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 [ijirset@gmail.com](mailto:ijirset@gmail.com)

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# Solar Power Generation and Crop Safety for Agricultural Environment

Dr. R. Bala Murugan<sup>1</sup>, Dr. R. Sivakumar<sup>2</sup>

Associate Professor, Department of Civil Engineering, Faculty of Engineering and Technology, Annamalai University, Chidambaram, India<sup>1</sup>

Assistant Professor, Department of Business Administration, Government Arts College, Kulithalai, Karur, India<sup>2</sup>

**ABSTRACT:** Agriculture is the craft and science of developing plants. Agriculture plays overwhelming position in the monetary improvement of our nation and this is the essential profession from numerous years. To expand the effectiveness of the yields and to restrict the expenses of rustic practices we go for shrewd procedures of agriculture by utilizing IoT innovation. Protection of crop during blustery season is significant test for ranchers. By consolidating Greenhouse innovation, an environment condition for a crop to developed will made along the different elements like sensor based absolutely monitoring, security, crop safety from unreasonable downpour and automatic rooftop overlaying office. Greenhouse is worked in two modes that are automatic mode and manual mode. It utilizes wire application for speaking with the cultivators about different environmental factors continuously. Different sensor hubs are conveyed at exceptional locations in the greenhouse. Controlling those boundaries are through any far off gadget or internet providers and the operations are finished through interacting sensors, with microcontroller. Power generation and supply is typically a monstrous issue. This task is likewise consisting of solar power generation and water collecting as innovation strategy is carried out along with crop safety.

**KEYWORDS:** Agriculture, Environment, Solar Power, Crop Safety and IoT.

## I. INTRODUCTION

Agriculture is the significant area and backbone of our country. A significant number of our Indian individuals rely upon agriculture. Around 65% individuals rely only upon agriculture. 45% of GDP of Indian economy contributed by agriculture. It relies upon monsoon and precipitation, so it is still being worked on. Adoption of irrigation and logical strategies helps in progress of agriculture. Greenhouse, polyhouse sort of improved and safeguarded strategy assists with yielding more. Indeed, even agriculture is embraced by many individuals in India, however production rate is less. Contrast with different nations like USA, China, Germany and Italy our production level is low, and we are bringing in food grains from them. To acquire additional benefit from agriculture, we should take on modern cultivating methods like Greenhouse cultivating (polyhouse cultivating), hydroponic cultivating and so on. Government is likewise reassuring these sorts of modern advances to expand the yield and give subsidizes through various plans. Focal government give endowment, credit for greenhouse, penny polyhouse, conceal net house plan to empower modern technique for agriculture. The public authority is continuously putting forth attempts to foster agriculture area and it is one of the fields where government stress a ton and we have made considerable progress in agricultural turn of events.

Greenhouse is a construction with dividers and rooftop comprised of straightforward material, like glass or clear material. In green house environment plants are filled in an expected controlling climatic condition. These designs might fluctuate in various designs and sizes including little sheds to enormous size like modern structures. The greenhouse which is scaled down is called as a virus outline. The modern greenhouses are made up with screening installations, warming, cooling, lighting, PC to give expected ideal conditions to establish development and it additionally deals with the miniature environment conditions by controlling boundaries like air, temperature, relative mugginess, and fume pressure shortfall and so on. In greenhouse the inside part is presented to daylight so it turns out to be altogether hotter than the outer temperature reasonable for crops to safeguard it from chilly climate condition.



This procedure empowers the rancher to get expanded development and efficiency. In which they have some control over the developing of any crops under halfway and completely controllable environmental conditions. These Greenhouse Technologies gives the appropriate environmental conditions in which one can develop any plant in any spot whenever by controlling reasonable conditions in various boundaries with least work an empowers specific crops to be developed consistently, It shields the plants from the unfavorable climatic conditions like breeze, cold, precipitation, unnecessary radiation, outrageous temperature, bugs and sicknesses.

## II. LITERATURE REVIEW

In certain regions the water supply is deficient; in those regions there is need of safeguarding of the water for agriculture. Conserving of water helps in different agricultural necessities. This can be accomplished utilizing water collecting and other high level irrigation strategies helps in better utilization of water. The principal key to defeat is to lay out a different space of concern, for example, land, ranch, water tank and so forth. There are a few progressions irrigation designing strategies i.e., dribble irrigation, site-explicit variable rate irrigation. By utilizing these strategies, the rancher gets helped by the diminished water consumption and decreased soil evaporation loses. At first irrigation project cost is high a direct result of this, duties to the cultivator is more as duty. The proposed framework requires seriously working information for ranchers. By utilizing sprinkler irrigation technique crops can harmed in light of the fact that by changing the sprinkler framework ordinarily, additionally water ought to be perfect while utilizing the sprinkler strategy [1].

To monitor temperature, dampness and dampness in the dirt of agricultural land done by utilizing IoT. Huge number of crops has been annihilated because of distinction in atmospheric condition. Sensors gather the field information i.e., more precise and measure the different boundaries like temperature, dampness, mugginess content in soil which serves to lessens the issues in agricultural field. The RFID innovation is utilized to follow and recognize the article or a crop and it helps in communication by sending or getting information. The dampness contents in the dirt is detected by utilizing the dampness sensor and it will recognize how much water supply expected to the crop and sends information to RFID and empowers the sensor to supply water which automatically turn on the water source and mood killer it when need is fulfilled. The course of encryption of information put away in RFID frameworks can be very costly. Additionally, the expense of RFID labels is higher when contrasted and different choices [2].

The inner boundaries of Greenhouse can be controlled by changing temperature, stickiness, concentration CO<sub>2</sub>, miniature/large scale supplements. We realize that greenhouse is the climatic model has nonlinearity, strong coupling, criticism feed forward linearization and decoupling. To defeat from this PSO-PI is utilized. First and foremost, nonlinear numerous information sources different results MIMO framework. This moved to SISO to take out the temperature and stickiness coupling. The significant hindrance is when PI utilized alone it works inadequately [3].

Automatic control of temperature in green house is done by utilizing an innovation called business installed framework. The framework is planned so that it can give the fitting air temperature in the region where the crops are developed. The deliberate information is given to the calculation of flowed PID and it is executed in implanted framework. Controls actuators like warming, cooling and fans concerning the actuators. Dispersing the natural air to whole greenhouse is troublesome. The fundamental disservices are absence of water, saltiness, higher air temperature and levels of mugginess [4].

The framework to monitor agricultural land is created by utilizing WSN. From the degree of production and nature of crops increments. The primary benefit of this is no manual connection point. The variables on which production, Quality and developing level depends are temperature, moistness and water level. We can likewise call WSN as WSN where physical and environmental conditions like temperature, sound, pressure and other are monitored utilizing autonomous sensors which are conveyed. To monitor and crop production microcontroller along with sensors are utilized. Contingent on the edge esteem engine is automatically controlled. Through IoT monitored information is shipped off cloud. With the goal that ranchers can get the information without any problem. Inconveniences are low response of WSN, less precision and cost of the innovation is more [5].



The application of inordinate pesticide to the plant cause unsafe effects on the environment. The IoT element of overseeing crops production in precision agriculture upgrades the nature of crops by applying required supplements. The application of AI calculation and graphical UI are sent with detecting organizations to accumulate the necessary field information of certain crops, for example, potatoes, cabbage, tomatoes and so forth. The assembled information from detecting hubs is taken care of to AI calculation showing the two information and cautioning message through a graphical UI.

### III. RESEARCH METHODOLOGY

The proposed framework is planned by consolidating different equipment and programming advances in to it. The proposed framework utilizes ARM7 LPC2148 microcontroller as a fundamental control unit and every one of the controlling operations and executions have been completed by this microcontroller. This framework utilizes different sensors to monitor and control different boundaries like temperature, dampness content in the dirt, mugginess and so forth. The sensors incorporate mugginess sensor, IR sensor, dampness sensor and downpour sensor/downpour switch as displayed in the Figure 1. This sensor gives different readings that will help monitor and control the greenhouse. Whole framework works in both automatic mode as well as in manual mode. By utilizing IoT innovation proposed framework additionally empowers the manual monitoring of green house from anyplace. Power is produced as a component of this framework utilizing solar boards put on the rooftop top of the greenhouse.

The essential thought beyond involving IoT in agriculture is to safeguard the crops during various seasons. As the numerous methods are applied in agricultural area greenhouse procedure is likewise one of them. As of controlling and monitoring of greenhouse utilizing IoT and a few different advances are executed.

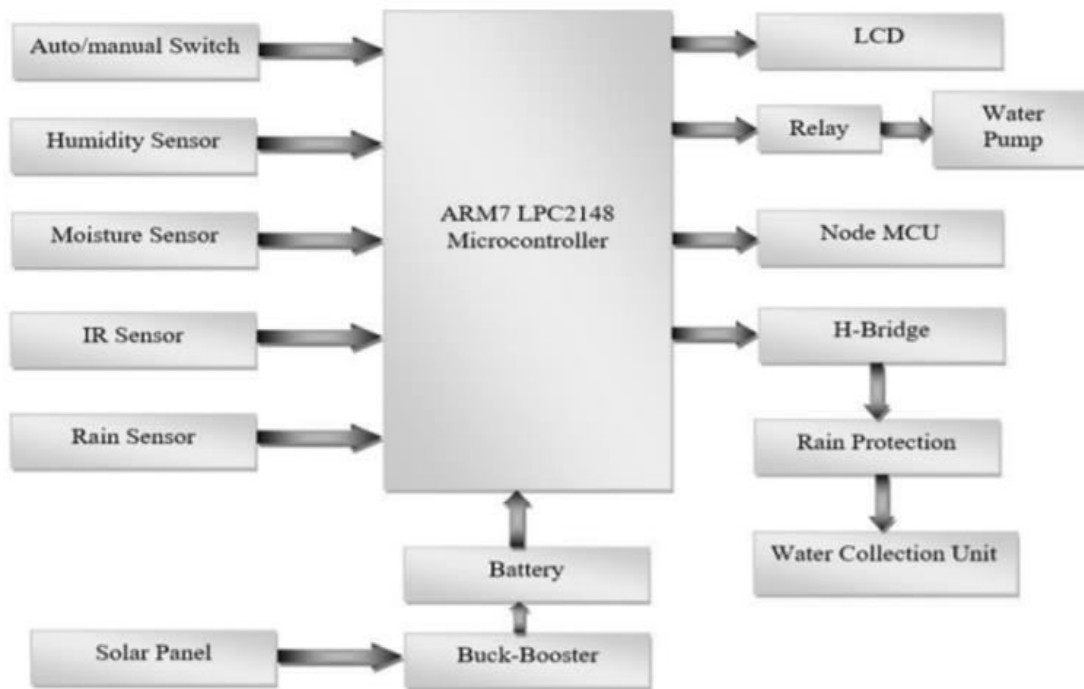


Figure.1 Disaster Management using GPS

### IV. RESULTS AND DISCUSSIONS

We will assemble a little greenhouse which is the area of 75X48 in centimeter. Here we utilized polycarbonate sheets made of unbending plastic that communicates light practically like glass sheet. Here we are concentrated on growing one crop in the greenhouse which is green cold named as Serrano pepper assembled under business crop. It



requires a 23°C-26°C temperature. So temperature is kept up with by setting this worth. Crop needs all around depleted sandy topsoil soil with rich natural content. It requires dampness in the dirt. To keeps the dirt in dampness condition here it is set to 100. On the off chance that the dampness content goes beyond 100, it will automatically close down the water pump through hand-off assuming it is working in automatic mode in any case send the notification to the rancher closure the water pump. Our primary goal is to safeguard and developing the crops during blustery season as numerous ranchers won't get high return during these days because of weighty precipitation. Downpour sensor will tell the presence of downpour comes. In the event that it is weighty downpour, the rooftop top of the greenhouse will automatically be shut and safeguard the crops and totally closures the irrigation interaction. That water is gathered, and it is utilized for different purposes moreover.

In manual mode of controlling the green house the rancher can monitor and control the operations of the green hose through wire application. Every one of the messages in regards to dampness content in the dirt, opening and shutting of boards shipped off the rancher. Rancher additionally control the on and off the water pump by providing the orders as \*PUMP ON# for on the water pump and \*PUMP OFF# for off the water pump as per the got messages in regards to the dampness content in the dirt. We looked at yield from the crops that are developed inside the greenhouse and with typically developed crop.

## V. CONCLUSIONS

As our principal intention to safeguard the crops and along with the generation of power utilizing solar board is laid out and the boundaries to develop the crop agreeing the appropriate environment are made utilizing greenhouse design. Impelling top of the greenhouse assists with safeguarding the crop in any climatic conditions. Utilizing IoT innovation it assists the ranchers with controlling their documented anyplace is basic and presently it is practical. This framework assists with taking care of power supply issue and these aides in yielding.

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