PROJECT VISION & SYSTEM OVERVIEW

Cassava Digital Knowledge, Consultancy & Market Platform

1. PROJECT VISION

This platform is designed to become **the single most trusted digital destination for everything related to cassava**.

The vision is to build a **centralized, intelligent, and scalable ecosystem** where:

- Farmers can **learn**, **get expert help**, **sell cassava**, and **buy inputs**
- Researchers can **publish and share cassava research**
- Consultants can **offer professional advisory services**
- Buyers can **source cassava directly from farmers**
- Stakeholders can **access reliable cassava data, insights, and trends**

In simple terms:

If you want any information, service, or opportunity related to cassava — this is where you come.

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2. PROBLEM THE SYSTEM SOLVES

Currently:

- Cassava knowledge is **scattered**
- Farmers lack **timely expert support**
- Research findings rarely reach farmers
- Markets are **fragmented**
- Inputs are hard to verify
- Data is underutilized

This system solves these by creating **one integrated digital platform** that combines:

- Knowledge
- Consultancy
- Marketplace
- Research
- Data intelligence

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3. WHAT THE SYSTEM IS (IN ONE SENTENCE)

A **modular, role-based web platform** that serves as a **knowledge hub, consultancy system, research repository, and digital marketplace for the cassava value chain**.

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4. CORE DESIGN PHILOSOPHY (IMPORTANT FOR ARCHITECTURE)

The system must be:

1. **Modular** – each feature works independently but integrates seamlessly
2. **Scalable** – built to support future AI, mobile apps, and regional expansion
3. **Role-Based** – users see only what is relevant to them
4. **Content-Driven** – knowledge is the foundation
5. **Data-Centric** – farm data, market data, and research data are valuable assets

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5. USER ROLES & HOW THEY INTERACT WITH THE SYSTEM

1. Farmers

- Access cassava knowledge (video, articles, PDFs)
- Request expert consultancy

- Upload farm data
- Sell cassava produce
- Buy tools, fertilizers, and pesticides
- Receive alerts and recommendations

2. Consultants / Agronomists

- Offer advisory services
- Respond to farmer requests
- Upload expert content
- Conduct video or chat consultations

3. Researchers

- Upload and publish cassava research
- Tag content by topic
- Share innovations with the ecosystem
- Track engagement and downloads

4. Buyers

- Browse cassava listings
- Contact farmers
- Place orders
- Track transactions

5. Admins

- Moderate content
- Approve listings and research
- Manage users

- Monitor analytics and system health

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6. SYSTEM COMPONENTS & HOW THEY CONNECT

A. Cassava Knowledge Hub (FOUNDATION)

This is the **core of the platform**.

- Structured cassava information:
    - Varieties
    - Cultivation
    - Pest & disease control
    - Processing
    - Storage
    - Marketing
- Content types:
    - Articles
    - Videos
    - PDFs
    - Audio (future)
- Searchable, filterable, and categorized

All other modules **reference and build on this knowledge base**.

B. Consultancy & Support Module

This allows **direct expert–farmer interaction**.

- Consultation requests

- Live chat / video calls
- Documentation of advice
- Paid and free consultations
- AI-powered basic assistance (future)

C. Marketplace Module

Two integrated marketplaces:

1. **Cassava Produce Marketplace**
    - Farmers list produce
    - Buyers source directly
    - Location-based discovery
2. **Input & Tools Marketplace**
    - Tools
    - Fertilizers
    - Pesticides
    - Verified sellers

D. Research & Innovation Hub

A structured publishing system for cassava research.

- Upload papers
- Tag by category
- Approval workflow
- Public access

- Discussion & feedback

This ensures research **flows from labs to farms**.

E. Data Capture & Analytics Layer

The system continuously collects:

- Farm-level data
- Pest and disease reports
- Market price trends
- Consultation data
- Research engagement metrics

This data supports:

- Future AI
- Policy insights
- Smart recommendations

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7. ARCHITECTURE PRINCIPLES FOR DEVELOPMENT

The platform should be built as:

- **API-driven backend**
- **Role-based access control**
- **Separation of concerns**
- **Cloud-ready**
- **Future mobile app compatible**

Each major feature should be its **own service/module**, including:

- Authentication
- Content management
- Marketplace
- Consultancy
- Research publishing
- Notifications
- Payments

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8. FUTURE EXPANSION (ARCHITECT FOR THIS NOW)

The architecture must allow easy integration of:

- AI cassava assistant
- Disease detection via images
- Mobile apps (Android/iOS)
- SMS & WhatsApp integration
- Government and NGO portals
- Multi-language support
- Blockchain traceability (future)

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9. SUCCESS DEFINITION

The system is successful when:

- Farmers rely on it daily
- Experts trust it
- Research flows freely

- Transactions happen smoothly
- Cassava data becomes structured and valuable

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10. FINAL NOTE TO DEVELOPER

This is **not just a website**, but a **long-term digital infrastructure for the cassava ecosystem**. Design choices should prioritize **clarity, scalability, security, and data intelligence**.

If you want, I can now:

- Rewrite this into a **formal Technical Brief**
- Create a **one-page vision summary**
- Translate this into **user stories for developers**
- Break it into **MVP + Phase 2 roadmap**

Just tell me.

Excellent vision, El-Max. What you're describing is not just a website — it's a **Cassava Digital Ecosystem / Knowledge & Market Hub**. Below is a **clear, professional, developer-ready architecture** you can hand directly to your web developer to build a **robust, modern, scalable system**.

🌱 CASSAVA DIGITAL PLATFORM

(Knowledge • Consultancy • Marketplace • Research • Community)

1. OVERALL SYSTEM ARCHITECTURE (HIGH LEVEL)

Three Core Layers

1. **Frontend (User Interface)**
2. **Backend (Business Logic & APIs)**
3. **Data & Infrastructure Layer**

Plus **AI, Payments, and Integrations**.

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2. USER TYPES (VERY IMPORTANT)

Your system should be role-based:

1. **Farmers**
2. **Researchers / Experts**
3. **Consultants / Agronomists**
4. **Buyers (processors, traders, companies)**
5. **Input Sellers (tools, fertilizers, pesticides)**
6. **Admins / Moderators**

Each role sees different dashboards.

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3. FRONTEND ARCHITECTURE (WHAT USERS SEE)

A. Public Pages (No Login Needed)

- Home Page (Vision, benefits, call to action)
- About Cassava (Overview, importance, value chain)
- Cassava Knowledge Hub (Preview content)
- Research Highlights
- Marketplace Preview

- Consultancy Overview
- Contact & Support

B. Authenticated Dashboards

1. Farmer Dashboard

- Farm Profile (location, farm size, cassava variety)
- Crop Calendar (planting → harvest)
- Pest & Disease Reporting
- Ask an Expert (consultancy requests)
- Access Learning Materials (video, PDF, audio)
- Sell Cassava (list produce)
- Buy Inputs (tools, fertilizers, pesticides)
- Order Tracking
- Notifications & Alerts

2. Consultant / Expert Dashboard

- Profile & Expertise Area
- Consultancy Requests Inbox
- Video / Chat / Document Consultation
- Upload Advisory Content
- Earnings & Payouts

3. Researcher Dashboard

- Upload Research Papers
- Tag Research (soil, yield, pests, processing)
- Peer Review / Approval Flow

- Citation & Downloads Analytics

4. Buyer Dashboard

- Browse Cassava Listings
- Filter by location, variety, quantity
- Contact Farmers
- Place Orders
- Logistics Integration (future)

5. Admin Dashboard

- User Management
- Content Moderation
- Marketplace Approval
- Research Review Approval
- Analytics & Reports
- CMS Control

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4. CORE FUNCTIONAL MODULES (BACKEND)

1. Cassava Knowledge Management System (KMS)

Heart of the platform

- Articles (Best practices, varieties, processing)
- Videos (farming, mechanization, disease control)
- PDFs & Research Papers
- Audio (local language lessons)
- Categorization & Tags

- Advanced Search & Filters

📌 **Everything about cassava in one place**

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2. Consultancy & Support System

- Ticket-based consultation
- Live chat & video (WebRTC / Zoom API)
- AI-powered FAQ (basic cassava questions)
- Paid & free consultation options
- History & documentation of advice

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3. Cassava Marketplace

A. Produce Marketplace

- Farmers list cassava (fresh or processed)
- Quantity, variety, harvest date
- Price negotiation / fixed pricing
- Buyer-farmer messaging

B. Input Marketplace

- Tools & equipment
- Fertilizers
- Pesticides & herbicides
- Vendor onboarding
- Stock & order management

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4. Research & Innovation Hub

- Upload research papers
- DOI / reference metadata
- Review & approval workflow
- Commenting & discussion
- Download tracking
- Featured research

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5. Data Capture & Analytics Engine

- Farm data (soil, yield, weather inputs)
- Pest & disease incidence mapping
- Yield performance data
- Market price trends
- Research impact metrics

📊 This data becomes **extremely valuable** later.

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5. DATABASE ARCHITECTURE (SIMPLIFIED)

Core Tables

- Users
- Roles & Permissions
- Farmer Profiles

- Farm Data
- Cassava Listings
- Orders & Transactions
- Knowledge Content
- Research Publications
- Consultancy Sessions
- Messages & Notifications
- Reviews & Ratings

Use:

- **PostgreSQL** (structured data)
- **MongoDB** (content & documents)
- **Cloud Storage (AWS S3 / GCP)** for videos & PDFs

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6. TECHNOLOGY STACK (RECOMMENDED)

Frontend

- React.js / Next.js
- Tailwind CSS
- Progressive Web App (PWA) support (offline access)

Backend

- Node.js (NestJS) or Django
- REST + GraphQL APIs
- Authentication (JWT + OAuth)

Infrastructure

- AWS / GCP / Azure
- Docker & Kubernetes (for scale)
- CDN for videos & files

Payments

- Mobile Money (MTN, Vodafone, AirtelTigo)
- Stripe / Paystack / Flutterwave

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7. AI & SMART FEATURES (ADD THIS — VERY IMPORTANT)

A. AI Cassava Assistant

- Farmers ask questions in simple language
- Recommends best practices
- Translates to local languages
- Voice input/output (future)

B. Disease & Pest Identification (Future Phase)

- Upload leaf image
- AI suggests possible disease
- Connects to consultant

C. Recommendation Engine

- Best cassava variety by region
- Best fertilizer schedule
- Best market prices nearby

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8. SECURITY & TRUST

- Role-based access control
- Data encryption
- Verified consultants & vendors
- Research plagiarism checks
- Activity logs & audits

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9. WHAT ELSE YOU SHOULD ADD (POWERFUL IDEAS)

1. Community Forum

- Farmer-to-farmer learning
- Regional groups
- Success stories

2. Certification System

- “Certified Cassava Farmer”
- “Verified Consultant”
- “Trusted Research Contributor”

3. Government & NGO Portal

- Policy updates
- Grants & subsidies
- Training programs

4. Offline Access

- SMS alerts
- WhatsApp integration
- USSD (future)

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10. HOW TO PRESENT THIS TO YOUR DEVELOPER

Tell them:

“We are building a **Cassava Digital Ecosystem** with modular architecture, role-based dashboards, knowledge management, consultancy, marketplace, research publishing, and future AI integration. The system must be scalable, secure, and API-driven.”
