

# WSN BASED AUTOMATED IRRIGATION SYSTEM DRIVEN BY SOIL MOISTURE

Vanumu Sirisha

Maharaj Vijayaram Gajapathiraj College of Engineering  
Chintalavalasa, Vizianagaram District, A.P  
e-mail: [sirivanumu@gmail.com](mailto:sirivanumu@gmail.com)

S.Vidya Sagar Appaji

Maharaj Vijayaram Gajapathiraj College of Engineering  
Chintalavalasa, Vizianagaram District, A.P  
e-mail: [sagarsetti4u@gmail.com](mailto:sagarsetti4u@gmail.com)

Eswara Rao Pandiripalli

Maharaj Vijayaram Gajapathiraj College of Engineering  
Chintalavalasa, Vizianagaram District, A.P  
e-mail: [eswar.yuvar@gmail.com](mailto:eswar.yuvar@gmail.com)

**Abstract**—N In recent year's automation is enjoying a significant role in each field like agriculture, military, business so on. Since an individual cannot exist in things once necessary automation would be generated to form things easier. During this we have a tendency to develop an automatic irrigation theme that is developed to revamp the water usage for agricultural crops. This technology trend has continuing to the purpose wherever we have a tendency to currently have several sensible controllers that permit the size of treatment to be reduced any, all the way down to the plant and even leaf scale. In doing so, these new methods of introducing smart controllers and automation have enabled the development of new concepts of practical crop management that were not feasible before. we have a tendency to currently have levels of automation wherever we will contemplate the ways individuals used before large-scale machinery was introduced and see if these same ways will be utilized these days victimization little sensible machines. This theme includes a distributed wireless network of soil-moisture and temperature sensors placed within the root-zone of the plants to ascertain the need of and supply installation victimization controller unit once needed supported the need and would stop once there's exuberance. The facility management system of this automation is completed victimization star panels.

**Key Words**— *WirelessSensorNetwork (WSN), Soil Sensor, Temperature sensor, Agriculture Automation.*

## I. INTRODUCTION

Agriculture is humankind's oldest and still its most significant economic activity, providing the food, feed, fiber, and fuel necessary for our survival. With the world population expected to succeed in nine billion by 2050, agricultural production should double if it's to fulfill the increasing demands for food and bioenergy. Given restricted land, water and resource, it's calculable that the potency of agricultural productivity should increase by

twenty fifth to fulfill that goal, whereas limiting the growing pressure that agriculture puts on the surroundings [3]. Agriculture uses eighty fifth of obtainable fresh resources worldwide, and this proportion can still be dominant in water consumption attributable to increase and enhanced food demand. there's Associate in Nursing imperative ought to produce ways supported science and technology for property use of water, as well as technical, agronomic, managerial, and institutional enhancements [4].

India being associated in nursing agricultural country wants some innovation within the field of agriculture. This could be achieved through fashionable technologies that assist computing, communication and management among devices. Automation is a backbone for this purpose. Property agriculture aims at the assembly of top quality food and raw materials in spare amount for a wide-range of shoppers. Any objectives square measure the rational use of natural resources and preservation of the surroundings [6]. Moreover, agricultural production takes place in Associate in Nursing open system that has varied relations to its surroundings.

Farmers face several issues in providing spare water to the fields that is ensuing a good loss to economy. Several systems square measure generated supported GSM and GPRS that square measure of no use if there's no network and therefore the batteries can't be charged continuously. To eradicate such issues automatic irrigation comes into existence.

Agricultural automation is to manage the farm on a site-by-site basis. Ancient soil and plant, sampling and analysis ways are terribly high-ticket, tedious, and time overwhelming for getting soil and crop parameters on a fine grid and at a brief continuance [6][8]. Thus my aim is to form an automatic agriculture method that consists of sensors that square measure capable of gathering data

from time to time. They will be significantly helpful to live parameters that change quicker in time. Mistreatment these values water would be equipped to the sphere once necessary and stop the provision once its excess supported soil wet and temperature that sensors square measure already placed. Primarily power offer to those systems would be done through batteries that don't seem to be economical, thus we have a tendency to create the advantage of natural resources and use star panels.

## II. REALTED WORK

Irrigation is one among the basic issues of agriculture in developing countries. In a country like India, wherever the economy is principally supported agriculture and therefore the weather conditions area unit isotropic, still we tend to aren't ready to alter use of agricultural resources. The most reason is that the lack of rains and level because of that heap of land is coming back slowly within the zones of un-irrigated land. Another important reason of this can be because of unplanned use of water because of that a major quantity of water goes waste. Within the fashionable irrigation systems, the foremost important advantage is that water is provided close to the basis zone of the plants because of that an oversized amount of water is saved [8].

At the current era, the farmers are victimization irrigation technique in Asian country through the manual management during which the farmers irrigate the land at the regular intervals. This method typically consumes additional water or typically the water reaches late because of that the crops get dried. Water deficiency may be prejudicial to plants before visible weakening happens. Slowed rate of growth, lighter weight fruit follows slight water deficiency [7]. This downside may be utterly corrected if we tend to use automatic irrigation system during which the irrigation can occur only if there'll be intense demand of water. Automating irrigation permits farmers to use the correct quantity of water at the correct time, in spite of the provision of labor to show valves ON and OFF. Additionally, farmer's victimization automation instrumentality area unit ready to scale back flee from over watering saturated soils, avoid irrigating at the incorrect time of day, which can improve crop performance by guaranteeing adequate water and nutrients once required. Automatic Irrigation could be a valuable tool for correct soil wetness management in extremely specialized production and it's a straightforward, precise technique for irrigation. It conjointly helps in time saving, removal of human error in adjusting out there soil wetness levels and to maximize their internet profits.

this work aims to develop a Wireless device Network primarily based low value soil temperature and wetness observation system which will track the soil temperature and wetness of the sector in real time and thereby permit water to be Dripped on to the sector if the soil temperature goes on top of and/or the soil wetness falls below a prescribed limit relying within the nature of crop mature within the soil. The sensors take the inputs like wetness, temperature and supply these inputs to the microcontroller. The microcontroller converts these inputs into its desired type with the program that's running on that and provides outputs within the mode of regulation of water flow

consistent with the current input conditions.

## III. PROPOSED SYSTEM

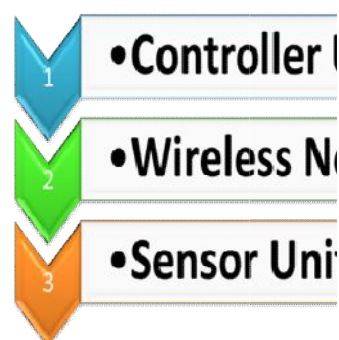


Fig1: System Overview

To develop a Wireless Sensor Network based low cost soil temperature and moisture monitoring system that can track the soil temperature and moisture of the field in real time and allow water to be dripped on to the field if the soil temperature goes above and/or the soil moisture falls below a prescribed limit depending in the nature of crop grown in the soil [1] [2]. The sensors take the inputs like moisture, temperature and provide these inputs to the microcontroller. The microcontroller converts these inputs into its desired form with the program that is running on it and gives outputs in the mode of regulation of water flow according to the present input conditions.

## IV. IMPLEMENTATION

In the past few years many automated systems came into existence to help farmers facing their problems regarding their irrigation. They include GSM based mobile networks which fail if there is no network in that area and the other is Internet using GPRS which would eventually fail if there is no network in that particular area. And they have used batteries to charge them which would again increase the complexity [2] [10]. Farmers are not that literate to use these technologies which would in return cause them many problems in maintaining them. Automated indicates to make things without any human support which we have done to eradicate all these issues.

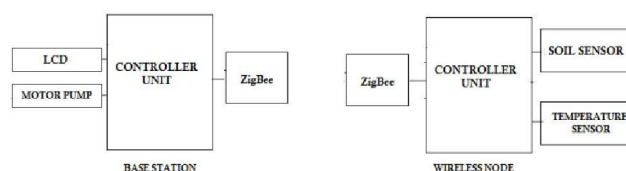


Fig1: System Architecture

### A. Controller Unit/Base station

It is the Heart of the system and controls all the system. It checks when the irrigation has to be done. Data is read by the sensors from time to time. Optimal values are collected and if the limitations are crossed water supply are done.

### B. Wireless Nodes

A sensor node in a wireless sensor network that is

capable of performing some processing, gathering sensory information and communicating with other connected nodes in the network.

### C. Sensor Unit

#### 1) Soil moisture sensor

The soil wet sensing elements are developed exploitation the essential property that the resistance of the soil between 2 points decreases with the rise of water content in it. We all know that water may be a sensible conductor of electricity within the presence of ions. So, larger the numbers of electrolytes within the soil, larger are the physical phenomenon of the soil. This suggests that the resistance of the soil decreases. The essential objective of irrigation planning is to reduce water stress of the plant, that of over irrigation and beneath irrigation. Sensible irrigation water management can increase yields, improve crop quality, conserve water, save energy and reduce plant food necessities.

#### 2) Temperature sensor

The current work uses temperature sensors for monitoring the soil temperature. For temperature measurement, sensors have been used. The soil temperature is one of the important environmental factor with a change of climate, topography, vegetation, soil type, planting form and other factors. The soil temperature is closely related with some processes, such as crop planting time, littering Growth and wintering safety etc. The change of soil temperature directly impact on soil nutrient absorption and soil moisture keep and sport. The soil temperature plays a certain role on many of the physical processes of soil. The soil water and heat migration is an important research problem. Therefore, the observation of soil temperature real time and Understanding of variation of soil temperature has vital significance to agricultural production and scientific research. The temperature sensor has an output voltage that is proportional to the temperature being measured.

### D. Power Management

Each and every node needs battery backup and continuous power which is not possible. So to avoid such problems we replace batteries with solar panels which would be reliable and cost effective. Using solar panels they would charge them-selves and utilize power when necessary. So that water would be pumped when needed and would stop when it is not needed.

## V. CONCLUSION

O The machine-controlled irrigation system enforced was found to be possible and price effective for optimizing water resources for agricultural production. This irrigation system permits cultivation in places with water insufficiency thereby up property. The machine-controlled irrigation system developed proves that the employment of water is diminished for a given quantity of contemporary biomass production. The employment of solar energy during this irrigation system is pertinent and significantly necessary for organic crops and alternative agricultural

merchandise that are geographically isolated, wherever the investment in power provides would be in hike.

## VI. RESULTS



Fig3: system in real time

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**Author A. Vanumu Sirisha**



Place: Visakhapatnam  
Date of birth: 1<sup>st</sup> May 1991  
Qualification: M.Tech in computer science engineering  
Year: 2014  
College: Maharaj Vijayaram Gajapathiraj College of  
Engineerng  
City: Vizianagaram  
State: Andhra Pradesh country: India

**Author B. S.Vidya Sagar Appaji**



Place: Visakhapatnam  
Qualification: M.Tech,[PhD]  
Designation:Asst.Professor  
College: Maharaj Vijayaram Gajapathiraj College of  
Engineerng  
City: Vizianagaram  
State: Andhra Pradesh country: India

**Author C. Eswara Rao Pandiripalli**



Place: Vijayawada  
Date of birth: 5<sup>th</sup> January 1990  
Qualification: M.Tech in computer science engineering  
Year: 2014  
College: Maharaj Vijayaram Gajapathiraj College of  
Engineerng  
City: Vizianagaram  
State: Andhra Pradesh country: India.