**SDG Problem Definition Document**

**Sustainable Development Goal 2: Zero Hunger**

Our project addresses SDG 2, which aims to "End hunger, achieve food security and improved nutrition and promote sustainable agriculture" by 2030. We also touch on SDG 13 (Climate Action) and SDG 15 (Life on Land) due to the interconnected nature of sustainable agriculture.

**Problem Statement**

Smallholder farmers face significant challenges in optimizing crop yields in our target region, leading to food insecurity and economic instability. Specific issues include:

a) Limited access to data-driven insights for decision-making

b) Suboptimal farming practices due to lack of information

c) Vulnerability to climate change and unpredictable weather patterns

d) Inefficient use of resources (water, fertilizers) due to lack of soil condition data

e) Significant yield gaps between actual and potential crop production

Relevance and Importance

*3.1 Regional Impact:*

Our target region experiences a 50% lower productivity compared to its potential

Approximately 30% of the local population faces food insecurity

3.2 Economic Implications:

Annual loss of $2.5 billion due to suboptimal yields in the target region

Average farmer income is 40% below the national average

3.3 Environmental Concerns:

Overuse of fertilizers leading to soil degradation and water pollution

Inefficient water use in agriculture, exacerbating regional water scarcity

3.4 Social Impact:

Rural poverty rate is 25% higher than the national average

Increasing rural-urban migration due to declining agricultural livelihoods

Project Contribution to SDG 2

Our "AgriInsight" dashboard addresses these challenges by:

*Improving Agricultural Productivity:*

Providing real-time crop yield predictions based on historical data and current conditions

Offering farm size analysis to optimize resource allocation

4.2 Enhancing Sustainability:

Tracking soil conditions to guide optimal fertilizer use and crop rotation

Integrating weather data for climate-smart agriculture practices

*Empowering Smallholder Farmers:*

Delivering actionable insights through an easy-to-use Excel dashboard

Enabling data-driven decision-making for improved yields and income

*Supporting Food Security:*

Aiming to increase overall crop yields by 25% within the first year of implementation

Reducing crop losses through better planning and resource management

Expected Outcomes

25% increase in crop yields within the first year of implementation

15% reduction in water usage through optimized irrigation scheduling

$500 million potential increase in farmer incomes across the target region

20% improvement in soil health index scores over three years

Alignment with SDG Targets

Our project specifically addresses the following SDG 2 targets:

2.3: Double the agricultural productivity and incomes of small-scale food producers

2.4: Ensure sustainable food production systems and implement resilient agricultural practices

2. A: Increase investment in rural infrastructure, agricultural research, and technology

Data Sources and Methodology

Our project integrates data from:

Farm records: Historical yield data, farm sizes, crop types

Weather stations: Temperature, rainfall, humidity data

Soil testing labs: pH levels, nutrient content, organic matter

Satellite imagery: For vegetation index and land use analysis

We use SQL for data management and Excel for analysis and dashboard creation, ensuring accessibility for agricultural officers and farmers.

Scalability and Future Impact

While initially focused on our target region, the AgriInsight dashboard has the potential for wider implementation. Its Excel-based format ensures easy adoption across various technological landscapes, making it suitable for scaling to other regions facing similar agricultural challenges.