

Solar Smart Irrigation Control System

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ABSTRACT-

Agricultural zone is backbone of Indian financial system as populace increases call for of water additionally increases. typically masses of water wastage takes vicinity inside the land, because of incorrect method of irrigation. A solar-based totally clever irrigation gadget permits user to monitor the relative soil moisture at many distinct location for the duration of the sphere to extra exactly scheduled irrigation cycle. with the aid of the usage of sun energy, we are able to store the electrical power. The sensing device is based totally on comments control mechanism with microcontroller unit depending upon the varied requirement of different plants we can irrigate our subject.

Index terms-field sensors, Microcontroller, smart Irrigation, solar electricity.

I. INTRODUCTION

sun strength is broadly available energy source in the global. sun energy is not simplest excellent with the aid of the view of the economic system however additionally it's far environment pleasant form of the power. Now days this power is used in avenue light and in other home hundreds. In nowadays's life because of improve generation's the price of sun panel decreases, on the way to help to use solar strength in numerous sectors. one of the packages of sun power is in irrigation system. In India there may be important problem of strength, consequently sun strength is high-quality answer for Indian farmer.

The continuously extraction of water from earth is resultant into lower in water stage from earth in order that lot of land comes slowly in the un-irrigated area, every other

reason of this is because of unplanned irrigation. also now-a-day's populace will increase hastily so demand of food additionally increases which doesn't get stability between call for and deliver of meals. To keep this manufacturing of food should boom. present work offers a simpler and within your budget technique to this hassle.

II. LITERATURE overview

concept of clever irrigation: The antique irrigation methods are sprinklers and flood type device. In those methods, the intake of water is in massive quantity. in the case of slopes inside the subject big quantity of water moves downwards. hence, the final part of discipline remains un- irrigated. big quantity of water goes waste in these techniques. Such problem will be triumph over by means of this paintings which uses sensors with microcontroller, consequently 50% water saving is completed. Use of sun panel makes this inexperienced way of electricity saving. [1]

according to the survey conducted by the Bureau of electrical strength, in India in 2011 there are round 18 million agricultural pump sets and round zero.five million new connections according to year are hooked up with average capacity of 5HP. total annual consumption in agriculture region is 131.ninety six billion KWh. (19% of overall strength consumption) [2]

III. METHODOLOGY

device Description: Proposed irrigation machine consists of two components, solar pumping and automated irrigation part. solar panel fees the battery thru price controller.

From the battery, deliver is given to the motor without delay on this work. [2]

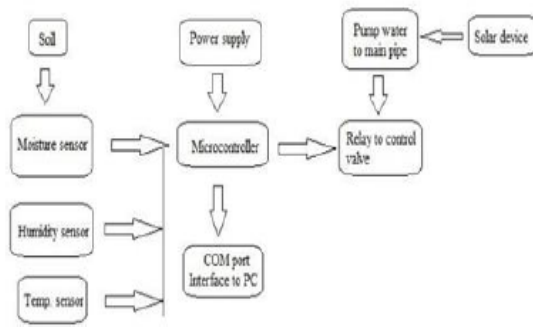


Fig.1. Block diagram of solar powered irrigation system

figure 1 indicates the block diagram indicating the primary elements of sun powered irrigation device. here the sensing circuit controls the motor. The sensors used are soil moisture sensor, temperature & humidity sensor. The sensor detects the values of soil moisture, temperature & humidity at distinctive factors within the field. Microcontroller according to pre-set fee compares the measured values. based on the error among the pre-set and measured values, motor ON/OFF circumstance is controlled. [3]

Components used:

- solar Panel, charge Controller & Battery
- electricity supply
- Moisture, Temperature & Humidity Sensor
- Relay
- Microcontroller
- liquid crystal display show

A. solar Panel, fee Controller & Battery

A sun panel pumps strength into a battery that shops it, however the sun panel has no control over how tons it does or how the battery receives it. The price controller (rate regulator) located among the solar panel and the battery regulates the voltage and the contemporary and basically halts charging pastime temporally when necessary. sun panels are related thru an Array Combiner.

B. power deliver

A 12V dc supply of battery is fed to the 7805 regulators which converts it into regulated 5V DC deliver. it's miles then, distributed to all of the driving force and relay circuits. 5V is provided to the microcontroller and to all ICs used in the machine.

C. Soil Moisture, Temperature & Humidity sensor

The fitness of a plant is influenced by means of many elements, one of the maximum important being the equipped availability of moisture within the soil. flora and vegetation usually depend more on the moisture to be had at root level than on precipitation prevalence. The moisture sensor monitors the moisture content material of the soil. It consists of a connecting probe, that is laid down within the soil. it is used to feel the moisture of the soil and sends the alerts to the controller. If the moisture level reaches the under the pre-set fee, then the water is sent to the field. these sensors have no moving components, they may be particular, in no way wear out, do no longer need calibration, paintings under many environmental conditions, and are steady between sensors and readings. moreover, they may be not highly-priced and quite smooth to use. the usage of the DHT eleven sensor, tracking of the temperature & Humidity at ordinary intervals, is done. when it exceeds the specific temperature, the circuit sends the alerts to the microcontroller. Based on the error signal blunders, the choice of turning the motor ON/OFF takes area. [4, 5]

D. Relay

Relay is also an electrically operated device which consists of operating coil, two contacts of NC and NO which is elaborated as usually Closed and generally Open contacts. whilst there is no deliver to the coil there may be no alternate in the touch function. when supply is given to the coil, the contact NO closes and NC opens. it's far unchanged till the coil is in energized circumstance. [6]

E. Microcontroller- (ATMEGA8)

ATMEGA8 is a sturdy, eight bit microcontroller that suits for such outdoor applications. There are 32×8 wellknown-reason registers having absolutely static operation. It includes 28-pin bundle. The characteristic of ATMEGA8 is five/2 EPROM statistics reminiscence. It consists of 3 ports particularly port B, port C & port D. port B have 8-bit bi-directional I/O pins. Ports C have 7-bit bi- directional I/O pins. Ports D have eight-bit bidirectional I/O pins.[6]

F. liquid crystal display

the usual liquid show used on this paintings is HD44780U. it's miles sixteen×2 show i.e. sixteen Characters in line with 2 traces. The liquid crystal display shows the motor ON/OFF country and presentations the quantity of moisture, humidity, temperature.

IV. result AND DISCUSSIONS

it is observed that, in India, throughout the month June- October consultation high rainfall takes area and at some point of April to June and December to February, the rainfall is mild.

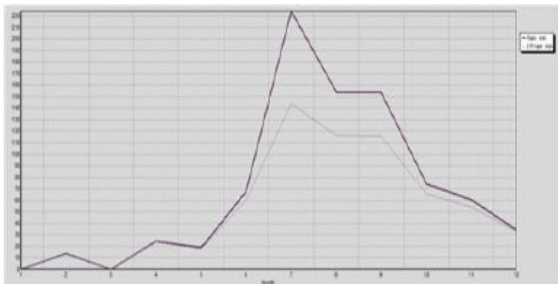


Fig.2. Rainfall and Effective rainfall during the cultivation period

So maximum of the need of irrigation is all through month December-February and April-June, but because of loss of water, amount of water for can't be maintained in area, so there is need for saving the water and manpower. This state of affairs is implemented on this work considering following cases.

Motor ON/OFF situations

A. preliminary level- Irrigation ON

Case 1 – in this, we take the values from field sensor like soil moisture, temperature &

humidity. If the enter values are peculiar then motor starts.

Case 2 – when the temperature, humidity and moisture are normal in the course of this case, the pre-set price and area sensors price are same so motor will robotically turn off.

Case 3 – both from temperature moisture and humidity is odd. In this case, if anybody of the field sensor remains atypical then pre-set cost will no longer match with subject sensor fee, so motor will stays ON.

V. CONCLUSION

At present, water saving technology is fundamental factor in irrigation. We located that, in vintage irrigation system there is lots of water wastage, power conservation and required huge man strength. by way of the usage of sun Powered smart Irrigation system, all problems mentioned above are minimized. the existing gadget is model to modernize agriculture with most reliable expenditure.

REFERANCES

- [1] K. Prathyusha and Chaitanya Suman, 2012, Design of embedded systems for the automation of drip irrigation, International Journal of Application or Innovation in Engineering & Management (IJAEM), Volume 1, Issue 2. pp. 254-258.
- [2] S. Harishankar, R. Sathish Kumar, Sudharsan K.P, U. Vignesh and T.Viveknath,2014, Solar Powered Smart Irrigation System, Advance in Electronic and Electric Engineering. ISSN 2231-1297, Volume 4, Number 4, pp. 341-346, Research India Publications.
- [3] Satyendra Tripathi, Lakshmi N., Sai Apoorva and U. A. Vasan, Solar powered intelligent drip irrigation system for sustainable irrigation services, pp-1-8.
- [4] K.S.S. Prasad, Nitesh Kumar, Nitish Kumar Sinha and Palash Kumar Saha, 2012, Water- Saving Irrigation System Based on Automatic Control by Using GSM Technology, Middle- East Journal of Scientific Research 12 (12): 1824-1827, ISSN 1990-9233, pp-1824-1827.



[5] Sweety R. Nandurkar and Vijaya R. Thool, 2012, Design of a Soil Moisture Sensing Unit for Smart Irrigation Application, International Conference on Emerging Technology Trends on

Advanced Engineering Research (ICETT'12), Proceedings published by International Journal of Computer Applications (IJCA), pp.-1-4.

[6] Shiraz Pasha B.R. and Dr. Yogesha B., 2014, Microcontroller Based Automated Irrigation System, The International Journal of Engineering And Science (IJES) Volume 3, Issue 7, pp-6-9.