

# Implementation of Soil Energy Harvesting System for Agriculture Parameters Monitoring and Controlling Using IOT: A Review

**Dhanshree S. Kale<sup>1</sup>, Dinkar L. Bhombe<sup>2</sup>, Dhiraj P. Tulaskar<sup>3</sup>**

<sup>1</sup>P.G. Scholar, Dept. of E and TC, SSGMCE, Shegaon, Maharashtra, India,

<sup>2</sup> Asso. Professor, Dept. of E and TC, SSGMCE, Shegaon, Maharashtra, India,

<sup>3</sup> Asso. Professor, Dept. of E and TC, SSGMCE, Shegaon, Maharashtra, India.

**Abstract** - Rarely do we consider soil a battery or a wellspring of power. However, Energy is effectively harvesting energy from soil, residue and waste water and, with the utilization of imaginative power management hardware, is changing over earth into a valuable wellspring of clean dependable power. Harvesting energy in an open, uncontrolled environment postures challenges. This project utilizes the common metabolic pathways of microbes discovered pervasively in soil, residue, and wastewater. In these environments, microbes act as natural catalysts to exchange electrons outside their cell walls, in this manner creating a little electrical charge in the surrounding substrate. This charge, measured as a Reduction-Oxidation (RedOx) potential, is specifically gathered by the BES electrodes, creating electrical current. With present and potential, you have power. In an open framework, new nourishment items and natural waste items guarantee an unending supply of fuel for the BES, empowering industrious power era. The area of the BES electrodes in the dirt guarantees that the power framework is discrete and covered. This energy is created by soil is utilized as a part of field of ongoing checking of moisture of soil giving alarming system that is cautioning alert to farmer's telephone when certain condition happens in light of Wireless Farming System can effectively manage agricultural generation and enhance crop yield. The utilization remote sensor organize empowers sensation of parameter by utilizing microcontroller which acknowledges information from sensor and transmitted to the farmer through the IOT which give direct access to the web and get the data from the Agricultural area to the customer PC.

**Key Words:** Soil moisture sensor, temperature sensor, Wireless sensor network, Microcontroller, IOT.

## 1. INTRODUCTION

Energy plays a vital part in our life. Fossil fuels are depleted and the demand for option energy production has an expanding pattern. Renewable energy might be a reasonable option for existing energy sources. Power generated from soil is considered as renewable energy. Soil give new chances to creation of bio-energy from organic and inorganic sources. The organic matters are changed over to hydrogen within the sight of dynamic biocatalysts in anode chamber under anaerobic condition. Microorganisms are utilized as a

part of soil is to change over natural and inorganic compounds into bioelectricity. The idea of bioelectricity production was presented in recent decades.

The Paper comprises of wireless sensor networks nodes and system administration stage. The automatic networking acknowledges through the many jump routing utilization, adaptable programmed networking temperature humidity monitoring arrangement of soil. The framework is a total arrangement of wireless sensor network acceptance, storage capacity, application, revealing, arrangement, has a decent man PC trade interface. Users require not go into farmland, in a corner anywhere in the world, could prompt understand the changing state of farmland soil temperature and moisture and different elements, and logically manage agricultural generation. In this paper proposes to design, create and execute a wireless sensor network connected with a central node utilizing WIFI, which thusly was associated with a Central Monitoring Station (CMS) through General Packet Radio Service (GPRS) or Global System for Mobile (GSM) advancements. The framework likewise gets Global Positioning System (GPS) parameters identified with the field and sends them to a central monitoring station. This framework was relied upon to help famers in assessing soil conditions and act in like manner. To screen innovative poly house remote sensor created with microcontroller and WIFI for secure information transmission. Utilization of smart sensor module causes to improve the precision and reliability. This was survey distinctive monitoring frameworks and proposed a programmed checking framework display utilizing Wireless Sensor Network (WSN) which helps the Farmer to enhance the yield. This review plans to give observing of environment and give favorable advantage of simple arrangement, in real time monitoring. [1]

To expand the efficiency of the farms one needs to utilize ideal water for this water system framework is use to enhance water administration and for the controlling their parameter of farm remote sensor system is depicted which store and used rain water to build their crop productivity, to reduce the cost for development and make utilization of real time values. In this paper different farming parameters are monitor and control by utilizing peripheral gadgets like valve, watering pump and so forth and screen consequently utilizing microcontroller to enhance the farmer yield. This

framework is utilized for enhancing water assets for farming creation, the places with water shortage.

## 2. LITERATURE REVIEW

The design, the execution and the approval of a minimal effort remote observing system for agricultural biological communities. The model observing framework comprises of various smart remote sensor hubs, which are associated with an Internet-empowered PC framework introduced nearby to store and deliver significant soil data and to give remote access to the checking framework. In particular, smart programming programs have been implanted into the remote sensor hubs empowering (i) self-governing interchanges among the sensor hubs, (ii) Cooperative basic leadership for planning water system occasions continuously, (iii) Dynamic adjustments to changing natural conditions, and (iv) Remote access to important soil data .[2] A computerized irrigation system framework was created to improve water use for agricultural harvests. The framework has a conveyed remote system of soil-moisture and temperature sensors set in the root zone of the plants. Also, a door unit handles sensor data, triggers actuators, and transmits information to a web application. An algorithm was created with edge estimations of temperature and soil moisture that was modified into a microcontroller-based portal to control water amount. The framework was controlled by photovoltaic boards and had a duplex correspondence connect in view of a cell Internet interface that took into consideration information assessment and water system planning to be customized through a website page. In light of its energy self-rule and low cost, the framework can possibly be helpful in water restricted topographically isolated areas .[3] Rising innovations have made low-power and minimal effort remote sensor systems possible. This paper exhibits a progressive remote sensor organize for measuring soil parameters, for example, temperature and moistness. In particular, we planned sensor hubs that are put totally underground and are utilized to gather soil estimations. These hubs utilize their radios to convey the gathered estimations to one of numerous transfer hubs situated over the ground. Thusly, relay hubs that are able to do long-go correspondences forward the information gathered from the system's sensor hubs to a base hub, which is associated with a workstation. The proposed various hierarchical remote sensors organize utilizes a probabilistic correspondence convention to accomplish a low duty cycle and subsequently a long lifetime for soil checking applications.[4]

An automatic irrigation system framework was created to enhance water use for agricultural yields. The framework has a disseminated remote system incorporates an arrangement of sensor hubs, a base station, and a web server farm. With an ATmegh32 microchip and inserted working framework, screen show, framework setup and GPRS based remote information sending. Through a Client/Server mode the administration programming for

remote server farm accomplishes real time information distribution and time-arrangement analysis . In this paper, with the advancement of sensor gadgets combined with remote innovations, it is conceivable remotely screen parameters, for example, moisture, temperature and humidity. Implementation of Wireless Sensor Network for Automatic water system by utilizing GPRS used to expand the yield of plants by observing and controlling ecological conditions (parameter) and along these lines giving vital information .[5]

The Paper goes for making agribusiness brilliant utilizing mechanization and IOT innovations. The highlighting components of this project incorporates smart GPS based remote controlled robot to perform undertakings like weeding, showering, moisture detecting, bird and animal scaring, keeping carefulness, and so forth. Furthermore it incorporates brilliant water system with keen control and smart decision making of exact continuous field information. Thirdly, brilliant distribution center administration which incorporates temperature maintenance, humidity maintenance and theft identification in the stockroom. Controlling of every one of these operations will be through any remote smart gadget or PC associated with Internet and the operations will be performed by interfacing sensors, Wi-Fi or ZigBee modules, camera and actuators with small scale controller and raspberry PI .[6] The recently created paper controls water supply naturally in water emergency regions through moisture sensor. This paper covers the use of Sensor based Irrigation framework through remote sensor systems, which utilizes a renewable energy as a source. Wireless Sensor Network comprises of moisture sensors, Energy harvesting frameworks, embedded controllers and uses Super capacitors as capacity device. The result incorporates the fruitful operation of Smart Irrigation System (Unmanned Irrigation). This framework can monitor the water assets and controls the general operation of water system. This framework is additionally called as a Dynamic Irrigation framework .[7] Exactness agriculture is the art and science of utilizing advanced innovation to improve crop generation. Remote sensor system can drive the advancement of exactness agriculture. This paper attempts to determine usefulness of WSN in the exactness agribusiness and seek solution for the ordinarily emerging inquiries amid the implementation. In Present Precision Agriculture more number of the parameters is required to be observed and controlled in view of the large varieties of the harvest in the meantime. Utilization of WSN will expand step by step due to the improvement in WSN innovation and its adaption by agriculture innovation. In this circumstance, the remote sensor coordinate with extra equipment and programming is an efficient answer for Precision Agriculture.[8]

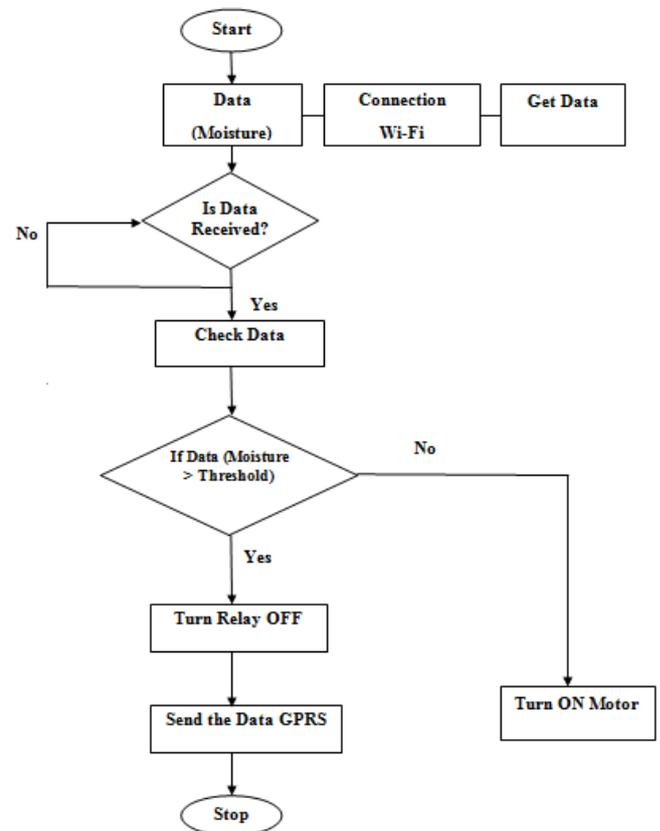
Remote control and observing framework for mining equipment is acknowledged utilizing the Zigbee correspondence convention for protected and economic data information correspondence in mining where the wired correspondence is either more costly or impossible

because of physical conditions. The engine will be Start/stop, speed high/low, clock / anticlockwise through Wireless because of the PC interface created with Zigbee likewise conceivable to screen operation .Moreover, a database is worked to execute online estimations and to spare the engine parameters got by information securing system. Therefore, control observing, and protection of system are acknowledged in genuine time. Controlling capacities of the system are expanded and also hardware and the necessities of other comparable hardware for information correspondence are limited. The system is completely controlled by the Personal Computer. All the processor and controllers are interconnected to PC through Zigbee. The Personal Computer will continuously screen every one of the Data from remote handling unit. If any error is found in a framework the PC makes essential move .[9]

### 3. PROPOSED WORK

The System reveals, comprised of two segments, remote sensor units (WSUs) and a remote data unit (WIU), connected by Radio transceiver that permitted the exchange of soil moisture implementing a WSN that utilizations WIFI innovation. The Remote data unit has additionally a GPRS module to transmit the information to a web server by means of the general population portable system. The data can be remotely checked online through a graphical application through Internet get to gadgets. Implementation of Soil Energy Harvesting System for Agriculture Parameters Monitoring and Controlling Using IOT aims at establishing the most suitable combination of energy source / power supply arrangement, in consideration of the application and power demand levels. This system is a compact wireless system enabling user to monitor and continuously keep checking on agricultural field . Internet of thing (IOT) is used to provide direct access to field information via internet .

### FLOWCHART



### 4. CONCLUSIONS

Implementation of Soil Energy Harvesting System For Real Time Monitoring Of Agriculture used to build the yield of plants by observing and controlling ecological conditions (parameter) and along these lines giving important data to the farmers. The utilization remote sensor organize empowers sensation of parameter by utilizing microcontroller which acknowledges information from sensor and transmitted to the farmer through the IOT which give direct access to the web and get the data from the Agricultural area to the customer PC . It likewise can give scientific basis to high-precision observing and computing for farmland drought and flood zone. Against the foundation of worldwide data and digitization, customary agriculture is progressively transforming into computerized farming.

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