

# Solar Operated Smart Irrigation System

Tejaswi Bodkhe<sup>1</sup>, Shital Salodkar<sup>2</sup>, Tejal Raut<sup>3</sup>, Sharmila Bhoumik<sup>4</sup>, Hempushpa Padoti<sup>5</sup>

Department Of Electrical Engineering

Assistant Professor, Prof. Y. Likhar

Guru Nanak Institute Of Engineering And Technology, Nagpur, Maharashtra, India

## Abstract:

Cost effective Solar Power can be the answer for all our energy needs. "Solar Operated Smart Irrigation System" is the title of project are the answer to the Indian Farmer. This system consists of solar powered water pump along with an Automatic water flow Control using a moisture sensor.

It is the proposed solution for the present energy crisis for the Indian farmer. This system conserves electricity by Reducing the usage of grid power and conserves water by reducing water losses.

**Keywords:-** Smart Irrigation ,Solar Panel, Solar pump, Moisture Sensor ,Energy Crisis.

## 1. Introduction

Solar energy is the most abundant source of energy in the world. Solar power is not only an answer to today's energy crisis but also an environmental friendly form of energy. Photovoltaic generation is an efficient approach for using the solar 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. One of the application of this technology is used in irrigation systems for farming. Solar powered irrigation system can be a suitable alternative for farmers in the present state of energy crisis in India.

This is a green way for energy production which provides free energy once an initial investment is made. 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.

Energy consumption all over the world is increasing swiftly with the growth of world population. In order to cope up with the increasing demand, energy generation needs to be increased. Conventional energy sources for energy generation. Nowadays, solar energy is one of the most popular and reliable energy sources. It is considered as a green technology because it does not emit greenhouse gases.

## Solar Operated Smart Irrigation System:

Solar Powered Smart Irrigation System.

Then using a control circuit it is used to charge a battery. From the battery using a converter circuit it gives power to the water pump which is submerged inside the well. Then the water is pumped into an overhead tank for storing water temporarily before releasing the water into the field.

In automatic irrigation module the water outlet valve of the tank is electronically controlled by a soil moisture sensing circuit. The sensor is placed in the field where the crop is being cultivated. The sensor converts the moisture content in the soil into

equivalent voltage. This is given to a sensing circuit which has a reference voltage that can be adjusted by the farmer for setting different moisture levels for different crops.

The amount of water needed for soil is proportional to the difference of these two voltages.

A control signal was given to a stepper motor whose rotational angle is proportional to the difference in voltage. The stepper motor in turns controls the cross-sectional area of the valve to be opened controlling flow of water.

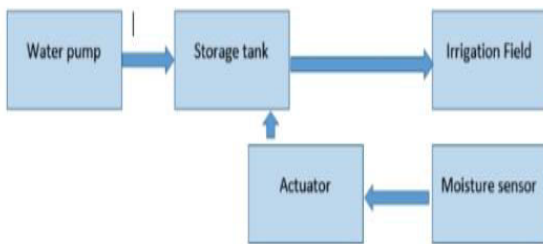
**Fig: Block diagram of automatic Irrigation system**

Solar powered smart irrigation systems are the answer to the Indian farmer. This system consists of solar powered water pump along with an automatic water flow control using a moisture sensor. This system conserves electricity by reducing the usage of grid power and conserves water by reducing water losses

**2. Principle**

This system consists of solar powered water pump along with an automatic water flow control using a moisture sensor. This system conserves electricity by reducing the usage of grid power and conserves water by reducing water losses. In recent days,

agriculture field farmers are facing



many problems in watering their plants to keep their crops green in summer season.

It's because they don't have correct idea about the availability of the power. Even if the power is available, they have to wait until the pitch is properly watered. Thus this process restricts them to stop doing

other deeds. But, there is a solution, i.e., automatic solar submersible pump control panel for irrigation.

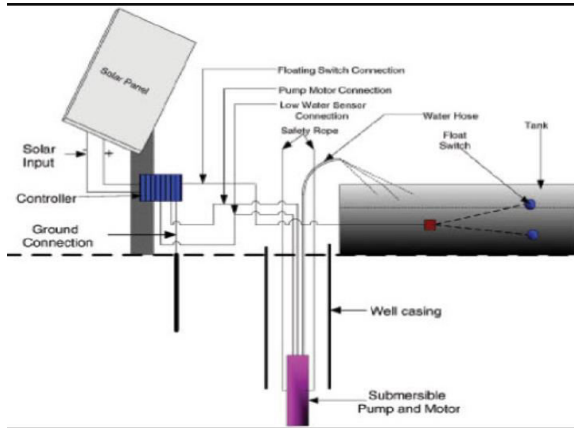
In the trial of solar based plant irrigation using submersible pumps, PV cells are used to generate electricity, which is stored in rechargeable batteries. submersible pump at the slope's toe, where the installed sprinklers water the crops or plants

**Objective:**

- This project is mainly related with off. grid application.
- The objective is to supply water to the using Solar power as the main source.
- In this the user can water fields from any. where by using GSM techniques.

**Component:**

- Solar Panel.
- PV module.
- Motor Pump.
- Pump Controller.
- Charge controller.
- Battery.
- Inverter
- Relay.
- Soil Moisture.
- Power supply



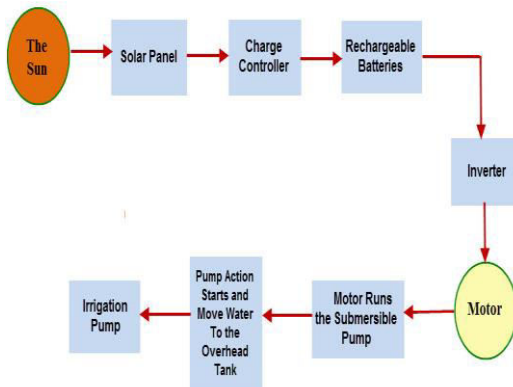
**Block Diagram**

### 3. Advantages:

- Low cost.
- No fuel required.
- Safe and environmental friendly.
- Require smaller water source.

### 4. Application:

- ❖ Agricultural fields.
- ❖ Agricultural research stations.
- ❖ Cultivations.
- ❖ Nursery Plants.



### 5. 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 Irrigation becomes easy, accurate and practical with the

There is an urgent need for a system to facilitate the agricultural process and the burden on farmers. With the recent advancement in technology, India has been increasing its production of annual crop production, a completely-centric economy. The ability to conserve natural resources and give impetus to superb agricultural production is one of the main goals of setting up this technology in the country's agricultural sector. To save the farmer's fatigue, water and time were the most important consideration. Therefore, systems must be designed to provide this efficient functionality by using sensor networks, sprinkler Day after day, the field of electronics is flourishing and has caused great impact the human beings.

The project will be implemented as an automatic irrigation method and has great potential for future development. The project can be extended to greenhouses where manual monitoring is rare and rare.

### 6. Conclusion:

The Smart irrigation system is feasible and cost effective for optimizing water resources for agricultural production.

The irrigation system allows cultivation in places with water scarcity there- by improving sustainability. It proves that the use of water can be diminished.

The use of solar power in this system is significantly important for organic crops.

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