources Planning", McGraw Hill Book company, Washington.

[5] Singh R.B. (1996): "Research in Geography", Vol. II, APH Publishing corporation, New Delhi. Pp 263-265

[6] Mathhews Olen, Paul (1987): "Water resources Geography and Law." Scientific publisher, Jodhpur. Pp 153-162 Tech. [Online].

[7] Rao K.S. (1992): "Fresh Water Ecology", Anmol Publication, New Delhi. Pp 65-70