



MANAGING THE DEVELOPMENT AND ADOPTION OF ML-BASED LEAF IMAGE DIAGNOSTICS FOR BANGLADESHI FARMERS

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PROBLEM CONTEXT & MOTIVATION



Significant Yield Loss

Farmers lose up to **40% of their annual crop yield** due to undiagnosed diseases and nutrient deficiencies.



Low-Cost, Offline Solution

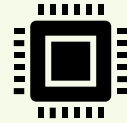
provides immediate, on-site diagnosis, addressing the challenges faced by farmers.



Economic Empowerment

Enhance rural wealth creation and improved livelihoods for farming communities.

TECHNOLOGY COMPONENTS



HARDWARE

RASPBERRY PI, CAMERA MODULE, DISPLAY, SPEAKER, BUTTONS FOR CAPTURE/SUBMIT.



SOFTWARE

ML MODEL FOR DISEASE/DEFICIENCY DETECTION.



BRAINWARE

AGRONOMIC KNOWLEDGE (DISEASE/NUTRIENT PATTERNS ON LEAVES).



KNOW-HOW

FARMERS TRAINED TO CAPTURE CLEAR LEAF PHOTOS & INTERPRET OUTPUT.

MANAGING TECHNOLOGY: TIMING, STRATEGY & INNOVATION



Timing

Early introduction provides a first-mover advantage.



Strategy

Balance R&D with growth; roadmap for continuous innovation.



Innovation Process

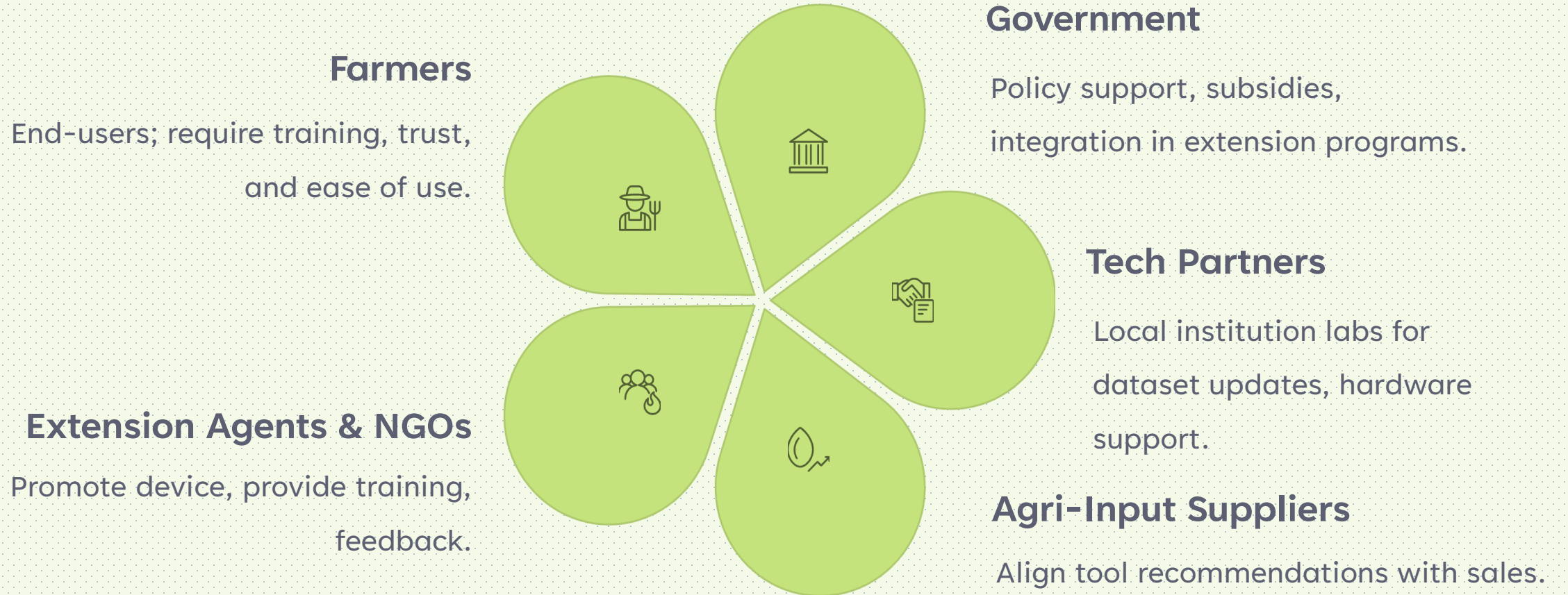
Iterative pilots, farmer feedback loops, agile improvements.



Proactiveness

Scan for new ML models/hardware to avoid obsolescence.

STAKEHOLDERS & ADOPTION STRATEGY



ADOPTION CHALLENGES & PROPOSED SOLUTIONS

Adoption Challenges

Device Cost

High upfront cost for farmers.

Training Required

Farmers need training to use the device effectively.

Maintenance Issues

Potential difficulties in long-term device upkeep.

Limited Dataset

Initial machine learning model trained on a limited dataset.

Trust Issues

Risk of farmers losing trust if the device misclassifies diseases.

Proposed Solutions

Subsidies

Government or NGO subsidies to reduce farmer cost.

Simple UI

Intuitive design for ease of use, minimizing training.

Local Repair Networks

Establish local support for maintenance and repairs.

Continuous Data Collection

Implement systems for continuous data collection and model updates.

Rigorous Validation

Conduct rigorous testing and farmer-validated accuracy studies; clear communication on device limitations.

COMPETITIVENESS, POLICY & WEALTH CREATION



Farmer Impact

Higher productivity, reduced waste, and increased income for individual farmers.



National Impact

Boosts agricultural competitiveness and contributes to the national GDP.



Policy Integration

Aligns with Bangladesh's digital agriculture programs for widespread adoption.



Future Growth

Potential to expand to more crops, integrate new sensors, and support multiple languages.

CONCLUSION



Empowerment

Affordable, offline device empowers smallholder farmers by providing accessible diagnostic tools.



Economic Growth

Improved yields and reduced crop losses directly lead to enhanced livelihoods and a stronger rural economy.



Sustainability

The technology supports sustainable agricultural practices and contributes significantly to national food security.



THANK YOU

ANY
QUESTIONS

