International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (IJAREEIE)

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

||Volume 9, Issue 5, May 2020||

Water To Water Communication Based Agricultural Field Monitoring

C. Shobana Nageswari[1], E.Pavithra[2], M.R.Nathisha[3], A.Nandhini[4]

Associate Professor, Dept. of ECE, R.M.D. Engineering College, Chennai, Tamil Nadu, India[1]

UG Student, Dept. of ECE, R.M.D. Engineering College, Chennai, Tamil Nadu, India[2]

UG Student, Dept. of ECE, R.M.D. Engineering College, Chennai, Tamil Nadu, India[3]

UG Student, Dept. of ECE, R.M.D. Engineering College, Chennai, Tamil Nadu, India[4]

ABSTRACT: The agricultural sector requires manual work due to various purposes. Nowadays farmers are facing many problems to grow various crops. It is very difficult to know the parameters of land such as pH, humidity, soil moisture without the physical presence of farmers at the agricultural farm. During the month of April, May; they find it very difficult to perform agricultural activities as the land dries within a certain period of time. The land is segregated into different sectors. In each sector, different crops are cultivated depending upon the coverage; sensors are placed to measure the various parameters. This proposed work focuses on measuring the various parameters of land and supplies adequate amount of water with the help of pump motor and the water supply is cut off only when it reaches the threshold level. This process is done through water to water communication technology using wireless sensor network. The proposed work implemented here gives the whole data of the farm & its various parameters. Farmers get much relief in farm cultivation with the help of this work and the growth of crops will be not affected by these conditions.

KEYWORDS: Wireless sensor network, pH sensor, Humidity sensor, IOT, Analysis**,** Research.

I.INTRODUCTION

Agriculture is one of the most important key need for our society. Agriculture is the way of cultivating plants and yielding food items. In ancient days agriculture is done manually by farmers. Technology plays a big role in developing agriculture to the next level. As the world is trending into new technologies and innovations it is necessary goal to trend up with agriculture also. We have proposed a new technology called water to water communication, where water plays a major role in communication between transmitter and receiver section**.** Water to water communication based agriculture field monitoring system is used to develop and deploy an automated agricultural monitoring system with the help of water. The monitoring system has a sensor network having pH, moisture, humidity and temperature and water level sensor placed in the root zone of the crops which can be measured and monitored. It is also used to supply adequate amount of water to agricultural field using wireless sensor network. IOT also plays a very important role in monitoring the field. IOT makes use of various nodes & sensors and sends the information through wireless protocol. This water to water communication based agriculture field monitoring system starts working and it checks the water level, humidity, pH and moisture level. It sends message alert to the phone about the various sensor levels. Sensor sense the level of water, if it goes down, it automatically starts the water pump.

II.LITERATURE SURVEY

SMART MONITORING AGRICULTURAL BASED INTERNET OF THINGS – The paper presents the agricultural monitoring in a tool based iot in a comprehensive manner using protype methods for agricultural process. Wifi a combination of hardware and software uses data communication to monitor visually and accurately making it easier for farmers and act rapidly when something goes wrong.

SECURE SMART AGRICULTURAL MONITORING TECHNIQUE USING ISOLATION– Agriculture has become data driven and data enabled because of the use of different technologies. It provides empirical measurement results from an iot platform based on remote telementry applications of agriculture. This paper aims on processing of big data and the concept of decentralized cloud operation it could answer the demands of iot in agriculture and how smart farming will help the farmers more effectively and in secured manner.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

||Volume 9, Issue 5, May 2020||

IOT BASED INTELLIGENT AGRICULTURAL FIELD MONITORING SYSTEM – The main purpose of this research is to propose a smart farming method to deal in adverse situations. The smart gaming method offers a high precision crop, control and collection of useful data by automated farming technique. The useful data are the soil moisture and temperature. These are measured using sensors and takes necessary actions without human intervention. The values are stored in cloud for future data analysis.

INTELLIGENT SYSTEM BASED ON LORA AND OT TECHNOLOGY – In order to solve the problem of low efficiency and high labour cost for the growth of traditional greenhouse crops, the project uses lora communication module as a communication core and use the STM32F103 development board for the control of sensors, the host computer program developed by QT receives the data , visually display them. The system uses timely monitoring and timely decision making on agriculture.

III.METHODOLOGY

The proposed work uses a microcontroller which will act as main memory of the project. To overcome the drawbacks of existing system like high cost, difficult in maintenance and wired connection, introduce a new system which will have wireless connection between server and nodes. A new design of embedded web server making use of internet of things is introduced. The automated irrigation system consists of distributed sensor network built using soil moisture sensor, temperature sensor, humidity sensor and water level sensor.

Water level sensor senses the excess water in the field and the motor automatically pumps the water to the outer area. Humidity and pH sensors are used here for sensing the presence of humidity and soil salinity. pH sensor strongly influences the availability of nutrients and presence of microorganisms in the soil. Humidity sensor determines the moisture content. Soil moisture is important in the activities in agriculture. These parameters will be sensed and transmitted by using water to water communication . Each of this status will be updated through IOT and is monitored by the user. Earlier, farmer faced the problem of sending SMS and making calls, overcoming which with a new system of desired application which does the work by button clicks.

A.USE OF WIRELESS SENSOR NETWORKS

Wireless sensor networks are networks of interconnected wireless devices that are embedded into the physical environment to provide measurement of various points over large spaces. These devices have radio frequency sensors that are linked into an interconnected network that routes the data they capture to a computer for analysis. In this project WSN system can collect and process large amount of data. It monitors and manages various sensors.

B.INTERNET OF THINGS

IOT is the network of everyday objects and activities - physical things embedded with electronics, software, sensors, and connectivity enabling data exchange. In this work IOT is used to transfer the recorded information about various sensors to the developed application so that farmer can view the changes happening in the field.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

||Volume 9, Issue 5, May 2020||

IV.BLOCK DIAGRAM

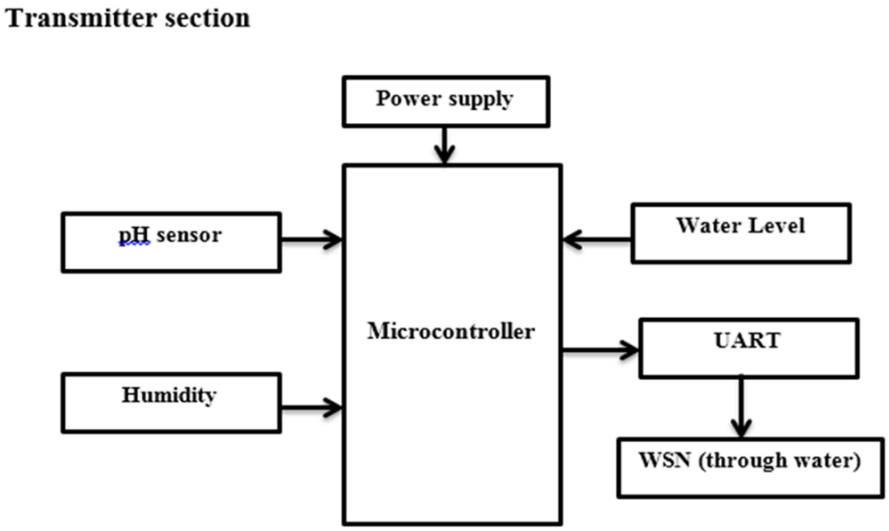

Fig 1.Block diagram of transmitter section

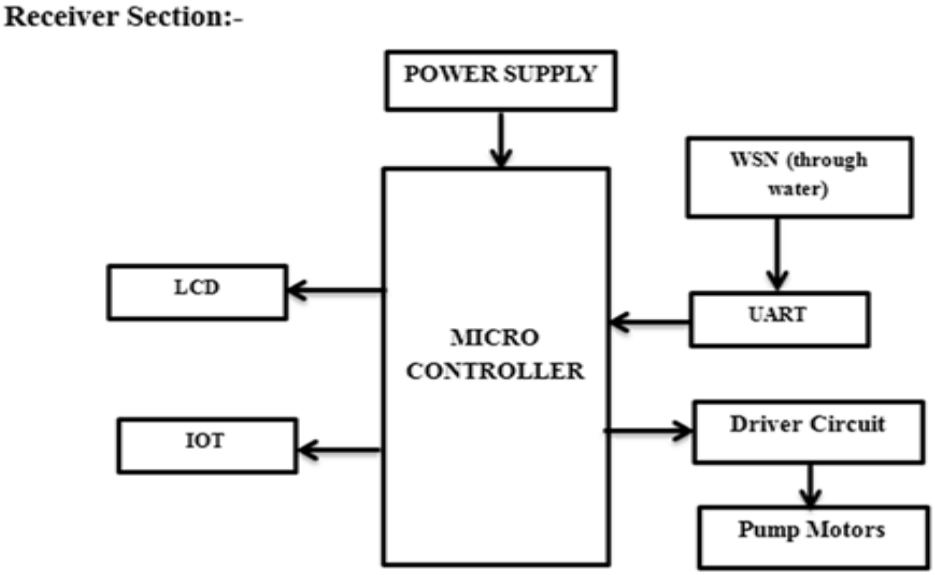

Fig 2. Block diagram of receiver section.

Fig 1 and 2 shows the block diagram of the system. The sensors coupled with the controller in the transmitter section senses the parameters like water level, humidity, pH, soil moisture and the measured data is transmitted to controller in the receiver section via WSN to take necessary actions.

V.EXPERIMENT AND RESULT

Water to water communication based agricultural field monitoring system is a real-time sensing system. The real time sensing is enhanced by various sensors for measuring water level, soil moisture and humidity. The sensors used are humidity sensor, pH sensor, water level sensor. Humidity sensor and pH sensor are used for sensing the presence of humidity and soil salinity.

Water level sensor detects the level of water in the land and when it reaches the threshold the water supply to the field is cut off. All these parameters will be sensed and transmitted through water to water communication. All these status

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

||Volume 9, Issue 5, May 2020||

will be updated through IOT and LCD is connected to the microcontroller to display the data. Farmers also understand how sensor work so they can read data sent to smartphones and server computers. By using this technique, various works involved in agriculture can be done easily.

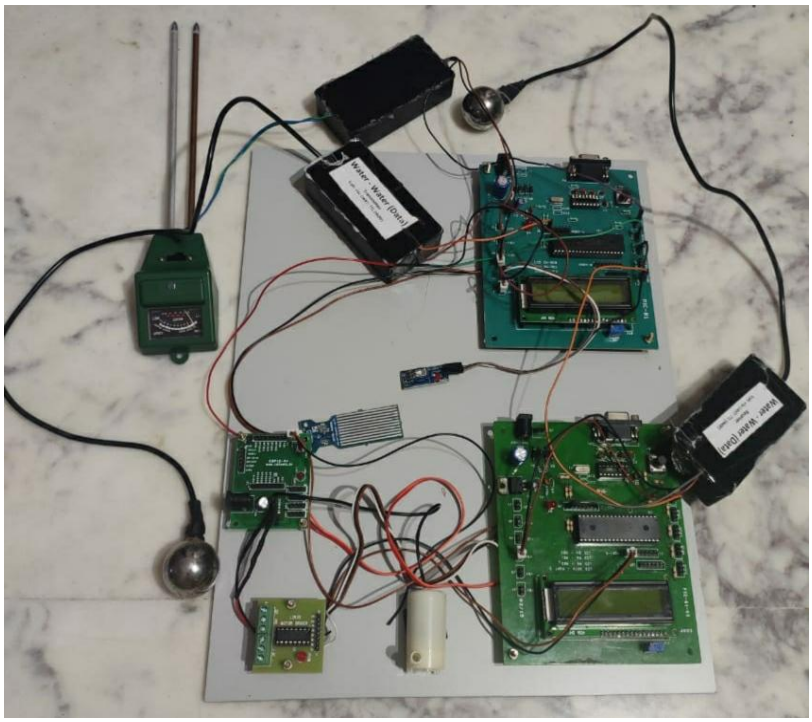

Fig 3. Hardware of the water to water communication based field monitoring system.

The above mentioned parameters have been controlled and measured using wireless sensor network with water as communicating medium. Water to water communication technology has overcome the existing field monitoring without the physical presence of farmers. The performance measures obtained can be maintained in database which will be useful for comparing different yields at different climatic conditions. Using these system variations in the field environment can be monitored easily and necessary actions can be taken at the right time. The system can be further enhanced by using various different techniques.

VI.CONCLUSION

Agriculture today is much easier than in the previous years by using this technique. Thus monitoring process in agricultural fields will be an effective method that will be useful in situations where usage of water resources is limited. By implementing this work, there will be an effective and efficient usage of water resources. It will be an indirect mean for the proper development of agricultural yield. Water level, pH and humidity have been examined using respective sensors and are stored in the application.

REFERENCES

[1] M. Singh, M. A. Rajan, V. L. Shivraj and P. Balamuralidhar, "Secure MQTT for Internet of Things (IoT)," 2015 Fifth International Conference on Communication Systems and Network Technologies, Gwalior, 2015.

[2] M. B. Yassein, M. Q. Shatnawi, S. Aljwarneh and R. Al-Hatmi, "Internet of Things: Survey and open issues of MQTT protocol," 2017 International Conference on Engineering & MIS (ICEMIS), Monastir, 2017.

[3] R. K. Kodali, "An implementation of MQTT using CC3200," 2016 International Conference on Control, Instrumentation, Communication and Computational Technologies (ICCICCT), Kumaracoil, 2016.

[4] K. Grgić, I. Špeh and I. Heđi, "A web-based IoT solution for monitoring data using MQTT protocol," 2016 International Conference on Smart Systems and Technologies (SST), Osijek, 2016.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

||Volume 9, Issue 5, May 2020||

[5] "Wireless connectivity for the Internet of Things: One does not fit all" by Nick Lethaby, IoT Ecosystem Manager, Texas Instruments.
[6] D. Palle, A. Kommu and R. R. Kanchi, "Design and development of CC3200-based CloudIoT for measuring humidity and temperature," 2016 International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT), Chennai, 2016.
[7] A.A.Gitelson, "Wide dynamic range vegetation index for remote quantification of biophysical characteristics of vegetation," J. PlantPhysiol., vol. 161, no. 2, pp. 165–173, 2004.
[8] O. Elijah, T. A. Rahman, I. Orikumhi , C. Y. Leow, and M. N. Hindia, "An overview of internet of things (iot) and data analytics in agriculture: Benefits and challenges," IEEE Internet of Things Journal, 2018.
[9] K. Taylor, C. Griffith, L. Lefort, R. Gaire, M. Compton, T. Wark, D. Lamb, G. Falzon, and M. Trotter, "Farming the web of things," IEEE Intelligent Systems, vol. 28, no. 6, pp. 12–19, 2013
[10] L. Zhou, N. Chen, Z. Chen, and C. Xing, "Roscc: An efficient remote sensing observation-sharing method based on cloud computing for soil moisture mapping in precision agriculture," IEEE Journal of selected topics in applied earth observations and remote sensing, vol. 9, no. 12,pp. 5588–5598, 2016.
[11] D.Shadrin, A.Chashchin, G. Ovchinnikov, and A. Somov, "System identication: Soilless growth of tomatoes," in 2019 IEEE International Instrumentation and Measurement Technology Conference (I2MTC). IEEE, 2019, pp. 602–607
[13] G. R. Mendez, M. A. M. Yunus, and S. C. Mukhopadhyay, "A wifi based smart wireless sensor network for monitoring an agricultural environment," in 2012 IEEE International Instrumentation and Measurement Technology Conference Proceedings. IEEE, 2012, pp. 2640–2645.
[14] J. Gutierrez, J. F. Villa-Medina, A. Nieto-Garibay, and M. A. Porta Gandara, "Automated irrigation system using a wireless sensor network and gprs module," IEEE transactions on instrumentation and measurement, vol. 63, no. 1, pp. 166–176, 2014.
[15] S. Cui, G. Schwarz, and M. Datcu, "Remote sensing image classification: No features, no clustering," IEEE J. Sel. Topics Appl. Earth Observ.Remote Sens., vol. 8, no. 11, pp. 5158–5170, Nov. 2015.