

## **Business Case: Smart Irrigation System**

### **1. Background**

Measuring soil moisture is a constant concern in the agriculture industry. Soil moisture level indicators help farmers to know what is happening at the root zone of a plant. The level indicators detect the amount of moisture content in soil and sprinkle the water as per requirement.

Soil moisture level indicators aid proper irrigation management for better yields. Knowing the right soil moisture conditions in the field helps less usage of water to grow a crop ideally. It will also enhance yields and crop quality with improved soil moisture management during critical plant growth.

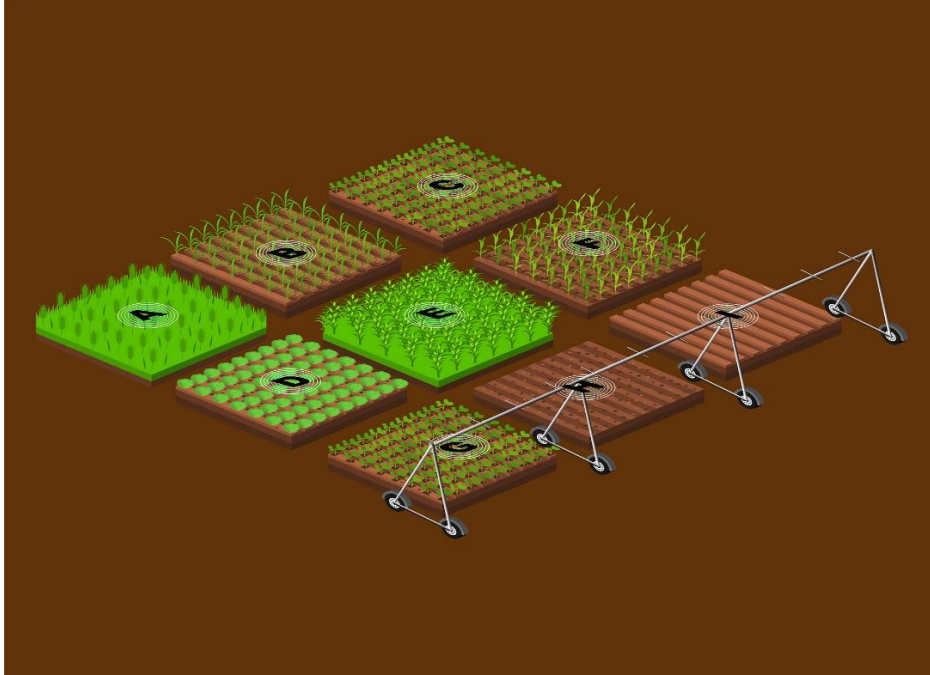
IMCS is building a product that will help the farmers in evaluating the moisture level based on sensors. This application will help the farmers to understand and manage the moisture level in the fields to get better yields

### **2. Guidelines**

- a) You can code in any preferred programming language and the solution can be displayed either as a Windows, Web or a mobile application
- b) Total time allotted for coding is 6 hours (9am to 3pm).
- c) You will be asked to present your work after the development.
- d) Your presentation or demo should be planned to strictly adhere to a duration of 5 minutes. Additionally, 2 minutes is allotted for Q/A with the judging panel.
- e) Strictly, no additional time will be allocated to any individual.
- f) You are allowed to use internet as a resource.
- g) Participation is on individual basis and no other assistance should be taken.

### **3. Scope of the Business Case Analysis**

There are 9 paddy fields as shown in the figure 1 marked as A, B, C, D, E, F, G, H, I. The water would be filled in three of the paddy fields at one time on starting the pump. The three paddy fields are listed in connection are ABC, DEF, GHI. Each of these three field series has a sensor which would evaluate and send the details to the application.

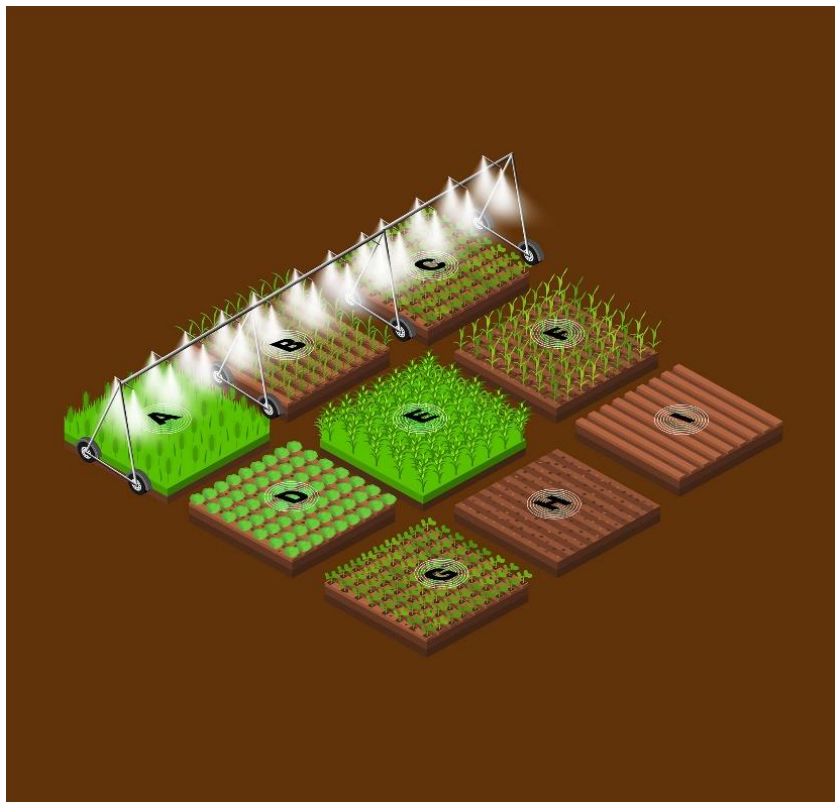


**Figure 1**

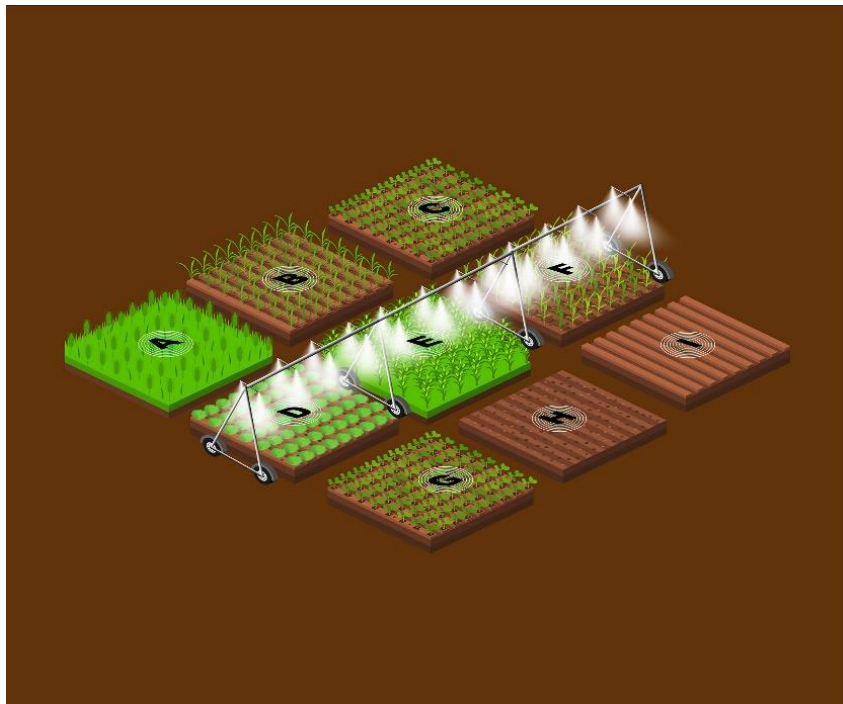
The application would have a start and stop button to control the flow of water. The time required to completely fill the paddy fields with water is provided in the API.

For example, if it takes five minutes to fill water for a set of fields (A, B, C), then the moisture level at the end of the 5<sup>th</sup> minute in fields ABC is 100%. At the beginning of 6<sup>th</sup> minute, the pump in fields EFG starts and continues for the next 5 minutes. If the stop button is clicked at any point, the moisture level would remain at the level and rise once the user clicks the start button.

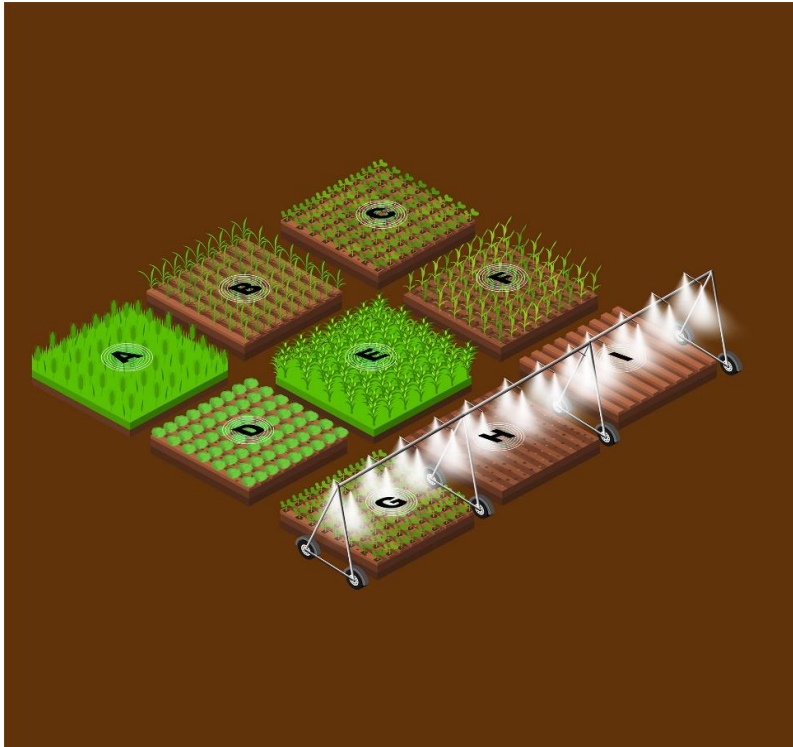
The pattern of fill up is shown in figure 2, 3, 4.



**Figure 2**



**Figure 3**



**Figure 4**

#### 4. Requirments:

- i. Registration: The application should allow the user to register with the following details:  
First Name  
Last Name  
Email Address  
Phone Number
- ii. Authentication: While registering, the application should incorporate one of the authentication concepts like Retinal Scan, Touch ID required while login.
- iii. Business logic: Once the user logs in, he needs to consume the web API to perform the calculations. This API will provide the data to calculate the time required to fill water in each field set (ABC, DEF, GHI).  
Based on the data provided, the user needs to write the business logic to compute the calculations of moisture level in each field at any point based on the Start and Stop button.
- iv. Display the computation results of moisture level should be displayed on the map based on the user activity of starting and stopping the water flow.

Links for the APIs:

- i. To register the user:  
Type: Post  
<http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/api/data/adduser?username=abc&password=xyz>
- ii. To authenticate the user:  
Type: Get  
<http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/api/data/getuserlist?username=admin&password=admin>
- iii. To get time:  
<http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/api/data/gettime>

Links to the images:

<http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/images/irrigation.jpg>  
[http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/images/irrigation\\_1.jpg](http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/images/irrigation_1.jpg)  
[http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/images/irrigation\\_2.jpg](http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/images/irrigation_2.jpg)

[http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/images/irrigation\\_3.jpg](http://ec2-3-14-152-181.us-east-2.compute.amazonaws.com/images/irrigation_3.jpg)

## 5. Evaluation Criterion

| Criterion            | Attributes   |
|----------------------|--|
| Registration (10%)   | <ul style="list-style-type: none"> <li>Without verbal explanation, can the readers grasp the intent of the analysis?</li> </ul>    |
| Authentication (10%) | One of the below <ul style="list-style-type: none"> <li>Thumb</li> <li>Retina</li> <li>Face recognition</li> </ul>                 |
| API (20%)            | <ul style="list-style-type: none"> <li>Usage of APIs</li> <li>Justification of the usage</li> </ul>                                |
| Logic (40%)          | <ul style="list-style-type: none"> <li>Logic used</li> <li>Functionality</li> <li>Data representation</li> </ul>                   |
| Presentation (20%)   | <ul style="list-style-type: none"> <li>Knowledgeable on subject matter</li> <li>Presentation Skills</li> <li>Q/A skills</li> </ul> |

### Bonus Points:

- To consume the API calls – 10 Points
- To implement the UI – 10 Points

If a user has difficulty with consuming the API or implementing the UI, please ask the company's representative for a sample code. However, the participant would not be eligible for the Bonus points.