Phase 2
Defining Research Questions

A **research question** is "a question that a research project sets out to answer". Choosing a research question is an essential element of both quantitative and qualitative research. Investigation will require data collection and analysis, and the methodology for this will vary widely. Good research questions seek to improve knowledge on an important topic and are usually narrow and specific.

In this project we have focused on the three major areas of the research topics. The topics can be mostly concentrated on the areas of the plant's soya and the corn. The users will be uploading the images to the portal and get the results. This will be flowing through different areas to get the result. 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 application can bring the benefits of precision agriculture to a more diverse group of farmers and can be tailored for specific crops and conditions. The output will be as the result of the following machine learning process and gives the suggestions to the end user. 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. The research questions are as follows:

1) what properties and orientation of fixed remote sensors can best capture images of popular crop varieties?
2) what relationships between plant health and nutrients, canopy cover, soil properties, weather, and information derived from these images can be used to inform farmers regarding crop health and site-specific treatments?

3) How to develop a mobile application and a web browser-based information dashboard to deliver actionable information and advice derived from previous measurements?

In the farming industry, while taking pic of the crop the camera position makes the best role for covering most of the best in the picture. As picture will be the main area to work on and the images. The images captured and will be taken to the process and the valuable information will be derived. The derived values will be helpful for the process of the plant life cycle and he user to know the health of the crop.

The relation between the plant health and the nutrition, soil will play a vital role in the images. The data collected from the images can be used to identify the soil and temperature such that the data will be helpful to the farmers in the long run. The other essential elements *are referred to as* plant nutrients*,* and are provided by the soil, or are added as fertilizers, and enter plants almost exclusively through the roots. Most soils have at least some residual nutrients. Only a soil test can assess this. Fertilizing without the results of a soil test leads to a waste of money and product and can exacerbate an existing nutrient imbalance. Some gardeners do not say that they garden, but rather that they work the soil. This reveals an understanding that good soil conditions are essential to support productive plant growth. Here are a few gardening tips related to soil management. In addition, sometimes nutrients are present in sufficient supply but are unavailable because of too high or too low pH. A soil test can reveal this, and a soil lab professional or crop consultant can recommend practices to resolve such problems. I want to work on the images and get the images from it.

The mobile application plays one more important rule. The images can be organised and sent to the cloud for the process. The result of the research will be a mobile application and a web browser-based information dashboard that can allow small, beginning and even established farmers to reap the benefits of precision agronomy with a small capital cost. Timely information delivered to the farmers, based on imagery captured of their crops, will be easy to understand and actionable. Using information delivered by the mobile app will allow inputs to be adjusted to increase yield.