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ijmrset@gmail.com



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Develop The Smart System to Optimize the Water Management in Irrigation

Bershan. B, Mariappan. A, Mohamed Kayum Khan.NI, Saravana Perumal. S, Dr. R. K. A Bhalaji

UG Students, Department of Mechanical Engineering, Francis Xavier Engineering College, Tirunelveli, India

Assistant Professor, Department of Mechanical Engineering, Francis Xavier Engineering College, Tirunelveli, India

ABSTRACT: Agriculture is basic source of livelihood People in India. It plays major role in economy of country. But now days due to migration of people from rural to urban there is hindrance in agriculture. Monitoring the environmental factor is not the complete solution to increase the yield of crops. There are no of factors that decrease the productivity to a great extent. Hence Automation must be implemented in agriculture to overcome these problems. An automatic irrigation system thereby saving time, money and power of farmer. The Traditional Farm land irrigation techniques require manual intervention. With the automated technology of irrigation, the human intervention can be minimized.

KEY WORDS: drylands; food insecurity; irrigation management; smart irrigation; sustainable development goals; water scarcity

I. INTRODUCTION

Drylands (hyper-arid, arid, semiarid, and dry sub-humid parts) occupy 41% of Earth's surface, supporting 38% of global population [1,2]. Agriculture and pastoralism are the major livelihood sources for most of the population, largely dependent upon natural resources [3]. About 70% of the world's drylands exist in developing countries where people are confronting the stark challenge of poverty, food insecurity, malnourishment, poor economic conditions, and marginalization [4,5]. Water availability and agricultural productivity are the most pressing issues associated with drylands and land degradation [6]. Globally, water scarcity is already affecting 1–2 billion people, and a majority of them are concentrated in drylands, where the supply of water is insufficient to meet the user demands [7]. Future climate projections also suggest that in coming decades more people will be facing huge shortages of water. Consequently, climate change and water management decisions will adversely affect drylands and their inhabitants [8]. As global population is increasing rapidly, agricultural productivity in drylands needs improvement to meet food security demands. Therefore, adopting smart irrigation approaches is a viable option to better utilize the available water resources and improve water productivity in drylands scarcity has become one of the critical issues and threatens the sustainable development in drylands [9]. Water scarcity occurs when water demand becomes equal or even exceeds the total available fresh water resources [10]. Water scarcity should be considered from both physical and economic perspectives [11]. Physical water scarcity has two aspects: green water scarcity (soil moisture in root zone is insufficient to meet crop water demands), and blue water scarcity (both surface and ground water availability is unable to meet human water needs) [12]. The economic water scarcity occurs when water resources are physically available, but lack of institutional capacity and socioeconomic conditions limit the use of that water [13]. Water scarcity negatively impacts social integrity and sustainable economic development, especially in drylands. The primary sector, which is seriously affected, is agriculture, utilizing more than 80% of total fresh water [14]. Intensification of agricultural water scarcity could affect food production and threaten food security in drylands in the future [15]. Further, it may seriously impact the associated Sustainable Development Goals of SDG-2 (Zero hunger), SDG-6 (Clean water), SDG-7 (Clean and affordable energy), SDG 15.3 (Desertification control) and SDG.

II. CONCEPT OF IOT

Simple an easy to install and configure. Saving energy and resources, so that it can be utilized in proper way and amount. Farmers would be able to smear to right amount of water at the right time by automatic irrigation. Avoiding irrigation at the wrong time of day, reduce runoff from overwatering saturated soils which will improve crop performance. Automated irrigation system uses vales to turn motor ON and OFF. Motors can be automated easily by using controllers and no need of labour to turn motor ON an OFF. It is precise method for irrigation and a valuable tool for accurate soil moisture control in highly specialized greenhouse vegetable production. It is time saving, the human error elimination in adjusting available soil moisture levels.



III. STEPS INVOLVEIN IOT ANALYSIS

IOT could be a combination of knowledge, web associated items, which is an integral component of the long run internet. IOT focuses on the automation of processes to cut back human intervention. IOT in agriculture focus is on automating the aspects of agricultural methods to form them more efficient and effective. Traditional approaches of farming don't include livestock management and have many inefficiencies like higher human interaction, labour cost, power consumption, water consumption, etc. The use of a wireless sensor network is finished during this project which collects the information from different sensors and sends it to the most server using wireless protocols. The info that's collected during the method provides the data about different environmental factors which is employed to watch the complete process. Monitoring environmental factors aren't the answer to boost yield, quality, and production of the crops. It's necessary to develop a combined and unique system that can make sure of all factors affecting productivity like cultivation, harvesting, and post-harvesting storage.

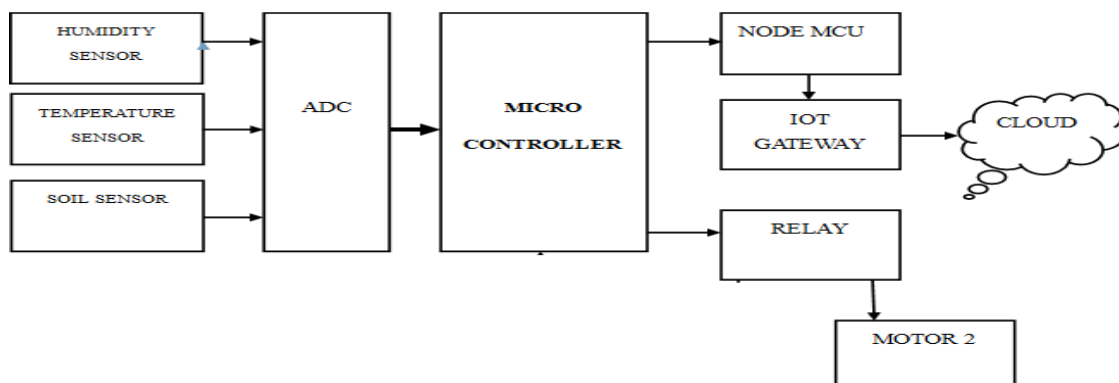
The word 'Agriculture' springs from the Latin word 'Ager' means Land or field and 'Culture' means cultivation. It means the science and Art of manufacturing crops and livestock for economic purpose. Agriculture is an art of raising vegetarian from the soil for the use of mankind. Agriculture is that the mile stone within the history of human civilization, thanks to agriculture man settled at particular place. Agriculture is one amongst the oldest and prime activities of the human being. It's remained a vital source of land. In spite of growing industrialization and urbanization within the world, nearly one-half working population still engaged in agriculture. In developing Countries agriculture sector has been a major source of employment and it's contributed to the economy.

The fundamental aim of agriculture is to lift stronger and more fruitful crops and plants and to help them for their growth by improving the soil and supplying the water. Agriculture is a backbone of Indian economy. In India about sixty four percent of the total population is dependent on agriculture for their live food. The agriculture activities in the world are closely controlled by Physical Factors. Indian agriculture is not an exception for this, today India is facing two main problems concerned with agriculture. The first is meeting the increasing demand of food and other is supplying Agro products for ever increasing population and the second is uneven development of agriculture and changing pattern of agriculture land use. India tried to be self-sufficient in agriculture through the five-year plans. After independence by taking systematic efforts due to the unique importance, agriculture gets more and more attention in every five-year plan and top priority is given for the development of agriculture in our Country. The study of land and agriculture from the geographical point of view gained more importance after 1950.

IV. PROPOSED SYSTEM

An automation of farm agriculture system using an Internet of Things (IOT) is proposed. The system provides a web interface to the user so that the user can control and monitor the system remotely. This project, gives over view about IOT technologies and applications related to agriculture with comparison of other survey papers and proposed a novel agriculture management system. Our main objective of this work is to for Farming where various new technologies to yield higher growth of the crops and their water supply. Automated control features with latest electronic technology using ATMEL microcontroller which turns the pumping motor ON and OFF on detecting the dampness content of the soil and updated in the cloud server simultaneously.

In this project, represents form house maintenance automaticallywith the help of microcontroller. The microcontroller





which helps to water irrigation for the plant as well as chemical motor (pesticide).

The following sensors are used:

- Temperature sensor
- Humidity sensor
- Soil moisture sensor.

The soil moisture sensor which helps to find out soil moisture content (i.e.) water content of the soil reduced and driven the water motor automatically. The temperature and humidity sensor detects temperature of form house and also drive the water motor automatically

The ac voltage, typically 220V rms, is connected to a transformer, which steps that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit removes the ripples and also remains the same dc value even if the input dc voltage varies, or the load connected to the output dc voltage changes. This voltage regulation is usually obtained using one of the popular voltage regulator IC units.

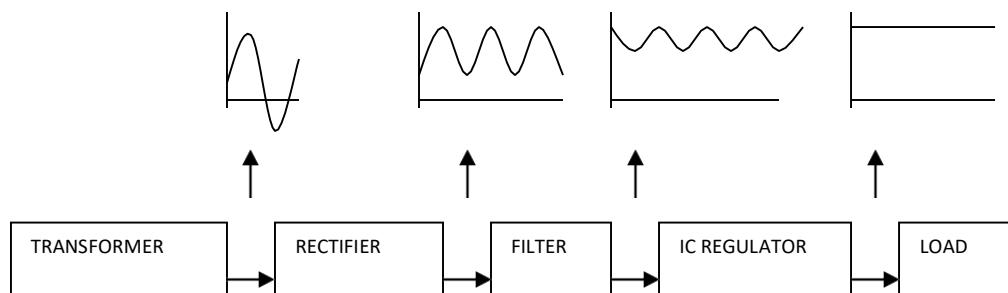


Figure -Flow Diagram

Thermometers

Thermometers are the most common temperature sensors encountered in simple, everyday measurements of temperature. Two examples of thermometers are the Filled System and Bimetal thermometers.

Filled System Thermometer

The familiar liquid thermometer consists of a liquid enclosed in a tube. The volume of the fluid changes as a function of temperature. Increased molecular movement with increasing temperature causes the fluid to expand and move along calibrated markings on the side of the tube. The fluid should have a relatively large thermal expansion coefficient so that small changes in temperature will result in detectable changes in volume. A common tube material is glass and a common fluid is alcohol. Mercury used to be a more common fluid until its toxicity was realized. Although the filled-system thermometer is the simplest and cheapest way to measure temperature, its accuracy is limited by the calibration marks along the tube length. Because filled system thermometers are read visually and don't produce electrical signals, it is difficult to implement them in process controls that rely heavily on electrical and computerized control.

Humidity Sensor

A humidity sensor senses, measures both moisture and air temperature. The sensor is composed of two metal plates and contains a non-conductive polymer film between them. This film collects moisture from the air, which causes the voltage between the two plates to change. These voltage changes are converted into digital readings showing the level of moisture in the air.

V. CONCLUSION

This paper describes automated irrigation system using IOT. Internet on things and cloud computing collectively makes a system that control agriculture sector effectively. This system will sense all the environmental parameters and



send the data to the user via cloud. User will take controlling action according to that this will be done by using actuator. This asset allows the farmer to improve the cultivation in a way the plant need. It leads to higher crop yield, prolonged production period, better quality and less use of protective chemicals

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