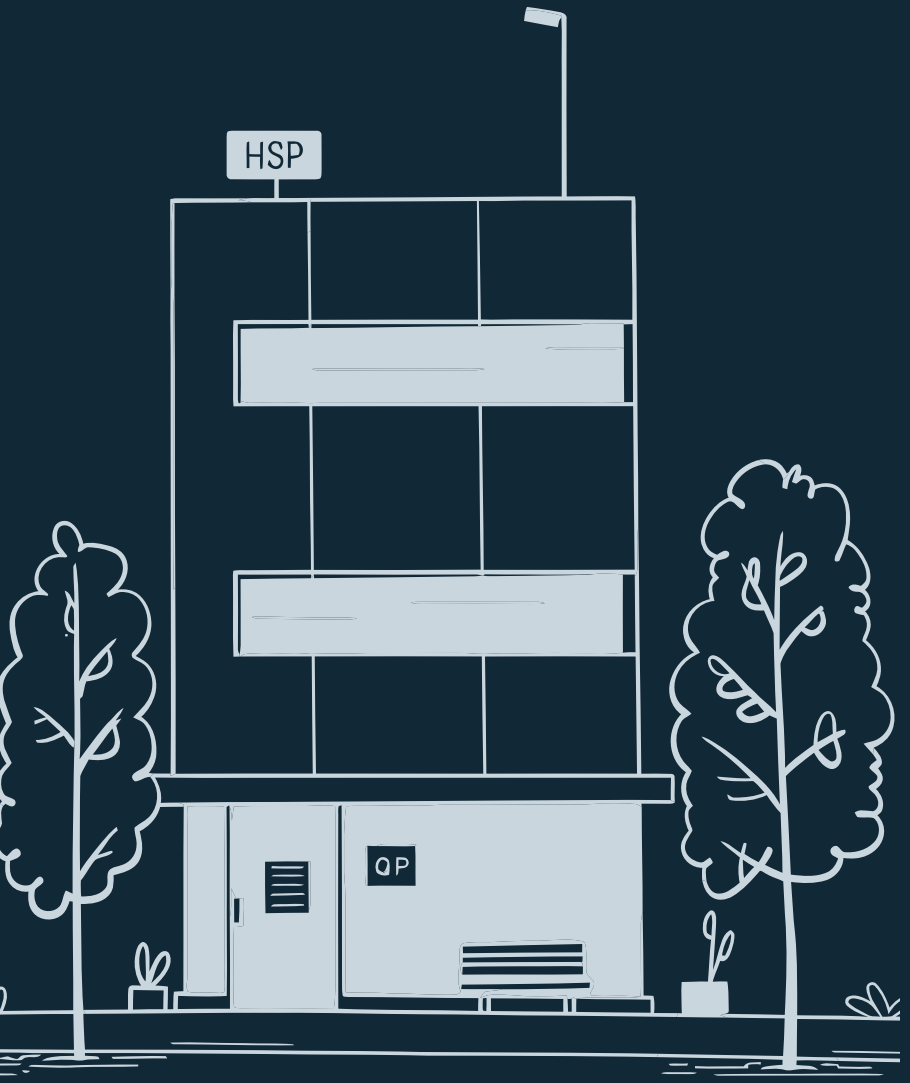

GREEN-PATH




# GREENPATH

Offline precision irrigation + climate-risk intelligence for dryland MENA

**Grow more with less water → stronger self-sufficiency → bankable farms**

Aligned with FAO's "climate-smart agriculture & water resilience" challenge focus.

# Dryland Agriculture in MENA is Under Water Stress

Dryland agriculture in MENA is under water stress — and volatility is breaking self-sufficiency progress. Agriculture dominates water use across the region, making efficiency gains here a system-level transformation opportunity.

## The Water Crisis

- Agriculture accounts for **88–89% of freshwater withdrawals** in MENA — any efficiency gain creates system-level impact
- Climate volatility makes seasons less predictable, eroding farmer confidence and investment
- Food systems are dangerously exposed: in Libya, **wheat and barley requirements are covered by imports up to 90%**

### Why Farmers Still Don't Adopt Solutions

**Trust gap:** Users don't rely on decision support system outputs; trust comes through validation by credible experts, testimonials, and extended use.

**Complexity barrier:** Many systems require complex site-specific inputs that farmers aren't able or inclined to provide.

**Time is the #1 killer:** Growers will only spend "as long as it takes me to drink a cup of coffee" on digital tools.

*— Rossi, CIHEAM 2023*

The real problem is not "lack of AI" — it's a system that can't adopt it.

# Precision Agriculture is the Only Scalable Response

Precision agriculture is the only scalable response to water scarcity and volatility — but diffusion is the real battle. Success requires both technical excellence and human-centered design.

### Precision Agriculture Principle

Do the right action, at the right time, at the right dose. Water is the "smoothest pill to swallow" and the strongest lever: irrigation decisions are frequent, costly, and irreversible.

### Support, Don't Replace

Decision support systems must support—not replace—the farmer's decision-making. "Proxy" tools fail when farmers feel bypassed.

### Timely & Simple

Systems must be timely, simple, not time-consuming, and integrated into real workflows to achieve adoption at scale.

## GreenPath's Two-Layer Solution

1. **Technical Layer:** Precision irrigation intelligence built on FAO-56 methodology
2. **Diffusion Layer:** Trust, usability, incentives, and institutional integration

# GreenPath Platform: Built for MENA Adoption Realities

GreenPath is an all-in-one platform designed from the ground up for the constraints and opportunities of MENA dryland agriculture. Every feature addresses a real barrier to adoption.

01

## FAO Irrigation Science + Local Calibration

Weekly irrigation recommendations using **$ET_0$ × Kc_local × Ks** methodology. FAO recommends Penman–Monteith as the standard $ET_0$ method, which we implement with local Kc calibration using NDVI scaling.

02

## Early Stress Detection

NDVI alerts provide early stress detection, enabling farmers to intervene before visible damage occurs.

03

## Confidence-Based Recommendations

Transparent confidence system showing "dose / drivers / confidence" builds trust through explainability.

## Offline-First Architecture

Works offline and syncs when internet returns — critical for rural connectivity reality.

## Privacy-First Security

**AES-256 encryption** with full farmer data ownership ensures trust and compliance.

## Arabic Interface

Native Arabic UI removes language barriers for widespread farmer adoption.

## Three User Types, One Platform

### Farmers

Offline mobile app with Arabic UI for daily irrigation decisions

### Institutions/NGOs

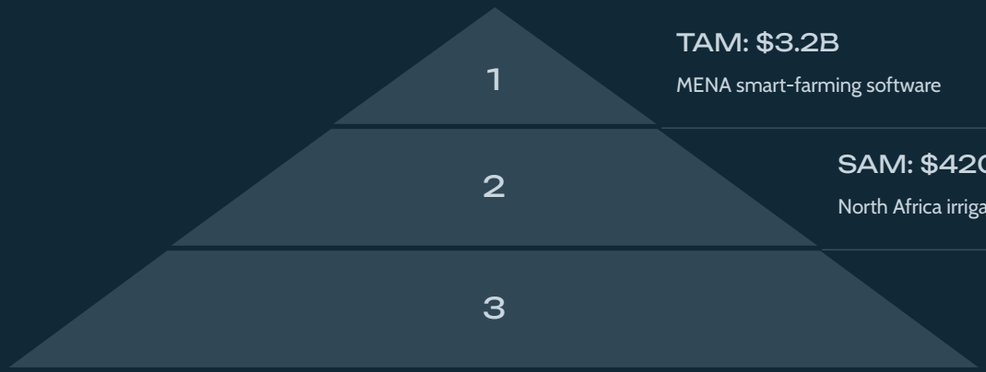
Aggregated dashboards for program management and outcomes

### Insurers/Banks

Risk and sustainability indicators with privacy-safe data sharing

# Market Opportunity: Monetizing Where Value is Highest

We monetize where willingness-to-pay is highest, while keeping farmers affordable. The market opportunity spans multiple revenue channels with clear pathways to scale.




### TAM: $3.2B

MENA smart-farming software

### SAM: $420M

North Africa irrigation subsegment

### SOM: 250K+ Farmers

Smartphone-enabled irrigated farms

## Bottom-Up Market Validation

### 250K Reachable Farmers

Base of smartphone-enabled irrigated farms across 6M+ hectares

### 5% Target in 3 Years

Conservative adoption goal: 12,500 active farms generating measurable impact

### Blended Revenue Model

Low farmer ARPA ($1–$3/mo) via co-ops; high-ticket institutional licensing

## Who Pays First

Ministries, NGOs, insurers, banks, and donor programs fund the scale. **Farmers are the beneficiary, not the cash bottleneck.**

This business model aligns incentives across the ecosystem while ensuring affordability for those who need it most.

# Competition: Global Players Lack MENA Optimization

Global precision agriculture platforms exist, but they're not built for MENA constraints, trust dynamics, or adoption realities. GreenPath's differentiation comes from ground-up design for this market.

### CropX

Integrates strongly with sensors and hardware ecosystems. "Works with CropX or third-party soil sensors" — requires hardware infrastructure that's often unavailable or unaffordable in MENA dryland contexts.

### EU Platforms (e.g., xFarm)

Strong capabilities but typically cloud-first architecture. Not optimized for offline rural adoption or the connectivity challenges prevalent across MENA agricultural regions.

### Planning Tools (e.g., CROPWAT)

Powerful reference planning for agronomists and researchers. Not designed as an everyday farmer UX tool — too complex for rapid field decisions.

## GreenPath's Competitive Advantages

### Local Calibration for MENA

Kc values, crop stages, and water stress parameters calibrated specifically for MENA microclimates and varieties

### Offline-First + Privacy Design

Architecture built for intermittent connectivity with AES-256 encryption and farmer data ownership

### Arabic Interface

Native language support removes a critical adoption barrier for the majority of target users

**The "Rossi Advantage":** Our UX is designed to be used in cup-of-coffee time, not as a research tool. Simplicity and speed are features, not compromises.

# Traction: Science-First Validation with Institutional Anchoring

GreenPath is pre-market but validated in the right sequence: science → benchmarks → partners → pilots. We're building credibility through rigorous methodology before seeking scale.

### Core Science Implementation

$ET_o$, NDVI, and Ks modules implemented and simulated following FAO-56 methodology with AQUASTAT parameters

### Offline Prototype Development

Offline-first prototype app with Arabic UI and web dashboard prototype using real satellite data

### Benchmark Validation

Benchmarked against xFarm and CROPWAT for equivalence and accuracy verification

### Expert Calibration

Discussions with Libyan agricultural engineers and academics for calibration validation and local parameter refinement

## Institutional Interest & Founder Network

NGOs and local programs have expressed interest in rural water management pilots. The founder's network spans critical institutional touchpoints:

- IPPC exposure and CropTrust/genebank partnerships
- IOC and African Union relationships
- Ministry connections across MENA region
- Agricultural machinery manufacturer relationships

This network accelerates pilot access and adoption pathways through trusted institutional channels.

# Business Model: Four Revenue Streams

Our business model keeps farmer pricing low while building a scalable, diversified revenue base. We capture value where willingness-to-pay is highest, subsidizing accessibility for smallholders.

1

## Farmers: Freemium to Premium

Core irrigation recommendations free; paid AI insights for advanced optimization, historical analysis, and predictive features. Low monthly cost ($1–$3) accessible through cooperatives and group subscriptions.

2

## Insurance & Investors: API Licensing

Anonymized sustainability and risk data via secure API access. Enables credible risk pricing, premium discounts, and investment decisions while protecting farmer privacy.

3

## Institutions: Annual Dashboards

Government ministries, agricultural agencies, and development organizations subscribe to aggregated program dashboards for monitoring outcomes, designing incentives, and measuring impact at scale.

4

## NGOs & Donors: Deployment Packages

Comprehensive deployment packages including setup, training, capacity-building, and ongoing support for water sustainability and food security programs.

# Customer Acquisition: Trust-Based Diffusion Strategy

Adoption happens through trust and incentives, not advertising. We're building distribution through institutional partnerships, youth engagement, and aligned financial incentives.

1. ### Libya: Institutional Pathway

   Formalize relationship with agricultural investment agency: land access creates natural onboarding pipeline for new farmers

2. ### Gen-Z Network Layer

   Launch youth engagement through social media (reels, creators), talent development, and job opportunities in agricultural technology

3. ### NGO Program Partnerships

   Water sustainability, environmental programs, and self-sufficiency initiatives provide trusted entry points with built-in training infrastructure

4. ### Top-Down Adoption Flow

   Institutional entry points (ministries, donors) → cooperatives → individual farmers ensures credibility at each stage

5. ### Insurance-Linked Incentives

   Premium discounts for verified efficient farms create financial motivation for adoption and sustained usage

## Aligned with Rossi Principles

Multi-channel delivery (not one method), simple inputs, not time-consuming. Our acquisition strategy mirrors our product philosophy: meet users where they are, respect their time, and build through trusted relationships.

# Impact: Making Agriculture Investable Again

GreenPath revives agriculture by transforming it from a high-risk, declining sector into an investable, resilient foundation for MENA food security. Our impact spans six interconnected dimensions.

### Self-Sufficiency (SDG 2)

More stable yields reduce import exposure. Libya's 90% import reliance on cereals shows the urgency — precision irrigation enables domestic production reliability.

### Water Resilience (SDG 6)

Agriculture is the biggest lever: MENA agricultural water withdrawals represent 88–89% of total freshwater use. Efficiency gains here create system-level water security.

### Climate Action (SDG 13)

Fewer wasted inputs and improved efficiency per kilogram produced reduce agricultural emissions and enhance climate adaptation capacity.

### Decent Work & Growth (SDG 8)

Youth entry opportunities and farmer ROI stability create labor momentum into the sector, reversing rural flight and agricultural decline.

### Better Public Programs

Dashboards help ministries and NGOs design targeted incentives, measure outcomes accurately, and allocate resources where impact is highest.

### Finance Inclusion

Insurer and investor dashboards enable credible risk pricing and capital flow into a sector historically considered "too risky" for structured finance.

### Impact KPIs We Will Measure in Pilots

- Water saved (percentage reduction in irrigation volume)
- Yield variance reduction (season-to-season stability)
- Farmer ROI improvement (input cost vs. output value)
- Adoption and retention rates (sustained usage over 12 months)
- Number of verified efficient farms (qualification for premium discounts)

# Milestones: From Reality to Maximum Potential

Our roadmap moves systematically from proof-of-concept to scaled diffusion, addressing technical validation, institutional partnerships, and financial ecosystem activation in parallel.

## Launch Network Layer

Youth and women inclusion, awareness campaigns, Gen-Z engagement through social platforms

## Finalize Calibration

Run demos and pilots across multiple microclimates; validate local Kc parameters

## Enable Asset Sharing

Facilitate access to tools and machinery through farmer collectives and shared ownership models

## Activate Finance Layer

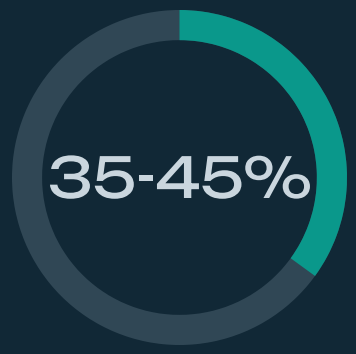
Banks and insurers offer products based on dashboard insights; premium discounts go live

## Supply Chain Integration

Standard reporting, transparency, sustainability signals for regional and export markets

# Financial Requirements: Building a Credible, Maintained System

We're building a decision support system that is credible, validated, and continuously maintained. Rossi warns that DSS are expensive to develop and maintain — and can vanish without ongoing support and updates. Our budget reflects this reality.




### Pilot Operations

Agronomy support, field visits, sampling, evaluation


### Product Development

Offline UX, dashboards, security, reliability


### Data & Calibration

Gridded meteo, NDVI pipeline, local validation


### Deployment & Training

Partner onboarding, extension enablement

## 12–18 Month Pilot-to-Scale Budget

# $250K–$400K

### What the Money Buys

- **3 pilot sites** across multiple microclimates with full measurement infrastructure
- **Measured water savings + yield stability KPIs** with scientific rigor for publication
- **Institutional dashboard v1** and insurer dashboard MVP with privacy-safe data flows
- **Proof of retention** demonstrating "cup-of-coffee" usability drives sustained adoption

This investment delivers not just technology, but validated proof that precision irrigation can diffuse at scale in MENA — the evidence needed to unlock institutional commitments, donor funding, and commercial partnerships.