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AUTOGRICULTURE – AN HI-TECH AGRICULTURAL FRAMEWORK

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ABSTRACT: *This work deals with the mechanism in which the crops which are grown in the agricultural land is automated by using an Adriano microcontroller and various sensors which can detect the moisture content, level of water in the land, smoke sensing to help the farmers during adverse conditions. A GSM (Global System for Mobile communication) module is used to send an alert message immediately to the landlord and the concerned department of Government if any unavoidable natural disaster affects the agricultural land. A GPS (Global Positioning System) module interfaced with the mobile application (FARMER ASSISTANT) is also employed in order to find the availability of seeds, fertilizers and other materials which are essential for agricultural purpose.*

Key words: *IoT, Global Positioning System, Global System for Mobile communication, Farmer Assistant, Arduino*

I. INTRODUCTION

Agriculture domain plays an important role in a supply chain which is expected to rise in the forthcoming years and in turn the technological development for supporting agriculture. Agriculture originates from desperate human needs; the domain proves to be an utmost importance to facilitate modern complex business processes related to agriculture. With the growth in technological advancements, the monetary growth from agriculture can also be revived. It is possible for farmers to utilize scientific data and technology to improve crop yields and keep themselves updated with innovative methods of farming**.** Each year farmers are facing various snags due to several natural disasters like flood, drought, crop fire. So, in order to help the farmers and to save the crops from getting affected due to unexpected natural and man-made disasters, this innovative technology will act as a helping hand to the farmers.

II. OBJECTIVES

- To prevent damage of crops during monsoon, fire and from excessive drought.
- We are implementing GPS module technology, through which we can identify the exact location of the stores where the fertilizers are available for a reasonable price and to find the availability of crops at a better quality and cheaper rate.
- We are interfacing GPS module with the mobile application (FARMER ASSISTANT) through which we can find the availability of seeds, fertilizers and other materials which are essential for agricultural purpose.

III. LITERATURE SURVEY

[1] Subham Patra and et al (2021) they analysed "Automation In Agriculture" The prototype model of Smart Agriculture System Using IoT has been advanced so that it can be used for Clever Farming, where cost will be a smaller amount and therefore the farmers can screen the sphere situations from anywhere. Temperature sensor, Moisture sensor, water level sensor is deployed to create this technique effective and operative through instructions from smart devices such as cell phone.

[2] K. Swarna Krishnan and et al (2020) they proposed "Self-Automated Agriculture System using IoT" it comprises a

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GPS based robot to accomplish tasks like weeding, spraying, moisture sensing, bird scaring, keeping care, etc. It needs smart irrigation with clever control and best result making based on precise real time data.

[3] Dr. Abul Bashar (2019) this paper depicts "Agricultural Machine Automation Using IoT Through Android" The proposed method in the paper uses the android application to mechanize the machines that are implemented in the agriculture with the use of IoT. The machine mechanization ensures that the works are done robotically without any human intervention.

[4] Anjali Chandavale and et al (2019) they investigate "Automated Systems for Smart Agriculture" This paper will help in the development of a system which will overcome the flaws in the existing automated agriculture systems.

[5] Ramesh B and et al (2017) they implemented "Automated Agricultural System for Multipurpose Activities of Farmers" This project includes smart warehouse management system which includes temperature and moisture maintenance, theft and fire detection in the warehouse and brings the real time notifications through GSM without human intervention.

III. METHODOLOGY

NATURE OF THE SOIL:

Agro Climatic Zones	Soil Type
Western Zone	1.Red Loamy 2. Black
Cauvery Delta Zone	1. Red Loamy 2.Alluvium
Southern Zone	1. Coastal Alluvium 2. Black 3. Red Sandy soil 4. Deep red soil
High Rainfall Zone	1. Saline Coastal 2. Alluvium 3. Deep Red Loam

- Farmers are facing increasing pressures from climate change, soil erosion, and bio diversity loss and from consumers changing tastes in food.
- Determination of harvests is a significant issue for agribusiness arranging. It depends on a few circumstances like production rate, market worth and government rules.
- Numerous specialists concentrated on forecast of yield pace of harvest, expectation of climate, soil order and harvest grouping for horticulture arranging, utilizing insights strategies or AI procedures. Assuming there is extra decision to establish a yield at a time with the restricted land asset, then decision of harvest is a riddle.

CROPS TO BE CULTIVATED:

The cultivated plant species are cereals (wheat, barley, rye, rice, corn, sorghum, etc.), pulses, roots and tubers (potatoes, yam, etc.), fruits, and vegetables.

SEED AND FERTILIZER AVAILABILITY AT CENTER:

The GPS module is interfaced with the mobile application (FARMER ASSISTANT) through which we can find the

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availability of seeds, fertilizers and other materials which are essential for agricultural purpose.

MOISTURE OF THE LAND:

The moisture content in the land is detected by the moisture sensors and it implements the mechanism.

CLIMATIC ALERT:

The various climatic conditions that affects the crops are Flood,Drought,Crop fire.Hence these type of natural disasters, which affects the crops, can be avoided by employing various sensors that are available in the market. Those sensors are Gas sensor,Water level sensor,Moisture sensor.

CROP SELLING POINT:

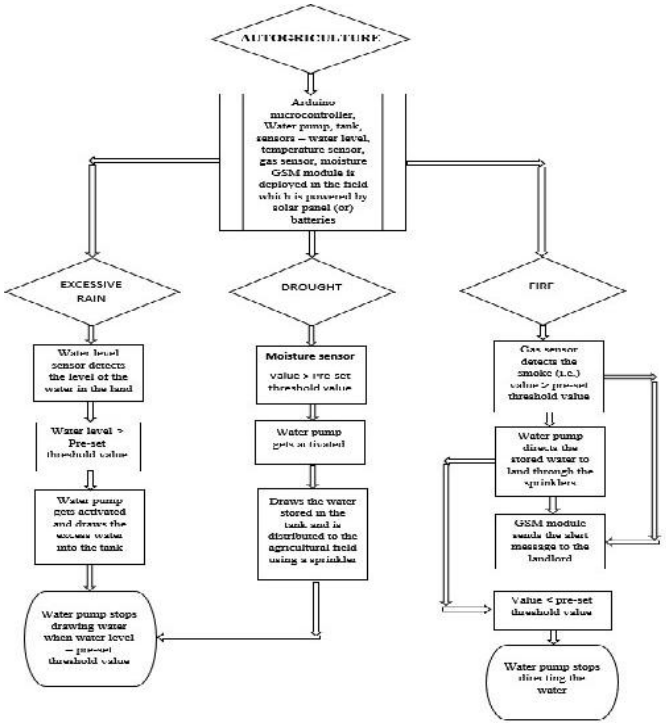
The search of crops selling stores is interfaced in our FARMER ASSISTANT ,so that it will help farmers to reach the crop selling point at ease.

ALL INFORMATION SENT THROUGH SMS:

- All the above mentioned conditions and informations are sent to the farmer through SMS.
- GSM module is being implemented, to send SMS to the registered mobile numbers such as landlord's number and concerned department.

IV. FLOWCHART

FIGURE 1: PATTER OF STEPS FOR AUTOMATED AGRICULTURAL SYSTEM



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V. NATURAL CAUSE AND ITS SOLUTION

DURING FLOOD:

Due to excessive rains during monsoon, crops get damaged due to stagnation of water in the fields. Hence the moisture sensor is employed in order to measure the moisture content of the soil and if the moisture content exceeds the threshold level, then the water pump which is situated in the agricultural land will start to run and hence the excess water in the land will be drawn by the water pump and it will be stored in the water tank. A water level sensor is employed to detect the level of water in the agricultural land. Hence these kinds of problems can be kept under control.

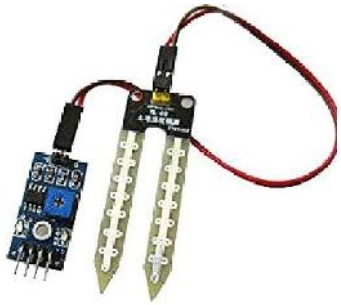

FIGURE 2: MOISTURE SENSOR

FIGURE 3: DAMAGED CROPS DUE TO FLOOD

DURING CROP FIRE:

In case of crop fire, a gas sensor is employed to detect the smoke spontaneously. Once it is detected, the water pump starts to spray the water from the water tank directly on the crops, using sprinklers to control the fire.

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FIGURE 4: WATER PUMP

FIGURE 5: CROP FIRE

DURING WATER SCARCITY:

During water scarcity, the crops get affected, therefore the moisture sensors which is deployed can be used to measure the moisture content of the soil. In case, if the moisture content is less than the threshold value, then the water pump starts to run and draws the water from the tank into the agricultural land. Hence the land can be saved from getting affected during summer season.

ALERT THE LANDLORD:

- Further, the greater loss is being avoided by sending a message to the registered owner's mobile, to the landlords of adjacent fields and concerned department of Government using GSM Module.
- The amount of energy required to power the sensors and to drive the water pump can be obtained by a solar panel installed in the agricultural land or using batteries.

FIGURE 8: GSM MODULE

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AVAILABILITY CHECK FOR THE FERTILIZERS USING GPS MODULE:

In the current world, there is a plethora problem faced by farmers each and every day. The main problem which needs to be addressed is the fertilizer purchase. The availability of fertilizers is becoming a big issue. So, in order to buy the fertilizers for their agricultural land, the price and quality of the fertilizers which is being used for their agricultural land will be a stymie factor for the farmers. So, in order to overcome these kinds of issues, we have implemented the GPS module for the exact tracking of the fertilizer store, where these fertilizers can be bought for a reasonable price and before there is a demand being created for the fertilizers.

FIGURE 9: GPS MODULE

VI. CONCLUSION WITH FUTURE SCOPE

Farmers are the backbone of our nation. Hence, this innovative technical advancement will be grateful in helping them by using this immense idea which will be user-friendly for the farmers. By using this idea, the farm land can be prevented from getting affected by various natural/man-made calamities like fire, drought and flood. This idea which is being implemented is cost efficient and more over, the farmers will get benefited by this idea.

REFERENCES

1. J. Burrell, T. Brooke and R. Beckwith, "Vineyard computing: sensor networks in agricultural production", *Pervasive Computing*, vol. 3, no. 1, pp. 38-45, Jan.-Mar 2004.
2. T. Brooke and J. Burrell, "From ethnography to design in a vineyard", *Conference on Designing for user experiences*, pp. 1-4, 2003.
3. Ning Wang, Naiqian Zhang and Maohua Wang, "Wireless sensors in agriculture and food industry—Recent development and future perspective", *Computers and Electronics in Agriculture*, vol. 50, no. 1, pp. 1-14, 2006.
4. S. Balamurugan, N. Divyabharathi, K. Jayashruthi, M. Bowiya, R. P. Shermy and Dr. R. Gokul Kruba Shanker, "Internet of Agriculture: Applying IoT to Improve Food and Farming Technology", *International Research Journal of Engineering and Technology (IRJET)*, vol. 03, no. 10, pp. 713-719, Oct 2016.
5. T. Kalaivani, A. Allirani and P. Priya, "A survey on Zigbee based wireless sensor networks in Agriculture", *3rd International Conference on Trendz in Information Sciences & Computing (TISC2011)*, pp. 85-89, 2011.
6. Clement Atzberger, "Advances in Remote Sensing of Agriculture: Contex Description Existing Operational Monitoring Systems and Major Information Needs", *Remote Sensing*, vol. 5, no. 2, pp. 949-981, 2013.
7. Prosanjeet J. Sarkar and Satyanarayana Chanagala, "A Survey on IOT based Digital Agriculture Monitoring System and Their impact on optimal utilization of Resources", *IOSR Journal of Electronics and Communication Engineering (IOSR-JECE)*, vol. 11, no. 1, pp. 01-04, 2016.
8. Cambra Carlos, Sendra Sandra, Lloret Jaime and Garcia Laura, "An IoT service-oriented system for agriculture monitoring", *IEEE International Conference on Communications (ICC 2017)*, 2017.
9. M. S. Mekala and P. Viswanathan, "A Survey: Smart agriculture IoT with cloud computing", *International conference on Microelectronic Devices Circuits and Systems (ICMDCS)*, pp. 1-7, 2017.