**Phase 1 Report**

Farming has become increasingly risky with uncertain natural growth processes of crops, weather, disease, pests, other site-specific factors, and lack of support services. The production risk is apparent. Currently, farmers are using manual, labor intensive methods to assess in-situ variations based on their experience and knowledge. There are numerous precision agronomy tools available in the market for balancing field variations and maximizing healthy growth. Mostly they are electronic sensors that attach to machinery to take remote sensing measurements. Although these technologies have increased our ability to understand and monitor field variations, equipment and software are very expensive, technologically advanced, require too much technological support, and do not represent the local field variations.

The main aim of this project is to develop a mobile application that uses low-cost remote sensors to deliver easy to understand, robust information to farmers enabling the precision application of fertilizer and other inputs. guidelines will be developed to indicate plant health and growing condition, nutrient and water deficiencies/excesses. The final product will be a mobile application and a web browser-based information dashboard that compares baseline dataset and farmer’s images and provides site-specific information and

advice. It is expected that farmers upload images acquired from fixed low-cost sensors either to the mobile application or information dashboard - the selection depends on the farmer’s choice. The subsequent processing as determined by the outcome of this research project will be done in the background, eliminating complexity and ambiguity for the end-user. The information that the farmers receive in a mobile application or information dashboard will be straightforward and make it easy to determine the best course of action to maintain or increase crop yields. The mobile application works offline unless the user needs to share information with others. Internet connection is required if the farmer decided to use a web browser-based information dashboard instead.

**Dataset:**

The dataset is being generated on the daily basis. The dataset is being made on the two plants. The two plants are Soya and the corn. The images are being captured from the farms and being stored in the computer storage. The data will be divided by the categories. Once the data is collected the data will be processed. The images that are collected will be processed. The images will be in RGB colour and the data will be processed into the particular size and then the data set will be ready.

The images will be of following type:

A picture containing outdoor, grass, green, tree

Description automatically generated

**Challenges:**

1. Camera
2. Image uploading
3. Storage

For the camera, the following observations have been made. Comparing the MAPIR and the low-cost camera these are the following results.

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| **MAPIR Camera** | **Sony Raspberry pi HQ camera** |
| 12 MP | 12.3 MP |
| Cost starts from $ 400 | Costs  $ 70 |
| Need Manual intervention to store images | Can be stored in the cloud by connecting through raspberry pi |
| Runs on battery | Runs on connection with raspberry pi |

The images can be uploaded directly to the cloud using the raspberry pi. Raspberry pi can be programmed in such a way that the information can be directly stored in cloud. As of now the images can be uploaded to google drive. The search for better storage service to continue the further process is going on.