



Solar Automatic Plant Watering System

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Abstract: The solar automatic Plant Watering System works on the principal of conductivity in the soil. As the moisture content or dampness of the soil also plays one of the important roles in the development of the plants. So it is important to keep the moisture contain. In the field of the agriculture, use of proper method of watering system like irrigation etc. Is important because the main reason is lack of rain and scarcity of land reservoir water. To tackle the problems of agricultural sector regarding irrigation system with available water resources. New concepts of technology are being developed to allow agricultural automation to enhance the yield of the crops. The aim of the project is to minimize this manual intervention by the agriculturist. Automated Irrigation system will serve the following purposes firstly as there is no un-planned usage of water, a lot of water is saved from being wasted secondly the irrigation is the only method when there is not enough moisture in the soil and the sensors which decides when the pump should be turned on/off, which saves a lot time for the agriculturist. This also gives much needed rest to the farmers, as they don't have to go and turn the pump on/off manually. In this project we use solar energy which is used to operate the irrigational pumps. Here Transistors are configured as a current controlling device. Two stiff copper wires are inserted in the soil to sense the moisture contain in the soil.

Keywords: Solar energy, transistors, soil moisture, irrigational system.

INTRODUCTION

Now a day's water is the major problems for the agriculturist during the summer. As the water plays an important role in the development of the plants, we should use some modern technologies and equipments for the agricultural system. Even electricity plays a major role in the field of agriculture. There will be less power supply to the agriculturist or to the agricultural land as to overcome this problem solar energy which is an abundant source of energy which can be used by installing solar panels which is the renewable source of energy. Solar panels (an array of photovoltaic cells) are nowadays extensively used for running street lights, for powering water heaters and to meet domestic loads. The cost of solar panels has been constantly decreasing which encourages its usage in various sectors. The installation of solar panels is the initial investment with less maintenance which brings a great relief to the agriculturist or the farmers. As by the usage of the modern method like Automatic Plant Watering System in their farms which help them in keeping the moisture contain of the plants in a good condition which helps in the better development of the plants. In this paper we propose an automatic irrigation system using solar power which drives water pumps to pump water from bore well to a tank and the outlet valve of tank is automatically regulated using controller and moisture sensor to control the flow rate of water from the tank to the irrigation field which optimizes the use of water. Solar energy is that the most abounding supply of energy within the world. Solar power isn't solely associate degrees were a solution to today's energy crisis however conjointly an environmental friendly type of energy. Electrical phenomenon generation is an economical approach for exploitation solar power. Solar High-powered irrigation system may be an appropriate different for farmers within the gift state of energy crisis. Automatic irrigation system uses alternative energy that drives water pumps to pump water from bore well to a tank and therefore the outlet valve of tank is automatically regulated exploitation controller. A wet detector is employed to manage the flow of water from the tank to the irrigation field that optimizes the employment of water. Since our country ranks second in agriculture and it receives daylight throughout the year, it's informed utilize solar energy for irrigation functions. The alternative energy is completely excellent for use with irrigation systems for gardens, apartments, greenhouses, etc. Improving irrigation potency will contribute greatly to reducing production cost of crops, creating the demand provide response additional efficient. Through correct irrigation technologies, average vegetable yields may be maintained or increased.

LITERATURE SURVEY AND BACKGROUND STUDY

Electric energy consumption in agriculture was recorded highest (17.89%) in India in the year 2015-16 among all countries. According to the survey conducted by the Bureau of Electrical Energy in India in 2011 there are around 18 million agricultural pump sets and around 0.5 million new connections per year is installed with average capacity 5HP. Total annual consumption in agriculture sector is 131.96 billion KWh (19% of total electricity consumption).



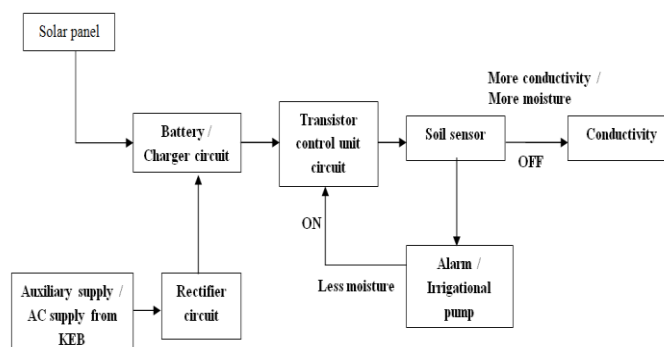
SYSTEM DESIGN

This System consists of a Solar panel, which is the main source of energy and is given to the charge controller for extracting regulated power from Solar panel at different irradiation and also to maintain correct charging voltage and current in order to charge the battery and increase its life. Water conservation in farm land is controlled using microcontroller with soil moisture sensor.

PRINCIPLE OF OPERATION

It works on the principal of the conductivity in the soil due to moisture content or water content present in the soil. Depending upon the soil moisture conductivity it control of buzzer or the irrigational pump. When there is conductivity in the soil then their will conductivity between the strands of the sensors in the soil which acts as short circuit i.e. which allows the current to pass through the strands where the buzzer goes OFF For the irrigational pumps will be in OFF stage. When the conductivity in the soil decreases it act as open circuit which allows the current to pass through the buzzer or irrigational pumps which turns to ON position in which the water is let it the soil gets moisture content that the current supply will shift to the sensor part.

BLOCK DIAGRAM



HARDWARE AND SOFTWARE COMPONENTS

Transistors Q_1 - 2N3904 NPN and Q_2 - 2N2222 NPN

LED1, LED2 -- LED 3mm

R_1 --10K ohm

R_2 --100 ohm

VR_1 --50K Potentiometer

Buzzer (BZ_1)--6V

Battery (B_1)--6V

Solar panel -- 6V

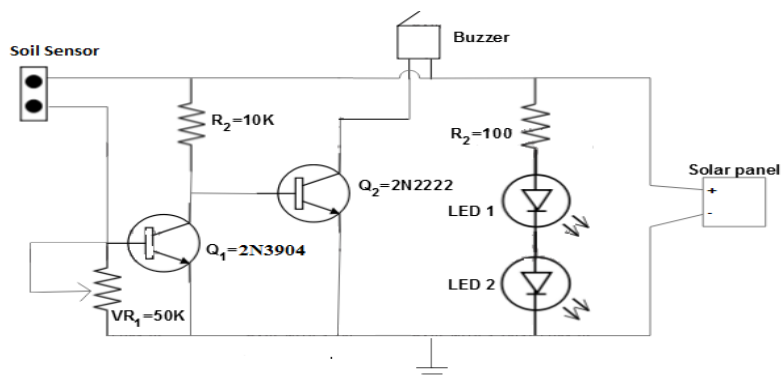
Wire

WORKING

The supply is given by the solar energy or by the AC supply in which it is converted in 6V DC supply using a rectifier circuit. And it is stored in the battery. The rectified output is given to the transistor circuit which acts as a current controlling device and the resistor which is connected in series with the LED, where LED acts as an indicating light. The when the power supply is on if the conductivity is there between the stiff copper rods which is inserted inside the soil as a soil sensor then there will be conductivity between the stiff rods in which there will be no conductivity between the buzzer or the connection given to the irrigational pump through converting the 6V DC supply to the 230V AC single phase supply or 415V AC three phase supply. If there is less conductivity the current flows through the buzzer or the irrigational pump side in which there will be no conductivity between the soil sensors. The potentiometer which helps in the increasing or decreasing resistance in which it maintains the resistivity the circuit. The resistance R_2 which is 100 ohm which helps in protection of the LED from the flow of oversupply of the current through the LED which may cause damage to the device.



CIRCUIT DIAGRAM



MERITS AND DEMERITS

It works according to the soil condition. As coming to the cost wise it is cheaper and having the reliable circuit. It reduces labor work. As the agriculturist is not required to constantly monitor the progress of irrigation as it is automatic system, the agriculturist is available to perform other tasks without any interruption. Agriculturist with automation is more inclined to irrigate when the plants need water, not when it suits the agriculturist. Automation can help to keep the fertilizer on farm by effectively reducing run off from the property. Retaining fertilizer on farm has both economic and environmental benefits. Automatic system can be switched into manual mode whenever required.

PROPOSED SOLUTION

In this proposed system we utilize the solar energy from solar panels to automatically pump water from bore well directly into a ground level storage tank depending on the intensity of sunlight. While conventional methods include pumping of water from bore well into a well and from this well onto field using another pump, our system uses only a single stage energy consumption wherein the water is pumped into a ground level tank from which a simple valve mechanism controls the flow of water into the field. This saves substantial amount of energy and efficient use of renewable energy. A valve is controlled using intelligent algorithm in which it regulates the flow of water into the field depending upon the moisture requirement of the land. In this system we use a soil moisture sensor that detects the amount of moisture present in the soil and depending upon the requirement of level of moisture content required for the crop the water flow is regulated thus, conserving the water by avoiding over flooding of crops

CONCLUSION

And also useful to the government with solar panel energy, solution for energy crisis is a problem. When the soil needs water is indicated by the sensor by this automatic irrigation system is implemented. As to increase the production of yield and to improve the agricultural sector by the implementation of modern equipments and modern methods of technique is more essential. Implementation of the Automatic Solar Plant Watering system is one of the present modern techniques in which implementation in their land will increase the effectiveness in their farming and it also reduces the labor cost. And also to installation of solar panels which makes an initial cost and with less maintenance cost which brings a great relief to the agriculturist. Which improves the agricultural sector and it makes a change in national economy.

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