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Roll no	24M0032	**Name**	Darsh Yogesh Butala
Department	Aerospace Engineering	**Program**	M.Tech. (Aerospace Propulsion)
Faculty Advisor(a)	Chandra Sekar Thyagarajan,P J Guruprasad		

Table of Contents

Academic Performance Summary

Year	Sem	SPI	CPI	Sem Credits Used for SPI	Enrolled Semester Credits	Cumulative Credits Used for CPI	Enrolled Cumulative Credits
2024	Spring	8.0	8.43	20.0	20.0	56.0	56.0
2024	Autumn	8.67	8.67	36.0	36.0	36.0	36.0

Semesterwise Details

*This registration is subject to approval(s) from faculty advisor/Course Instructor/Academic office.

Year/Semester: 2025-26/Autumn

Course Code	Course Name	Tag	Credits	Grade	Credit/Audi
AE 726	Heat Transfer - Aerospace Applications	Department elective	6.0		C

Year/Semester: 2025-26/Project

Course Code	Course Name	Tag	Credits	Grade	Credit/Audi
AE 796	I Stage Project	Core course	42.0		C

Year/Semester: 2024-25/Spring

Course Code	Course Name	Tag	Credits	Grade	Credit/Audi
AE 607	Aerospace Propulsion Laboratory	Core course	4.0	AB	C
AE 694	Seminar	Core course	4.0	AA	C
AE 708	Aerospace Propulsion	Core course	6.0	BC	C

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Code	Course Name	Tag	Credits	Grade	Credit/Audi
AE 796	I Stage Project	Core course	42.0		C

Year/Semester: 2024-25/Spring

Course Code	Course Name	Tag	Credits	Grade	Credit/Audi
AE 607	Aerospace Propulsion Laboratory	Core course	4.0	AB	C
AE 694	Seminar	Core course	4.0	AA	C
AE 708	Aerospace Propulsion	Core course	6.0	BC	C
AE 714	Aircraft Design	Additional Learning	6.0	BB	C
AE 899	Communication Skills	Core course	6.0	PP	N
ENT603	Introduction to Entrepreneurship	Institute elective	6.0	BC	C

Year/Semester: 2024-25/Autumn

Course Code	Course Name	Tag	Credits	Grade	Credit/Audi
AE 616	Gas Dynamics	Department elective	6.0	AA	C
AE 681	Combustion of Solid Propellants	Department elective	6.0	AB	C
AE 683	Fluid Dynamics	Core course	6.0	AA	C
AE 705	Introduction to Flight	Core course	6.0	AB	C
AE 707	Aerodynamics of Aerospace Vehicles	Department elective	6.0	BC	C
AE 711	Aircraft Propulsion	Core course	6.0	BC	C
GC 101	Gender in the workplace	Core course	0.0	PP	N
TA 101	Teaching Assistant Skill Enhancement & Training (TASET)	Core course	0.0	PP	N

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Personal Info

Darsh Yogesh Butala Room : H17-4054
Rollno : **24M0032**
Mobile :9819177286
M.Tech.,Aerospace Engineering
DoB : 2002-03-15   Nationality: null

Informtion last updated on 2024-08-03

Cycle of Soil Health Management Challenges

SoilPulse

High-Cost Solutions

Many soil monitoring tools are expensive.
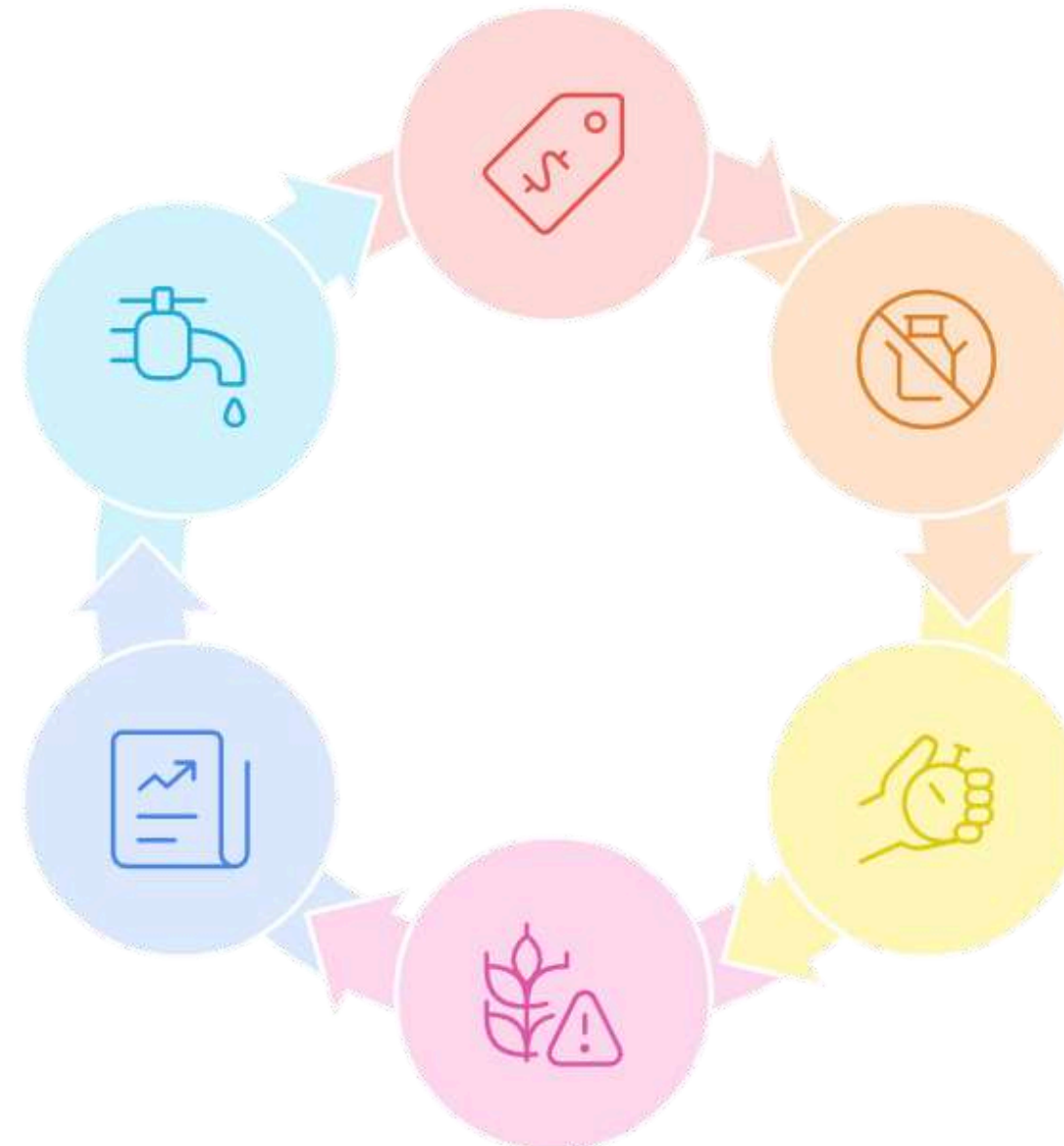
Limited Adoption

Mid-sized farms struggle to adopt solutions.

Delayed Reactions

Farmers react slowly to soil issues.

Crop Health Impact

Delayed actions harm crop health.

Static Reports

Current solutions offer only static data.

Inefficient Practices

Inefficiencies in irrigation and fertilization arise.

SoilPulse Solution Process

Continuous Monitoring

SoilPulse provides 24/7 updates on soil conditions.

Insight Generation

Insights are generated to suggest corrective actions.

App Interface

Farmers interact with a user-friendly app.
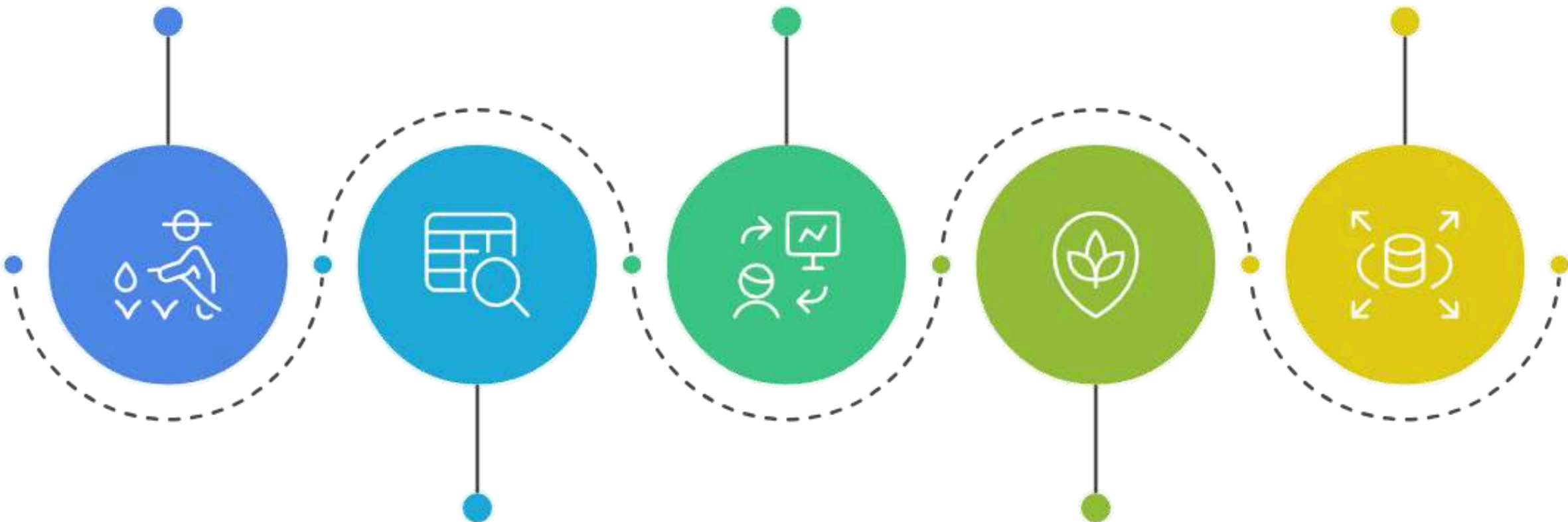
AI Analysis

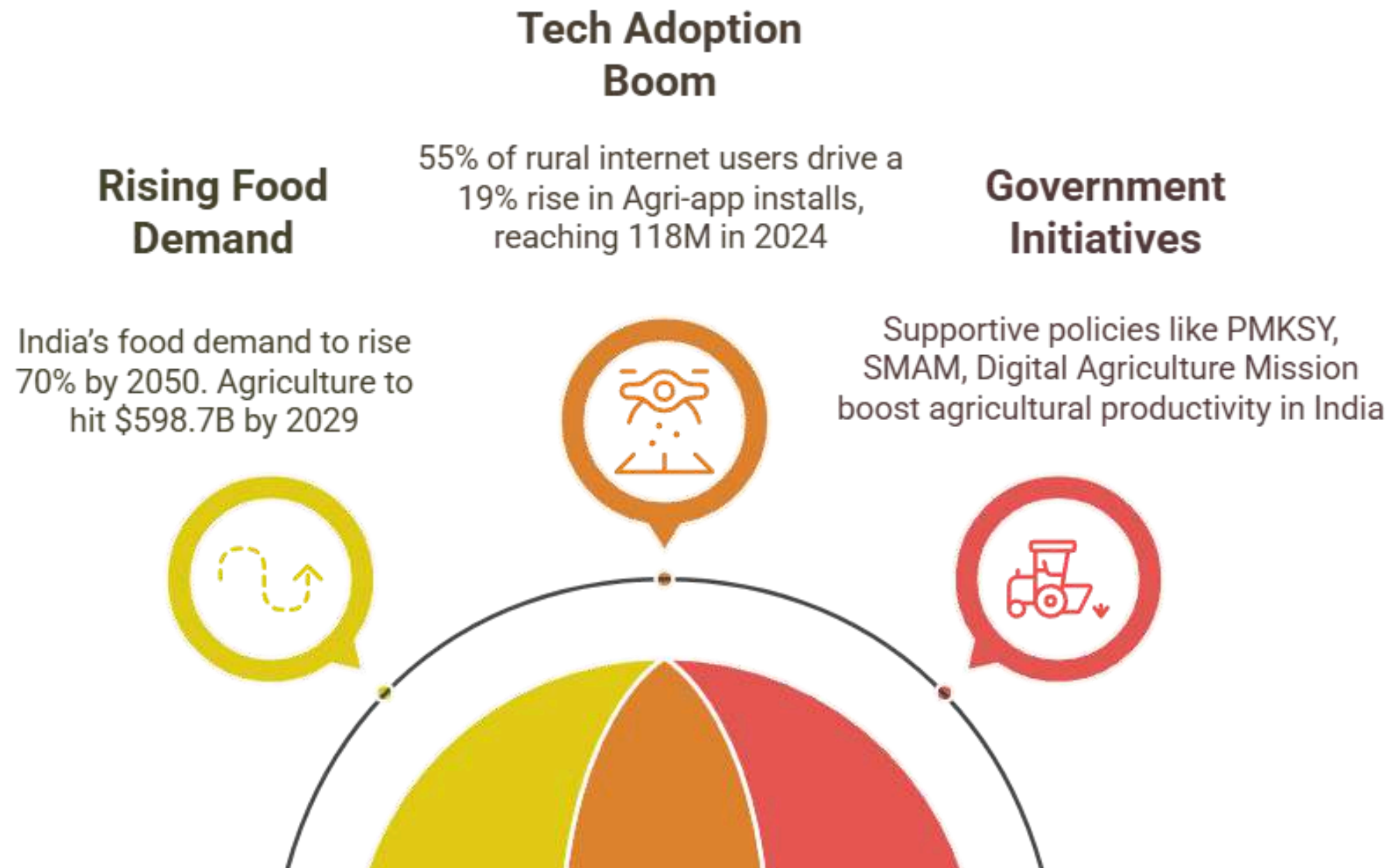Algorithms analyze data to detect imbalances.

Localized Recommendations

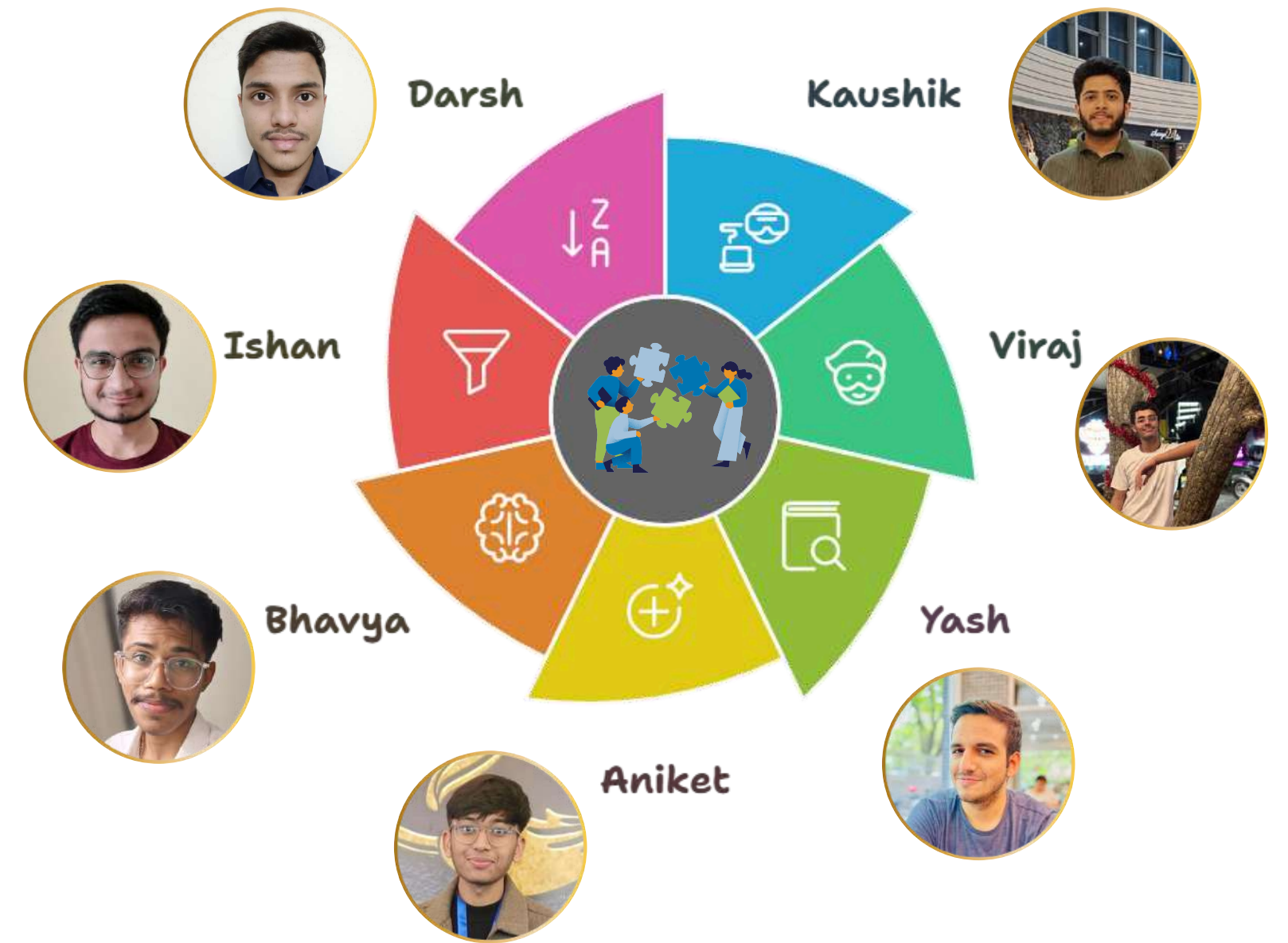Recommendations are tailored to regional data

Why Us?

SoilPulse

Why Now?

Rising Food Demand

India's food demand to rise 70% by 2050. Agriculture to hit $598.7B by 2029

Tech Adoption Boom

55% of rural internet users drive a 19% rise in Agri-app installs, reaching 118M in 2024

Government Initiatives

Supportive policies like PMKSY, SMAM, Digital Agriculture Mission boost agricultural productivity in India

Team SoilPulse Introduction

Mitti ki jaan, kheti ka gyan – SoilPulse kare sab aasaan!

Darsh

Kaushik

Ishan

Viraj

Bhavya

Yash

Aniket

SoilPulse

SoilPulse is a smart, portable device that gives farmers real-time soil health data to improve crop decisions.

THE PROBLEM

- 50% of farmers waste fertilizers and money due to lack of real-time soil data.

- Anthropogenic factors such as poor fertilizer management and lack of soil knowledge account for 40–60% of yield loss risk variation

- Precision insights could boost yields by 20% and cut costs by 15%—but most farmers lack access.

- Farmers unknowingly mine 83 million tonnes of nutrients from soil annually, fueling a slow-motion food crisis

- $23 million wasted annually by Punjab farmers on inefficient fertilizer use

MARKET SIZE

India
USD 991.2 Million

SAM

TAM

Madhya Pradesh
USD 198.24 million

TARGET MARKET

Khargone district
USD 19.24 million

Bediya, Baijapura

According to IMARC Group data:

For TAM:
- Market Size (2024): USD 878.1 Million
- CAGR (2025-2033): 10.93%
- Current Market Value (April 2025):
- Using the 10.93% CAGR:
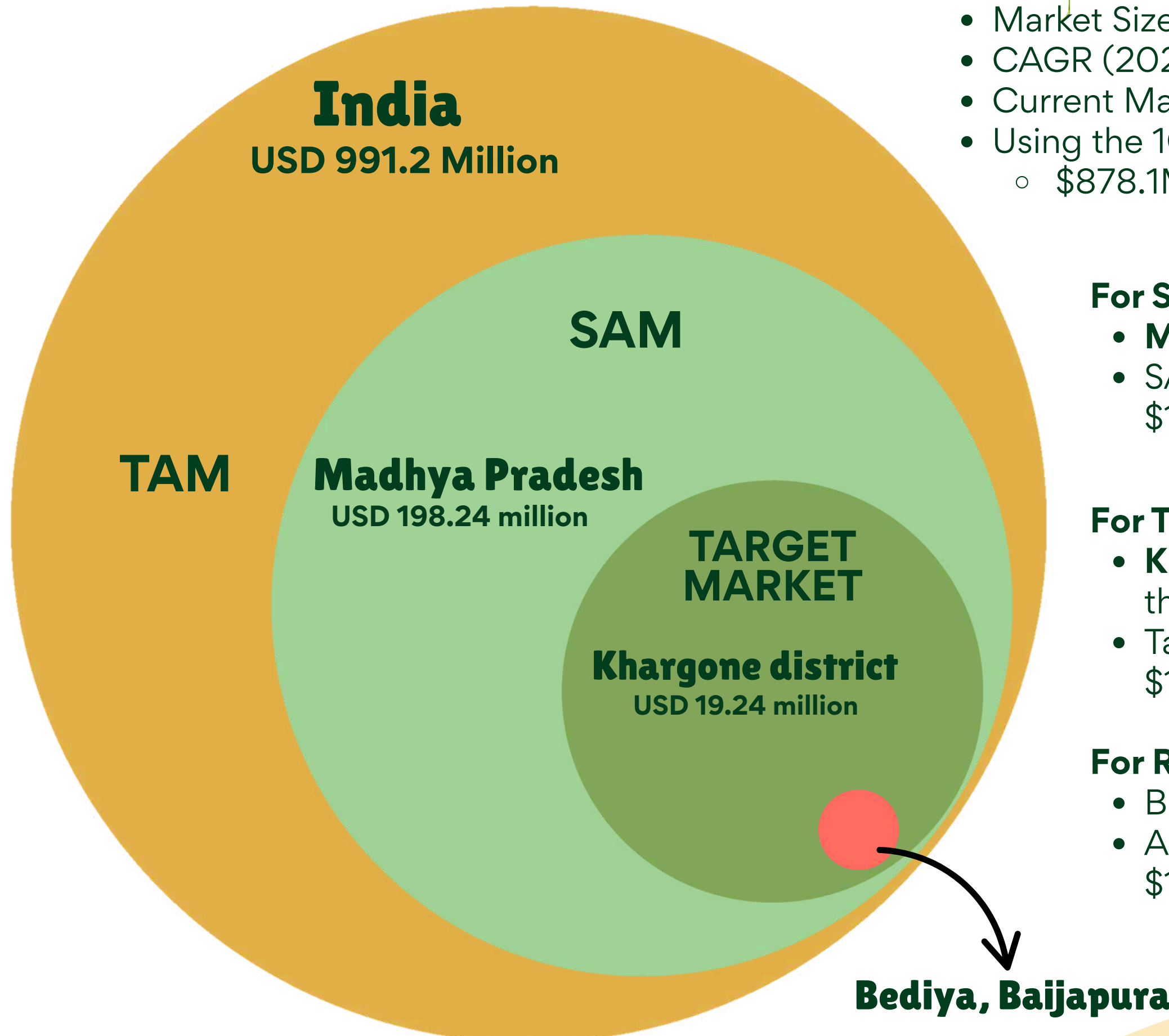 - $878.1M × (1 + 0.1093)^1.3 = USD 991.2 Million

For SAM:
- **MP** contributes approximately 20%
- SAM = 20% × TAM = 0.20 × $991.2 million = $198.24million

For Target Market:
- **Khargone district** represents approximately 10% of the SAM
- Target Market = 10% × SAM = 0.10 × $198.24 million = $19.24 million

For Red Dot:
- Bediya, Baijapura represents 10% of the target market
- Awalya Village Market = 10% × Target Market = 0.1 × $19.24 million = $1924000

SoilPulse

Competition Analysis

Parameter	CropX	Prospera	Arable	Climate FieldView	Typical Labs	SoilPulse
Soil Parameters Monitored	Moisture, temperature, EC	Limited soil data (relies on cameras)	Climate metrics focus	Relies on external soil data	NPK, pH, organic matter, contaminants	Moisture, NPK, pH, temperature, salinity
NPK Nutrient Monitoring	No	No	No	No	Yes	Yes
Predictive Analysis	Partial	Partial	No	Partial	No	Yes
AI-driven Insights	Yes	Yes	Partial	Partial	No	Yes
Response frequency	Real-time	Real-time	Real-time	Real-time	3-10 days	Real-time

Customer Discovery

SoilPulse

Summary:

1. Soil monitoring is non-existant in case of small scale farmers.
2. Medium and large-scale farmers are willing to adapt the technology
3. Farmers in cities typically don't have agriculture as their primary occupation
4. There is a Friction in adoption of technology and newer solutions
5. There is Lack of incentive for city farmers to improve yield since it doesn't affect their livelihood much (in cities)

Customers Met

Professors:

Mr. Pennan Chinnaswamy (CTARA)
Mr. Chaaruchandra Korde (CTARA)

10 Small Scale Farmers:

8 Medium Scale Farmers

4 Large Scale Farmers

Insights

1. Farmers prefer a subscription model over a one time payment.
2. Our Idea is an Opportunity more than a Problem
3. Target Segment is Medium and Large Scale Farmers.
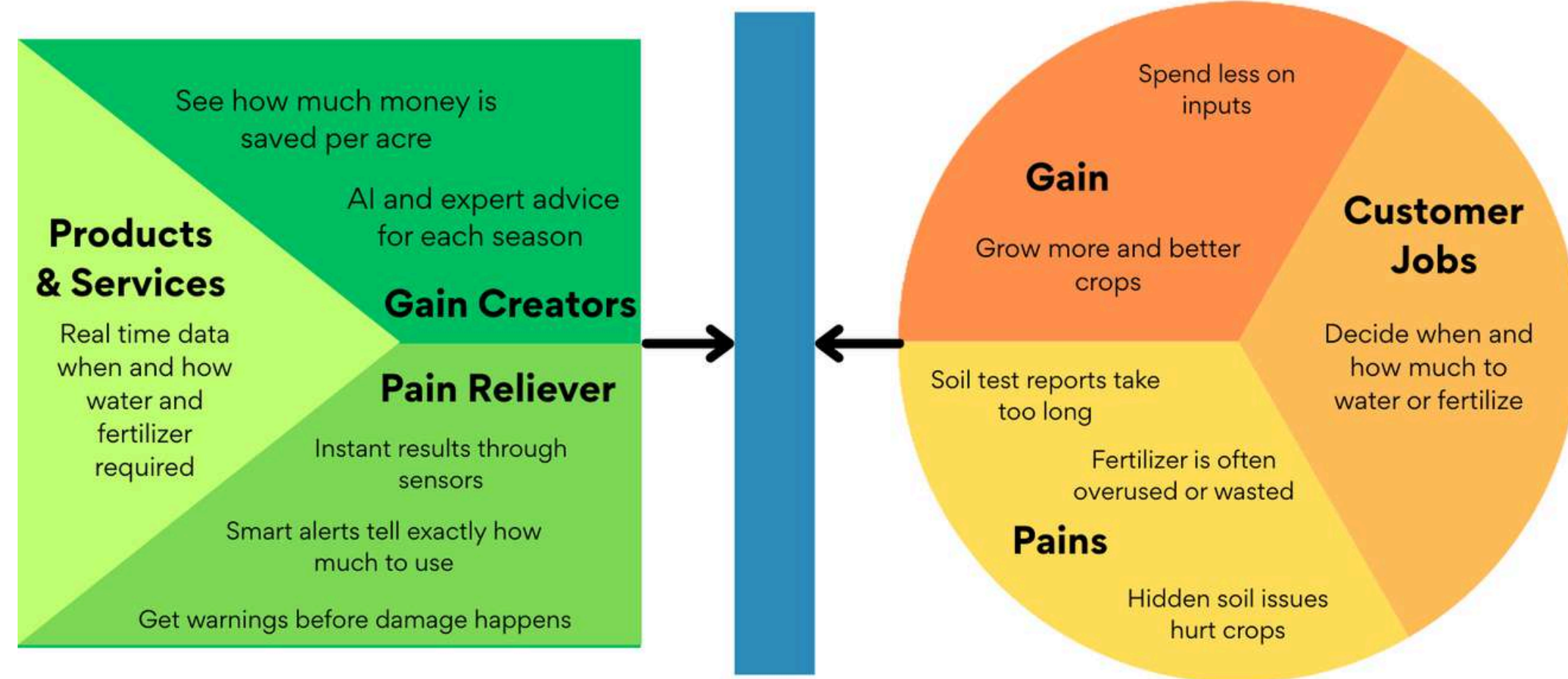4. Farmers prefer using the device throughout the year

Value Proposition

Boosts crop yields by 15–25% through real-time soil insights

Cuts fertilizer waste by 20–30%, saving up to ₹15,000/acre annually

Delivers soil health data 80% faster than traditional methods

Enables better seasonal planning and crop health management

OUR SOLUTION

SoilPulse

VisNIR Spectroscopy
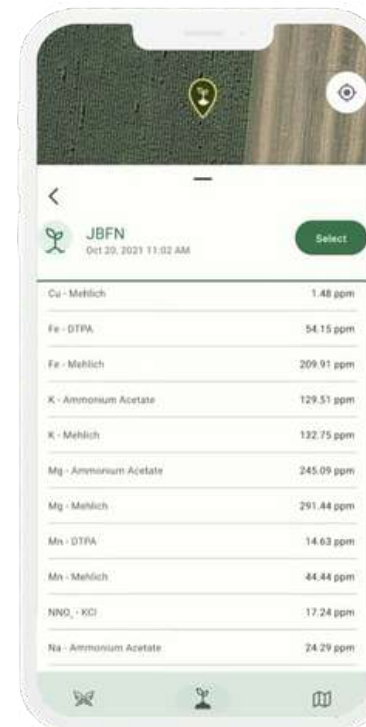- Soil nutrients
- Moisture
- Organic matter

Portable
- One device
- Light weight
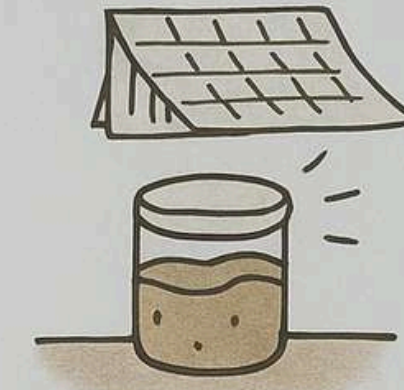- More samples for large area

Realtime Data
- <30 sec
- GPS mapping
- Fertilizers suggestion

STORYBOARD – SoilPulse: Smart Soil Health Monitoring

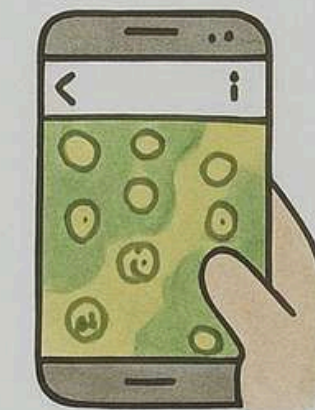Collecting soil samples manually...

Waiting days for lab reports

Using outdated data, leading to crop loss.

SoilPulse scans the soil instantly

Real-time soil insights on mobile in seconds

Better decisions = Higher yield

GO TO MARKET

SoilPulse

Target Audience
- Primary: Mid-scale & large-scale farmers (5+ acres)
- Secondary: Agro-based companies

Distribution Channels
- Direct Sales: Through dedicated field teams
- Channel Partners: Farm equipment dealers, agri-service providers
- Online Presence: Website + e-commerce

Acquisition Costs:
- Cost of demo setup+field agent (~₹5K per village/town/locality)
- Channel partnership setup costs
- Content creation

Awareness Channels
- Field demos – builds trust on-ground
- Newspapers, TV advertisements
- YouTube & WhatsApp – visual, vernacular content

Customer Acquisition
- free trials to large farms in key regions
- Show yield improvement through data
- Use referrals & partnerships to scale

Challenges
- Farmer trust → solved via demos
- Cost concerns → EMI/Govt. support
- Support → with strong field team

Revenue Streams

SoilPulse generates revenue through a subscription based model-
Offering monthly or seasonal rental of our smart soil sensors coupled with app access and also includes

Premium services-
That include expert agronomist consultations and advanced analytics.

This dual model not only helps cover the cost of the hardware but also increases the overall value a customer get by providing ongoing support and useful data insights.

Subscription Revenue (₹)
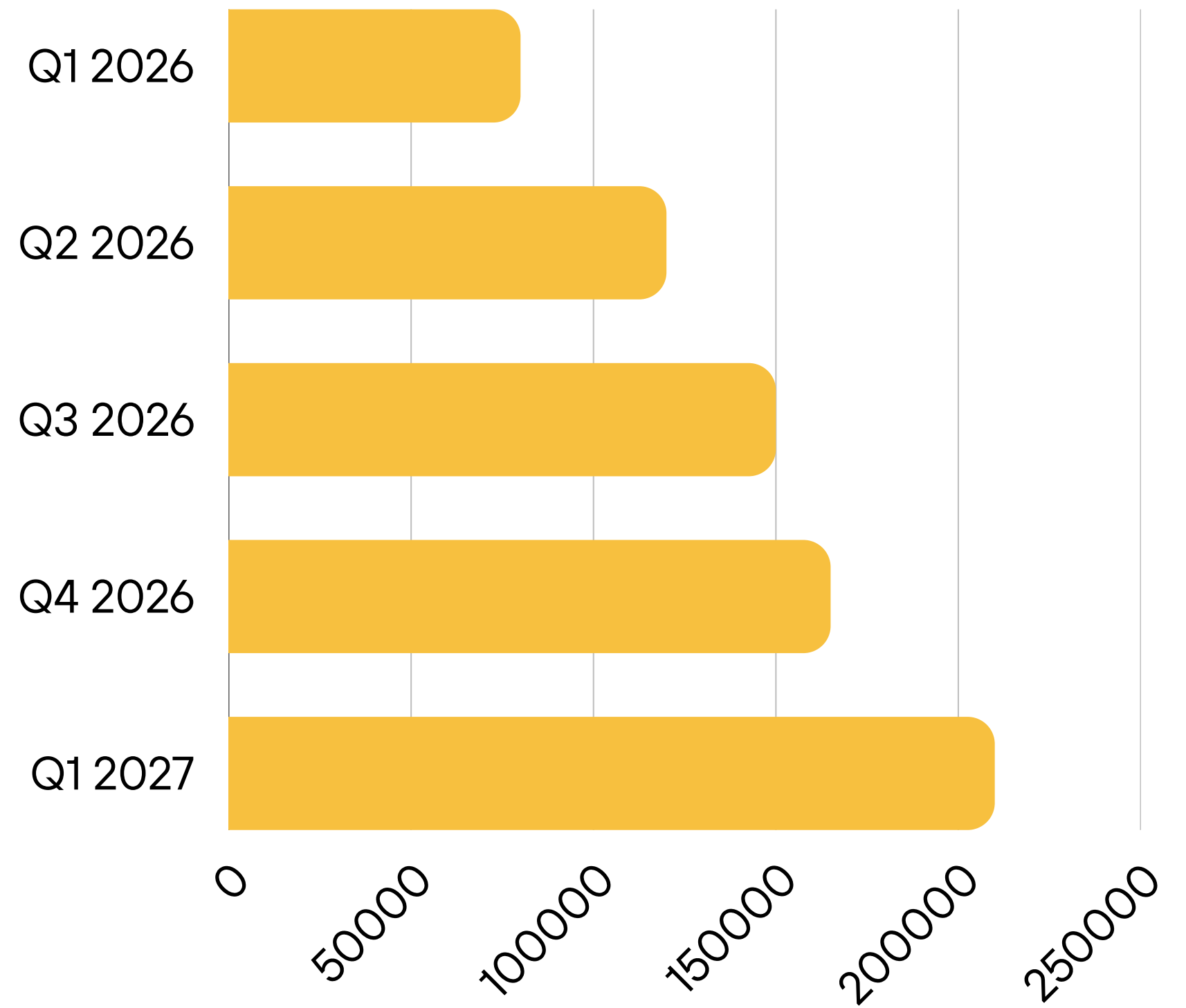
Revenue Streams

SoilPulse follows a rental–based model for its hardware (soil sensors), which means the initial hardware cost is recovered gradually through monthly or seasonal subscriptions.

Since the mobile app and expert consultation services are digital and knowledge–based, they require minimal additional cost to scale. As the number of users increases, the cost per user drops, leading to high operational efficiency.

Over time, this results in 30–40% profit margins, making the business sustainable and highly scalable in the agri–tech sector.

Quarter	Number of Operational Units	Subscription Revenue (₹)	Profits Margin
Q1 2026	6	80,000	4.3%
Q2 2026	8	1,20,000	5.6%
Q3 2026	15	1,50,000	1.5%
Q4 2026	20	1,65,000	1.6%
Q1 2027	32	2,10,000	7.3%

SoilPulse

TEAM

Yash

CSE | 4th year

Darsh

Aerospace | 1st year

Ishan

Energy | 3rd year

Viraj

Electrical | 2nd year

Kaushik

Chemical | 2nd year

Bhavya

Energy | 3rd year

Aniket

Chemical | 2nd year

Mentor

Mr. Pennan Chinnaswamy (CTARA)

SoilPulse

GANTT CHART

SoilPulse

	2025				2026				2027	2028	2029	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				

Product Development

- Proof of Concept
- Beta Prototype
- Second Release (v2)
- Miniaturized Prototype
- Marketable Product (v1)
- New Product R&D

Market Expansion

- Farmers of Bediya village in M.P.
- Madhya Pradesh Farmers
- Punjab / Haryana Farmers
- Other Indian States

Company Building

- Build Development Team (App + Sensor)
- Begin Manufacturing Setup
- Regional Offices / Hubs
- Set Up Customer Support
- Build Sales & Field Ops Team
- Seed Funding / Early Grants
- Series A / Scaling Investment

Financial Projections

SoilPulse

	2025	2026	2027	2028	2029
No. of Units Operational	5	20	100	500	2000
Price Per Unit Per Month	3000	3250	3500	4000	4500
Revenue (Considering 8 month subscription per year)	1,20,000	5,20,000	24,00,000	1,60,000	7,20,00,000
COGS (New Product)	5*30000 = 1,50,000	15*30000= 4,50,000	80*27500= 20,00,000	400*25000= 1,00,00,000	1500*25000= 2,55,00,000
COGS (Maintenance)	-	5*5000 = 25,000	20*3000= 60,000	100*2500= 5,00,000	500*2000= 10,00,000
Sales and Marketing Costs	20,000	60,000	2,00,000	5,00,000	10,00,000
Overheads (Salaries, Warehouses, Factories)	-	-	6,00,000	20,00,000	1,00,00,000

Thank You