



INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact factor: 4.295

(Volume3, Issue1)

Available online at: www.ijariit.com

Low Cost Solar Powered Smart Management System for Indian Farming

Nirdosh Kumar
PG Scholar, EED,
NITTTR, Chandigarh, India.
Kumar-nirdosh@yahoo.com

Mrs. Shimi S. L
Asth. Prof., EED,
NITTTR, Chandigarh, India.
shimi.reji@gmail.com

Abstract-This paper shows the investigation and use of solar energy based farming system for farmers. Solar energy is the most abundant source of non-conventional energy in the universe. Solar power is not only the solution to today's energy crisis but also an eco-friendly form of energy. Solar cells are an excellent approach for utilizing the solar energy. Solar panels (an array of photovoltaic cells) are now a day extremely utilized for street solar lights, for empowering water heaters and to run different house hold loads. The costs of solar panels are decreasing day by day which encourages its usage in various sectors. One of the applications of this technology is used in irrigation systems. Solar powered irrigation system can be a suitable alternative for farmers in the present state of energy crisis in India. Farmers are also facing the change in temperature during the whole day. So it is very much essential to maintain the temperature for proper farming. In the same way humidity and moisture control is also necessary for proper farming. To control these challenges, the investigator has designed a new farming system using Arduino microcontroller

Keywords: Arduino based System, Smart Farming System.

I. INTRODUCTION

The farming systems that significantly contribute to the domestic GDP of India are subsistence farming, organic farming, and industrial farming. So farming is a very important part of India and the GDP of India also can be improved by improving the overall farming quality of India.

Agriculture in India began in about 9000 BCE when Indians learned to cultivate plants and domesticate crops such as wheat, barley etc. By 4500 BCE, the development of irrigation made the Indian continent prosper. As a result, Indian civilization grew, leading to more planned settlements that made use of drainage and sewers and introduced the development of storage systems such as artificial reservoirs and canals, making irrigation much more sophisticated.

The concerned work of the investigator will not only enhance the farming system, but also improves the method of farming done, by using the latest engineering technology.

II. AIM OF THE WORK

In this work the investigator has used different sensors like temperature sensor, moisture sensor etc. to tackle different problematic situations and a program has been fed in the microcontroller to handle the situation and solve the problems of the farming system.

The aim of this project work is to develop an intelligent system using microcontroller and GSM (Global System for Mobile Communications) technology for the solution of the problems related to irrigation as well as other problems which are being faced by farmers in the field of agriculture by programming the component and building the necessary hardware.

The work is also implemented with GSM technology so that it will work as a link between microcontroller and farmer. By using GSM technology, information on user's phone in any emergency or unfavorable conditions may be sent to make the farmer aware of the emergency condition.

III. LITERATURE SURVEY

Satya Prasanth Yalla et al. in [1] have explained information related to automatic supply of water to fields, automation of system is provided with modules and soil moisture sensor, the source to generate electricity through renewable resources, prefer sunlight as the main source.

E. Pradeep et al. in [2] have developed and atomized the PV farmers pump considering the power supply, direct current (dc), alternating current (ac), inverter frequency, GSM technology, a well, water level in the well, submersible mono block pump. Here the investigators introduce an advanced technique with GSM (Global Service for Mobile communication) module.

JiaUddin et al. in [3] have proposed a model of variable rate automatic microcontroller based irrigation system. Solar power is used as only the source of power to control the overall system. Sensors are placed on the paddy field and these sensors continuously sense the water level and give the message to the farmer informing the water level.

Binoy seal ET al. in [4] have discussed the design of solar tracking system to harness maximum solar energy that is converted into electrical energy which in turn is used to power the irrigation system.

Ishwar Kumar et al. in [5] have discussed solar powered auto tracker along with an automatic water flow control using a moisture sensor. It is the proposed solution for the present energy crises for the Indian farmers. This system conserves electricity by reducing the usage of grid power and conserves water by reducing water losses.

LwinL winOo et al. in [6] have discussed a prototype of two-axis solar tracking system based on a PIC microcontroller. This auto-tracking system is controlled with two 12V, 6W DC gear box motors. The five light sensors (LDR) are used to track the sun and to start the operation (Day/Night operation). Time Delays are used for stepping the motor and reaching the original position of the reflector.

Nilesh R. Patel et al. in [7] have discussed different monitoring and controlled systems installed in order to increase the yield. Disease is one of the key factors that cause the degradation of yield. So the developed monitoring system mainly focuses on predicting the start of germination of the disease. Sensor module is used to detect different environmental condition across the farm and the sensed data is displayed on LCD using microcontroller.

IV. PROBLEM FORMULATION

Following are the main points of the problem formulated by the investigator:

- (i) To design a system using water pump that starts automatically to function when soil needs water.
- (ii) To provide proper light for sophisticated crops
- (iii) To design automatic buzzer system to prevent unwanted entry/occupancy
- (iv) To incorporate water spreading jet motor to the system
- (v) To design a system that uses fan to meet out the problem of maintenance of temperature for sophisticated crops.
- (vi) To equip system with solar panel to provide power backup
- (vii) To design a system that uses display the information collected by all sensors along with decision/action taken by microcontroller.
- (viii) To design the system in such a way that GSM is used to link controller and farmer.

V. CIRCUIT DIAGRAM OF LOW COST SOLAR POWERED SMART MANAGEMENT SYSTEM FOR INDIAN FARMING

First of all we will have to take the data from five sensors- soil moisture sensor, LDR sensor, Temperature sensor, DHT 11 humidity sensor and ultrasonic sensor. These sensors provide information to the Arduino UNO. Arduino takes necessary decision/action, and also informs about the sensor values and its necessary actions to farmer through farmer's cell phone by message with the help of GSM module. All the sensors values along with decision/action taken by microcontroller are continuously displayed on 20x4LCD. In Fig. 1, the hardware developed is shown. The hardware is tested for accuracy and it is found that it's working properly

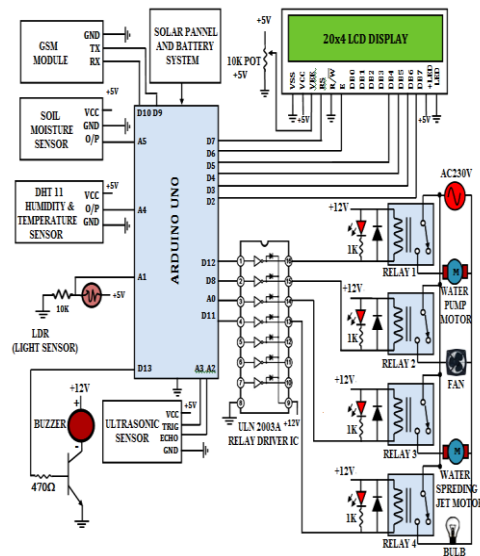


Fig. 1 Hardware Circuit diagram of low cost Solar Powered Smart Management System for Indian Farming.

RESULT AND DISCUSSION

The investigator designed and developed a system which provides electronics and eco-friendly solution to the problems related to Indian farming system. This will result in reducing problems faced by farmers especially in the field of irrigation system like: Solution to Water Problem, Solution to Unwanted Occupancy, Solution to Humidity Level Maintenance, and Solution to Temperature Maintenance etc.

REFERENCES

- [1] SatyaPrasanthYalla, B.ramesh, A.Ramesh, "Autonomous Solar Powered Irrigation System", International Journal of Engineering Research and Applications (IJERA), Surampalem, Vol.3, pp. 60-65, January -February 2013.
- [2] E. Pradeep, R. Ganeshmurthy, K. Sekar, E. Arun, "Automation of PV Farmer pump" 2nd International Conference on Sustainable Energy and Intelligent System (SEICON), Chennai, Vol.1, pp. 163-166, 20-22 July 2011.
- [3] Uddin J., Reja S. M. T., Newaz Q., Islam T., Jong- Myon Kim, "Automated Irrigation System using Solar Power", 7th International Conference on Electrical and Computer Engineering (ICECE), Dhaka, Vol. 7, pp. 228-231, 20-22 December 2012.
- [4] Seal, OmkarShirke, SiddheshShewale, AbhilashSirsikar, Priyahankare "Solar Based Automatic Irrigation System", International Journal of Research in Advent Technology (IJRAT), Mumbai, Vol. 12, pp. 186-189, April 2014
- [5] Ishwar Kumar, JatinVij, LeenVitthal Patel, Mayank Sharma, Devasishaldar "Solar Powered Auto Irrigation System", International Journal of Engineering Research & Management Technology (IJERMT), Ghaziabad, Vol 1, pp. 61-66, March-2014.
- [6] LwinLwinOo, Nang kaythyHlaing, "Microcontroller-Based Two axis Solar Tracking System", IEEE Transaction Journal, Vol-3, issue-2, Vol 3, pp. 436-440, July-2010
- [7] Nilesh R. Patel, Swarup S. mathurkar, "Microcontroller Based Drip Irrigation System using Smart Sensor", Annual IEEE India Conference, Shegaon, Vol 13, pp. 978-982, August -2013