

# Grape Farmland Monitoring Using Wireless Sensor Network

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**Abstract:** - In this paper, we have proposed the system for monitoring the growing status of the Grape plants continuously and intimate the agriculturist using wireless sensor network (WSN). The upsurge increase in the technological and scientific innovation makes advancement in agricultural field. But in practice, cultivator faces too much effort in the farmland. This paper makes eases the work of the farmer in cultivated land through the usage of different kind of sensors. The humidity sensor will compute the moisture level in the corn field, if the level decreases, then it automatically switches ON the DC motor. Another sensor is Water level sensor will anticipate the water level, if the water level aloft the level then it switches OFF the motor. All the particulars of farmland are sending to the farmer through GSM and revel in the LCD screen. The temperature sensor will find the intensity of heat present in the soil. PH sensor is used to find the soil alkalinity which is essential for plant nutrition. With this less cost and energy utilization, WSN is a hopeful method for harvesting the grape crop and also improves the quality of the Grape crop and reduces the usage of pesticides, thereby increasing the overall profits for the farmers.

## I. INTRODUCTION

Today, Agriculture plays very important role in country development. To make feasible for the farmer, the automatic monitoring system for grape farmland using different sensors, PIC Microcontroller etc., and transmit the farm information through SMS to the farmer using Global Positioning System (GPS).

Wireless Sensor Network plays important task in monitoring physical, environmental conditions used in the agricultural field, military surveillance, industrial, consumer application, etc., In the agriculture field, wireless sensor network is used to monitor Temperature, Humidity, Soil moisture, Wind, Pressure, and PH. By monitoring the grape growth continuously will achieve better yield with less manpower.

If the canopy growth reaches its threshold value, then the information was displayed in the Liquid Crystal Display (LCD) and also send to the cultivator through mobile RF signal.

[1]Using wireless sensor network (WSN), the Leaf Area Index was monitored continuously for measuring plant growth in forest by LAInet method and the information are shared using cloud computing

[2]The automatic irrigation system will save all the unique stages of plant growth and the message about plant growth are transferred through Zigbee module to the agriculturist

[3]Using Digital Image Processing, the unique stages of plant growth are taken as input image. Based on the captured image with its weather condition, the nutrition material is given to the plant for its better yield

[4]The INTELLIGENT HUMIDITY sensor will automatically monitor the soil moisture level in the farmland with reduced power consumption by collecting only less data which in turn cause more data to be lost in the system and there is no need to monitor and save the bulky data required in agricultural fields

[5]The different types of crops such as Paddy, banana, turmeric fields the canopy growth was monitored by a temperature sensor, humidity sensor, soil moisture sensor and the information about the farm are transmitted using a Zigbee module to the farmer and consume less power by using solar cells

[6]Using the Image Processing, the population of the grape plant count is measured automatically using a digital video camera on the vehicle moving in the distance of 1 to 2m/s. Based on this count, the fertilizers are given to the plant more approximately with avoiding insect attack.

In the proposed system, the Grapes plant is continuously monitored by Temperature sensor, Humidity sensor, Water level sensor, PH sensor and finally the LDR sensor automatically and updates the information about corn plant growth to the agriculturist periodically through mobile phone SMS using Global Positioning System (GPS)

for improving the quality of the grape with better yield by avoiding spraying of chemical substance in the farmland which in turn reduces the insect attack in the grape.



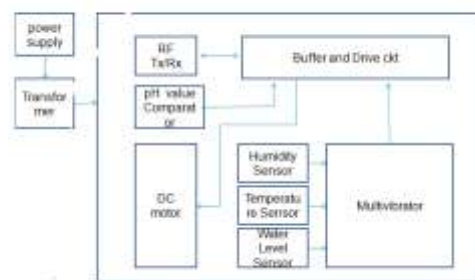
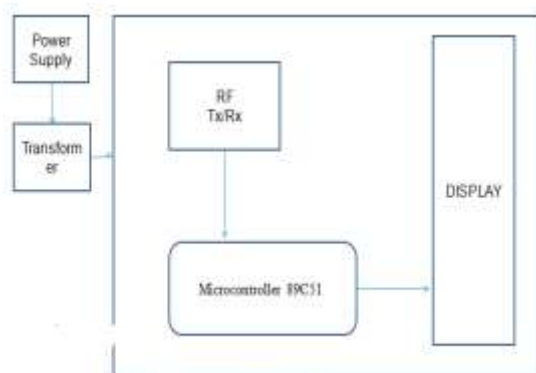
**Fig -1: Stages of grape Plant Growth**

The power consumption is reduced by using Solar cell panel for running stepper motor automatically when the water level becomes low in the farmland and switch off the motor after watering the field with glowing LED. By using PIC16F877A microcontroller, the sensor will sense the temperature of the soil, soil moisture level, water level in the field, the amount of light which falls on the grape leaf for photosynthesis, the amount of acidity in the soil and display the messages on the LCD screen and also update the details to the farmer by connecting GSM using max232 in UART module. The system will make feasible for agriculturist in the modern environment.

## II. SYSTEM ARCHITECTURE

The Architectural model is developed to monitor the grape growth in the farm. The Microcontroller is a low cost RISC processor with multiple features. When the 5v power supply is given to the microcontroller, the sensors which are attached to the controller start sensing the grape farmland. The Temperature sensor will perceive the soil. Temperature in the grape field. If the temperature is high, then intimate to the cultivator through mobile phone SMS via GSM. The humidity sensor will sense the soil moisture level and automatically turn ON the DC motor when the water level in the farm is low.

The DC motor will run on battery supply from the solar cell panel and LED will also glow when the DC motor runs. The water level sensor will sense the water level in the farm aloft or not, if it exceeds then automatically switch OFF the DC motor.

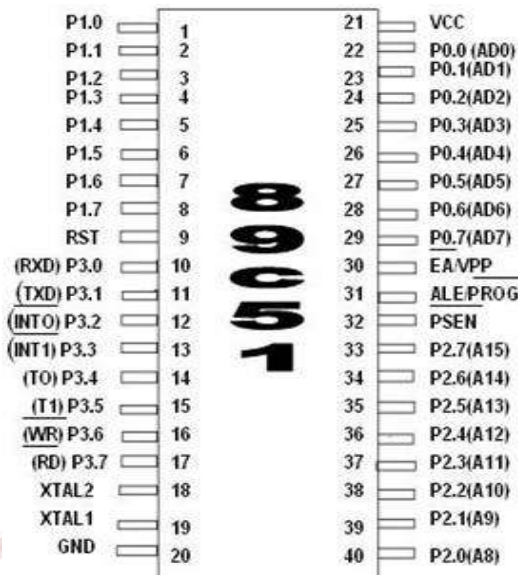


**Fig -2: Block Diagram for Monitoring Grape Growth**

The solar cell arrangement is designed based on the amount of power required to run the DC motor. LDR sensor will perceive the amount of light received by the leaves which is responsible for leaf growth in the Leaf Area Index (LAI) measurement. The PH sensor will identify the alkalinity of the soil caused by the chemical substance applied in the farmland. The LCD display will shows the messages about grape grown in cultivated land. The max232 is used to connect the GSM to the PIC16F877A in UART module. The mobile phone SIM should be registered for sending messages to the cultivator. By using the messages displayed on the cultivator's phone, the corn field situation will periodically know. If any upsurge changes occur, it will inform the cult

### III. COMPONENTS REQUIRED

The microcontroller is based on Harvard architecture with RISC processor developed by Microchip technology. The is a one of the most powerful controller which has 40 pin with itself. The high performance executes the instruction in very high speed within less cost.



It is reliable and easy to interface with its peripherals. The power required for operating PIC16F877A microcontroller is 5v power supply.

Normally grape crop are planted in summer the THERM200 is also another choice for measuring accessible sensor. But for low power consuming,



**Fig -4: Temperature Sensor LM35**

#### 3.3 Humidity Sensor:

The humidity sensor will find the water content in the soil responsible for the soil moisture. In the grape farmland, the humidity of the soil should be maintained by using SY- HS-220 sensor. Based on the humidity of the soil, it will turn ON or OFF the DC motor. It will help the cultivator for producing the good quality corn. Temperature of soil in corn field. The temperature will hold the ranges between 24° to 35°. The LM35 will measure the temperature in the grape farmland

#### 3.4 Water Level Sensor:

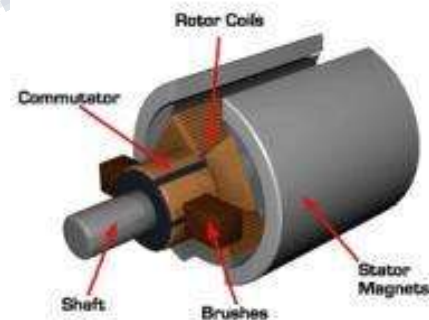
The water level sensor will find the water content level in the grape farmland. If the water level is low or high by using the DC motor the water is supplied to the field using solar power supply.

#### 3.5 PH Sensor:

The PH sensor is very useful in the Grape field to find the alkalinity in the natural or chemical materials present in the soil. The PH of the soil is responsible for its nutrition content. By knowing the PH of the soil, the minerals are sprayed in the grape field without affecting the grape quality.

#### 3.7 DC Motor:

The DC motor is used to watering the grape farm. The DC motor converts electrical energy into the mechanical energy.

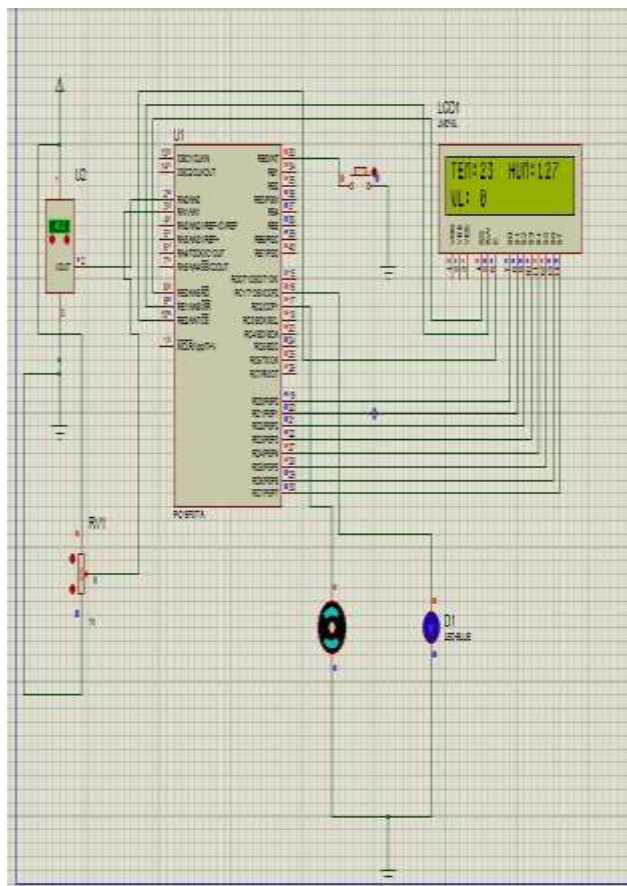


**Fig -5: DC Motor**

Here, the DC motor operates based on the commands from the humidity sensor and water level sensor in the grape farmland. The speed of the DC motor is maintained by voltage applied to it. The Relay will act as a switch for operating DC motor in ON or OFF condition for



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**Fig -8: Schematic output screen2**

## VI. CONCLUSION

The project had resulted as efficient monitoring system for the grape farmland and informs the details about the current situation of the farm to the cultivator by using different sensors. By using solar power source, the power consumption cost required for driving the processor and DC motor is reduced.