

# AGRiSPHERE

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## Team NEBULA

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# The Problem



***Traditional agricultural practices and heuristic decision-making diminish farmers' profitability.***

## Description:

Farmers relying on empirical/traditional methods and lacking access to data-driven insights often make uninformed decisions, leading to inefficient practices, lower crop yields, and reduced profitability, ultimately hindering agricultural growth and sustainability

# Our Solution

***Smart Farming Assistant to improve crop yields and sustainability.***

## Description:

Our Smart Farming Assistant empowers farmers with data-driven insights to optimize resources, boost yields, and cut costs. Through sensors monitoring soil and an app offering tailored recommendations, we promote sustainable and efficient farming. Our solution answers key questions on "which," "when," "how much," and "how" for seeding, fertilization, irrigation, pest control, and harvesting.

# Hypotheses



1. Farmers often rely on **traditional practices** or advice from others to make farming decisions, which may lead to less informed choices.
2. Farmers are likely to embrace **mobile apps** for farming assistance due to their convenience.
3. Farmers struggle with low productivity and financial crises, for which they are actively **seeking solutions**.
4. **Medium-sized farmers** with sizable land are more likely to adopt recommendations based on researched methods to achieve better yields.
5. Farmers who use the personalized farming app and soil analysis kit will see an **increase in crop yield** and profits within a single farming season, compared to those relying on traditional methods.

# Questionnaire



1. Are you satisfied with your crop yield?
2. How do you decide which crop to grow and what seed to use for it?
3. What do you find most difficult about managing soil health throughout the irrigation period?
4. How do you currently determine when and how much fertilizer or pesticide to use?
5. What are your biggest concerns regarding pests, animals, or other threats to your crops?
6. How do you currently monitor and plan your harvest timing and methods to ensure optimal yield?
7. What problems impact your crop yield and profits the most?
8. How comfortable are you with using mobile apps or technology for farming assistance?
9. Would you follow our recommended practices if they could help?
10. How significantly do you believe that incorporating scientific farming practices and data-driven recommendations would improve your productivity?

*During the questionnaire we gave basic insight into what the kit does and how the data collected is used by app to give them optimal recommendations and tips about farming practices*

# Interview Summary

## Customer Diversity and Data Collection



<b>Interview Methods</b>	In-person interviews with small farmers in Kadav, Maharashtra (who mostly don't use mobiles), and call interviews with farmers from Maharashtra, Kerala, Rajasthan, Tamil Nadu, and Uttar Pradesh
<b>Farmer Distribution</b>	13 small farmers (< 5 acres), 5 medium-sized farmers, 7 large farmers (> 25 acres)
<b>Family Involvement</b>	Nearly half of family members are involved in farming.
<b>Farming Practices</b>	Most farmers rely on ancestral knowledge and use minimal modern inputs
<b>Satisfaction with Crop Yields</b>	21 out of 25 farmers are dissatisfied with crop yields, mainly due to rain and soil issues
<b>Openness to Technology</b>	17 out of 25 farmers are positive about adopting modern farming methods, especially if others in their community do so.
<b>Investment in Technology</b>	Small farmers hesitate to invest due to financial constraints, needing low-cost, high-impact solutions. 14 farmers support investing in apps or machinery, while 11 are uncertain or disapprove.



# Analysis of Customer Discovery



## Findings

- Dissatisfaction: 84% of farmers unhappy with crop yields.
- Interest in Modern Methods: 68% open to adopting new farming techniques.
- 56% favor tech investments (apps/machinery), 44% oppose.

**Trends:** There is a general agreement towards modernization. Farm owners are still skeptical about the necessity of such sensors but the workers agree with the benefits of these tools.

## Insights

- Demand for education and training in modern practices.
- Financial constraints and skepticism about technology.
- Tailored Interventions: Different needs for small, medium, and large farmers.
- Collective Action Potential: Family dynamics could enhance collaborative farming efforts

## Challenges:

- High cost of farming equipment.
- Limited comfort with using mobile technology.
- Difficulty accessing recommended products (fertilizers, pesticides, seeds).
- Insufficient understanding of farming techniques.
- Rain dependency affecting crop success.
- Skepticism about modern technologies

# Hypotheses Validation



Hypothesis	Results	Remarks
Farmers often rely on traditional practices or advice from others to make farming decisions, which may lead to less informed choices.	Validated	Farmers' dependence on traditional methods and outside advice often leads to poor decision-making in their farming.
Farmers are likely to embrace mobile apps for farming assistance due to their convenience.	Invalidated (Discarded)	Old aged farmers do not view mobile apps as convenient tools for farming assistance and most of the poor farmers do not have smartphones
Farmers struggle with low productivity and financial crises, for which they are actively seeking solutions.	Validated	This hypothesis has been validated, confirming that farmers face low productivity, financial challenges, prompting them to seek effective solutions.
Medium-sized farmers with sizable land are more likely to adopt recommendations based on researched methods to achieve better yields.	Validated	This hypothesis has been validated, showing that medium-sized farmers with sizable land are indeed more likely to adopt it compared to low-class or larger farmers
Farmers who use the personalized farming app and soil analysis kit will see an increase in crop yield and profits within a single farming season, compared to those relying on traditional methods.	Validation Pending	This hypothesis is theoretically validated since research data shows that personalized, scientific methods yield better result than traditional practices

# Customer Value Proposition



An AI powered **mobile app** and a **soil analysis kit**, for **middle-class, middle-aged farmers** in rural areas relying on traditional unscientific farming methods, offering **data-driven recommendations** on **better farming methods**, soil nutrient composition, irrigation methods, crop selection, fertilizers, and pest control strategies, resulting in **higher crop yield** and **increased net sales**

# Pitch & BMC

*Our app and soil analysis kit provide farmers with personalized, real-time recommendations for crops, seeds, fertilizers, and suggests scientific farming practices helping them increase yields and profits*

*By replacing guesswork with data-driven insights, we empower farmers to make smarter decisions and break away from traditional methods—making us the ideal partner for modern, sustainable farming*

## Value propositions

- Data-driven crop, seed, fertilizer recommendations.
- Increases yield and profitability
- Affordable, user-friendly mobile app and kit
- Personalized, real-time insights based on soil data
- Better resource management and sustainability

## Customer Relationships

- Personalized support and training
- Yearly subscription for apparatus maintenance
- Regular updates and farming tips via the app
- Customer feedback integrated into updates

## Channels

- Direct sales at rural markets and fairs
- Mobile app via Play Store(Android)
- NGOs and cooperative partnerships

## Customer segments

- Middle class farmers in rural areas using traditional methods
- Farmers with limited access to scientific data for decision-making
- Farm owners who face challenges in improving yield and profitability
- Farmer groups

## Revenue Streams

- One-time apparatus (kit) sales
- Subscription for yearly maintenance and calibration
- Paid version of the app with premium features
- Data monetization (long-term)
- Partnering with cooperatives and government bodies for bulk purchases

# Product and Solution



Our **Smart Farming Assistant** is a comprehensive solution designed to empower farmers with data-driven insights. It consists of two key components:

**1. Sensor Device/Kit:** It is embedded with sensors to monitor critical soil properties in real-time, including:

- **Nutrient levels:** To assess the availability of essential nutrients for plant growth
- **Moisture content:** To determine the optimal irrigation timing and amount
- **pH level:** To measure soil acidity or alkalinity, which impacts nutrient availability and plant health
- **Temperature:** To track temperature fluctuations that can affect seed germination, plant growth, and disease development.

**2. Personalized App:** App connects to the kit, the data collected is used to parse the big data available through government ventures, and the research data to understand the land's properties and it's best suited recommendations/practices. Key features include:

- **Personalized guidance:** Receive tailored recommendations for irrigation, fertilization, and pest control.
- **Disease diagnosis:** Use AI to identify plant problems and get treatment recommendations.
- **Seed selection:** Find high-yield seeds that are suitable for your region
- **Planting guidance:** Determine the best time and method for planting

**3. Cost:** Tentative costs of final models: 15-20k per acre

# Wrapping up

## Concerns:

- **Upfront Cost:** Farmers may be hesitant to invest in the initial cost of the sensor kit, especially in regions with low financial resources.
- **Adoption of New Technology:** Traditional farmers may resist adopting digital solutions or may need significant training to understand and use the product effectively. so we provide video tutorials to use the kit easily without too much complications
- **Maintenance and Durability:** The sensors and hardware will need to last the promised 3 years, and any failure may lead to dissatisfaction or additional costs for farmers.

## Highlights:

- **AI-Powered Disease Diagnosis:** The AI model diagnoses plant diseases or pest infestations from user-uploaded photos and suggests treatments and preventive measures.
- **Sustainability Focus:** Optimized resource usage (water, fertilizers) leads to environmentally sustainable farming practices.
- **Multilingual Support:** Our app is available in multiple languages, ensuring accessibility for farmers nationwide and eliminating language barriers, so they can easily understand and implement recommendations in their preferred language.