



DESIGN THINKING IN AGRICULTURE

INNOVATING SUSTAINABLE FARMING PRACTICES

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ABOUT US

GET TO KNOW US BETTER

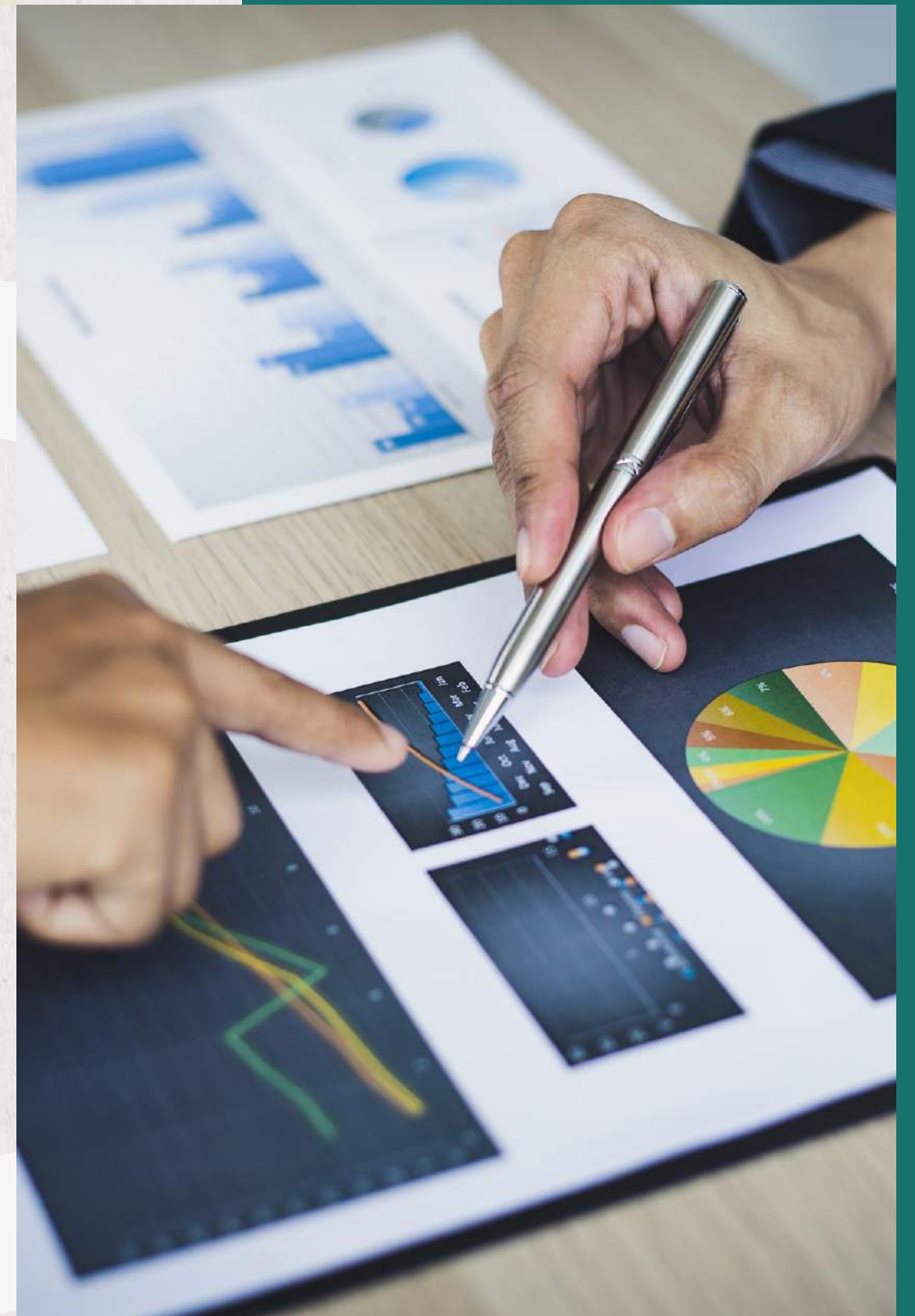


SAATHI, INC.

Aapke Saath

We are a B2C consultancy firm specializing in agricultural solutions, providing expert guidance to farmers and individuals involved in agriculture, with the aim of increasing crop productivity and production. However, we always prioritize environmental conservation while doing all of this, which is sustainability. Our approach involves analyzing soil composition, climate conditions, and topography of the targeted areas of our clients to provide comprehensive reports and effective solutions.

We have a dedicated team of experienced specialists who possess deep knowledge and expertise. Our mission is to make Indian agriculture more skilled and productive while always remaining environmentally conscious.



AGENDA

- 1.Introduction to SAATHI, INC.
- 2.Understanding the Challenges in Indian Agriculture
- 3.Strategies for Tackling Problems Faced.
- 4.Innovations to Reduce Expenses in Intensive Farming.
- 5.Applying **Design Thinking** and **Octalysis** to Sustainable Agriculture
- 6.Case Studies: Successful Implementation of Sustainable Practices
- 7.Monitoring and Evaluation of Sustainable Agriculture Initiatives
- 8.Conclusion and Q&A

02

UNDERSTANDING THE CHALLENGES IN INDIAN AGRICULTURE

PROBLEMS FACED

Animal Intrusion

When wild animals and birds ruin crops, it's like losing money and feeling really sad. Farmers depend on their crops to make a living, so when they're destroyed, it's hard for them to earn enough money. It makes them worry a lot and can even make them feel scared about having enough food to eat.

Unstable Water Levels

Water levels often drop, leaving farmers with insufficient irrigation water. Every few years, they must dig deeper for working submersible pumps. Heavy rains sometimes lead to crop destruction, adding to the challenges farmers face in managing their fields and livelihoods.

Small Land Fragments

Small land fragments result in inefficient use of resources and limited economies of scale. Farmers find it difficult to adopt modern agricultural practices or invest in mechanization due to the small size of their holdings, leading to lower productivity and higher production costs per unit area.

Soil Quality Degradation

Farmers often rely too much on chemicals, harming the soil and environment. Soil erosion, salt buildup, and nutrient loss make land less fertile. Poor land care practices worsen these issues, posing long-term sustainability challenges for agriculture.

TOXICITY IN WATER

Table 2 Statistical parameters for arsenic content (ppb) and redox potential (mV) in deep tube well, hand pump and canal waters

Parameter	Tube well water		Hand pump water		Canal water	
	As content	Redox potential	As content	Redox potential	As content	Redox potential
Minimum	3.80	−19.0	9.00	−46.0	0.30	174.0
Maximum	19.10	170.0	85.00	56.0	8.80	229.0
Mean	9.80	81.3	29.50	21.6	2.89	190.8
Median	9.90	70.0	25.00	22.0	2.60	186.0
75th percentile	12.35	126.5	36.00	35.5	4.15	192.5
90th percentile	15.50	166.0	44.10	51.8	4.90	209.0



SOLVING THE PROBLEM

Using Design Thinking

06

WALKING IN FARMERS' SHOES

Insights Gathered

1. Financial Strain:

- Farmers express distress over mounting debts and shrinking profit margins, highlighting the urgent need for cost-effective solutions.

2. Emotional Toll:

- The emotional toll of crop losses due to wildlife intrusion weighs heavily on farmers, impacting their mental well-being and resilience.

3. Water Scarcity Worries:

- Concerns about water scarcity loom large, with farmers expressing anxiety over dwindling water sources and erratic rainfall patterns.

DEFINING THE PATH FORWARD

08

- 1.Reducing Crop Damage by Wildlife:
 - Developing effective deterrents and sustainable wildlife management strategies to minimize crop losses and foster coexistence.
- 2.Promoting Water Conservation Practices:
 - Implementing water-efficient irrigation techniques, rainwater harvesting systems, and community-led conservation initiatives to address water scarcity.
- 3.Reducing Input Costs:
 - Exploring alternative farming methods, such as organic farming and integrated pest management, to reduce dependency on costly inputs and enhance profitability.

CULTIVATING CREATIVE SOLUTIONS

1. Bio-Fencing and Natural Deterrents:

- Exploring the use of natural barriers, scent repellents, and non-lethal deterrents to protect crops from wildlife intrusion while preserving biodiversity.

2. Modern Irrigation Technologies:

- Leveraging IoT-enabled sensors, precision irrigation systems, and predictive analytics to optimize water usage and enhance crop resilience.

3. Agroecological Farming Practices:

- Promoting regenerative agriculture techniques, including agroforestry, cover cropping, and crop rotation, to enhance soil health and reduce input costs.

09

A modern office interior with wooden desks, ergonomic chairs, and various potted plants. The space is bright and airy, with large windows in the background. A semi-transparent white rectangle is overlaid on the image, containing the text.

Proposed **SOLUTIONS**

10

11

BIO FENCING



Bio-fencings are lines of trees or shrubs planted on farm or field boundaries that provide protection against cattle and wildlife, act as windbreaks, enrich the soil, provide bee forage, provide shade, and control dust.

Stems of thorny nature such as Kiluvai (*Commiphora*) can be stacked in layers to form a barrier from animals. Bamboo splits, lemon grass, lantana stems, Coconut and palm thatch are commonly weaved as fences. Bamboo skins are also weaved into barriers (also called “Padal” in Tamil), which are later sealed with cow dung.

for Animal Intrusion

12

USING ULTRASONIC ANIMAL REPELLENT

Ultrasonic sound waves have a frequency higher than what human ears can hear, but invading species can detect them. The sound is meant to irritate pesky critters and prevent them from making homes near the source of the noise.



for Animal Intrusion

USING NATURAL DETTHERENTS

Indian organic farming embraces the use of bio-pesticides derived from plants like neem, custard apple, and garlic. These natural extracts are prepared and used as deterrents against pests. They are safe for the environment, humans, and beneficial insects.



for Animal Intrusion

13 SUSTAINABLE AGRICULTURAL PRACTICES



Crop rotation : is the practice of planting different crops sequentially on the same plot of land to improve [soil health](#), optimize nutrients in the soil, and combat pest and weed pressure.



Mixed farming : refers to one of the agricultural systems (gaining popularity, nowadays) wherein addition to growing crops and other agricultural practices including dairy farming, poultry, or bee keeping are practiced by a farmer.

SUSTAINABLE IRRIGATION PRACTICES



Sprinkler irrigation : is a technique where water is dispersed in rain-like droplets using fixed, temporary, or mobile setups across land surfaces to efficiently distribute water for crop irrigation.



Drip/trickle irrigation : systems are methods of microirrigation wherein water is applied through emitters to the soil surface as drops or small streams. The discharge rate of the emitters is low so this irrigation method can be used on all soil types.

Rain Water HARVESTING

Rainwater harvesting has transformed agriculture in India by providing a reliable water source through techniques like rooftop harvesting and farm ponds. This has reduced dependence on erratic rainfall and groundwater, boosting crop yields, conserving water, and enhancing resilience to climate change.



SOIL QUALITY UPLIFTMENT

01

pH & Mineral Test

ensure soil acidity and nutrient levels are balanced, optimizing conditions for plant growth and maximizing crop yields.

02

Organic Biochemicals

replenish soil with essential nutrients, promoting microbial activity and enhancing soil fertility for sustainable agriculture.

03

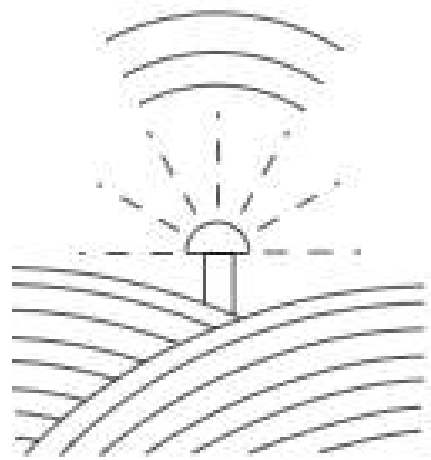
Agro-Forestry

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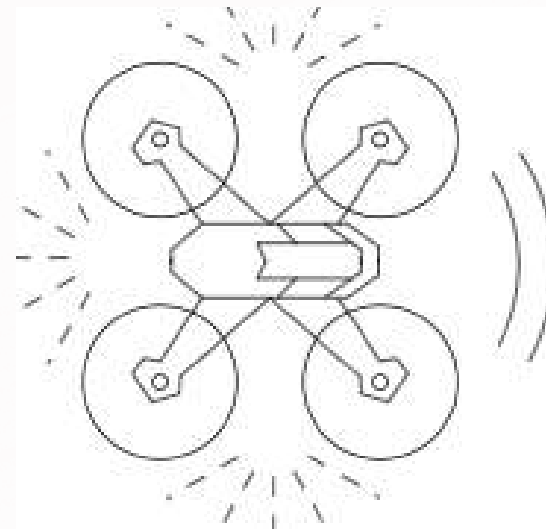
MODERN TECHNOLOGY

can be employed to improve agriculture productivity



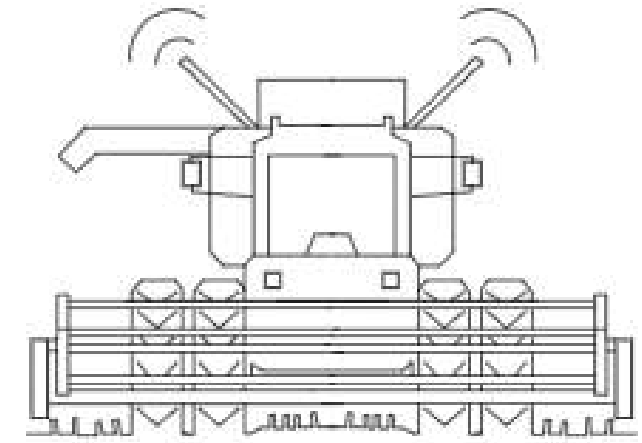
Smart Crop Monitoring

Technology-based approach to agriculture that uses sensors, data analytics, and connectivity to monitor crop health and optimize yields



Drone-Farming

Drone cameras can provide an overview of farm operations throughout the day to ensure operations are running smoothly and to locate equipment being used.



Autonomous-Farming machinery

uses robots and automated machinery to perform farming tasks. This technology can improve efficiency, yield, and crop quality, while also reducing labor costs.

The background is a textured green. It is decorated with white line-art icons related to finance and business. In the top left, there are stacks of paper money and a single coin. In the top right, there are more stacks of money and a coin. On the left side, there is a coin with a dollar sign and a small bar chart. On the right side, there is a bar chart with a dollar sign and a piggy bank. At the bottom, there are more coins, a bar chart, and a large number '18'.

Applying Octalysis

to the Solution

18

Octalysis Framework

Octalysis is a gamification framework that analyzes human motivation and engagement through eight core drives: epic meaning and calling, development and accomplishment, empowerment of creativity and feedback, ownership and possession, social influence and relatedness, scarcity and impatience, unpredictability and curiosity, and loss and avoidance. It helps designers create experiences that leverage these drives to motivate users and increase engagement.



Octalysis Framework SAATHI INC.

This Octalysis graph from SAARTHI INC. has been created by researching, understanding and calculating all the eight factors required in Octalysis and applying them to



EPIC

Meaning

AND CALLING

While Farming is a great Job, and providing food is a sense of pride, but here nothing is as big as epic. There is no higher meaning besides being a farmer



DEVELOPMENT AND
Accomplishment

- Farms giving more Output and getting profits through it.
- Badge of being an Organic farmer
- Saving the ecology while spending less money



Empowerment

OF CREATIVITY AND FEEDBACK

- Encouraging farmers to innovate and share their ideas fosters a culture of continuous improvement.
- By empowering them to experiment with new techniques and provide feedback, we enable them to drive positive change in their farming practices.



Ownership

AND POSSESION

Farmers having control over their land and crops instills a sense of pride and responsibility. When farmers feel a sense of ownership, they are more likely to take proactive steps to protect and nurture their resources for future generations.



Social Influence

AND RELATEDNESS

Building a supportive farming community where farmers can connect, share knowledge, and learn from each other fosters a sense of belonging and camaraderie. This network of support encourages collaboration and collective problem-solving.



Scarcity

AND IMPATIENCE

Highlighting the urgency of adopting sustainable practices in the face of resource scarcity motivates farmers to take action. By emphasizing the limited availability of resources, we inspire farmers to implement changes sooner rather than later.



Unpredictability

AND CURIOSITY

Introducing farmers to new techniques and technologies sparks their curiosity and keeps them engaged in the farming process. By embracing innovation and experimentation, farmers can discover new ways to improve their productivity and sustainability.



LOSS AND

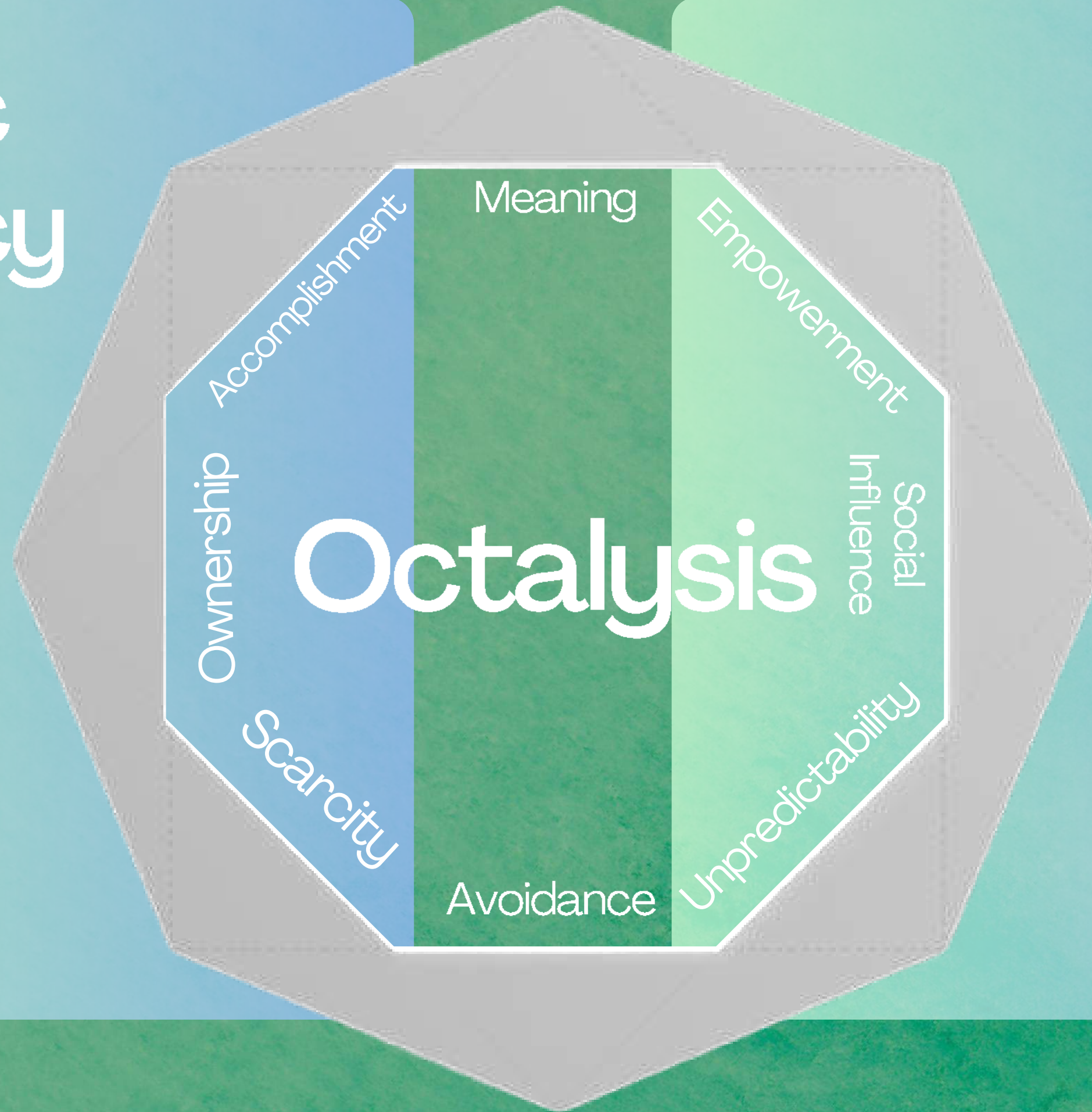
Avoidance

Communicating the risks of not adopting sustainable practices helps farmers understand the potential consequences of inaction. By highlighting the negative impacts of unsustainable farming methods, we motivate farmers to make changes to protect their livelihoods and the environment.



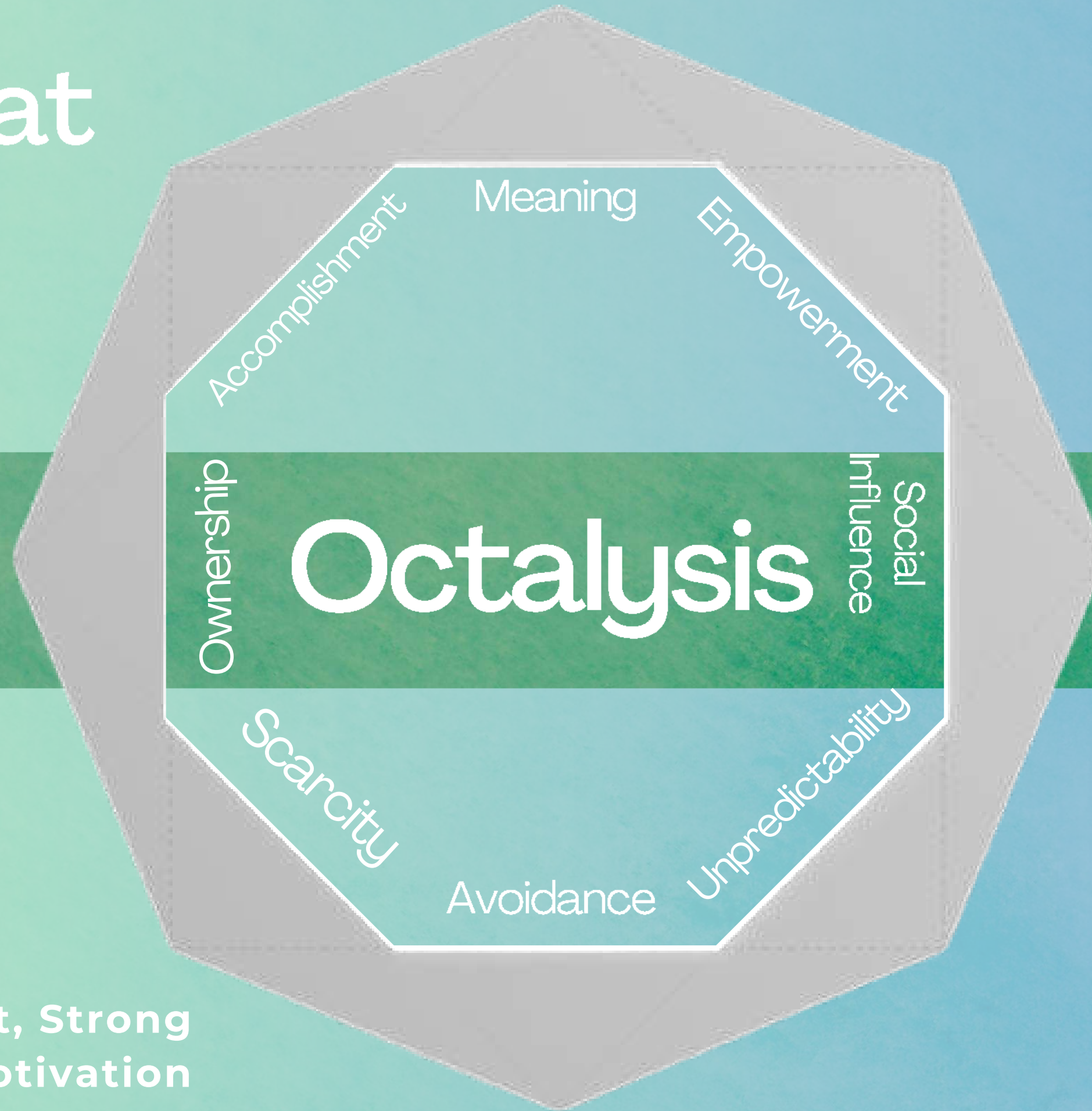
Extrinsic Tendency

Doing things for
Goals, purpose or
Rewards.



Doing For
Enjoyment
**Intrinsic
Tendency**

White Hat



Feeling of Pride,
Sense of Growing,
You are in Power

30

Negative Impact, Strong
but bitter motivation

Black Hat

31

BRINGING IDEAS TO LIFE

1.Virtual Wildlife Deterrence System:

- A virtual fencing solution utilizing motion sensors and AI algorithms to deter wildlife while minimizing physical barriers and environmental impact.

2.Smart Drip Irrigation Kit:

- An affordable, user-friendly drip irrigation kit equipped with smart sensors and mobile connectivity, enabling precise water delivery based on crop needs and weather conditions.

3.Integrated Pest Management Toolkit:

- A comprehensive toolkit comprising biological controls, pheromone traps, and pest-resistant crop varieties, empowering farmers to combat pests sustainably.

FIELD TESTING FOR IMPACT

32

1. Evaluate Effectiveness:

1. Measure the performance of prototypes in real-world conditions, assessing their ability to address the identified challenges and deliver tangible benefits.

2. Gather User Feedback:

1. Solicit feedback from farmers and stakeholders to understand their experiences, preferences, and suggestions for improvement.

3. Iterate and Refine:

1. Use insights gained from field testing to iterate on our prototypes, refining them iteratively based on user feedback and performance data.

CONCLUSION

In conclusion, our presentation has underscored the critical importance of embracing sustainable agriculture practices to address the pressing challenges faced by Indian farmers. By integrating design thinking and Octalysis principles into our approach, we have outlined holistic solutions that prioritize environmental stewardship, community empowerment, and long-term agricultural resilience. Through tailored guidance, comprehensive soil analysis, and innovative techniques such as organic biochemicals and agroforestry, we aim to uplift soil quality, enhance crop productivity, and foster a culture of sustainability within the farming community.

Our mission is clear: to optimize Indian agriculture by making it more efficient, productive, and environmentally sustainable, ensuring a prosperous future for generations to come. Together, we can cultivate a greener and more resilient agricultural landscape that benefits both farmers and the planet.





SAATHI, INC.

THANK YOU

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