AGRIRAKSHAK

AI FARM GUARD

Smart AI-Powered Farm Protection System

- Solar Power
- Wind Power
- 24×7 AI Monitoring
- Connectivity
- Sound-Based Deterrent

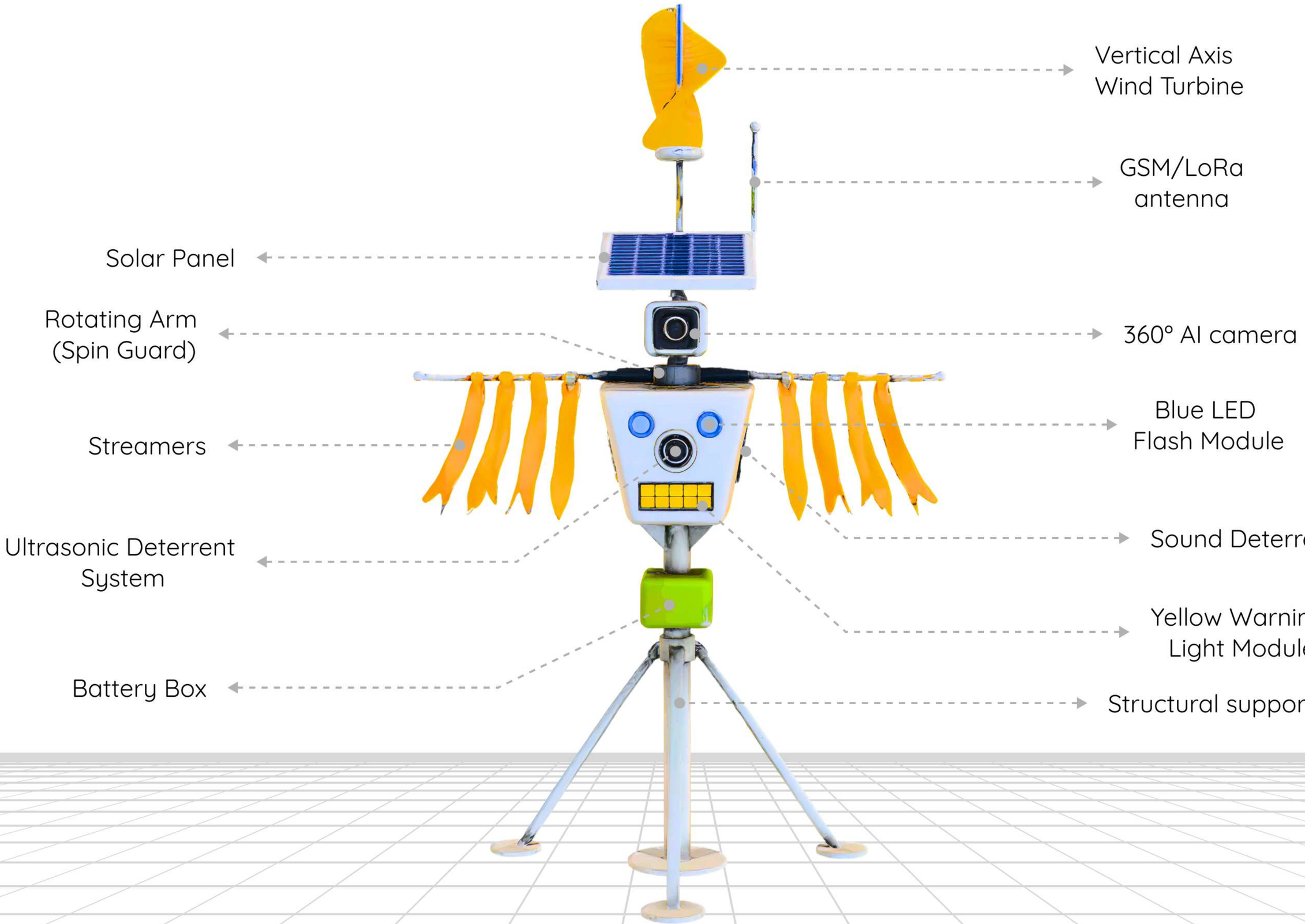
Problem Statement

Farmers in rural areas face major crop losses due to frequent threats from birds and wild animals. Traditional scare methods provide limited protection and lack real-time monitoring. Power shortages further restrict the use of continuous surveillance systems. As a result, farmers experience financial losses and increased labor efforts in safeguarding crops. There is a need for an automated, sustainable, and intelligent solution that can operate round-the-clock, deter threats effectively, and offer smart monitoring even in power-limited areas.

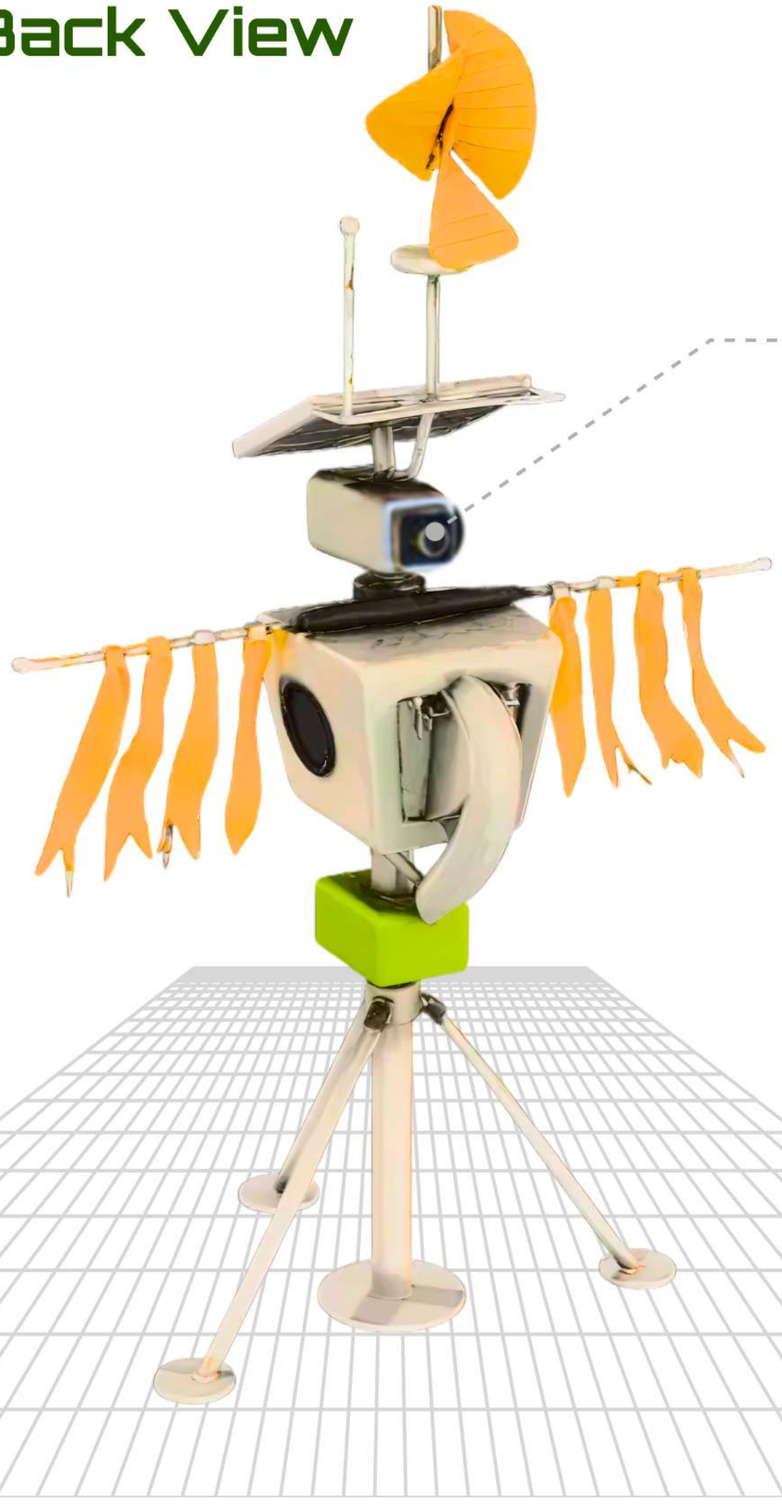
Design Objective

- Enable 24×7 AI-driven detection of birds, animals, and intruders.
- Deliver multi-sensory deterrence through sound, light, and motion.
- Operate completely off-grid using a hybrid solar and wind power system.
- Ensure the system is affordable, durable, and easy to deploy (plug-and-play).
- Provide real-time alerts and updates directly to farmers.

System Components

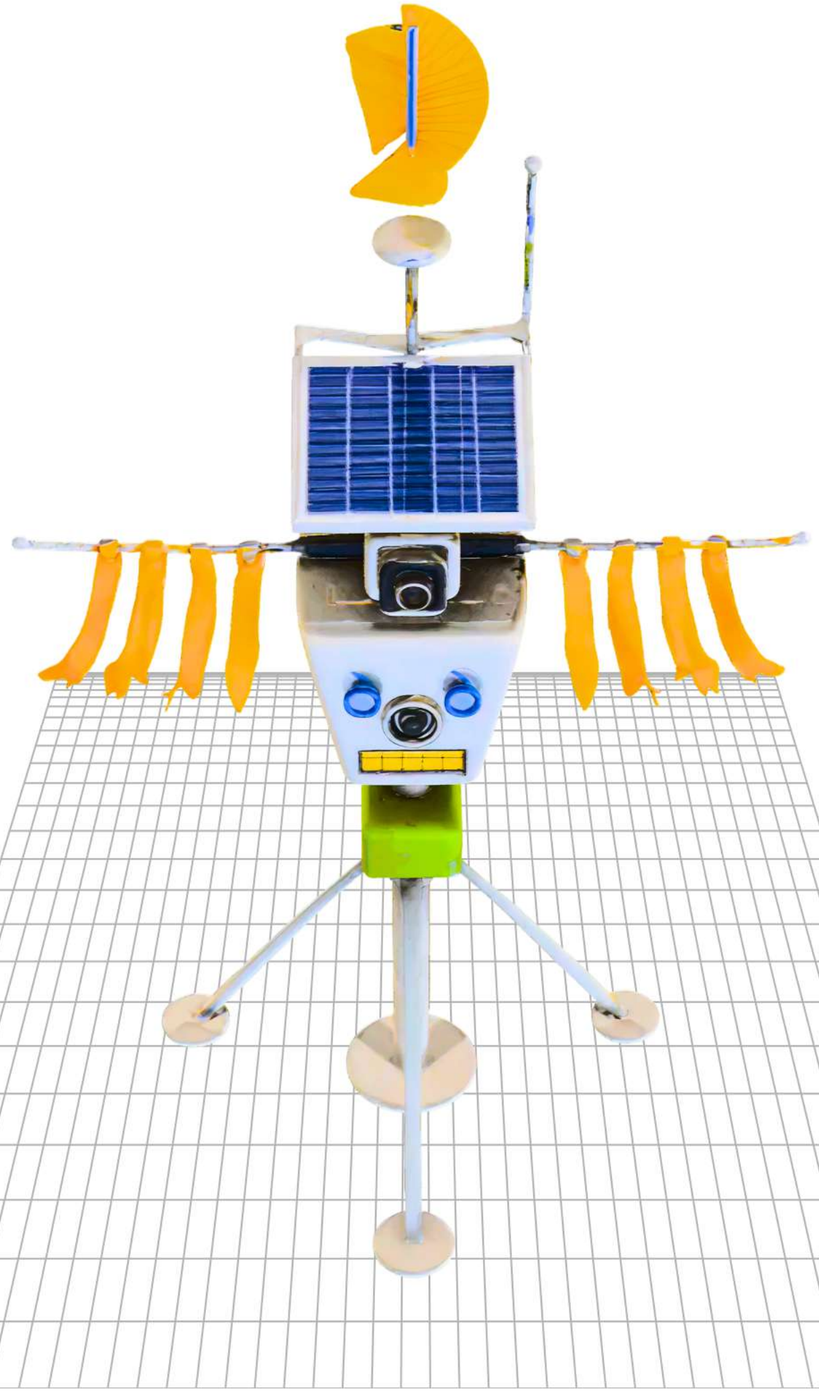


Back View



180° AI Vision
Camera (Rear)

Top View



Internal Parts

Body Unit

Wires

PCB Board

Electronics Housing

Rechargeable Battery Pack

Power Management PCB

System Architecture

Detection & Intelligence

- AI Camera + Processor: Detects birds, animals, and intruders with real-time classification.
- GSM/LoRa Antenna: Sends instant alerts to the farmer.

Solves the problem of constant monitoring and false alarms.

Hybrid Power System

- Solar Panel + VA Windmill: Dual renewable sources for 24×7 operation.
- Battery Box: Stores energy for night and cloudy days.

Solves rural electricity issues and ensures continuous operation.

Multi-Layer Deterrence

- LED Lights
    - Yellow LED – visibility, daytime deterrence
    - Blue Strobe – nighttime strong deterrence
- Speakers: Predator calls, alarms, claps.
- Streamers + Spin Guard: Visual motion deterrent.

Solves bird & animal intrusion with sound + light + motion.

Structural Stability & Mechanics

- Tripod Stand + Support Rods: Stable on uneven fields.
- 360° scanning and targeted deterrence.
- Weatherproof Housing: Dust, rain, and field condition protection.

Solves durability and long-term outdoor usage.

Offline Operation

How It Works Offline

- Works fully on-device — AI detects and stops intruders without internet.
- Actions (lights, sound, rotation) run locally.
- Events auto-saved with time, image & action details.

When Signal Returns

- Sends stored alerts automatically (store-and-forward).
- Farmer can also check history via Bluetooth/USB/LoRa.

Proof of Attack

Log shows: “Intruder detected – deterrent activated – attack prevented.”

Key Points

- Works without network
- Auto-records every incident
- Syncs later when connected
- Low cost, reliable & self-sustaining

Structural Safety & Impact Resistance Design

- **Increase height:** mount bot on a 2–3 m telescopic pole so big animals can’t hit it easily.
- **Stable base:** use a wide tripod with ground anchors or concrete pad for support.
- **Shock-absorbing mount:** add a flexible or breakaway joint to absorb impact if struck.
- **Protective body:** cover camera & electronics with a metal or polycarbonate casing.
- **Impact detection:** include a tilt or vibration sensor to log or alert if the bot is attacked.
- **Optional add-ons:** perimeter sensors or low-cost decoy posts to reduce direct hits.

Use Case

Day-time

The bot detects birds and activates its rotating arm, streamers, and yellow LEDs. The motion and sound scare the birds away, protecting the crop instantly.

Night-time

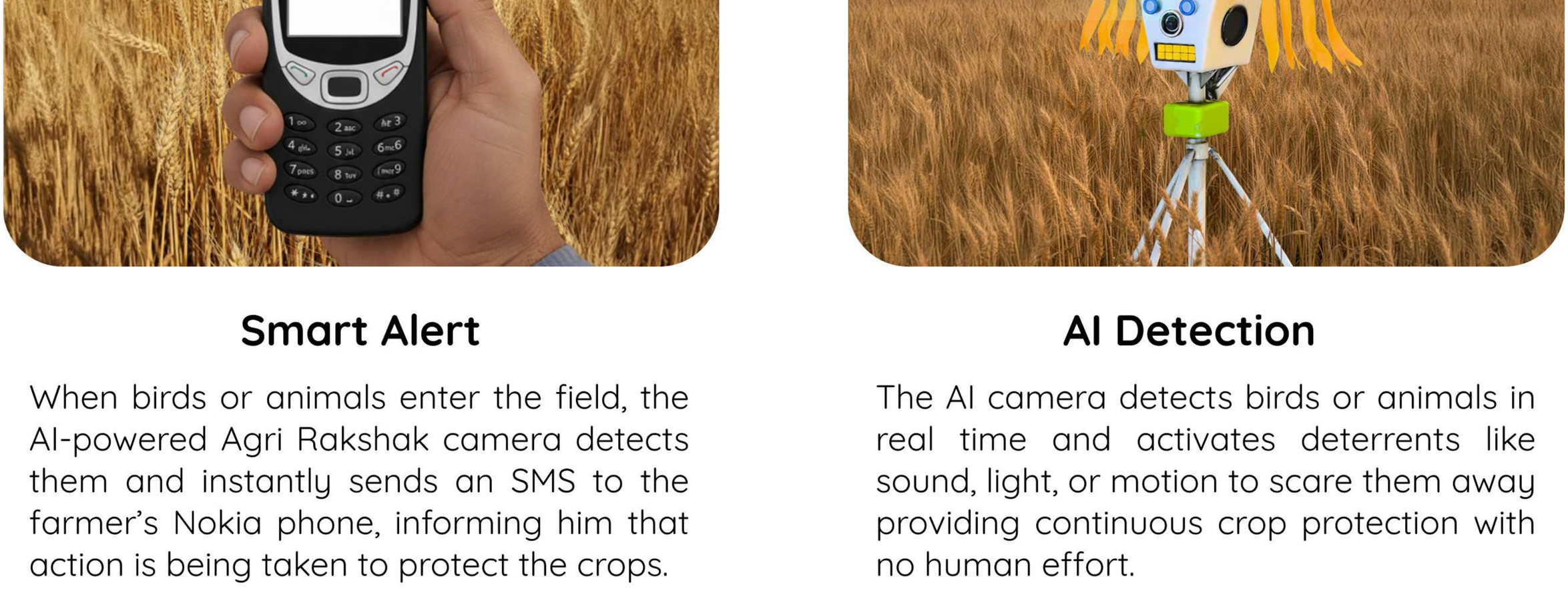
At night, blue strobe lights, sound waves, and ultrasonic signals activate when animals appear. The strong deterrence forces the boar to retreat immediately.

Smart Alert

When birds or animals enter the field, the AI-powered Agri Rakshak camera detects them and instantly sends an SMS to the farmer's Nokia phone, informing him that action is being taken to protect the crops.

AI Detection

The AI camera detects birds or animals in real time and activates deterrents like sound, light, or motion to scare them away providing continuous crop protection with no human effort.



Adaptive Intelligence – Learning from Nature

The AI Farm Bot intelligently adapts to its surroundings just like animals adapt to their environment. It learns from the terrain, weather, and animal behavior to improve its protection strategy over time. By observing patterns, it changes its sounds, light flashes, and movements to prevent animals from getting used to one deterrent. The bot also adjusts its actions based on conditions like wind, rain, or night activity—ensuring effective protection in every situation.

Animal Deterrence

Animal Type	Primary	Secondary	Effect
Crows	Arm + Streamers	Yellow LED	Startles, prevents landing
Pigeons	Streamers	Ultrasound	Breaks flocking
Monkeys	Loud Sound	Blue Strobe	Strong noise reaction
Wild Boars	Blue Strobe	Alarm + Ultrasound	Night vision disruption
Dogs	Ultrasound	Yellow LED	High-freq discomfort
Rodents	Ultrasound	Yellow LED	Silent repelling
Peacocks	Arm + Yellow LED	Sound	Stops crop pecking
Cows	Loud Sound	Blue Strobe	Redirects movement
Buffaloes	Blue Strobe	Loud Sound	Strong night deterrence
Insects	Yellow LED	Blue LED (optional)	Mild light repellence

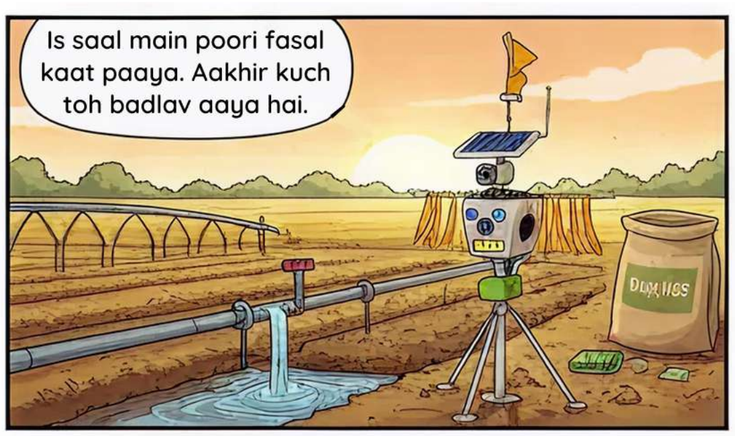
Personalized Farm Bot – Designed for Every Kisan

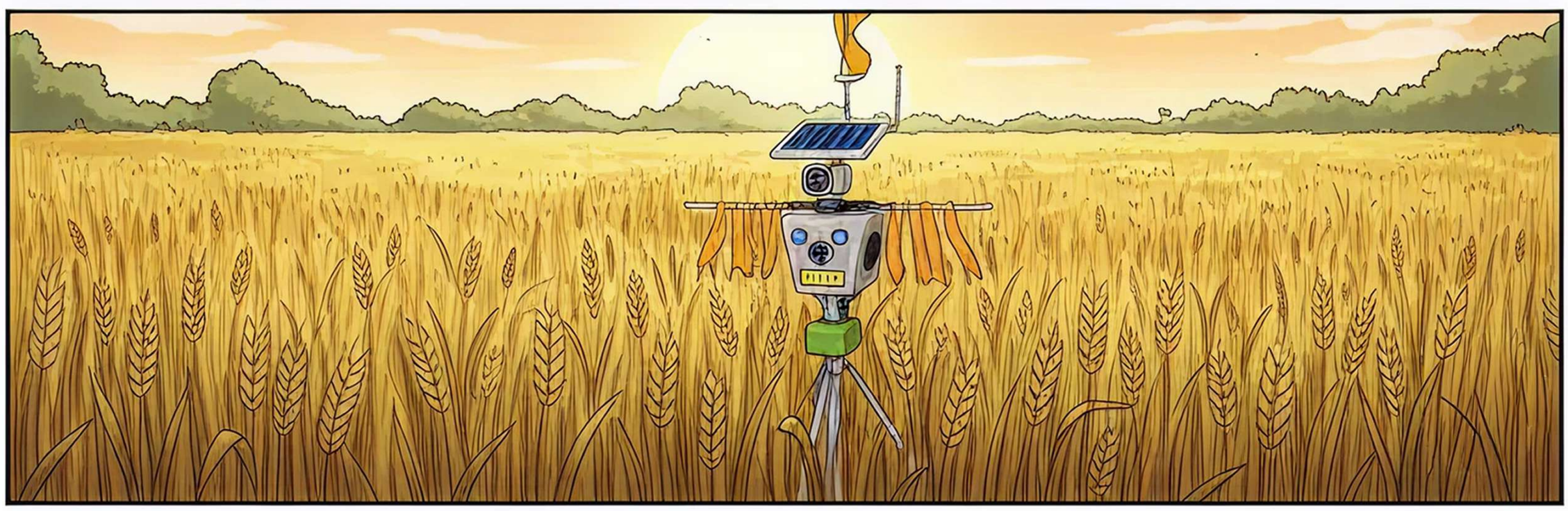
Component	Option Choices	Purpose
Power Source	Solar (variable size)/ Wind / Hybrid	Match local weather
Camera Module	HD / Night / Thermal	Adjust accuracy & cost
Connectivity	LoRa / GSM / Wi-Fi	Based on signal strength
Deterrents	Sound / Light / Ultrasonic	Suit local wildlife
Pole Height	1.5 m / 2.5 m / 3 m	Fit animal type
Battery Capacity	Small / Medium / Large	Choose backup time
Material Finish	Standard / Weatherproof premium	Climate-fit design

Key Advantages -

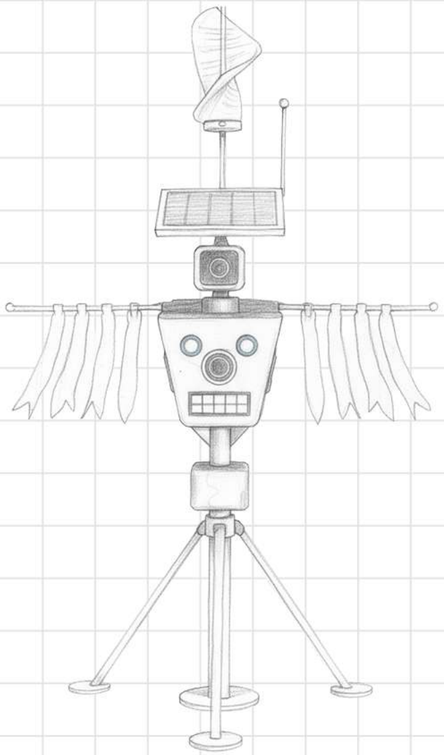
- Farmer-centric design - fits every region's need.
- Cost control - pay only for required modules.
- Scalable system → easy to upgrade later.
- Encourages adoption → flexibility increases trust and usability.

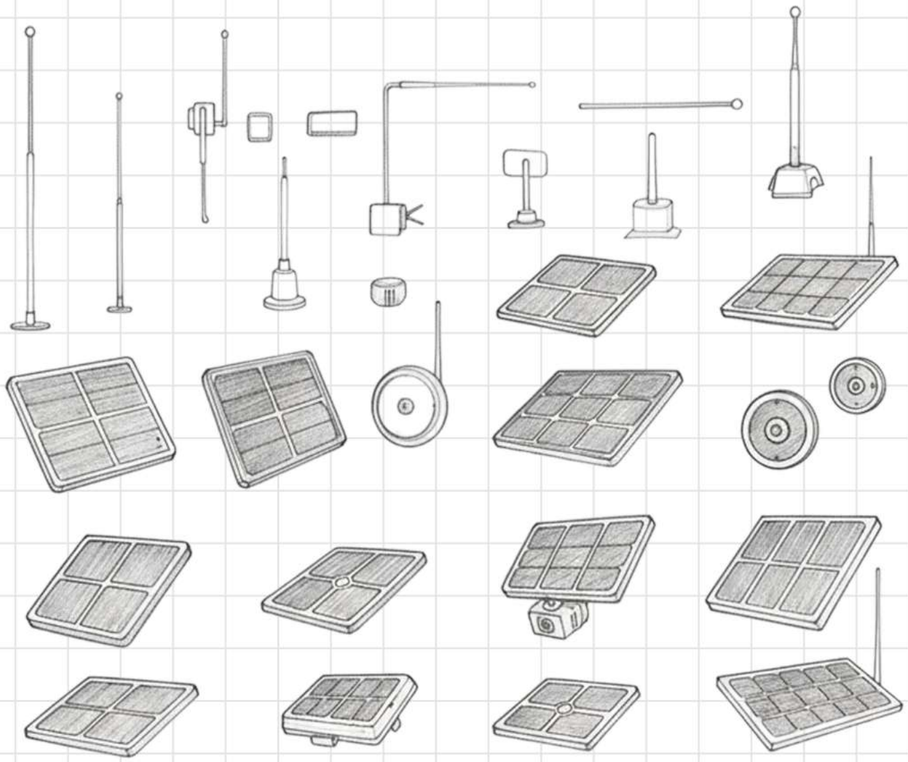
“Meri Fasal Ka Sachcha Rakshak”

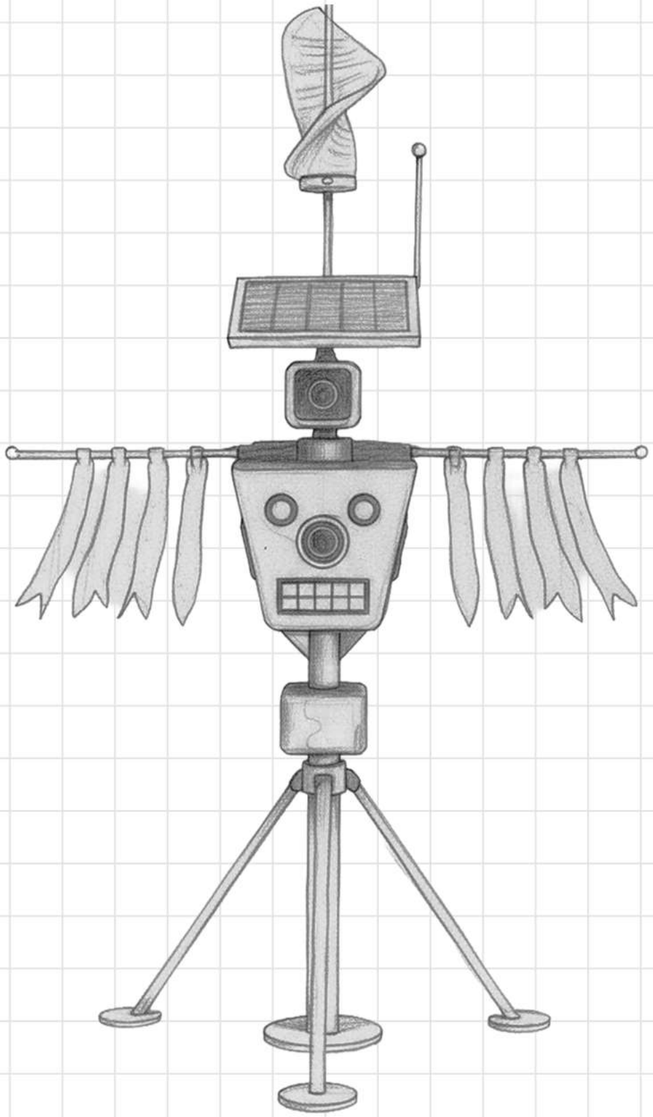


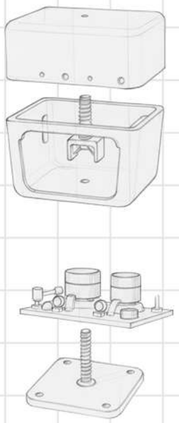


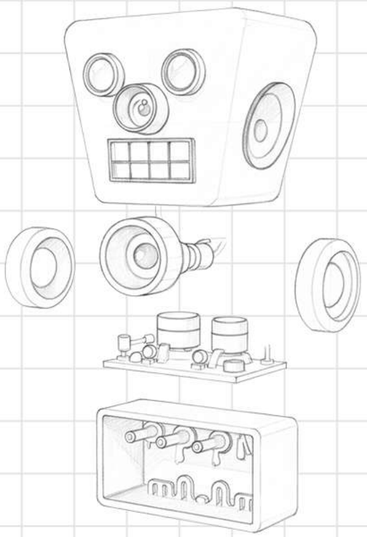
Sketches

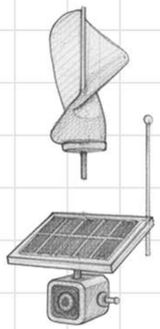


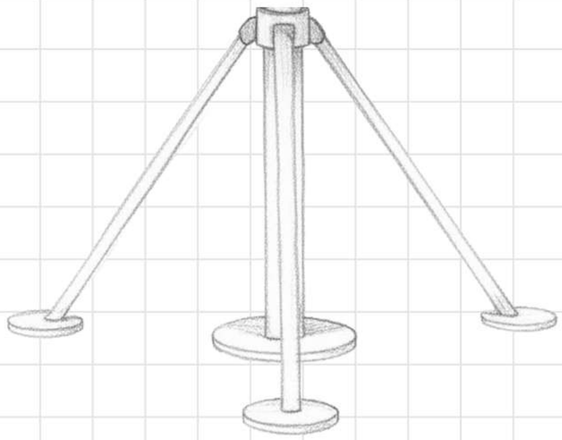


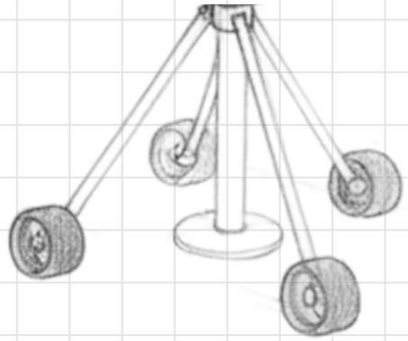












Prototype Cost Estimation

Component	Approx. Cost (₹)
Solar Panel (20W)	1,200
Mini VAWT Windmill	2,500
AI Camera + Processing Module (ESP32 / Jetson Nano)	4,000
GSM / LoRa Communication Module	1,200
Speakers (Sound + Ultrasound)	1,000
LED Lights (Blue + Yellow)	500
Battery (12V Li-ion / Lead-acid)	2,500
Structural Frame + Support (Tripod/Stand)	2,000
Miscellaneous (Wiring, Controllers, Casing, Assembly)	1,000

Total Estimated Cost: ₹15,000 – ₹16,000

Cost Feasibility & Farmer-Friendliness

Feasible Prototype:
Budget-friendly at ₹15K–₹16K for a working AI-based scarecrow.

Low Running Cost:
Powered by solar and wind - no electricity or fuel needed.

Farmer-Friendly:
Reduces bird-related crop loss automatically with minimal upkeep.

Scalable Design:
Commercial production can lower cost to ₹8K–₹10K.

Pricing Models

One-Time Investment	Rental Basis Model
₹15K–₹16K upfront cost	₹500 per month rental
Full ownership	Temporary seasonal use
1–2 year warranty	Warranty included during rental period
Farmer handles long-term maintenance	Company handles maintenance
Fixed yearly usage	Ideal for harvest/crop seasons
Best for long-term users	Best for small/seasonal farmers

Note -
- Pay only for successful deterrence events
- Company covers all repairs & damage during warranty and rental period

Guarding fields.
Empowering farmers.
Shaping the future of agriculture