

# DESIGN & DEVELOPMENT OF LOW COST AUTOMATION IN POLYHOUSE

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## ABSTRACT

*In India agricultural management system is not enough to solve all the agricultural problem which cause various problems to the farmers. To solve this issue new type of farming such as poly house farming is used. A poly house is a house in which a simple polythene sheet is used to cover the house which is also called as green house. The use of this poly house or green house is to create a favourable growing condition for the plants. The main objective behind this project is to design a very low cost automation poly house which can be used for rain protection and light control, temperature, humidity and spiral path for spraying the pesticides.*

**Keywords:** *Poly house, Green Houses, Cultivation, Temperature, Humidity*

## 1. INTRODUCTION:

India is primarily a agriculture country. In India today varieties of crops are cultivated in different parts as per the climatic conditions, such as crops which required low climate are grown in the top part of the country ,while which required hot climate are grown in the west part of the country. Hence to provide proper climatic condition to the crops a new type of farming called as poly house farming has been developed. Its main aim is to provide better and suitable climatic conditions to the crops. It provides better income in short period of time with less labour . Its reduces dependency on rainfall and makes the optimum use of land and water resources. Polyhouse farming can help the farmer to generate income by growing multiple crops within short period of time.



## 2. LITRATURE REVIEW :

As per the author Polyhouse prevents the plant from the effects of climate; inspect and so on, which makes great sense for agricultural production. The automation and high efficiency on Polyhouse environment monitoring and control are crucial. Applying ZigBee-based WSN technologies to Polyhouses is a revolution for protected agriculture which overcomes the limits of wire connection systems. Polyhouse is much suitable since light is falling equally into the Polyhouse and the sensor needs to be placed in a place where it is directly subjected to light from the sun.

It is concluded that the better growth, development and yield of tomato were achieved under playhouse due to the higher (optimum) temperature and lower relative humidity during the winter months (December to February) which positively influenced the morpho-phenological and Physiological events of tomato plants. The

growth and development of tomato plant becomes restricted during the cold winter months of December to February because of its season bound nature.

Review and comparison of various Polyhouse systems based on different technologies have been discussed in this section.

**2.1 Wired Technology:**

In wired technology input sensors are directly connected with the microcontroller. Analog output of the sensors is sent to ADC which gives the digital output to the controller for further processing. To obtain the required conditions necessary actions are taken by using the output devices. some surrounding parameters like ambient temperature, humidity percentage, light intensity range and soil moisture content inside polyhouse are controlled

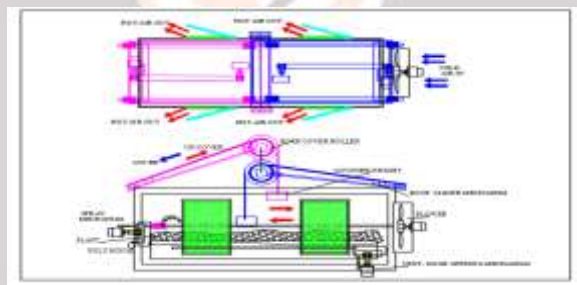
**2.2 GSM Based Technology:**

The atmospheric conditions are changing from place to place, therefore it becomes necessary to make balance in the environment to enhance the quality of crops. To maintain uniform environmental conditions by Android based system can be used The updates about the field condition can be sent to the user through GSM (Global System for Mobile Communication) facility in the form of SMS. The status of environmental conditions can be checked from their mobile phone at any remote location by the farmer. Therefore human efforts are reduced to maintain the suitable condition. There is no ADC required separately if PIC microcontroller is used which reduces the power consumption and complexity of the circuit. If the microcontroller used other than PIC, like ARM and AT89S52 which are not having inbuilt ADC then more power is consumed which enhance the cost of the system. This problem can be solved by using Arduino which is easy to program and has inbuilt ADC.

**3. OBJECTIVES**

Development and analysis of Rain sensing roof – top cover mechanism to cover the poly house roof on the left hand and right hand end automatically .

Design and development of temperature sensing automatic vent door opening mechanism coupled to an axial blower that will drive the hot and moist air out of polyhouse and maintain temperature within specified range.



**4. METHODOLOGY :**

1. Literature Review
2. Mechanism Identification
3. System component identification
4. Assembly of components

SR. NO.	PART NAME		
01	ROLLER	09	BEARING HOUSINGS
02	BEARING HOUSINGS	10	BEARINGS
03	BEARINGS	11	MOTOR
04	ROOF COVER SHEET	12	TIMER BELT
05	SLIDER BARS	13	SLIDER BAR HOLDER PLATES
06	SLIDER BRG HOUSING	14	COUNTER WEIGHT PULLEY
07	SLIDER BRGS	15	COUTER WEIGHT

08	TIMER BELT PULLEY SHAFTS	16	THREAD FOR WEIGHT
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## WHEN IT RAINS

When the rain sensor senses rain it operates the motor which rotates the timer belt drive , the belt moves the cover from right to left on the slider mechanism with help of linear slide bearing to give a very smooth operation in minimum time. Counter weight moves up and ensures that proper tension is maintained in unwinding of the over on the roller drum.

## WHEN RAIN STOPS

When the rain stops circuits operates the motor which rotates the timer belt drive , the belt moves the cover from left to right on the slider mechanism with help of linear slide bearing to give a very smooth operation in minimum time. Counter weight moves down and ensures that proper tension is maintained in winding of the over on the roller drum without any wrinkles.

## 5 USES OF COMPONENTS :

### 5.1 BEARING :

A bearing is the element which provide the desired motion between the two parts. one part of them is fix part and another one is moving part .bearing also reduces friction also reduces friction an prevent motion by controlling the forces, such as axial forces and radial forces.

### 5.2 MOTOR :

An electric motor is a machine which converts electrical energy into mechanical energy. Its acting is based on the principle that when a current carrying conductor is placed in a magnetic fields is a experiences a mechanical force whose direction is given by flening's left hand rule and when magnitude is given by  $F=1311$  Newton  
Construction ally, there is no basic of ference between a D. C generator and a d.c motor. In fact the same d.c machine can be used interchangeably as a generator , shunt-wound or series-wound or compound ;wound. It will be seen that each conductor experiences a force which tends to rotate the armature in anticlockwise.

### 5.3 TIMER BELT :

A timer belt is a component which is transmit the rotational motion from one pulley to another pulley. Timer belt have a tooth at the inner surface. timer belt also called as timing chain or cam belt use in internal combustion engine. it helps synchronous the rotation of cam shaft end crank for proper operation of engine valve.

### 5.4 BLOWER :

A blower is an equipment which blows out high velocity air through nozzle in order to move scrapped particles. such as leafs ,grass, plastic hand bag etc .here the blower is used to blow out the broken pedays of rose.

### 5.5 SPRAYER.

As a name indicated this devices is used to spray some fluid. In this project the sprayer is used to spray the herbicides. Pesticides, fertilizers and even alcohol on the rose plant.

## 6. CONCLUSION:

Traditional farming is popular in India but Polyhouse farming has been introduced to replace this traditional farming. It helps to provides better crop within a short period of time with less time and with low labour cost. It reduces reliance on rainfall & apex usage of land & water resources. Polyhouse farming help the farmers for their living by growing multiple crops. Polyhouse cultivation provides proper irrigation system and reduces the wastage of water. The main advantage is that the system's action can be controlled according to different atmospheric conditions for various types of crops.

## REFERENCES

[1] Baldwin, K. R. "Soil Quality Considerations for Organic Farmers", Organic Production, Center for environmental farming systems (2006), pp.1-14.

- [2] Jonnala P. & Sathyanarayana G.S.R., 2015, "A Wireless Sensor Network for Polyhouse Cultivation using Zigbee Technology", ARPN Journal of Engineering and Applied Sciences, ISSN: 1819-6608, Vol. 10, No. 10, June 2015, pp. 4413-4418.
- [3] Khandelwal S.A., 2012, "Automated Green House Management Using GSM Modem", International Journal of Computer Science and Information Technologies(IJCSIT), ISSN: 0975-9646, Vol. 3 (1) , 2012, pp. 3099-3102.
- [4] Rangan K. & Vigneswaran T., 2010, "An Embedded Systems Approach to Monitor Green House", 978-1-4244-9182-7/10/\$26.00 ©2010 IEEE, pp. 61-65.
- [5] Gautam I. & Reddy S.R.N., 2012, "Innovative GSM Bluetooth based Remote Controlled Embedded System for Irrigation", International Journal of Computer Applications (0975 – 888), Vol. 47, No.13, June 2012, pp. 1-7.
- [6] Pavithra D.S. & Srinath M.S., 2014, "GSM based Automatic Irrigation Control System for Efficient Use of Resources and Crop Planning by Using an Android Mobile", IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE), e-ISSN: 2278-1684, p-ISSN: 2320-334X, Vol. 11, Issue 4, Ver. I , Jul- Aug. 2014, pp. 49-55.
- [7] Jonnala P. & Shaik S., 2013, "Wireless Solution for Polyhouse Cultivation Using Embedded System", IEEE International Conference on Renewable Energy and Sustainable Energy [ICRESE'13], 978-1-4799-2075-4/13/\$31.00 ©2013 IEEE, pp. 21-25.
- [8] Sengunthar G.R., 2013, "Greenhouse Automation System Using Psoc 3", Journal of Information, Knowledge and Research in Electronics and Communication Engineering, ISSN: 0975 – 6779, Vol. 02, Issue 02, Nov 12 To Oct 13, pp. 779-784.
- [9] Pawar A.M., Patil S.N., Powar A.S. & Ladgaonkar B.P., 2013, "Wireless Sensor Network to Monitor SpatioTemporal Thermal Comfort of Polyhouse Environment", International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET), (An ISO 3297:

