MARUMEGH

Kisaan E- Patrika

Available online at www.marumegh.com

 ISSN: 2456-2904

# AUTOMATIC IRRIGATION SYSTEM ON SENSING AVAILABLE SOIL MOISTURE CONTENT BY USING SOIL MOISTURE SENSOR

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**Abstract**

This article is more useful to automatic watering to the plants without interface of human being. We know that people do not pour the water on to the plants in their garden when they go to the vacation or often forget to water plants. As a result, there a chance to get the plant damaged, decreasing water level day by day, reduce wastage of water and efficient use of irrigation water, this article is an excellent solution for such kind of solutions.

## Introduction

India is the agriculture dependent country. Agriculture is a source of employment of majority of Indians and has great impact on the economy of the country. In dry areas or in case of lacking rainfall, irrigation becomes necessary for accomplishing the water requirement.

Water is important and essential for survive the human life as well as plant life. Everybody knows this. But question is that for each of us is do we really know about importance of water. One common perception about drinkable water is that all of it is more or less equal at molecular level having a simple composition, yet such a simple molecule is complex by nature and it could hurt us in many ways. all the planet's renewable resources, fresh water may be the most unforgiving. Difficult to purify, expensive to transport and impossible to substitute, water is essential to food production, to economic development, and to sustain life itself.

As the method of dripping will reduce huge water losses it became a popular method by reducing the labor cost and increasing the yields. When the components are activated, all the components will read and gives the output signal to the controller, and the information will be displayed to the user (farmer). The sensor readings are analog in nature so the ADC pin in the controller will convert the analog signals into digital format, Durisic,2012. Assimilation is that the artificial application of water to the land or soil It is used to assist in the growing of agricultural crops Srikar,2017.

## Need of Automatic Irrigation System

1. Water scarcity in India is due to both natural and human made causes. The main factor is that is contributed to water issues include poor management of resources, lack of

government attention and man-made waste 18 % of world population which resides in India only has access to 4 % of usable water sources. Mehta, 2012.

2. A proper usage of irrigation system is very necessary because the main reason is the shortage of land reserved water due to lack of rain, spontaneous use of water as a result large amounts of water goes waste.
3. The awareness of this technology is very less in India, due to poor awareness, farmers irrigate the field as well as crop without requirement of water. As electricity come, tube well will start to lift the water without sense the moisture in the soil. So, it is the wastage of ground water and decreasing water level day by day.
4. Sustainable development consists of three important but overlapping steps: save it, know it, and use it. These three components have penetrated the current concept of biodiversity conservation, so much so that conservation is now inseparably intertwined with sustainable development, Rana and Gulariya,2018.

**Disadvantages of Traditional Irrigation**

1. Water wastage is more due to this reason ground water and decreasing water level day by day.
2. Wastage of water is caused due to seepage in the drain.
3. Increase labor and electricity cost.
4. Promote soil erosion.
5. Over dieting of land as well as crop it decreases the crop growth.
6. It making the soil saline due to leaching and percolation process.

**Urgent Need of Automatic Irrigation System**

1. So, it needs to be automated for proper watering a plant and handled remotely by farmer. The aim of the implementation is to reduce water wastage.
2. Automatic irrigation can be used for save time and low power monitor device. The main objective of this article to broadcast the awareness of the automatic irrigation system among farmers.
3. When soil goes dry pump will start watering automatically Automatic irrigation system can be used to reduce water use, save your time and proper management of water.
4. Appropriate amount of water gives to the field as well as crops increase the production.
5. A proper usage of irrigation system is very necessary because the main reason is the shortage of land reserved water due to lack of rain, spontaneous use of water as a result large amounts of water goes waste.

**Working of System**

Automatic irrigation system using Arduino UNO board is programmed such that it gives the signals to the motor via the motor driver module. AB pin of soil sensor is connected to the CD pin of converter. A0 pin of converter is connected to A0 pin of Arduino board, D0 pin of converter is connected to digital pin 10 of Arduino board, GND pin of converter is connected to GND of Arduino board and VCC pin of converter is connected to VCC of Arduino board. The pin of 5 V (VCC) of Arduino board is connected to VCC pin of motor shield, GND of Arduino board is connected to GND pin of motor shield. The digital pin 11 and 12 is connected to the M1.1 and M1.2 respectively. Motor pump is connected to M1 pin of motor shield. Soil moisture sensor senses the available moisture content in the soil. Whenever the

soil moisture content values go down, the sensor senses the humidity change, giving signal to the microcontroller so that the pump (motor) can be activated. This concept can be used for automatic irrigation system. The circuit comprises an Arduino UNO board, a soil moisture sensor, a 5V motor pump, a Motor driver L293D (IC1), motor driver IC to run the water pump. You can power the Arduino board using a 5V to 9V wall wart or plugin adaptor or solar panel. You need a separate 5V to 9v battery for the pump motor.

**Components of Automatic Irrigation System**

**Arduino UNO Board**

Arduino board (Fig.1) is an open source electric platform used for electronics projects. Arduino is the best board to get started with electronics and coding. It has 14 digital input/output pins (of which 6 can be used as PWM outputs) 6 analog input a 16 MHZ ceramic resonators connection and a jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller, simply connect to a computer with a USB cable or power it with an AC to DC adapter or battery to get started.


**Fig.1 Arduino UNO Board**

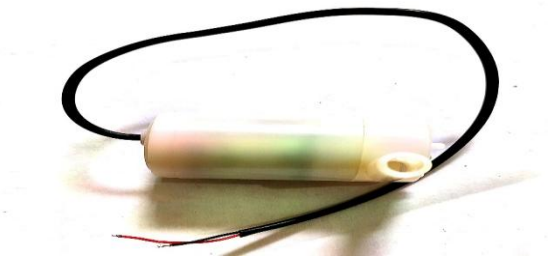

**Fig.2 Motor Pump**

**Motor Pump**

A motor pump is shown in Fig. 2. Motor normally connected to water pump, motor have a stationary stator coil having coils furnished with AC to supply a rotating flux, and an indoor rotor is connected to the output shaft manufacturing a second rotating flux. Motor rotates the water pump which lift the water through suction pipe and deliver water discharge through delivery pipe.

**Motor Shield**

Motor Shield (Fig.3) allows you to easily control motor direction and speed using an Arduino. By allowing you to simply address Arduino pins, it makes it very simple to incorporate a motor into your project. It also allows you to be able to power a motor with a separate power supply of up to 12 V

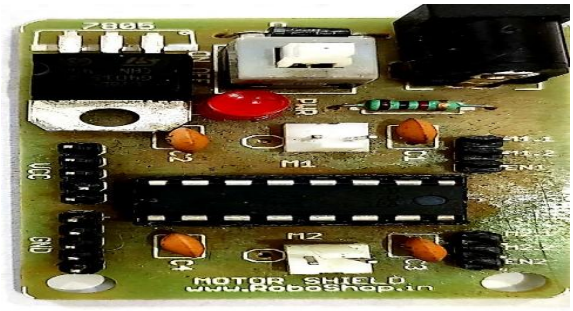


**Fig.3 Motor Shield**

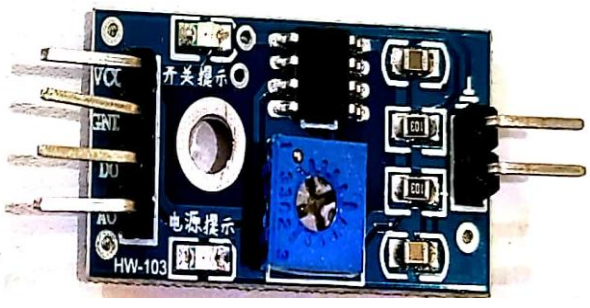


**Fig.4 Converter**

**Soil Sensor**

Soil moisture sensor (Fig.4) measure the humidity of water content in soil. Since the direct hydrometric measuring of free-soil wetness needs removing, drying, and coefficient of a sample, soil wetness sensors live the meter water content indirectly by victimization another property of the soil, like electrical phenomenon, nonconductor constant, or interaction with neutrons, as a proxy for the wetness content

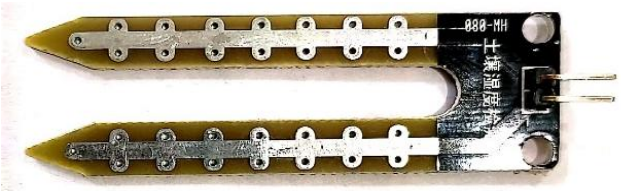

**Fig.5 Soil Moisture Sensor** **Fig. 6 Female pin**

**Circuit Connection**

AB pin of soil sensor is connected to the CD pin of converter. A0 pin of converter is connected to A0 pin of Arduino board, D0 pin of converter is connected to digital pin 10 of Arduino board, GND pin of converter is connected to GND of Arduino board and VCC pin of converter is connected to VCC of Arduino board. The pin of 5 V (VCC) of Arduino board is connected to VCC pin of motor shield, GND of Arduino board is connected to GND pin of motor shield. The digital pin 11 and 12 is connected to the M1.1 and M1.2 respectively. Motor pump is connected to M1 pin of motor shield

**Advantages of Sensor base Automatic Irrigation System**

1. It will reduce the wastage of water.
2. It will reduce weed growth.
3. It will maintain the ground water level.
4. It will conserve the water through evapotranspiration.
5. It will increase the production
6. It will reduce the cost of electricity.
7. It will reduce the labor used on agricultural farm.
8. If available moisture level is below in the soil then it will start automatically otherwise not.
9. Not required inspection of field every day.
10. By sensor mechanism anybody farmers can control the field activities by their home.
11. This automatic plant watering and soil moisture monitoring system is very useful in all climatic conditions, Kumar and Magesh 2017.

**Conclusion**

It can be concluded that a proper and efficient use of irrigation water is necessary because the main reason is the shortage of land reserved water due to lack of rain, spontaneous use of water as a result large amounts of water goes waste. Now a day's farmers giving the irrigation in the field without knowing the available moisture content. So, huge amount of water waste through evaporation. Farmers have tube well on their field, as electricity come then tube well is start to irrigate the field due to continuing discharge by tube well, it is reducing the water level day by day. The aim of the implementation is to reduce water use and automatic irrigation can be used for save time and low power monitor device. The main

objective of this article to broadcast the awareness of the automatic irrigation system among farmers. Automatic irrigation system can be used to reduce water use, save your time and proper management of water.

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