SOLAR BASED AUTOMATIC MOISTURE CONTROL SYSTEM

[1]Dr.J.Rejina Parvin, [2]Kousik Raja K, [3]Netheesh P, [4]Keeran M, [5]Mananithyanantham T M

[1]Professor
Department of Electronics and Communication Engineering
Sri Krishna College of Engineering & Technology, Coimbatore
rejinaparvinj@skcet.ac.in
[2]U.G Scholar
Department of Electronics and Communication Engineering
Sri Krishna College of Engineering and Technology, Coimbatore
[3]U.G Scholar
Department of Electronics and Communication Engineering
Sri Krishna College of Engineering and Technology, Coimbatore
[4]U.G Scholar
Department of Electronics and Communication Engineering
Sri Krishna College of Engineering and Technology, Coimbatore
[5]U.G Scholar
Department of Electronics and Communication Engineering
Sri Krishna College of Engineering and Technology, Coimbatore

Abstract:

Agriculture is the source of living ofmajority Indians and it also has acountless influence on economy of the country. The objective of our project is toreduce this manual involvement by the farmer by using an automated irrigation system which purpose is to enhance water use for agricultural crops. The inspiration for this project came from thecountries where economy is based onagriculture and the climatic conditions prime to shortage of rains & scarcity of water. The farmers working in the farm lands are only dependent on the rains andbore wells for irrigation of the land. Evenif the farm land has a water-pump, manual involvement by farmers is required to turn the pump on/off when needed. The project is intended to cultivate an automatic irrigation system which controls the pump motor ON/OFFon sensing the moisture content of the soil. In the field of agriculture, use of appropriate technique of irrigation is essential. The advantage of using thistechnique is to reduce human intervention and still certify proper irrigation. A software application wasdeveloped by predetermining thethreshold values of soil moisture, temperature and water level that was programmed into an arm controller. Thispaper presents the controlling and monitoring the level of water and detecting the soil moisture content.

Keyword: *Microcontroller, Irrigation, SoilMoisture Content, Automated Irrigation*

1. INTRODUCTION

As we know that Indian economy is one ofthe largest developing economies of theworld. The agricultural sector has its largestcontribution in the Indian economy. To achieve maximum utilization of man powerand to obtain maximum profit in a givenstipulated there is a need in the upgradationof various engineering techniques that arebeing used today. Thus maintaining properamount of water level in the soil is one ofthe necessary requirements to harvest agood crop that can be a source of varioustypes of nutrients whether micro or macrofor their proper growth. If we talk aboutIndian farmers they are worst hit by thefamines that occurs due to failure of cropsdepending upon various drought factors.Rain plays the key role in deciding thefuture of these crops as well as the farmersevery year. The over utilization of groundwater has drastically reduced the groundwater level in the last 15 years. So it is theneed of hour to utilize each and every dropof water wisely so that it can also be usedby our coming generations also. Also weshould develop some new methods that usethe renewable sources of energy. Thedevelopment of these new techniques aregoing to reach our goal of sustainabledevelopment as well as to cut off theemission of greenhouse gases to aminimum level. This technique will be avery good option for the small and mediumfarmers who suffer every year just becauseof failure of crops that took place everyyear.The implementation of this technology has a wide scope in the nearby future.

2. OBJECTIVE AND SCOPE:

The main objective of this project was todesign a small scale irrigated system thatwould use water in more well-organizedway in order to prevent excess water lossand minimize the cost of labor. The following aspects were considered in thechoice of design solution

- Installation cost
- Water saving
- Human intervention
- Reliability
- Power consumption
- Maintenance
- Expandability

A critical Consideration in the segment costs, since cost define the viability and feasibility of a project. The water saving was also an important feature, since there is demand to decrease water loss and to Maximize the efficiency used. The Power consumption must also be monitored.

3. LITERATURE SURVEY

In this report, soil moisture sensor, temperature sensors positioned in root zoneof plant and opening unit handles the sensorinfo and transmit data to a web submission.One algorithm was developed for measure threshold values of temperature sensor andsoil moisture sensor that was planned into amicrocontroller to control water amount.For power photovoltaic panel was used. Another facto like cellular- Internetinterface used that allowable for dataassessment and irrigation planning to beprogrammed through a web page.

The automatic system was tested for 30days and save 90% compared with modernirrigation system. Because of its energy autonomy and low price, the system has thepossible to be valuable in water limitedgeologically isolated zone. In this paper,soil moisture content has been sensed usingacoustic based technique was developed. The main propose of this technique is growth for measure soil moisture in real time method. The technique based on association between two quantities i.e. speed of sound and the degree of permeation with water in soils. This experiment found that the speed of sound reductions with the moisture content following, contingent on the kind of soil

This paper design a model of automatic irrigation arrangement which is based on microcontroller and solar power was used only for source of power supply. Several sensor are placed in paddy field. Sensors sense water level unceasingly and give the data to farmer through cellular phone. Farmer controls the motor without going inpaddy field. If the water level reaches at danger level, routinely motor will be off without conformation of farmer.

4. PROPOSED SYSTEM

Here in this paper an experimental scale within rural areas where there is an enormous disposition of irrigation system which is executed using arm controller and wireless communication. The main of this implementation was to demonstrate that the automatic irrigation system can be used to optimize /reduce water usage. It can also bea photovoltaic irrigation system which consists of a solar powered that is the soil moisture sensor and temperature sensor placed under the soil where plants roots arereached which is a distributed network. Thesystem has a water level sensor which will indicate the presence of water level in tank.A software application was advanced by programming the verge values of soil moisture water level that was automated into a microcontroller.

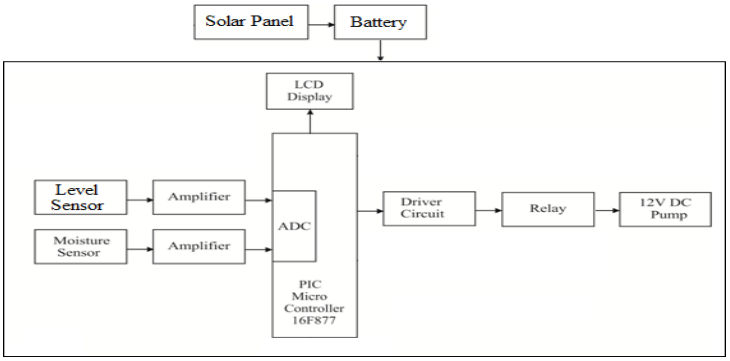
4.1. SOIL MOISTURE

Soil moisture is a vital component in theatmospheric water cycle, both on a smallagricultural scale and in large-scalemodelling of atmosphere interface.Vegetation and crops always be contingent more on. The moisture available at root level than on rainfall incidence. Water budgeting for irrigationplanning, as well as the actual preparation of irrigation action, requires local soil moisture data. Knowledge of the degree of soil wetness benefits toforecast the risk of flash floods, or the occurrence of fog

Soil water contented is an expression of the mass or volume of water in the soil, though the soil water potential is an expression of the soil water energystatus. The relation between content and potential is not general and depends on the features of the local soil, such as soil density

and soil texture. The basic system for measuring soil water content is thegravimetric method. Because this method is based on directmeasurements, it is the standard with which all other methods are related. Unfortunately, gravimetric sampling is destructive, rendering repeat measurements on the same soil sample difficult. Because of the difficulties of accurately measuring dry soil and water volumes, volumetric water contents are not usually determined straight. A software application was advanced by programming the verge values of soil moisture water level thatwas automated into a microcontroller.

4.2. BLOCK DIAGRAM AND WORKING



The above fig shows Microcontroller based irrigation system shows to be a real time feedback control system Which monitor sand controls all the actions of drip irrigation system competently. The present proposal is a Model to update the agriculture industries on a small scale with best expenditure. Using this system, onecan save manpower, water to advance production and ultimately profit.

4.3. SOLAR POWER

Solar power is the alteration of energy from sunlight into electricity, either directly by means of photovoltaics (PV), orindirectly by means of intense solar power. Solar energy is most abundant source of energy in world. Photovoltaic is an effective approach for using solar energy.

Solar powered irrigation system can be appropriate alternative for farmers in present state of energy disaster automatic system using solar power. The main objective of this project is to advance an irrigation system in field of agriculture by using solar energy.

4.4 .NEED FOR IRRIGATION

(i) In term of populations India is thesecond largest country after China. So it is necessary to increase the production of food to feedstuff millions of people.

(ii) There is uneven and indeterminatedistribution of rainfall which cause drought.

(iii) For different water necessities of crops can only be met through irrigation amenities.

Being tropical country there is quick increase in the high temperature and evaporation. So, for abundant cause ofwater artificial irrigation is essential

4.5.COMPONENT REQUIRED

- Solar Panel
- Battery
- PIC MC
- LCD Display
- Level sensor
- Moisture sensor
- Relay
- Pump

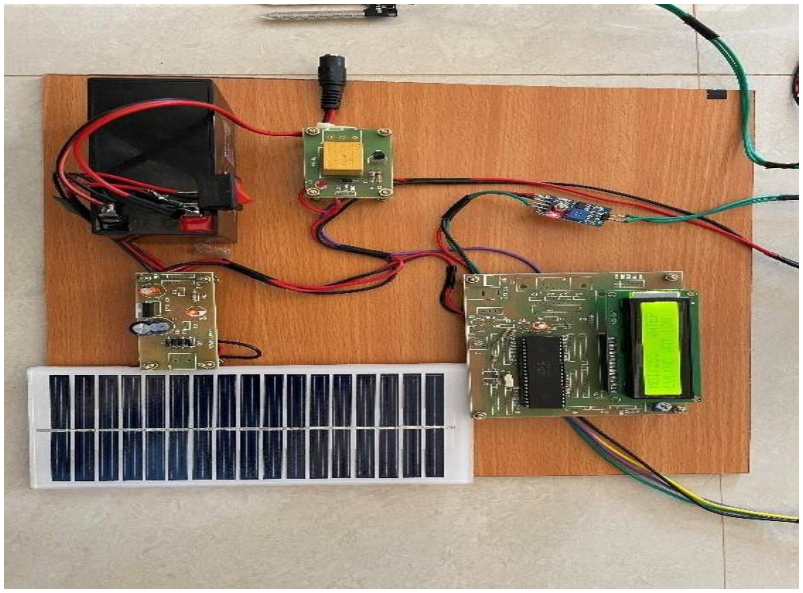
4.6.SYSTEM DESCRIPTION

Measuring soil moisture is very significant in agriculture to help farmer for handling the irrigation system. Soil moisture sensor is one who resolves this.This sensor measures the content of water. Soil moisture sensor uses the capacitance to measure the watercontented of soil. It is simple to use this sensor. Simply insert this rugged sensor into the soil to be tested, and the volumetric water content of the soil is stated in percent.

4.8.ADVANTAGES

The system is inexpensive in terms of hardware component and power consumption. The system helps in saving of water and electricity. It can be appliedin large agricultural areas. The system helps in labor problem when there are nolabors to work and eradicates man power. System can be swapped into manual mode whenever required. It is convenient to all climatic conditions andall sorts of irrigation.

5. WORKING MODEL:



6. APPLICATIONS

Irrigation can be completed in fields, gardens, farms etc. It is effective for diversities of crops. This application canbe used for patient monitoring. The software application developed for this system can be used for domestic works such as tank storage. This system can befunctioned automatically as well asmanually.

7. FUTURE SCOPE

Rain gun sensor can be added so that when it rains there won't be floods and this shield the field and evades floods. Rain water harvesting can be done and this harvested water can be used to moisten fields. Hooters can be used so that it gives siren at various occasions such as interruption detection, floods etc. Using IR sensors any object passing into fields can be detected and warned.

8. RESULT

Irrigation becomes easy, accurate and practical with the impression above shared and can be executed in agricultural fields in future to endorse agriculture to next level. The output from moisture sensor and level system plays vide role in producing the output.

9. CONCLUSION

The main applications for this project are for farmers and gardeners who do not have abundant time to water their crops/plants. It also covers those farmers who are wasteful of water during irrigation. The project can be extended to green houses where manual management is far and few in between. The principle can be extended to create completely automated gardens and farmlands. Collective with the principle of rain water harvesting, it could lead to massive water savings if applied in the right way.

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