EcoGrow: IoT-Powered Farm Intelligence Platform

Empowering Farmers with Real-Time Weather and Soil Intelligence

Presented by Khush Kothawala and Nishika Kakrecha

THE PROBLEM

Smallholder farmers face:

- Unpredictable climate
- Unplanned irrigation
- Repeated resource wastage
- Existing platforms lack real-time, field-level intelligence

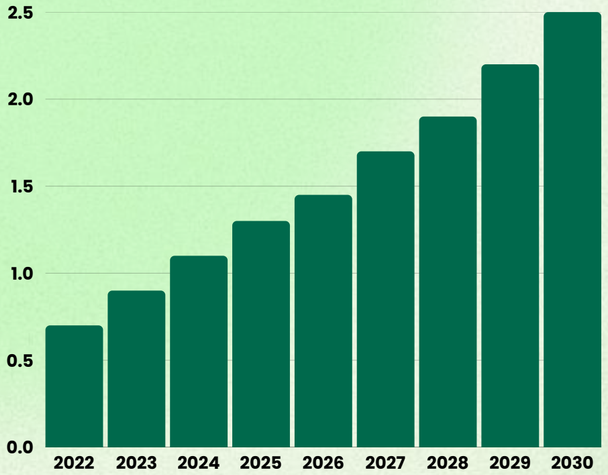
OBJECTIVES

- Deliver hyper-local weather-based crop insights
- Reduce irrigation and energy usage by 20–30%
- Improve crop yields by 8–12% via optimized field timing
- Provide SMS and mobile interface for low-literacy users
- Reach 100,000+ farmers in Northeast India within 3 years

SOLUTION OVERVIEW

- IoT Dashboards: Soil moisture, temp, humidity
- Hyper-local Weather Forecasting
- Crop Recommendation based on real time data
- Smart Irrigation Scheduler
- Pesticide/Fertilizer Recommendation and Timing Advisor
- Greenhouse Automation
- Offline Integration and Multilingual Access

Market Insights



TAM: $2.5B

indian organic market by 2030

SAM : $60M

digitally active Indian farmers

SOM : $100K

farmers targeted in NE India (~2% of region)

Trends: 5G rural growth, agri IoT adoption, government climate policy support

Competitor Gaps: Skymet, CropIn, and DeHaat lack farmer-first, real-time advisory and sensor integration

BUSINESS MODEL

Revenue Streams

- **Freemium Tier**: Free access to weather summaries and basic recommendations.
- **Premium Tier**: INR 50–100/month for access to IoT features, AI-driven advisories, and trend dashboards.
- **IoT Kit Sales**: Modular sensor kits priced between INR 1500–2500, sold directly or via EMI to smallholders
- **B2B Analytics**: Sale of anonymized insights to agri-input firms, insurers, and policy analysts.
- **Institutional Contracts**: Collaborations with government schemes, NGOs, and state agriculture departments.

Pricing and Bundling

- Discounts for FPOs, cooperatives, and block-level distributors
- Option for bundled kits + premium access at subsidized rural rates

Customer Strategy

- Referral Programs: Free premium months for farmer referrals.
- Grassroots Campaigns: Demos, training camps, multilingual posters.
- Retention Tools: Seasonal challenges, loyalty badges, real-time crop planning alerts.

TECHSTACKS USED

- Frontend: Streamlit
- Backend: Python, scikit-learn
- Model: Random Forest
- Status: Fully working local MVP
- Inputs: N, P, K, Temp, Humidity, pH, Rainfall

HOW IT WORKS

- Inputs entered via web app
- Model predicts from 22 crops
- Trained on labeled agri dataset
- Outputs recommended crop

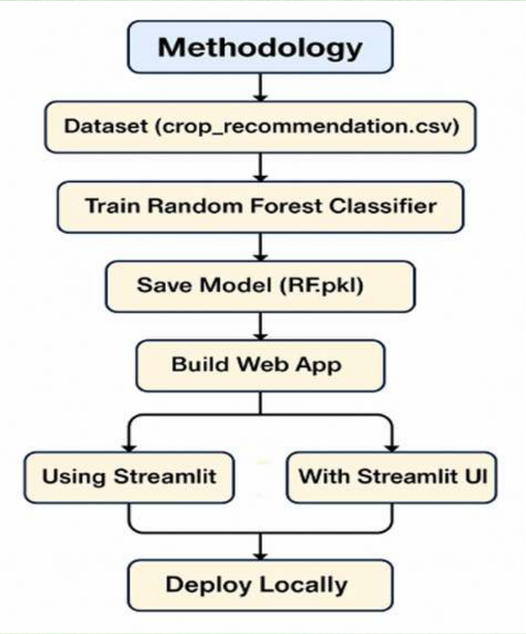
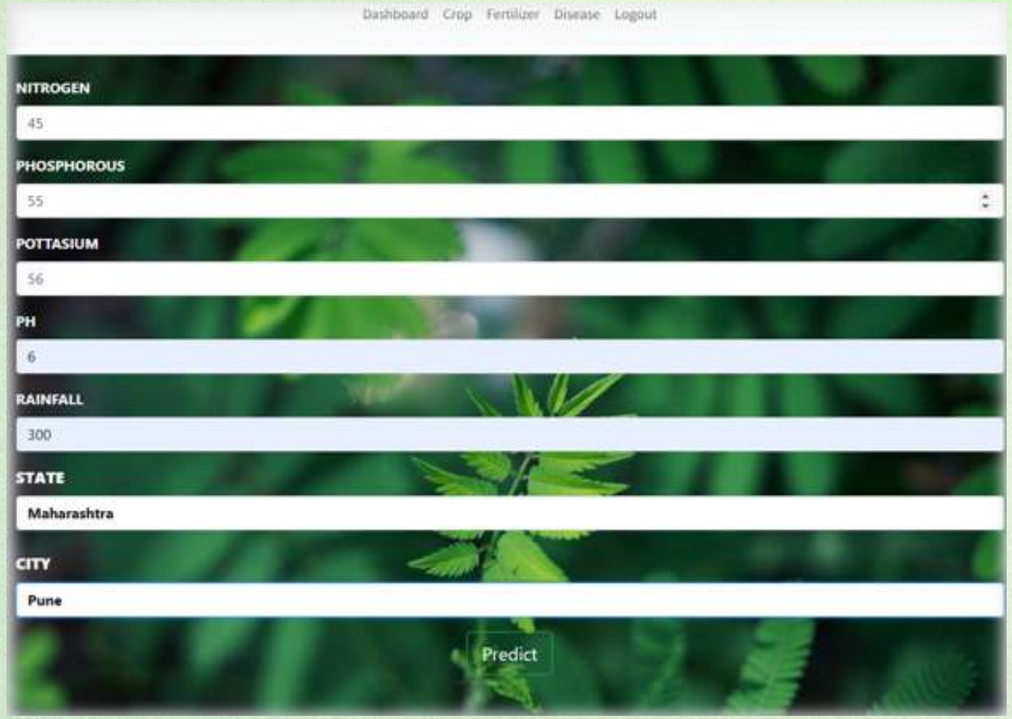


table for a sample input

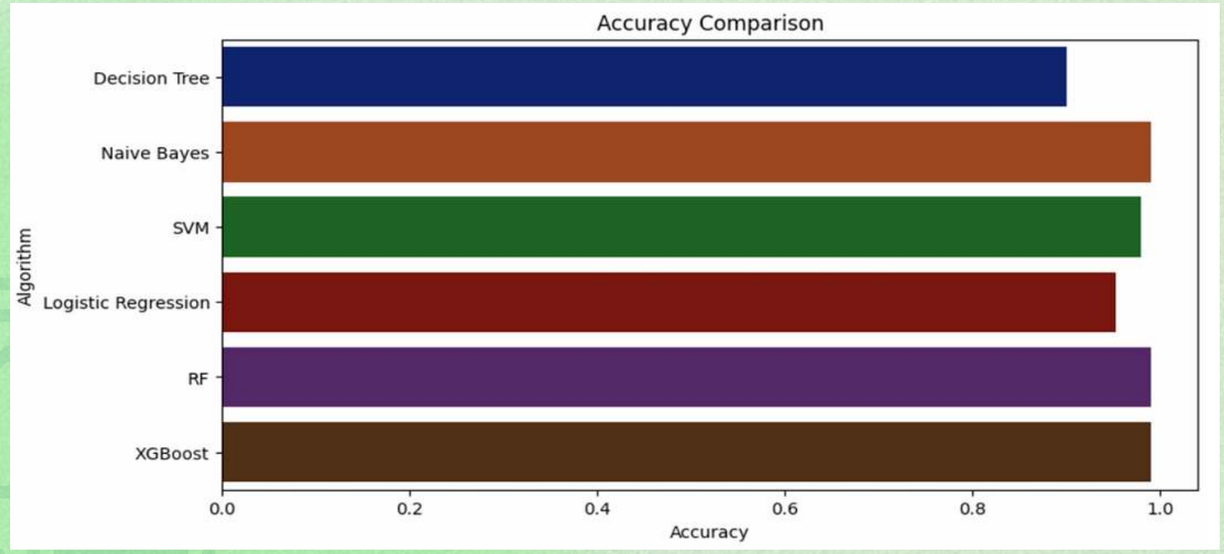
N	P	K	Temperature (°C)	Humidity (%)	pH	Rainfall (mm)	Label
13	60	25	17.1369	20.5954	5.68597	128.256	kidneybeans

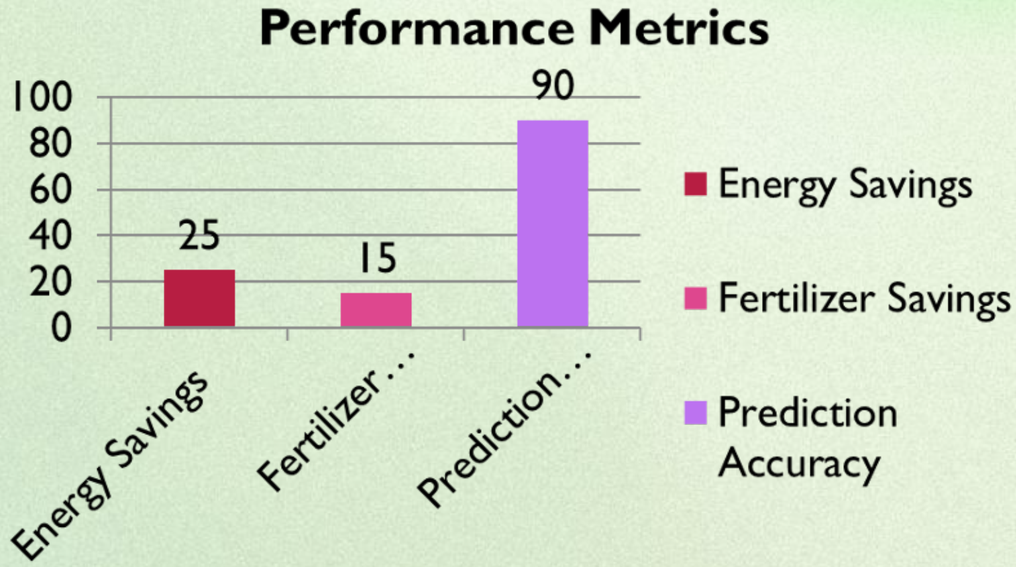
sample output



RESULTS

- Random Forest Classifier proved to be the most accurate
- >90% prediction accuracy
- Simulated savings: 25% energy, 15% fertilizer





FUTURE ENHANCEMENTS

- Cloud deployment (Streamlit Cloud/Heroku)
- Weather API integration
- Add pest/fertilizer suggestions
- Mobile UX, AI chatbot, analytics dashboards

GO TO MARKET STRATEGY

Awareness

- Partnering with agricultural colleges and rural extension agencies for pilot demonstrations.
- Sharing regional success stories through YouTube explainers, field interviews, and infographics.

Conversion

- Onboarding local Krishi Mitras, KVKs and FPO leaders as regional brand ambassadors.
- Offering seasonal subscription plans and IoT kit discounts during the harvest window

Retention

- Enabling gamification features like crop health check-ins and irrigation tracking streaks.
- Offering loyalty badges and periodic advisory reports to maintain engagement.

Channel Partners

- Collaborating with companies producing low-cost IoT sensors for joint distribution.
- Reaching out to government departments running PM-KUSUM and eNAM for institutional integrations.
- Engaging NGOs working in digital literacy and sustainable agriculture for grassroots rollout

RESULTS & DISCUSSION

- **Accuracy**: Random Forest model delivered >90% prediction accuracy consistently across seasons
- **User Testing**: Farmers appreciated visual simplicity.
- **Operational Savings**: Simulated trials suggest up to 25% reduction in electricity (pump usage) and 15% reduction in fertilizer input when used with smart irrigation and pest modules
- **Limitations**: Model currently assumes timely user input; sensor calibration, device durability, and weather data licensing are ongoing concerns

FUTURE GOALS

- Deploy field-testing in diverse agro-climatic zones (Assam floodplains, Meghalaya hills, and Tripura dry belts)
- Introduce impact monitoring KPIs such as ROI per acre, water liters saved per crop cycle, and pest spread prediction accuracy

CONCLUSION

EcoGrow stands at the intersection of inclusive design and frontier agri-technology. By combining field-ready IoT, explainable AI models, multilingual delivery, and a modular roadmap, it offers a transformative, accessible tool for India's climate-vulnerable farmers. Beyond just a tech product, EcoGrow is positioned to become an ecosystem catalyst, fostering digital adoption, sustainable practices, and data-driven decision-making across India's rural economy.