

# Soil Monitoring Robot to Detect Level of Carbon, Hydrogen and Nutrition Inside the Soil

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**Abstract-**The research aims to find the extent of use of Soil monitoring Robot in farming to get good quality of crops and do farming with the help of organic fertilizer. The main objective is to provide better healthcare by using the organic fertilizer in the farming. Soil related data is retrieved from the robot and is used to get analysis of the parameters of the nutrients in the soil. It is important to understand the current extent and use of IT in the agriculture.

**Keywords-** Soil monitoring, organic farming, use of robot

## I. INTRODUCTION

Technology has played an important role in the agricultural industry. Today, crops can be grown in the desert through agricultural biotechnology. Using this technique, plants have been designed to survive in dry conditions. Through genetic engineering, scientists have managed to introduce features into existing genes in order to produce crops that are resistant to pesticides.

In dry areas, such as the deserts, farmers have already received technical irrigation crops. A good example is in Egypt, where farmers use water pumps to collect water from crops from Nile. Most of these farmers do rice plantation that requires lots of water, so they use advanced techniques to enhance irrigation to grow the rice. They use advance sprinkle to irrigate farms, which helps crops get enough water, which is critical to their growth. Many a time's farmers mix some different fertilizers in order to enhance the Soil fertility.

Organic fertilizers are carbon-based compounds that increase plant productivity and growth quality. They have a variety of benefits for fertilizers, which including the following:

Nontoxic food

On-farm production

Low capital Investment

- Safe Environment

## II. AIM AND OBJECTIVE:

To help farmers detect the fertility of the soil and increase the crop productivity using new technology.

To guide farmers about use of fertilizers and pesticides.

## III. REVIEW OF LITERATURE

Study conducted by Prem Prakah Jayaram, CSIRO DP&S Flagship, Canberra, Australia 2601, conducted an IOT enabled application in Digital agriculture domain [1]. Tadashi Okada, conducted study on it. It is examined whether the problem of agriculture in Japan can be solved with Information Technology [2]. Hyunjoong Kang, USN/IoT Convergence Research Department, ETRI (Electronics and Telecommunications Research Institute), Daejeon, Korea, conducted study on managers expected to establish and adjust next schedules, store and analyze multidimensional information [3]. Anu B. Titus, AMMACHI Labs, Amrita School of Engineering, Amritapuri Campus Amrita Vishwa Vidyapeetham, Amrita University, India, conducted study on vision system for coconut farm cable root [4]. S. Jaiganesh, Department of Agriculture Engineering, Mahendra Engineering College, Namakkal (TN), India, Conducted study on using IOT in agriculture to improve food and farming technology [5]. S. R. Prathibha, Conducted study on IOT based monitoring system in smart agriculture [6]. Informatics can fulfill its promises in developing countries only in agriculture care.

## IV. METHODOLOGY

The research survey was conducted at the Vasai west farming area, India. Production happens in more quantity in Vasai area.

The literature review does not support sufficient data to understand the use and awareness of Information Technology amongst agriculture. Hence, Quantitative approach was implemented to understand the same. Survey method was used to get data. Questionnaire and Face-to-face Interviews were conducted to get appropriate information from the respondents.

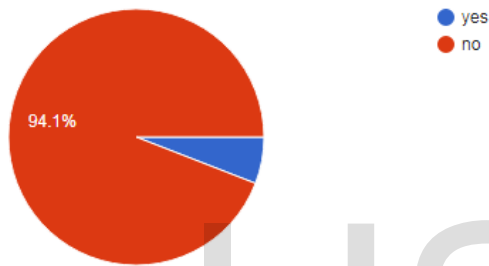
By doing the literature review we decide to make the robot for agriculture which can detect the various types of nutrients in the soil. The robot is made up of various types of sensors in it. The robot will be placed on the farm and this robot will collect the soil samples of soil around every 10 meters across the farm. After this sample of soil is collected the robot will store some amount of soil in it and will take the reading of soil, like what nutrients are missing in the soil and what kind of nutrients or fertilizers are needed to make the soil fertile enough for the production of crops. After the sample reading is done, the data

will be stored over the cloud. The Data will get synchronized to the farmer's smart phone, but some of the farmers are illiterate, so we are also implementing the voice message which will be given by the phone in the language understood by farmers.

The testing is done by robot on weekly basis, If robot analyzes that some element level is getting decreased weekly, then the robot will send alert message to the farmer through cloud, the notification tell the user to click on the particular button to send the particular data to the nearby expert, the expert will analyze the data and give report to the farmer.

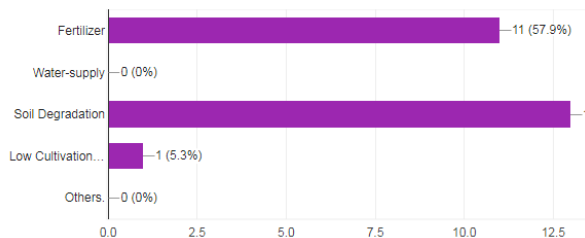
**V. RESULT AND DISCUSSIONS**

A study was conducted at Vasai west farming area. Review of 20 farmers was taken, to conduct the use of IT in agriculture amongst them through questionnaire. A total of 1 farmer (5.9%) demonstrated that they are doing organic farming. While 19 farmers (94.1%) use Non-Organic fertilizers in their fields.



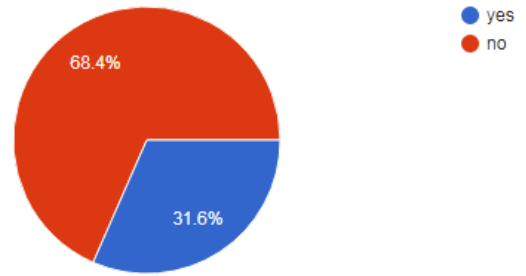
**Fig 1: Use of Organic Fertilizer in the farming**

It has been observed that the farmers are suffering from the various problems of farming. Some problems are like Fertilizer, Water-supply, Soil Degradation and Low-cultivation.



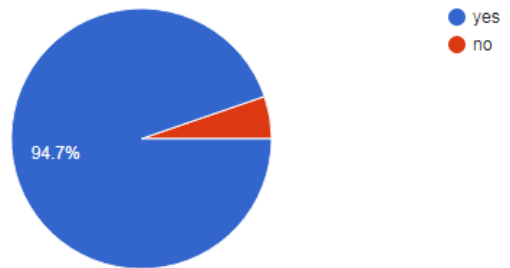
**Fig 2: Different Types of problems farmers are facing**

The study also states that the farmers don't have knowledge that which fertilizer is to be used on which crop to improve the productivity without affecting the soil. Only total of 6 farmers (31.6%) know which type of fertilizer to use on which crop, while total of 14 farmers (68.4%) don't know.



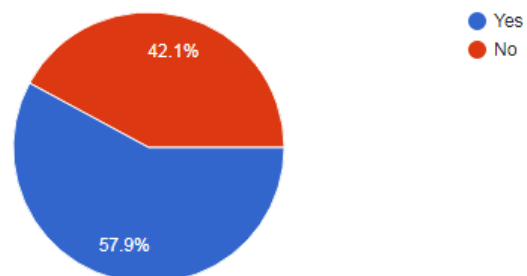
**Fig 3: Proper use of fertilizer to the particular crop**

It has been studied that how many farmers are using any electrical equipments or any other technologies which will help in farming. Total off 18 farmers (94.7%) use the technology in farming. While 2 farmers (5.3%) don't use.



**Fig 4: Use of any technology in farming**

As shown in the Fig. 5, it has been observed that how much amount of water and fertilizers are required to the crops is known to the farmer or not. Total of 11 farmers (57.9%) know quantity of water and fertilizer to use in the crop, while 9 farmers (42.1%) don't know.



**Fig 5: Use of water and fertilizer on crops the farmers knows**

**VI. PROPOSED SOLUTION**

The robot is made up of various types of sensors in it. The robot will be placed on the farm and this robot will collect the soil samples of soil around every 10 meters across the farm. After this sample of soil is collected the robot will store some amount of soil in it and will take the reading of soil, like what nutrients are missing in the soil and what kind of nutrients or fertilizers are needed to make the soil fertile enough for the

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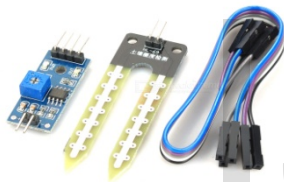
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### I. Equipment Required

- Soil Moisture Detector Sensor .



- PH Detector Sensor



- Raspberry Pi



### VII. CONCLUSION AND SUGGESTIONS

The research finding indicates the low level of use and awareness of use of technology in the farming. Farmers don't have the knowledge of use of technology in the farm. So we can implement the robot that can help the farmers to increase the cultivation of the crops. This includes measures such as increasing IT in a agriculture.

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