# Project Guideline: Idea Proposal Submission

## Project Idea

## Title: Crop Care

### Problem Definition

The project aims to develop a predictive healthcare system for agriculture that leverages machine learning to detect diseases in tomato plants at an early stage. By focusing on disease detection in tomatoes, the project seeks to improve crop yield and quality, which is particularly important for farmers in underdeveloped regions.

### Specific Goal

To create a model that accurately detects diseases in tomato plants using image data, and to provide recommendations for appropriate fertilizers. Additionally, the project will incorporate weather forecasting to optimize crop management and enhance agricultural productivity.

## Relevance to Sustainable Development Goals (SDGs)

**SDG 3: Good Health and Well-being**

The project indirectly contributes to SDG 3 by promoting agricultural health and food security, which are essential for overall community well-being.

**SDG 1: No Poverty**

By improving crop yield and quality, the project helps reduce poverty by increasing farmers' income and ensuring food availability, thereby supporting economic stability in underdeveloped regions.

## Literature Examples

**Paper Title**: "Deep Learning for Image-Based Tomato Disease Detection"

Summary: This research demonstrates the application of deep learning models to detect various diseases in tomato plants from image data, achieving high accuracy and providing a basis for real-time disease monitoring systems.

**Paper Title:** "Agricultural Disease Diagnosis Using Machine Learning"

Summary: The study explores various machine learning algorithms for diagnosing diseases in crops, showcasing the potential of these technologies in enhancing agricultural productivity and sustainability.

## Describe Your Data

## Data Description:

* Source: The data will be sourced from Roboflow, a platform providing annotated datasets for computer vision tasks.
* Format: The data consists of high-resolution images of tomato plants in formats such as JPEG and PNG.
* Size: The dataset includes thousands of images, with an approximate size of 5 GB.
* Preprocessing Steps: Data preprocessing involves resizing images to a standard resolution, normalization of pixel values, and data augmentation techniques like rotation, flipping, and contrast adjustments to increase dataset variability and enhance model robustness.

## Approach (Machine Learning or Deep Learning)

Chosen Approach: YOLO v8 Model (You Only Look Once, version 8)

* Justification: The YOLO v8 model is chosen due to its high efficiency and accuracy in real-time object detection tasks. Its architecture allows for fast and precise detection of diseases in tomato plant images, making it well-suited for this agricultural application. YOLO v8's ability to process images in a single pass enables rapid disease diagnosis, which is crucial for timely intervention and effective crop management.

The project will also provide recommendations for suitable fertilizers based on the detected diseases and incorporate weather forecasting to offer comprehensive crop care solutions, enhancing overall agricultural productivity and sustainability.