



Fasal | Sathi

Helping Hands That Feed India

WE ARE THE VISIONARIES BEHIND FASAL-SATHI



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WE Impower :

Sustainable Farming

THE STARK REALITY: AGRICULTURAL CRISIS IN INDIA



Fertilizer Efficiency Dropped to 15 kg grain per kg to just 5.



Infertility due to Over - Fertilization



Fertilizers Addiction
India's Monocropping Trap
(Newsletter/Scroll.in)

CURRENT-PROBLEMS



1

Soil Degradation → 30% of India's farmland is degraded, losing fertility every year.

2

Late Disease Detection → Farmers notice crop stress only after visible damage.

3

Water Misuse → Over-irrigation or under-irrigation due to lack of guidance.

4

Nutrient Imbalance → Overuse of urea, wrong NPK ratio, resulting poor soil health.

5

Rising Costs → More fertilizer used, but yields struggle, cutting farmers income.

6

Limited Access to Testing → Lab tests are expensive and takes time; small farmers can't afford them regularly.

WE SOLVE ALL THESE AT ONCE !

CURRENT GAPS & COMPETITION

(current)

Current Market Gaps

Affordability for All

LIMITED ASPECTS

Real-time & Actionable

Competitive Market: Limitations

Traditional Labs

Standalone Mobile Apps

High-End Devices

(having less features, still expensive)

- Products Like :**
- ❑ AgroCares Scanner-F – A NIR equipped Soil analyser, but lacks a camera for detection, and still costs ~Rs. 5.9 Lakhs, yet not affordable by a small farmer.
 - ❑ Other AI's, Alone sensors (Alibaba) – Need other components to work.

❖ *Fasal-Sathi is uniquely positioned to fill these gaps by offering an affordable, integrated, and immediate solution, empowering farmers who have historically been underserved.*

HOW ARE WE CONTRIBUTING IN ITS SOLUTION ?

Introducing, Fasal - Sathi !

FOR WHAT IS FASAL - SATHI ?

Fasal-Sathi wand and mobile application are the one-way solution for saving hectares of Indian land. And bring advanced diagnostics directly to every farmer's field.



What does The Wand and APP do ?

Our Wand and App scan few crops in a whole plantation and check the soil factors, detects Crop diseases, pest infection etc. then advice preferred amount of fertilizer, etc. required, all on-sight.

How is Fasal - Sathi planned to solve this ?

By Fasal Sathi's precise farming, we help reduce reliance on excessive chemicals, conserve resources, and increase the production, unmatched then ever, empower the farmer and cultivate a more resilient and sustainable agricultural ecosystem.

Every step we take is aimed at transforming challenges into opportunities for growth and prosperity for Indian agriculture.

AI Domains Used in Fasal | Sathi

Harnessing the Power of Artificial Intelligence for Smarter Farming



COMPUTER VISION

Used to analyze crop and leaf images, detecting early signs of disease, pest attack, or nutrient deficiency that are often invisible to the naked eye. This ensures farmers can act **before major crop loss occurs.**



Statistical Data

Combines soil sensor readings (NPK, pH, moisture, etc.) with crop health data to generate **precise, data-driven advice** on fertilizer use, irrigation scheduling, and pest management — helping farmers save resources while improving yield.



NLP: (LLM)

Converts complex diagnostic data into **simple, farmer-friendly recommendations** in local languages, ensuring that advanced technology is accessible and understandable to every farmer.

Outcome

Together, these three domains deliver an integrated outcome: a clear, actionable advisory that tells farmers exactly what their crop and soil need at the right time — reducing costs, improving yields, and protecting long-term soil health.

Fasal-Sathi uses a fusion of Computer Vision, Natural Language Processing, and Predictive Analytics powered by Machine Learning to deliver real-time soil and crop health diagnostics.

For Whom it is ? and Where are its applications ?



Designed too for Marginal Farmer and for all !
Exclusively designed keeping in mind the millions of Indian farmers who have limited access to costly lab soil testing or high-end agricultural technologies.



It's application in Plantation Field

The Fasal-Sathi Wand provides immediate, on-site diagnostics, eliminating the need to send samples to distant labs and wait days for the results.



Accessible Technology

Even if the farmer cannot afford the Wand, he/she can still access this tech for his/her field using the Mobile application. Everything is priced just right to suit every Indian Farmer's wallet.

Actual Applications of it and a Little Overview

- ❑ Designed for solving every farmer's problem, like overuse/excessive use of fertilizers in the soil, resulting in wastage of capital, water and it leads to decreased soil fertility rates.
- ❑ Our Wand and App use AI to accurately determine fertilizer and pesticide quantities and detect or predict pest infection details. The App needs a photo, crop, land, and location, while the Wand only requires pointing its camera at crops and placing its soil sensors. It then works automatically.

BENIFITS FOR OUR FARMERS ?

~Turning Data into Actionable Insights for Every Farmer



Real-time Soil & Crop Analysis

The Fasal-Sathi wand provides instant, on-site diagnostics of soil nutrient levels, pH, and detects early signs of crop diseases and pest infestations. While the Fasal Sathi App works on the provided picture and details like the crop name, land size etc., but does not include the soil nutrients, pH etc. levels alone by itself as our Wand is needed for that.



Proactive Problem Solving

Identify potential issues before they become widespread problems, by analyzing the photos and soil health from the sensors integrated in the wand and, cameras in the phone if using mobile application. Our AI-driven insights give on-sight advice to the farmer to take timely corrective actions, protecting their valuable yields.



Precise Resource Utilization

Receive precise recommendations for irrigation, fertilization, and pesticide application, minimizing waste and maximizing efficiency. This means less money spent and better environmental outcomes, including savings of money of the farmer, saving water, saving the land from getting over-whelmed from the fertilizers and pesticides etc..



Increased Yield & Profitability

By implementing Fasal-Sathi's data-driven advice, farmers can significantly improve crop health, leading to higher yields and ultimately, increased income and get better facilities for their families. This tech can revolutionize farming culture all over India if it reached till all the farmer's holy hands.

Fasal-Sathi transforms traditional farming into a data-powered, sustainable, and profitable endeavor.

FASAL - SATHI: TECHNOLOGY STACK

HARDWARE ↗

- Raspberry Pi 3 B+
- 7 in 1 NPK Soil Sensor
- OV5647 Camera
- USB-RS485 Adapter
- OLED Display 0.96in.
- ST7735 TFT Display
- IP2312 Charging Module
- ESP-32 Microcontroller
- Solar Pannel & Speaker
- 3D Printed Custom Body (Cover Case)

❖ Programming Languages ↗

C++ Python Java Kotlin

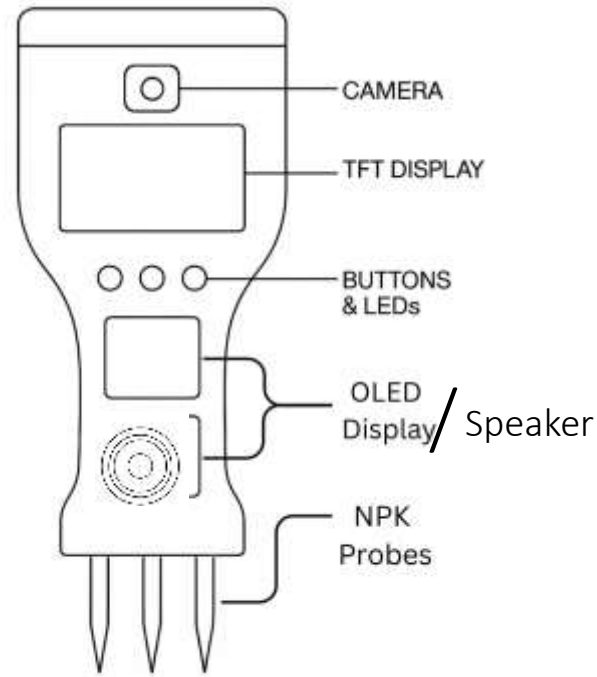
- ## ❖ Platforms, Tools →
- Plant.id (API)
 - Chat-GPT 4o (API)
 - OpenCV (.py module)
 - GitHUB (for Dataset)
 - Wikipedia (for Dataset)
 - Articles, Research Papers etc. (for Dataset)
 - Flutter and Firebase (for App Development)



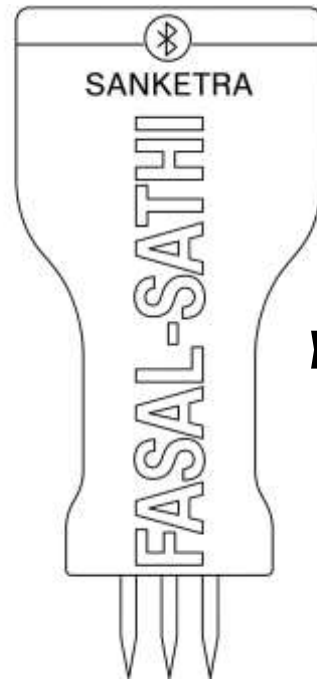
FASAL-SATHI: APP INTERFACE & DESIGN

Finalized Production Schematics

Front View

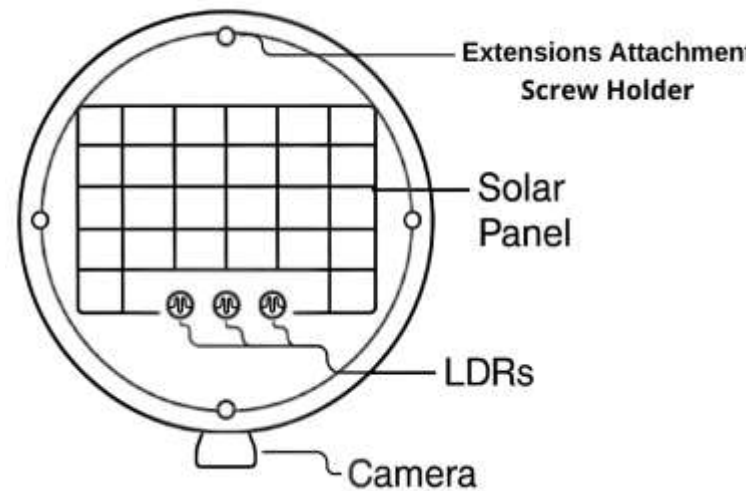


Back View

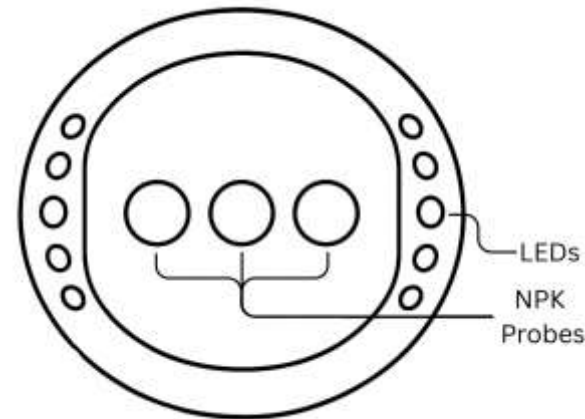


Est. Height
51cm

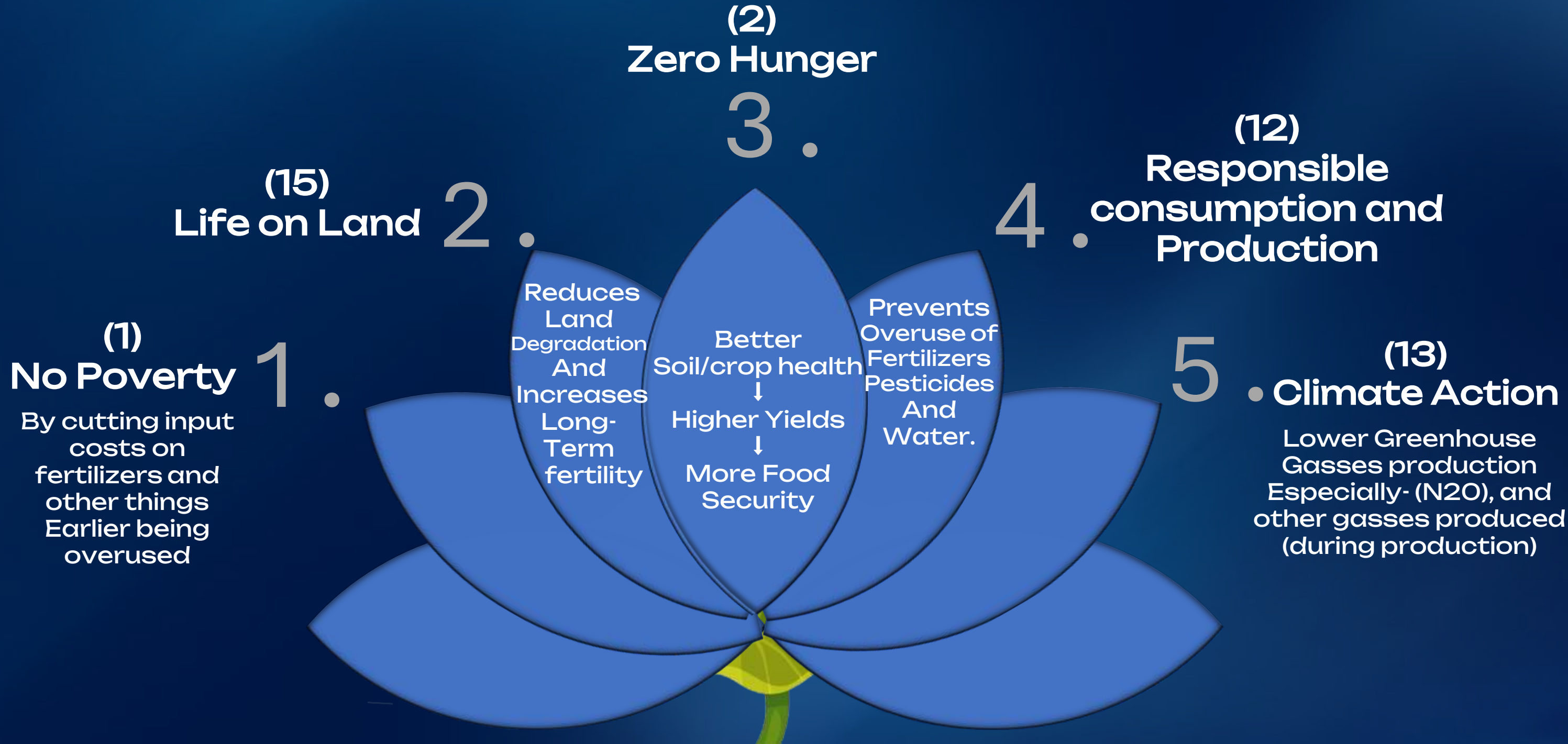
Top View



Bottom View



IMPACT & BENEFITS with SDGs



FASAL-SATHI: FEASIBILITY & SCALABILITY

Making Advanced Agriculture a Reality for Every Farmer

Fasal-Sathi is meticulously engineered for practical implementation and widespread adoption across India's diverse agricultural landscape, ensuring a sustainable impact.

Feasibility & Scalability

Practical Feasibility

- ❑ Fasal-Sathi is practical for use in farming fields directly, it's the only solution out there around the world, which truly helps farmers farm effectively by giving drastically comparable price than others.
- Other than traditional lab tests of soil which takes days, but our Wand and App both give on-sight advices and report, causing no delay for the farmers to farm, which is the only one out there to do at such a low price.
- ❑ If scaled to a larger production line, it's a million-dollar innovation, but before a million-dollar startup project it's a blessing to farmers who are not aware of modern technology and how much to use fertilizers and other chemicals to increase their yield, it's our compliment!

Total Cost (est.)

(For its Production and Deployment)
(around ↷)

INR
21,000

Our strategic approach to design and operations, guarantees that Fasal-Sathi is not only effective but also sustainable and widely adoptable.

INNOVATION & FUTURE SCOPE

For Helping The Hands That Feed India

Unmatched Innovation & Uniqueness

Affordability at its most

Giving cost-effective and easy-to-use technology for every farmer, regardless of greed. **No money to buy wand no problem, use our app!**

Flexibility & Instant

Offering comprehensive, on-site analysis of soil and crop health in real-time, eliminating delays and providing immediate actionable insights.

Intelligent Innovation never made before

Our self-learning AI engine provides hyper-localized, predictive recommendations that continuously improve, ensuring optimal decision-making.

Our Roadmap & Future Scope



Next Steps

Our Next Step would be to open a web-store for Fasal Sathi Wand and deploy its APP globally, and large scaling our database for more countries other than India and make our own LLM with CV model, all of this from the money if we win this challenge competition.



Long-term Vision

Partnering up with Gov. and NGOs to make it reach to every single farmer out there on a subsidized rate so that the farmer who is working hard to feed us and our India, who can't afford the Wand, can now purchase it and make his/her yield grow with advance tech. and efficiency. That's our vision.



Potential Improvements

Developing our own, crop specific AI models and train our own LLM from regional data for it to be familiar with Indian agricultural practices, improving its core for faster processing and analytics, and it giving regional language-based answers and making it more-better on every possible aspect from every farmer's reviews & feedback.



Our personal view

Fasal-Sathi is not just a tool or an app, it's a commitment to a future where every farmer thrives through intelligent, sustainable, and tech enabled agriculture.

Thank You

Acknowledgement

A very special **Thank You** to our mentor, **Mrs. Nidhi Goel** and our principal **Mrs. Shalini Samadhiya**, for co-operating us in building this project and guiding us to overcome the challenges we faced while building this Project.



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