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Internet Of Agriculture: A Wireless Sensor Based Agricultural Monitoring System

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Abstract: **: *Rapid population growth of world forcing us to invent new technologies and more efficient system to produce adequate amount of food to feed the planet. We need to adopt more effective agriculture methods to increase yield that are more predictable, more controllable and at the same time become less polluting, and less demanding on water uses and other nutrients. Therefore alteration of the Agriculture through modern technology is quite important to fulfil today's Agriculture needs. Hence we did a descriptive research by existing document survey and literature reviews to know that what technology can be adopted to improvise agricultural production. In our study we find that wireless sensor networks (WSN) technology can be used as efficient tool in the field of agriculture to increase the quality and quantity of agricultural products. Wireless Sensor Network enables a capacity in our farmers to rely on satellite farming which is very efficient and less expensive than traditional agriculture practices. Satellite farming or Precision agriculture is also called Internet of Things (IoT) based Agriculture or Internet of Agriculture. In which several sensor nodes are deployed and scattered over farming land. These sensors sense the physical parameters, they digitize it, process it and then transmit it with a transmitter. In this research we investigate the use of Wireless Sensor Networks (WSN) for Agriculture applications in India. We proposed an innovative system named Wireless Sensor Agri Monitoring System (WSAMS) to monitor crop health through the use of wireless sensors fixed in agriculture land. WSAMS enables farmer to remotely manage different variables of soil. In future we can improvise this system by adopting more secure energy efficient algorithm for wireless sensor network.*

Keywords- **:** Wireless Sensor Network, Satellite farming, WSAMS, IoT.

I. INTRODUCTION

As we know that India is having second largest population in the world after China. With this continuous growth in population, it is assumption that till 2025 Indian population will reach approx. 1.50 billion. To provide food security to one six of humanity who is living in India is quite challenging task for government and policy makers. Researchers across the globe are trying to find out a robust technology based solution for this critical problem. They are agreed on adaptation of Wireless Sensor Technology in field of agriculture to improve food productivity. Wireless sensor network consist of self-organizing, low – power, concurrent processing, low cost, tiny sensors having ability of sensing storing and communicating wirelessly. Wireless sensor networks are used for diverse applications like machine health monitoring, health care application, home automation, traffic monitoring and control system, Agricultural applications etc. In our study we try to build a smart agriculture system with Wireless enabled technology. Wireless sensor network for agriculture consist of several sensor nodes which are scattered in farming land as shown in (figure 1.1). These sensors sense the physical parameter, they digitize it, process it and then since a transmitter is also fixed with them so they will transmit it. Data sense by one sensor node is passed on to next one and so on ultimately it is send to one end system which is known as gateway of this network. The physical variable of farming fields is uploaded on cloud provider over internet and farmer can access or alter this physical parameter of field through internet via a smart phone or a laptop with internet connectivity.

Fig 1.1 Wireless Sensor Agriculture

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Internet of Things (IoT)

The Internet of Things is a massive global network that allows each sensor enabled device or object to communicate with each other. IoT is a technology enables capability in each device to think intelligently and act smartly that can interact with environment and interact with people. Internet of things consists of any object that has sensor attached to it and that can transmit data from that sensor into cloud on internet, where it can be analysed and used to make decisions. Every device as shown in (figure 1.2) has unique id which makes the communication possible among them.

Fig 1.2 Laptop and Device Connected with Internet

IoT in agriculture as shown in (figure 1.3) consist sensors fitted everywhere in the farming land, collecting real time environmental variables like temperature, dryness of soil, amount of pesticide, pH value etc. consistently and uploading these data over internet for analysis to make system more efficient and smarter in which intelligent decision are taken by machine without human intervention. An IOT application in agriculture includes remote smart irrigation using wireless sensor network, soil quality monitoring, plant growth monitoring, satellite agriculture, remote monitoring of sensor enabled animals, health monitoring of cow etc.

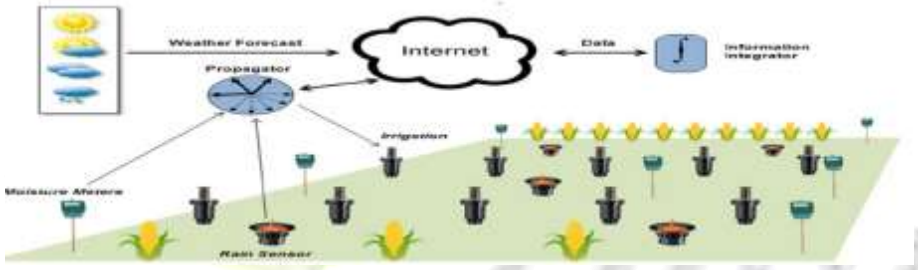

Fig: 1.3 Agri IoT

II. Literature Review

Suba G & Jagadeesh Y (2015) in their research explored the idea of Smart irrigation system through Wireless Sensor Network Technology. They built an experimental setup where sensor is used to detect the moisture content of soil. The Output of the sensor may be either 0 or 5v. Microcontroller processes these values, If the sensor gives the high output the the corresponding motor is turned on and water starts flowing to the agriculture field. Atmega128 Microcontroller is programmed for analyse of sensed data and it sends the value to the Base station through Xbee Radio Modules integrated in the nodes.

S. Roham & Pawar G(2015) built a conceptual framework of smart agriculture through wireless sensor network. They proposed a system that allows the farmer to visualize the graphical representation of environmental variables of the green house and to operate on these variables using an internet enabled smart phone.

Israni S & Meharkure H (2015) built a model of smart agriculture based on cloud computing and IoT, where agriculture data is stored at central data warehouse through wireless sensors and authentic cloud user can access this data for analysis purpose.

Patil V & Al-Gaadi K (2012) in their study explained the importance of Internet of things and cloud computing in the field of agriculture. According to them Wireless Sensor Networks (WSN) helps farmer to visualize field level food production from anywhere anytime with the help of an internet enabled smart phone.

Proposed System - Wireless Sensor Agri Monitoring System (WSAMS): In our study we proposed Wireless Sensor Agri Monitoring System (WSAMS) model for smart agriculture (figure 3.1). The WSAMS system is completely automated wireless system in which plants are attached with sensors that continuously sense the environmental variables like Dryness of soil, Temperature, Pressure, Soil fertility, pH Concentration of soil etc. and upload these data to respective IoT cloud Provider. The Major benefit of our IoT agri system is that farmer can remotely monitor these environmental variables with

the user interface provided by cloud provider. He can on/off water tap if soil is too dry and if the variable value reached to a certain threshold. Farmer can increase or decrease Temperature, pH, Pressure etc. Values depending on the soil need and environmental conditions. Wireless sensor uses algorithm to calculate amount of water or fertilizer to release which is captured and twisted to the farmer.

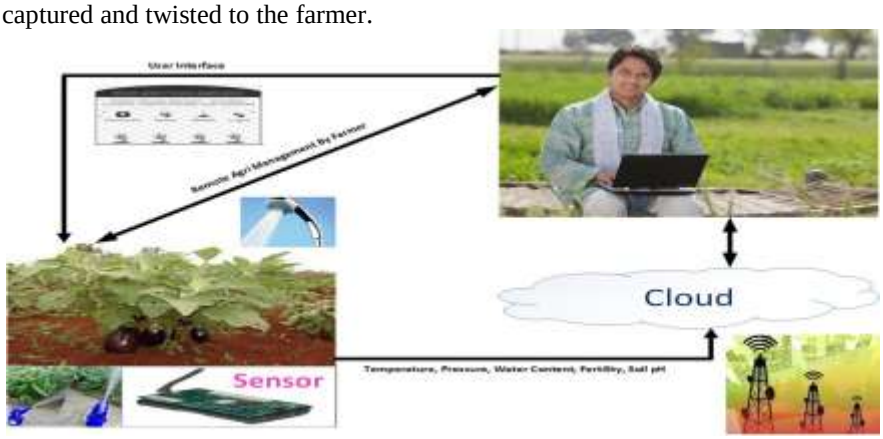

Figure: 3.1 WSAMS SYSTEM

III. Conclusion

In farming environmental variables like Water level, fertilizers, Temperature, Humidity and CO2 are the most important parameters of crop health. The growth of crops is mainly depending on these parameters. It is very difficult for farmer to monitor these variables continuously physically at fields. Our proposed system enables the farmer to continuously monitor these changes periodically and allow him to take an action automatically or pretend the required action to the farmer. Our System provides a graphical user interface and very interactive environment so that famer can operate it easily without sound technical knowledge to monitor his fields from remote location with a smart phone.

IV. References

1. Suba G, Jagadeesh Y, S Karthik, E Raj Sampath. Smart Irrigation System through Wireless Sensor Networks. *Journal of Engineering and Applied Sciences.* 2015; VOL. 10, NO. 17.
2. S. Roham, Pawar G, Abhijeet S, R Prasad. Smart Farm using Wireless Sensor Network. *International Journal of Computer Application.*2015; (0975 – 8887).
3. RV Chandrashekar. Development or end of Agriculture? Implications on Agriculture. *Indian Journal of Innovations & Development*.2012; Vol. 1, No. 8.
4. Israni S, Meharkure H, Yelore Parag. Application of IOT Based System for Advance Agriculture in India. *International Journal of Innovative Research in Computer and Communication Engineering, 2015;* Vol. 3, Issue 11.
5. V.C.Patil, K.A.Al-Gaadi, D.P.Biradar, M.Rangaswamy, "Internet of Things (IoT) And Cloud Computing For Agriculture: An Overview", *Proceedings of AIPA 2012*, INDIA.
6. A.Divia Lakshmi, N.Sudha. An efficient Qos-Balanced routing protocol in wireless sensor networks. *Indian Journal of Innovations & Development*. 2015; Vol 4 (5).
7. Dacosta Francis (2013), "Rethink the Internet of thinks", Apress,Santa Clara, California, 2013.