"SMART IRRIGATION SYSTEM"

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Abstract – This project aims to build a fully functional irrigation system. The main motivation for this programis to conserve water and lower the rate of wastage and to manage the amount of crop irrigation. It alsoaims to reduce human performance, efforts and errors due to human negligence. It uses solar panels to power the system during the day. Solar power is used to operate the system during the day and charge batteries to operate at night. It uses moisture sensors to sense moisture in the soil. When soil moisture is dropped, a pump system is started and the land is watered. The plants are well irrigated until the required amount is reached and the pump is switched off automatically.

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

1. INTRODUCTION

Renewable energy is rapidly gaining importance as an energy resource as fossil fuel prices fluctuate. At the educational level, it is therefore critical for engineering and technology students to have an understanding and appreciation of the technologies associated with renewable energy. One of the most popular renewable energy sources is solar energy. Many researches were conducted to develop some methods to increase the efficiency of Photo Voltaic systems (solar panels) With the help of solar panel pump automatic controlling will be done.

2. OBJECTIVES

- To utilize natural source (solar) as energy.
- To manage the amount of crop irrigation.
- To compare improved designs with previous designs for overall idea.

3. LITERATURE REVIEW

Increased energy demand, the continued depletion of existing mineral resources and growing concerns about pollution, have forced mankind to explore rare, renewable energy resources such as solar power, wind power, etc. electrical energy. As India receives sunlight all 12 moths per year. So, using it in different fields is a wise idea. Solar power is one of the world's most powerful sources of energy. Solar energy is not only the answer to today's energy crisis but also a friendly energy source. Photovoltaic production is an effective way to use solar energy. Solar panels (a series of photovoltaic cells) today is widely used to light street lights, power water heaters and meet home loads. The cost of solar panels has been steadily declining which has encouraged their use in various fields. One of the advantages of this technology is its use in irrigation systems. A solar-powered

irrigation system could be another viable option for farmers in India's energy crisis. This green energy production system provides free energy as long as the initial investment is made. According to a study by the Bureau of Electrical Energy in India in 2011 there are approximately 18 million agricultural pumps and approximately 0.5 million new connections per year with 5HP standard power supply. Total annual expenditure in the agricultural sector is 131.96 billion (19% of total electricity consumption). Solar powered smart irrigation technique is the future of farmers and the solution to the energy crisis. We propose an automatic irrigation system that uses solar power that drives water pumps to pump water from the bottle to the tank and the outlet valve is automatically controlled using a controller and a moisture sensor to control the flow of water from the tank to the irrigation system. which increases water consumption

4. BLOCK DIAGRAM

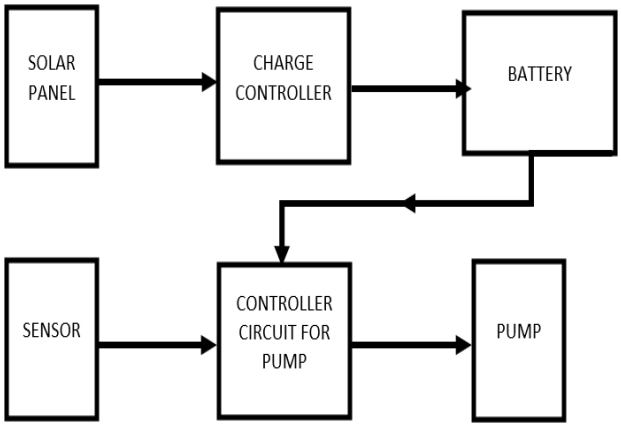

Figure 1

In this paper, the moisture content of the soil is felt using an acoustic based method. The main suggestion of this process is the growth of the soil moisture balance in a real-time manner. A method based on the relationship between two values namely noise speed and water infiltration rate. This study found that the noise reduction rate for subsequent humidity content, depending on the type of soil This paper designs an automated irrigation system based on microcontroller and solar energy used for energy source only. Several sensors are located in the paddy field. The sensors sense the water level continuously and provide the farmer with data via cell phone. The farmer controls the engine without going to the paddy field. If the water level reaches a level of danger, the motor will usually shut down without compliance with the grower.

5. DESIGN OF EXPERIMENT

A bridge rectifier makes use of four diodes in a bridge arrangement to achieve full-wave rectification. This is a widely used configuration, both with individual diodes wired. The simple capacitor filter is the most basic type of power supply filter. The application of the simple capacitor filter is very limited. It is sometimes used on extremely high-voltage, low-current power supplies for cathode-ray and similar electron tubes, which require very little load current from the supply.

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.

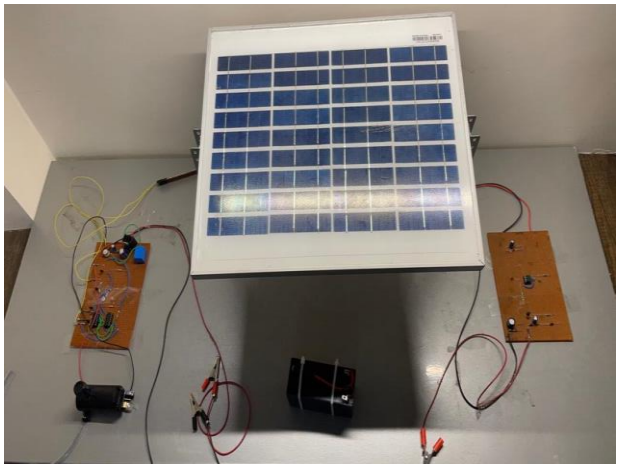

Figure 2

It Maximizes Battery Life, Solar panels generate pure D.C. electricity when exposed to sunlight. This is exactly what your batteries want. By saturating the lead plates with these pure D.C. electrons in a slow and steady manner on a daily basis, you prevent your batteries from repetitive deep discharges which shorten their life. In fact, a properly sized and designed solar battery charging system can easily double the useful life of your batteries.

Electrical Independence, with a properly sized system and the appropriate components, you will be able to park where you want and be free of the concerns of finding shore power or running your generator. Go to the desert, the mountains, ocean beaches, anywhere the sun shines and declare your electrical independence.

6. RESULT

In this system we use solar energy from the sun automatic panels from spring source directly at a lower level depending on the intensity of sunlight. Although common methods include pumping borewater into a well and a well in the field using another pump, our system uses only a power consumption of a single stage where water is present, he was thrown into a low-lying tank from whichit is easy valve system controls the flow of water to field. This saves a lot of energy as well efficientuse of renewable energy. Valve controls the flow of water in the field depends on the humidity the need for land. In this program we use soil moisture sensor that detects moisture content present in the ground and depending on need the level of humidity required in salmon water flow is thus controlled,saving water to avoid overcrowding. Irrigation becomes easy, accurate and practical with the impression above shared and can beexecuted in agricultural fields in future to endorse agriculture to next

level. The output frommoisture sensor and level system plays vide role in producing the output.

7. DISCUSSION

Here we have a solar panel which provides charge to the battery but sometimes due to high intensity of sunlight the solar panel may pass higher voltage than required by the battery which can cause damage to the battery. That is why we have installed a controller circuit to provide a constant voltage to the battery ensuring no damage is caused to it.

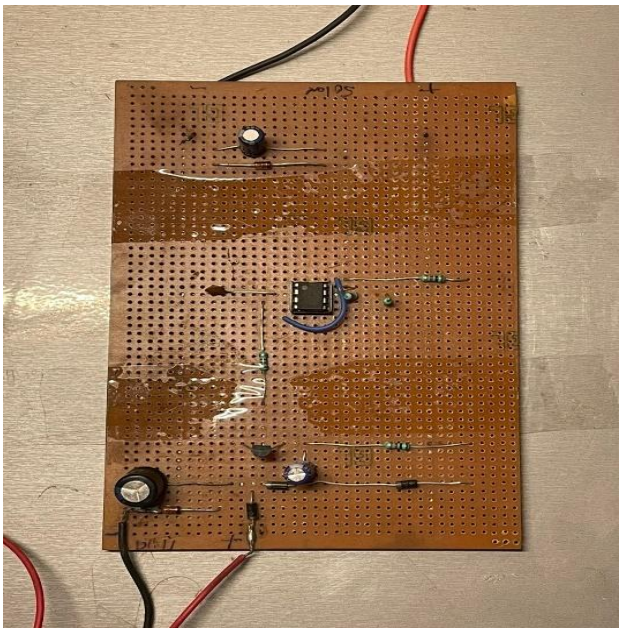

Figure 3

Also, controller circuit helps to protect solar panel from damage caused by reverse voltage from battery when there is no sunlight. The soil sensor is placed in the soil and the as long as there is moisture in the soil the sensor passes a command to the sensor circuit to stop the water supply and as soon as the moisture content is drawn out the sensor passes command to initiate the water supply ensuring there is no wastage water also it helps to improve the crop quality due to proper supply of water.

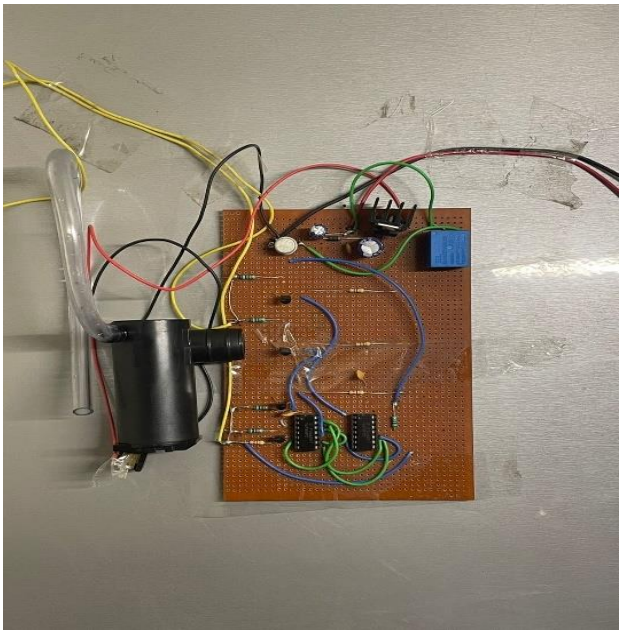

Figure 4

8. CONCLUSION

By implementing the proposed system there are variety of benefits for the government and the farmers. For the government a solution for energy crisis is proposed. By using the automatic irrigation system, it optimizes the usage of water by reducing wastage and reducing human intervention for farmers. The excess energy produced using solar panels can also be provided to the grid with slight modifications in the system circuit, which could be a source of income for the farmer, as well to promote agriculture in India and at the same time to provide a solution for energy crisis. Proposed system is easy to implement and environment friendly solution for irrigating fields.

The system requires minimal maintenance and attention as they are self-starting. To improve daily pumping rates tracking arrays can be performed. This system shows the feasibility and practicality of the application of using solar PV to provide energy for the pumping requirements for irrigation.

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