

# Irrigation Made Easy: Block Wise Filling Of Firm Filed Using WSN System

Shaik Vahida, Rayudu Srinivas, Rama Reddy T, Sheik Shabuddin, B. Durga Anuja

**Abstract:** Agriculture is playing very crucial part in our everyday life and is a job of Farmers. Farmers follow some steps ladders to firm a field and one among is irrigation (is an essential step in the farming). Irrigation systems must inspire plant development while diminishing salt disproportions, leaf injuries, environmental conditions, and water loss. Loss of water will arise because of, wind drift, vaporation, run-off and water sinking deep below the root. To acquire noble results in irrigation we must use noble irrigation system. Now a days, farmers are using so many irrigation systems like traditional methods, modern methods and automated methods. Even though farmers facing problems to irrigate farm filed in sloppy areas. In this paper an automatic sensor based water pumping system is proposed to made irrigation easy to the farmers by dividing firm field into blocks and each block is monitored with soil moisture, temperate and humidity sensors to pump the water and the proposed method is more useful for irrigation in sloppy areas.

**Keywords:** Agriculture, Blocks, Irrigation, Pumping, Sensor, Slope Areas, Water, WSN.

## 1 INTRODUCTION

In Indian economy, Agriculture acting a vital part and is a work of farmers and farmers are responsible for the food we will eat daily. Farmers start work early, and in planting and harvesting season work till sunset. Even though modern agricultural equipment has made the work far less physically demanding than it was a few generations ago, most of a farmers are still preferring hands-on physical work. Farmers follow some steps in farming. In Farming life cycle essential step is irrigation. Active irrigation will affect the whole development process. The main motive to increase irrigation attempts is consistency. The manufacturer has a lot of governing over how to apply water and quantity of water to apply it. Over 70 per cent of the rural households depend on agriculture. Agriculture is an important sector of Indian economy as it contributes about 18% to the total GDP and provides employment to over 60% of the population. Indian agriculture has registered impressive growth over last few decades. The food grain production has increased from 68 million.[1] Agriculture is a job of Farmers and farmers are playing very crucial role in survival of human beings as they produce food and fiber for human beings. They make responsible usage of natural resources and advanced technologies to accomplish farming task. They have the ability to deal with different seasons, climatic variations, soil conditions, and the often harsh catastrophic events of wildfire, drought, and floods. In some areas farmers are very specialized in what and how they produce a limited number of products. Farming is an industry that depends everyday on the

natural environment and the careful and responsible use of it. Without the conscious caring for the natural resources and wildlife any and all farming enterprises are doomed to failure. Farming practices often provide natural biologically active filter mechanisms for water as well as vegetative stabilization of soils. Farmers and farming societies offer an exceptional atmosphere to raise people.

They offer opportunities for young and old alike to gain experiences in basic lifelong values, an appreciation for success, as well as the heartache of life's most challenging occurrences.

### Farming Life Cycle:

The following are eight essential steps followed by farmer to produce a food [2-3]

1. Selection of crop
2. Preparation of land
3. Selection of seed
4. Sowing of seed
5. Irrigation
6. Crop growth
7. Fertilizing
8. Harvesting

Irrigation is an important step in farming. Irrigation is nothing but amount of water to be given to the plants. We have so many tradition, modern and automated methods to irrigate the firm. But there is no such good method to irrigate the firm in slope areas. So, in this paper proposed a new method to irrigate a firm filed in slope areas.

## 2 LITERATURE SURVEY

The main motive to increase irrigation attempts is consistency. The manufacturer has a lot of governing over how to apply water and quantity of water to apply. To get good results in irrigation we should use good irrigation system. So many methods available for irrigations. In the following mentioned all traditional, modern and automated methods those using in present farming world.[2-3]

### 2.1 Traditional Methods of Irrigation

The following are the approaches of irrigation that were used in the past years. Even currently several minor farms in rural areas use these. Though they are inexpensive than the new

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methods, they are not that much efficient. They require human or animal labour to complete their works. Some of these methods are,

### 1. Moat

It is also known as pulley system, it includes pulling up water from a well to irrigate the land. It is a really time overwhelming process and labor concentrated system, but it is less in cost. While using this system wastage of water will be avoided [2]

### 2. Chain pump

This system consist of two big wheels linked by chains .To the chain buckets get attached. After that one portion of the chain dips into the water. When wheel turns, the bucket picks up water. The chain future lifts them to the upper wheel where the water gets dropped into a source. And the empty bucket gets carried back down.[2]

### 3. Dhekli

In this approach a rope and bucket will be tied and is a system of drawing water from a water sources such as well. And for the sake of balance everything, to the other side a heavy stick or any object will be tied. And we use this pole to draw up water.[2]

### 4. Rahat

In this approach of Rahat system of irrigation farmers use animals as a labour. Above the well, we tie a large wheel. Animals such as ox or cow would turn the wheel to take out the water from the well.[2]

## 2.2 Modern Methods of Irrigation

**The following are the modern methods of irrigation:**

1. Furrow systems
2. Level basin systems
3. Center-pivot sprinkler systems
4. Hand move sprinkler systems
5. Solid set / fixed sprinkler systems
6. Travelling gun sprinkler systems
7. Side-roll wheel-move systems
8. Low-flow irrigation systems

Some of the above mentioned modern methods explanation is given below:

#### **Furrow System:**

It consist of a series of small, shallow channels used to direct water across a paddock. Furrows are usually straight, but also be curved to follow the contour of the land, especially on steeply sloping land. [4]

#### **Level basin systems:**

In this system water is supplied at high capacities to attain a smooth, speedy ponding of the preferred application depth within basin. [4]

#### **Center-pivot sprinkler systems:**

It is a self-propelled system in which a single pipeline maintained by a row of mobile tower is suspended two to four meters above the ground. And water is pushed into central pipeline and as the towers slowly rotates around the axis, a huge spherical space is irrigated. [4]

#### **Hand move sprinklers system:**

It is a combination of light weight pipeline units that are moved physically for successive irrigations. Generally, this system is suitable for small irregular areas.

#### **Solid set or fixed sprinkler system:**

Fixed or solid set is nothing but motionless sprinkler system. Water supply pipe lines are fixed below the soil surface and sprinkler nozzles are elevated above the surface. This system is usually used in vineyards and orchards for frost guard and cooling of crop. [4] Now a days, farmers are using above mentioned modern methods to pump water to the farm. Even though farmers facing problems like current shocks, standing long time and monitoring each and everything to pump water on the entire farm. So, later automated irrigation methods are introduced.

#### **2.3 Automated Methods of irrigation:**

Microcontroller Based Automated Irrigation System is developed by Shiraz Pasha B.R., Dr. B Yogesha, Dept. of Mechanical Engineering, MCE, Hassan. 2, Professor, Dept. of Mechanical Engineering, MCE, Hassan: In this an effort has been done to automate farm or nursery irrigation that allows farmers to put the accurate quantity of water at the right time, irrespective of the availability of labor to turn on and off. In adding, farmers using automation kit are able to decrease overflow from over watering, eschew irrigating at the incorrect time of the day and this will be useful in the areas where electrical power is difficult to obtain. [5-6],[7] Sensor based Automated Irrigation System with IOT: A Technical Review is developed by Karan Kansara , Vishal Zaveri , Shreyans Shah1 , Sandip Delwadkar , Kaushal Jani: The key intention of this system is to offer an automatic irrigation. By this time ,money and power of the farmer will save. With the automated equipment of irrigation the hominid involvement can be lessened. When there is a alteration in temperature and humidity of the environment and the sensor devices senses the variation in temperature and humidity and gives an interrupt signal to the micro-controller. [5-6],[8] Automated irrigation system using solar power is developed by Jia Uddin ; S.M. Taslim Reza ; Qader Newaz ; Jamal Uddin ; Touhidul Islam ; Jong-Myon Kim: Here author suggested a model of adjustable rate automatic microcontroller based irrigation system. Here solar power is used to control the entire system. Sensors are positioned on the field and these sensors incessantly sense the water level and inform the same to the farmer. On the basis of water level, a farmer can regulate the motor from a remote place with cell phone. [5-6],[9] Automated Irrigation System Using a Wireless Sensor Network and GPRS Module is developed by Joaquín Gutiérrez ; Juan Francisco Villa-Medina ; Alejandra Nieto-Garibay ; Miguel Ángel Porta-Gándara: Here the author has developed scattered WN of soil-moisture and temperature sensors located in the origin zone of the plants. In adding, a doorway component handles sensor information, send the data to a web based application. An methods was introduced with threshold values of temperature and soil moisture that was automated into a microcontroller-based doorway to regulates water quantity. This project consist of photovoltaic panels and had a duplex communication link based on a cellular-Internet interface that permitted for data inspection and irrigation scheduling to be automated through a web page. [5-6],[10] Automated Irrigation system using Wireless Sensor Network is developed by shahin A pathan Student,G. H

Raisoni Institute of Engineering and Technology Wagholi-Pune, India and MR. S. G. Hate Faculty, G.H Raisoni Institute of Engineering and Technology Wagholi-Pune, India the author of this paper presented a methodology that uses a soil moisture sensors to capture the information about the soil and send this information to central server that control water pumping. Here MATLAB was used to show threshold value and previous data in excel sheet. [5-6],[11] The above mentioned automation methods are not suitable to irrigate firm fields in the slope areas, so, in this paper proposed a method which can irrigate firm field in slope areas.

### 3 METHODOLOGY

When reviewing collected works and understanding need an innovative technique called Irrigation Made Easy: Block Wise Filling of Firm Filed using WSN is proposed. To implement the proposed work the following components are:

#### Software and Hardware Requirements:

1. Soil moisture sensor
2. DHT Sensor
3. Raspberry Pi Kit
4. Motor
5. Latest Version of Python Software
6. Racks

#### 3.1 System Block Diagram:

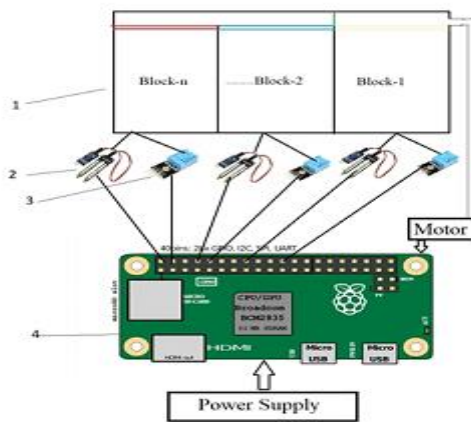


Fig. 1 system Block Diagram

#### In above Figure:

1-Firm Field 2-Soil Moisture Sensor 3-DHT Sensor 4-Raspberry Pi Board As shown in above figure, in our proposed work firm field is divides into n-blocks, block-1 will be opened initially and motor will be connected to block-1. In firm field we arrange one vertical rack at the end of the first block and n-1 horizontal racks will be arranged to each block to make work our system. For each block there will be one DHT and one Soil moisture sensor will be connected to monitor temperature, Humidity and level of wetness of the soil. Initially we will set moisture and temperature. And we are using raspberry pi as a processor to control the system activates.

#### 3.2 Proposed Method:

#### If field is dry the following steps will happen:

- Step-1: Automatically motor will on with the help of sensors information  
 Step-2: The pumping will be starts from first block.  
 Step-3: After reaching moisture and temperature value that we set, sensors will send signal to controller and then the horizontal rack will move back and vertical rack will move front with the help of motion sensor.  
 Step-4: And now water flows to the second block and step-3 will repeat till all n-block get wet  
 Step-5: And finally block-n will send a signal to controller about the completion of work so that motor will off automatically.

### 4 CONCLUSION

Irrigation Made Easy: Block Wise Filling of Firm Filed using WSN system keep track of all the events and manage all the events of irrigation system dynamically. The proposed structure is accurate soil moisture control in sloppy areas. It also support in time saving, deletion of hominid mistake in regulating obtainable soil moisture echelons and to amplify their net revenue.

### 5 ACKNOWLEDGMENT

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