

# **IOT in Crop Production**

## **i. Abstract**

### **1. Objectives**

The Internet of Things (IoT) is transforming the agriculture industry and enabling farmers to contend with the enormous challenges and predicament situations they face. Internet of Things in Farming can really boost farmers status and our country's economy. We will try to solve the basic problem of utilizing complete area of the farming land taking consideration the weather, resources and the land to cultivate using hardware inputs and some manual inputs through application on Mixed Integer Linear Programming (MILP) algorithm.

### **2. Beneficiaries (For whom)**

Our vision is to provide maximum output a farmer can get from his field so as to live a good life.

### **3. Value of results (Use)**

1. Project pushes forward the possibilities in agriculture. Maximum production means maximum profit to farmers and so as to the government.
2. It will provide moral boost to the farmers. Countries agriculture sector can once again somehow hold its back. Possibility of 5% - 15% rise in production.

## **ii. Background**

India is a developing nation and an agriculture major country. Our honorable PM Mr. Narendra Modi talks about Smart Cities. We can put smartness in every object possible. We have heard a number of incidents where farmers are not able to maximize their crop production. In this project we are trying to take into consideration wide number of factors which involves in crop production. Internet of Things in Farming can really boost farmers status and our country's economy. We will try to solve the basic problem of utilizing complete area of the farming land taking consideration the weather, resources and the land to cultivate by Mixed Integer Linear Programming (MILP).

## **iii. Statement of Problem**

The Internet of Things (IoT) is transforming the agriculture industry and enabling farmers to contend with the enormous challenges they face. The industry must overcome increasing water shortages, limited availability of lands, difficult to manage costs, while meeting the increasing consumption needs of a global population that is expected to grow by 70% by 2050. (Reference: [Food and Agriculture Organization of the United Nations](#))

Our scope of problem is how to best utilize complete area of the farming land to increase productivity. I don't think that our current approach is friendly enough to be used by a farmer but surely will be one day. Maximizing the output from a field is not just affected by one or two possible factors.

#### **iv. Research**

##### **1. Present methods of tackling the problem**

There are number of companies working towards providing best possible ways to ameliorate agricultural problems like farmx which provides information about water stress in crops and many others like farm mobile and cropx.

##### **2. Proposed Solution**

Farmers will get suggested crops for their owned agriculture land, crops to plant for best profit to the farmers and way to plant the crops in their shape of land. This all will be provided in an easy to use android application. In our solution proposed we will be crowd sourcing a number of components for calculation like selling price of seeds and cost price of crops.

##### **3. Novelty of Approach**

Our solution focuses on providing solution to the farmers not just giving them numbers and analytics. Our prototype promises answers to a number of basic questions in farmers mind.

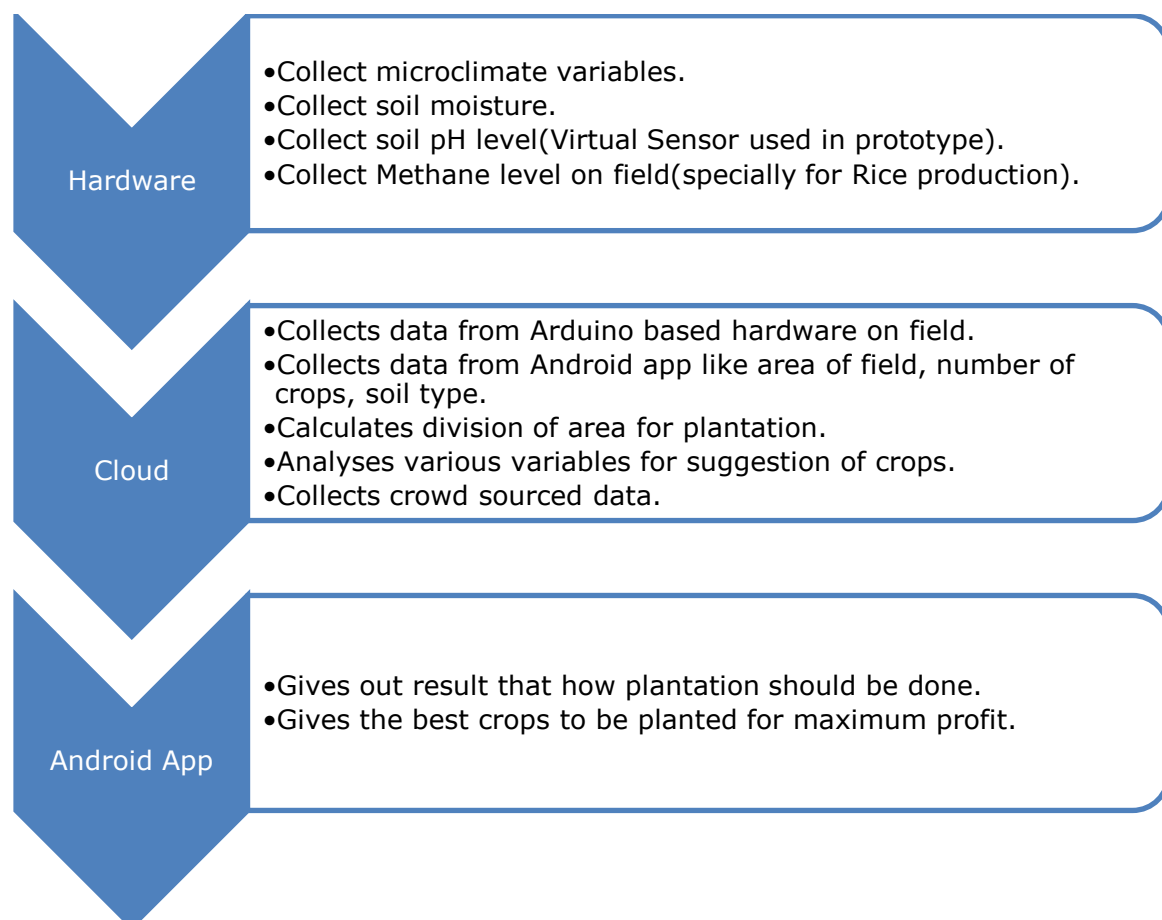
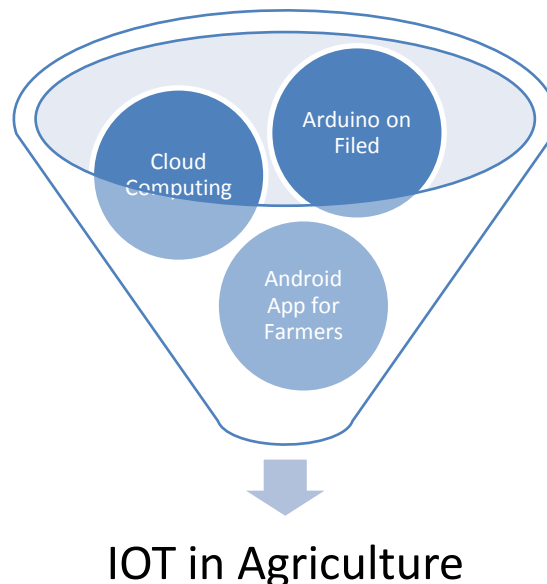
#### **v. Technical Report**

##### **1. Description of concepts, theories or approach involved in the proposed solution**

It depends on a number of factors which we will be treating as variables in our program. This project can be subdivided into 3 phases i.e., Algorithm to solve the problem, hardware to gather the physical information of the field and the surroundings and third is integrating the hardware with a user accessible interface on the cloud. Arduino will be the board we are focusing on to be used for the project with integration of a number of sensors physically present like humidity, temperature, soil moisture, pH sensor etc and some of them would be virtual sensors to be used. IBM Bluemix will be used for hosting the application on the cloud and node-RED for prototyping and visualizing the working of complete application. Mixed Integer Linear Programming or MILP is the algorithm which is to be used to generate the output. Inputs in the algorithm will be variables like Soil Moisture, Soil Acidity, Atmospheric Temperature, Atmospheric Moisture, Field Size, Number of Crops, Type of Soil, pH of Soil, Rainfall pattern in the Area and many more. We would be considering all the factors in the algorithm. The program will give the outputs like division of field for the crops and which plants to be planted. Output's provided will really help

the farmers optimize their productivity. As we have become the second largest country operating Smartphone's, the outputs will be provided in a very interactive Android application with a beautiful user interface.

## **2.Detailed technical specifications and pictorial representations (block diagrams/ flow chart)**



## **vi. Application**

1. Educated farmers can easily use this application to maximize their profits.
2. Food producing organisations and companies can use to maximize their profit and fulfil the needs of population.
3. Crowd sourcing will not bias the prices of the crops and reduce corruption in marketing of agricultural goods.