TINY SEED OS - COMPLETE MASTER SPECIFICATION

Single Source of Truth - Final Version - Updated Jan 9, 2026 11:50 PM

EVERY FEATURE FROM OUR ENTIRE CONVERSATION - ORGANIZED BY PRIORITY

🎯 PROJECT OVERVIEW

Goal: Build the best farm management system in the world
Deadline: March 10, 2026 (60 days from today)
Budget: $0/month after initial development (no subscriptions)
Team: You (farm owner) + 5-10 crew members

Core Principle: Complete standardization - ONE source of truth for all farm data

---

📊 CURRENT STATE

Production Database
- **Location:**
  https://docs.google.com/spreadsheets/d/128O56X_FN9_U-s0ENHBBRyLpae_yvWHPYbBheVlR3Vc/edit
- **Status:** Working but clunky, extensive Apps Script automation
- **Main Tabs:** PLANNING_2026, MASTER_LOG, DAILY_TASKS_GENERATED, 42-column crop profiles
- **Has API:** Yes, sophisticated Google Apps Script with 15+ functions

Sales Database
- **Location:**
  https://docs.google.com/spreadsheets/d/1S7FNi11NItqeaWol_e6TUehQ9JwFFf0pgPj6G0DlYf4/edit
- **Status:** Working but separate from production
- **Connected to:** Shopify + QuickBooks
- **Has API:** Yes

Current Features Already Built:

✅ New Planting Wizard
✅ Duplicate & Move Plantings (bulk succession tool)
✅ Add New Crop Profile
✅ Auto-generate daily tasks
✅ QR code generation
✅ Weather logging (Open-Meteo API) ✅ Tray inventory management ✅ Field visual

maps
✅ Price projections (multi-year) ✅ Session logging (project management)

✅ COMPLETE FEATURE CHECKLIST - PRIORITY ORDER

🔥 TIER 1: CRITICAL PATH (Must Have By March 10)

🌱 GREENHOUSE & SEEDING OPERATIONS (Week 1 - HIGHEST PRIORITY)

Greenhouse Seeding Labels [IN PROGRESS]

- ☒ Auto-generated label system (prototype completed)
- ☐ Connect to real Google Sheet data
- ☐ Pull upcoming seedings by date range
- ☐ Print-ready labels (4" x 2" waterproof)
- ☐ Label content:
    - ☐ Crop name & variety
    - ☐ Seeding date
    - ☐ Transplant date (auto-calculated)
    - ☐ Unique tray ID/barcode
    - ☐ Tray number (1 of 3, 2 of 3, etc.)
    - ☐ Cell count per tray
    - ☐ Batch number for traceability
    - ☐ QR code for scanning
- ☐ Printer optimization (Dymo, Brother, Zebra, Avery)
- ☐ Print multiple copies option

Seed Inventory Management

- ☐ Track seed packets by lot number
- ☐ Auto-deduct on planting
- ☐ Low-stock alerts
- ☐ Seed vendor tracking
- ☐ Organic certification lot tracking
- ☐ Germination rate tracking
- ☐ Seed calculator (from existing code)

📱 PRODUCTION PLANNING INTERFACE (Weeks 1-2)

Core Planning Tools

- ☐ **Bulk Succession Planting Tool**
    - ☐ "Plant X crop every N days, M times, starting DATE"
    - ☐ Auto-assigns to alternating beds

- – ☐ Visual timeline preview
- – ☐ Template saving for patterns
- – ☐ Clone from previous year's plan
- ☐ **Visual Calendar View**
  - – ☐ Gantt-style timeline
  - – ☐ Netflix-style crop cards with images
  - – ☐ Filter by: crop, field, status, date range
  - – ☐ Zoom levels: day/week/month/season
  - – ☐ Drag-and-drop scheduling
- ☐ **Smart Bed Selector**
  - – ☐ Real-time availability display
  - – ☐ Color-coded by crop type/rotation
  - – ☐ Drag-and-drop assignment
  - – ☐ Conflict detection
  - – ☐ Bed occupation calendar
- ☐ **Quick Clone & Duplicate**
  - – ☐ Right-click → "Clone to new beds"
  - – ☐ Adjust density/spacing on-the-fly
  - – ☐ Batch edit multiple plantings

Auto-Calculations
- ☐ Bed feet required
- ☐ Transplant dates (from seed date + DTM)
- ☐ Harvest windows
- ☐ Expected yield projections
- ☐ Labor hour estimates
- ☐ **Dynamic DTM Learning** - System learns YOUR actual days-to-maturity vs textbook numbers

---

📦 REAL-TIME INVENTORY MANAGEMENT (Weeks 2-3)

Inventory Bridge
- ☐ **Available-to-Promise (ATP) Logic**
  - – ☐ Available = Harvested - Reserved - Sold
  - – ☐ Real-time calculation
  - – ☐ Auto-hide from Shopify when ATP = 0
  - – ☐ Alerts on low stock
  - – ☐ Suggests which bed to harvest next
- ☐ **Harvest → Inventory Flow**
  - – ☐ Log harvest → auto-updates inventory
  - – ☐ Shelf-life tracking with expiration warnings

- – ☐ FIFO (First In, First Out) tracking
- – ☐ Batch/lot traceability
- • ☐ **Shopify Inventory Sync**
  - – ☐ Product auto-creation from crop profiles
  - – ☐ Real-time stock level updates
  - – ☐ Smart tagging (Flex, Market, Wholesale, CSA)
  - – ☐ Out-of-stock auto-hiding
  - – ☐ Restock alerts

📱 MOBILE FIELD OPERATIONS (Weeks 3-4)

GPS & Location Intelligence
- • ☐ **GPS Auto-Detection**
  - – ☐ Map bed coordinates (one-time setup)
  - – ☐ Auto-detect field/bed from GPS (10-foot accuracy)
  - – ☐ Pre-fill forms based on location
  - – ☐ Saves 30 seconds per log entry

QR Code System
- • ☐ **QR Code Generation**
  - – ☐ Bed markers
  - – ☐ Tray labels
  - – ☐ Harvest bin tags
  - – ☐ Equipment/asset tags
  - – ☐ Batch QR generation
- • ☐ **QR Code Scanning**
  - – ☐ Scan bed → see planted crop, tasks due
  - – ☐ Scan tray → log transplant automatically
  - – ☐ Scan harvest bin → log yield
  - – ☐ Scan equipment → view setup/maintenance
  - – ☐ Works offline, syncs when connected

Harvest Logging
- • ☐ Mobile-optimized interface
- • ☐ Touch-friendly controls
- • ☐ Minimal typing required
- • ☐ Photo upload for records
- • ☐ Quick quantity entry
- • ☐ GPS + timestamp auto-logged
- • ☐ Voice logging option
- • ☐ Updates MASTER_LOG instantly

- ☐ Updates PLANNING_2026 status
- ☐ Triggers inventory changes

Task Management (Kiosk Mode)

- ☐ **Crew-Facing Dashboard**
  - ☐ Daily task list (pulls from DAILY_TASKS_GENERATED)
  - ☐ Swipe to complete
  - ☐ Photo documentation
  - ☐ Time tracking per task
  - ☐ Equipment setup cards (seeder settings, roller specs)
  - ☐ View-only mode (no editing/deleting)
  - ☐ Hide financial info from crew

🚀 TIER 2: HIGH PRIORITY (March 10 Nice-to-Have)

👥 CUSTOMER & SALES MANAGEMENT (Weeks 4-5)

Customer Onboarding

- ☐ **First Order Registration**
  - ☐ Capture: name, email, phone, address, preferences
  - ☐ Future orders: just phone or email lookup
  - ☐ Auto-save delivery preferences
  - ☐ Payment method storage

Customer Communication (SMS & Email)

- ☐ **Twilio SMS Integration**
  - ☐ Sales cycle reminders ("Order deadline: Friday 5pm")
  - ☐ Chef's specials / flash sales
  - ☐ Inventory alerts ("Tomatoes back in stock!")
  - ☐ Order tracking updates
  - ☐ Delivery ETA notifications
  - ☐ Pickup reminders
  - ☐ Arrival notifications
- ☐ **Email Campaigns**
  - ☐ Drag-and-drop email builder
  - ☐ Newsletter templates
  - ☐ Harvest announcements
  - ☐ Recipe sharing
  - ☐ Seasonal updates
  - ☐ Automated sequences (welcome, renewal)

Wholesale Portal
- ☐ Customer-facing order form
- ☐ Real-time availability
- ☐ Custom pricing by customer
- ☐ Order history
- ☐ Favorite/recurring orders
- ☐ Minimum order amounts

CSA Management
- ☐ **Member Portal**
  - ☐ Manage subscriptions
  - ☐ Vacation holds
  - ☐ Share customization
  - ☐ Delivery preferences
  - ☐ Communication history
- ☐ **Add-On Sales**
  - ☐ Notifications of crop availability
  - ☐ One-click add to box
  - ☐ Order period reminders
  - ☐ Flash sales for excess inventory
- ☐ **Flex CSA Features**
  - ☐ One-click add-ons
  - ☐ Flash sale campaigns
  - ☐ Automated renewal reminders
  - ☐ Custom share sizes

🚚 DELIVERY & LOGISTICS (Week 5-6)

Route Optimization
- ☐ **Google Maps Integration**
  - ☐ Auto-generate optimized routes
  - ☐ Multiple stops per route
  - ☐ Time window constraints
  - ☐ Driver assignments
  - ☐ Optimize for: time, distance, or priority

Driver Mobile App
- ☐ **Kiosk/Driver Mode**
  - ☐ Turn-by-turn navigation
  - ☐ Customer contact info
  - ☐ Delivery notes

- – ☐ Next-stop notifications
  - – ☐ ETA updates
- • ☐ **Live Van Tracker**
  - – ☐ Customer-facing tracking page
  - – ☐ Real-time map with van location
  - – ☐ "Your delivery is 3 stops away"
  - – ☐ SMS when driver is nearby

Proof of Delivery
- • ☐ Photo capture of delivered order
- • ☐ GPS coordinates logged
- • ☐ Timestamp recorded
- • ☐ Customer signature capture
- • ☐ Issue reporting (damaged/missing)
- • ☐ SMS/email confirmations

Pick & Pack Automation
- • ☐ **Pick Lists**
  - – ☐ Auto-generate from orders
  - – ☐ Organize by field location (optimize route)
  - – ☐ Scan harvest bins for traceability
  - – ☐ Check-off interface
  - – ☐ Quality control checkpoints
- • ☐ **Packing Labels**
  - – ☐ Customer name + order details
  - – ☐ Contents list
  - – ☐ Delivery date/time
  - – ☐ Handling instructions
  - – ☐ Batch/traceability codes

🐛 PEST & DISEASE MANAGEMENT (Week 6-7)

Wildlife Tracking
- • ☐ **Groundhog Hole Tracker**
  - – ☐ Mark den locations with GPS
  - – ☐ Photo of entrance
  - – ☐ Den size/activity status
  - – ☐ Number of entrances
  - – ☐ Nearby crops at risk
  - – ☐ Trap locations
  - – ☐ Activity timeline

- ☐ **Deer Damage Tracking**
  - – ☐ Entry point mapping
  - – ☐ Damage type (browse, trampling, rubbing)
  - – ☐ Crops affected
  - – ☐ Hoof print evidence
  - – ☐ Fence effectiveness ratings
- ☐ **Farm Pest Map**
  - – ☐ Visual satellite map overlay
  - – ☐ Active/inactive den markers
  - – ☐ Trap locations (set/empty status)
  - – ☐ Damage zone heat maps
  - – ☐ Filter by pest type/status

Pest Damage Logging
- ☐ **Damage Reports**
  - – ☐ Location (GPS or manual)
  - – ☐ Photo documentation
  - – ☐ Pest identification
  - – ☐ Damage severity (minor/moderate/severe/total)
  - – ☐ Estimated loss (quantity × value)
  - – ☐ Link to known pest/den
  - – ☐ Immediate action taken
- ☐ **Financial Impact Tracking**
  - – ☐ Total losses by pest type
  - – ☐ Loss by crop
  - – ☐ Prevention cost tracking
  - – ☐ ROI on prevention measures
  - – ☐ Insurance/grant documentation (PDF export)

Pattern Detection & Prevention
- ☐ **AI Analysis**
  - – ☐ Peak activity times
  - – ☐ Preferred crops
  - – ☐ Hot zones/vulnerable areas
  - – ☐ Seasonal patterns
  - – ☐ Prevention recommendations with ROI
- ☐ **Prevention Planning**
  - – ☐ Auto-suggest interventions (fencing, traps, barriers)
  - – ☐ Cost-benefit analysis
  - – ☐ ROI calculations
  - – ☐ Shopping list generation

- – ☐ Task creation for installation

Disease & Insect Management
- • ☐ **Farm Scout Feature**
  - – ☐ Photo capture of issue
  - – ☐ AI identification (Google Vision API)
  - – ☐ Severity assessment
  - – ☐ GPS location
  - – ☐ Auto-create tasks
  - – ☐ Assign to crew members
- • ☐ **AI Diagnosis**
  - – ☐ Image analysis
  - – ☐ Disease/pest identification
  - – ☐ Confidence scoring
  - – ☐ Organic treatment database
  - – ☐ Treatment recommendations
  - – ☐ Preventive measures
- • ☐ **Issue Tracking**
  - – ☐ Complete timeline
  - – ☐ Treatment logs
  - – ☐ Resolution tracking
  - – ☐ Cost tracking
  - – ☐ Lessons learned
  - – ☐ Pattern detection
- • ☐ **Organic Compliance**
  - – ☐ Input logging (OMRI-approved products)
  - – ☐ Batch numbers
  - – ☐ Application dates/rates
  - – ☐ Weather conditions
  - – ☐ Applicator names
  - – ☐ Re-entry intervals
  - – ☐ Pre-harvest intervals

💎 TIER 3: ADVANCED FEATURES (Post-March 10)

💰 FINANCIAL INTEGRATION (Weeks 7-8)

QuickBooks Integration
- • ☐ QuickBooks Online connection
- • ☐ API authentication
- • ☐ Auto-create customers from database

- ☐ Auto-generate invoices from deliveries
- ☐ Product sync (crop profiles → QB)
- ☐ Payment tracking
- ☐ Aging reports
- ☐ Financial dashboard

Shopify Full Integration
- ☐ Product auto-creation
- ☐ Variant management
- ☐ Image uploads
- ☐ Product descriptions
- ☐ SEO optimization
- ☐ Order import/de-duplication
- ☐ Backorder management

Financial Reporting
- ☐ Revenue by crop
- ☐ Revenue by customer
- ☐ Profitability analysis
- ☐ **Debt-Down Dashboard**
  - ☐ Progress tracker
  - ☐ This week's sales → debt payment
  - ☐ Next milestone calculator
  - ☐ Motivational metrics
- ☐ Tax preparation exports

🌦️ WEATHER & ENVIRONMENTAL (Week 6-8)

Weather Intelligence
- ☐ **Daily Weather Logging** (already built)
  - ☐ Max/min temperature
  - ☐ Precipitation
  - ☐ Growing degree days
  - ☐ Auto-log from Open-Meteo API
- ☐ **7-Day Forecast Dashboard**
  - ☐ Temperature trends
  - ☐ Precipitation forecast
  - ☐ Frost warnings
  - ☐ Planting window recommendations
- ☐ **Weather-Triggered Tasks**
  - ☐ Frost alert → "Cover tender crops"

- – ☐ Heavy rain + warm → "Check for fungal disease"
- – ☐ Dry spell → "Irrigation needed"
- – ☐ Perfect planting conditions alert
- ☐ **Smart Scheduling**
  - – ☐ Auto-adjust planting dates for frost
  - – ☐ Harvest window optimization
  - – ☐ AI predictions based on weather patterns

🌱 SOIL & AMENDMENTS (Week 8-9)

Soil Management
- ☐ **Soil Test Tracking**
  - – ☐ Test results by field/bed
  - – ☐ Historical trends
  - – ☐ Amendment recommendations
  - – ☐ Nutrient tracking (N-P-K, pH, OM)
- ☐ **Amendment Application**
  - – ☐ Log applications (compost, lime, etc.)
  - – ☐ Rates and dates
  - – ☐ Cost tracking
  - – ☐ Organic certification compliance
- ☐ **Cover Crop Management**
  - – ☐ Planting schedules
  - – ☐ Termination dates
  - – ☐ Biomass estimates

🚜 EQUIPMENT & FLEET MANAGEMENT (Week 7-8)

Asset Tracking
- ☐ **Equipment Database** (from REF_Assets)
  - – ☐ Tractors, vehicles, tools
  - – ☐ QR code labels
  - – ☐ Purchase info
  - – ☐ Current location

Maintenance Management
- ☐ **Maintenance Scheduler**
  - – ☐ Service intervals (hours/miles/dates)
  - – ☐ Auto-generate maintenance tasks
  - – ☐ Service history
  - – ☐ Parts inventory

- ☐ **Repair Logging**
  – ☐ Issue reporting
  – ☐ Photo documentation
  – ☐ Repair costs
  – ☐ Downtime tracking
  – ☐ Warranty tracking
- ☐ **Equipment Setup Cards**
  – ☐ Seeder configurations (rollers, gears, spacing)
  – ☐ Implement settings
  – ☐ Photo references
  – ☐ Crop-specific setups

Fleet Operations
- ☐ Fuel tracking
- ☐ Hour meter logging
- ☐ Depreciation calculation
- ☐ Insurance/registration reminders

📊 ANALYTICS & INTELLIGENCE (Week 9-10)

Crop Profitability
- ☐ **Revenue Analysis**
  – ☐ $ per bed-foot
  – ☐ $ per labor hour
  – ☐ $ per square foot
  – ☐ ROI by crop
- ☐ **Cost Allocation**
  – ☐ Seed costs
  – ☐ Labor hours
  – ☐ Input costs (amendments, treatments)
  – ☐ Overhead allocation
- ☐ **Margin Analysis**
  – ☐ Gross margin by crop
  – ☐ Net margin with labor
  – ☐ Contribution margin
  – ☐ Break-even analysis

Labor Tracking
- ☐ **Time Clock**
  – ☐ Punch in/out
  – ☐ GPS verification

- – ☐ Break tracking
- ☐ **Task-Based Time**
  - – ☐ Time per task type
  - – ☐ Productivity metrics
  - – ☐ Labor cost per bed/crop
- ☐ **Payroll Export**
  - – ☐ Hours summary
  - – ☐ Rate application
  - – ☐ Export to payroll service
- ☐ **Crew Gamification**
  - – ☐ Performance badges
  - – ☐ Task completion streaks
  - – ☐ Productivity leaderboards

Predictive Analytics
- ☐ **AI Harvest Predictions**
  - – ☐ Yield forecasting
  - – ☐ Harvest date refinement
  - – ☐ Quality predictions
- ☐ **Demand Forecasting**
  - – ☐ Historical patterns
  - – ☐ Customer ordering trends
  - – ☐ Seasonal adjustments
- ☐ **Auto-Succession Suggestions**
  - – ☐ "Plant more basil based on demand"
  - – ☐ Optimal timing recommendations
  - – ☐ Quantity optimization

✉ MARKETING & CONTENT (Week 8-9)

Automated Marketing
- ☐ **Welcome Series** (new customers)
- ☐ **Renewal Campaigns** (CSA)
- ☐ **Win-Back** (lapsed customers)
- ☐ **Birthday Offers**
- ☐ **Seasonal Promotions**

Content Tools
- ☐ **Recipe Integration**
  - – ☐ Farm-branded recipe cards
  - – ☐ Seasonal recipe suggestions

- – ☐ Ingredient availability matching
- ☐ **Marketing Materials Generator**
  - – ☐ Print-ready PDFs
  - – ☐ Social media templates
  - – ☐ Member handbooks
  - – ☐ Farm brochures
  - – ☐ Poster designs

📋 COMPLIANCE & CERTIFICATION (Week 9)

Organic Certification
- ☐ **Complete Traceability**
  - – ☐ Seed lot → planting → inputs → harvest → sale
  - – ☐ Batch tracking throughout chain
  - – ☐ Complete audit trail
- ☐ **One-Click Audit Report**
  - – ☐ Auto-generate PDF for inspector
  - – ☐ Includes:
    - ☐ Seed purchase records
    - ☐ Planting records
    - ☐ All inputs applied
    - ☐ Harvest records
    - ☐ Sales records
  - – ☐ Inspector-ready format

Food Safety
- ☐ Worker health logs
- ☐ Water quality tests
- ☐ Temperature logs (cooling)
- ☐ Cleaning schedules

Record Keeping
- ☐ Labor logs
- ☐ Equipment maintenance
- ☐ Pest/disease reports
- ☐ Harvest records

🎨 USER EXPERIENCE & POLISH (Week 9-10)

Mobile Optimization
- ☐ **Progressive Web App (PWA)**

- – ☐ Install on home screen
- – ☐ Works offline completely
- – ☐ Push notifications
- – ☐ App-like experience
- – ☐ Background sync

Responsive Design

- ☐ Desktop view (planning/reports)
- ☐ Tablet view (field management)
- ☐ Phone view (logging/scanning)
- ☐ Adaptive layouts

User Roles & Permissions

- ☐ **Farm Owner/Manager**
    - – ☐ Full access
    - – ☐ Financial reports
    - – ☐ Planning tools
    - – ☐ Analytics
    - – ☐ Settings
- ☐ **Crew Members**
    - – ☐ Task view only
    - – ☐ Harvest logging
    - – ☐ Time tracking
    - – ☐ No financial access
    - – ☐ No delete permissions
- ☐ **Customers**
    - – ☐ Order portal
    - – ☐ Account management
    - – ☐ Delivery tracking
    - – ☐ No farm operations

Training & Documentation

- ☐ Video tutorials
- ☐ User manual
- ☐ Quick reference guides
- ☐ Troubleshooting docs
- ☐ FAQ
- ☐ In-app help tooltips

📅 REVISED DEVELOPMENT TIMELINE

Week 1 (Jan 9-16): Foundation + LABELS

Priority: Get you printing labels NOW - [x] Project kickoff - [ ] Greenhouse label system (connect to real data) - [ ] Test with your printer - [ ] Seed inventory tracking - [ ] Google Sheets API foundation

Deliverable: Working label generator with real data

Week 2 (Jan 17-23): Production Planning

Priority: Make planning 10x faster - [ ] Bulk succession planting tool - [ ] Visual calendar (Gantt view) - [ ] Smart bed selector - [ ] Quick clone/duplicate - [ ] Real-time inventory (ATP logic)

Deliverable: Plan 2026 season in 2 hours

Week 3 (Jan 24-30): Mobile Field Ops

Priority: Crew efficiency - [ ] GPS auto-detection setup - [ ] QR scanning interface - [ ] Harvest logging mobile view - [ ] Kiosk mode for crew - [ ] Task dashboard - [ ] Offline mode

Deliverable: Crew logs work from phones

Week 4 (Jan 31-Feb 6): Customer Management

Priority: Sales automation - [ ] Customer onboarding flow - [ ] Wholesale portal - [ ] CSA management - [ ] Order processing - [ ] SMS notifications (Twilio)

Deliverable: Customers order online

Week 5 (Feb 7-13): Delivery & Logistics

Priority: Route optimization - [ ] Pick list generation - [ ] Route optimization (Google Maps) - [ ] Driver mobile app - [ ] Live van tracking - [ ] Proof of delivery

Deliverable: Optimized routes, customer tracking

Week 6 (Feb 14-20): Pest Management

Priority: Problem tracking - [ ] Groundhog hole tracker - [ ] Pest damage logging - [ ] Farm Scout (AI photo analysis) - [ ] Treatment tracking - [ ] Financial impact analysis

Deliverable: Complete pest management system

Week 7 (Feb 21-27): Integrations

Priority: Eliminate double entry - [ ] QuickBooks setup - [ ] Auto-invoicing - [ ] Shopify full integration - [ ] Email campaigns - [ ] Weather automation

Deliverable: Data flows automatically

Week 8 (Feb 28-Mar 6): Equipment & Analytics

Priority: Long-term value - [ ] Equipment/fleet management - [ ] Profitability tracking - [ ] Labor analytics - [ ] Debt-down dashboard - [ ] Predictive analytics

Deliverable: Business intelligence

Week 9 (Mar 7-13): Compliance & Polish

Priority: Certification ready - [ ] Organic audit reports - [ ] Soil management - [ ] Cover crops - [ ] Final UI polish - [ ] Performance optimization

Deliverable: Certification-ready

Week 10 (Mar 14-20): Training & Launch

Priority: Team adoption - [ ] Team training sessions - [ ] Documentation complete - [ ] Video tutorials - [ ] Final testing - [ ] Launch preparation

Deliverable: Production-ready system

🛠️ TECHNICAL STACK

Backend
- Google Sheets (database)
- Google Apps Script (API layer - already built)
- Serverless functions (complex logic if needed)

Frontend
- React (web app framework)
- Progressive Web App (PWA)
- Responsive design (desktop/tablet/mobile)

- Works offline with background sync

AI & Machine Learning
- Google Vision API (image recognition)
- Pattern detection algorithms
- Predictive analytics

Integrations
- Shopify API (inventory, orders)
- QuickBooks Online API (invoices, products)
- Google Maps API (routing)
- Twilio API (SMS)
- Open-Meteo API (weather - already integrated)
- Mailgun/SendGrid (email)

Hosting
- Vercel or Netlify (FREE tier)
- Google Cloud (minimal costs)
- All code version controlled (Git)

Cost After Launch
- $0/month subscriptions
- ~$10-30/month for:
  - SMS messages (Twilio pay-as-you-go)
  - Map API calls (Google Maps)
  - Email sends (if over free tier)
  - Cloud hosting (if exceeds free tier)

⚡ IMMEDIATE NEXT STEPS (Next 48 Hours)

Your Action Items:
1. **Download and review this complete spec**
2. **Answer label questions:**
   - Confirm 4" x 2" label size?
   - What printer model do you have?
   - Which spreadsheet tab has seeding schedule?
3. **Test the prototype** (index.html already delivered)
4. **Confirm Shopify credentials** still work
5. **Share QuickBooks account** details

My Action Items:
1. **Connect label generator** to your real Google Sheet

2. **Set up daily progress tracker** (Google Doc)
3. **Build production planning** prototype
4. **Plan QuickBooks integration**

🎯 SUCCESS METRICS

By March 10, 2026, you will be able to:

✅ Plan your entire 2026 season in 2 hours (vs. 2 days)
✅ Print greenhouse labels in 30 seconds
✅ Log a harvest in 10 seconds (vs. 2 minutes)
✅ See real-time inventory across all channels
✅ Generate customer orders → pick lists → invoices with 1 click
✅ Optimize delivery routes automatically
✅ Track pest damage with financial impact
✅ Communicate with customers via automated SMS/email
✅ Generate organic certification reports instantly
✅ Track equipment maintenance automatically
✅ Analyze crop profitability in real-time
✅ Have zero monthly subscription costs

And compete with $500/month farm management platforms - for FREE.

📊 PROGRESS TRACKING

Starting Jan 10, daily progress log format:

```
DATE: Jan 10, 2026
COMPLETED TODAY:
- Item 1
- Item 2

IN PROGRESS:
- Item A (50% done)

BLOCKED BY:
- Waiting on: User to test X

TOMORROW'S PLAN:
- Build Y
- Test Z

AHEAD/BEHIND SCHEDULE: On track
```

💪 THIS IS THE COMPLETE PLAN

Every single feature from our entire conversation is now documented:

✅ Greenhouse labels
✅ Production planning
✅ GPS auto-detection
✅ Pest tracking (groundhog holes, deer, insects)
✅ Customer notifications (SMS/email)
✅ Delivery tracking (live van)
✅ CSA add-on sales
✅ Farm Scout (AI photo analysis)
✅ Equipment management
✅ Weather automation
✅ Soil & amendments
✅ Debt-down dashboard
✅ One-click audit reports
✅ Real-time inventory (ATP logic)
✅ QuickBooks/Shopify integration
✅ Labor tracking & gamification
✅ Predictive analytics
✅ And everything else discussed

Nothing is missing. Everything is prioritized. Let's build this.

Last Updated: Jan 9, 2026, 11:50 PM
Next Update: Daily progress log starts Jan 10
Document Status: COMPLETE - All features from entire conversation included