OnlyFood Agriculture Research & Marketing System (OFARM) Case Study

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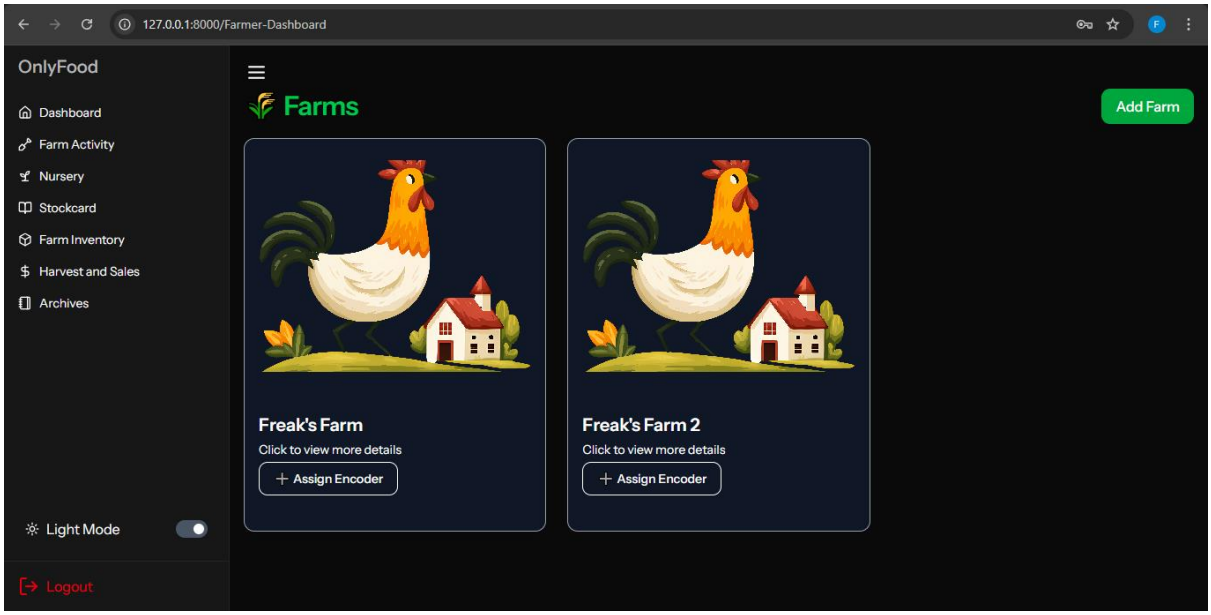
Project Overview

The **OnlyFood Agriculture Research & Marketing System (OFARM)** is an AI-powered digital infrastructure platform designed to empower local farmers by enhancing their backend operations. Unlike a traditional marketplace, OFARM equips farmers with intelligent tools for crop planning, pricing, marketing, and logistics, leveling the playing field against larger agricultural firms. Recognized as a Top 11 finalist in the 2025 Filipinnovation challenge, this minimum viable product (MVP) is actively showcased in startup pitches, demonstrating its potential to transform the agricultural economy.



OFARM's main dashboard, designed for intuitive farmer interaction.

The Challenge

Local farmers, particularly small-scale producers in regions like Valencia, Negros Occidental, face significant challenges: rising costs, unpredictable climate conditions, and intense market pressures. Without access to reliable data, many make planting decisions blindly, often leading to oversupply and diminished returns on investment (ROI). A notable example from interviews with a Valencia farmer organization highlighted a significant drop in corn prices due to oversupply, leaving farmers with low ROI. Additionally, government agencies, such as the Department of Agriculture, lack real-time data to monitor crop distribution and inform policy decisions, hindering effective agricultural interventions.

Interviewing farmers in Valencia to understand market challenges.

Target Audience

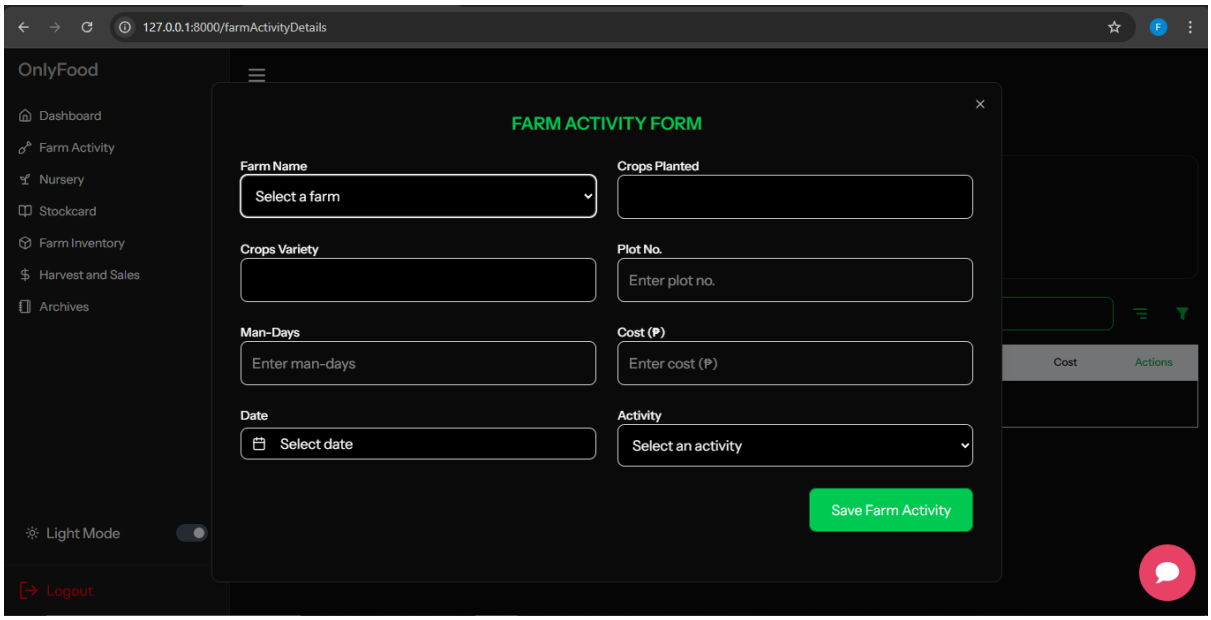
OFARM serves two primary audiences:

- **Small-Scale Farmers**: Independent farmers in regions like Valencia, Negros Occidental, who lack access to digital tools for data-driven decision-making. These farmers need affordable, user-friendly solutions to optimize crop selection, pricing, and logistics while maximizing ROI.
- **Government Agencies**: Entities like the Department of Agriculture, which require real-time data on crop distribution, seasonal trends, and farm productivity to design informed policies and mitigate risks like oversupply.

My Role and Contributions

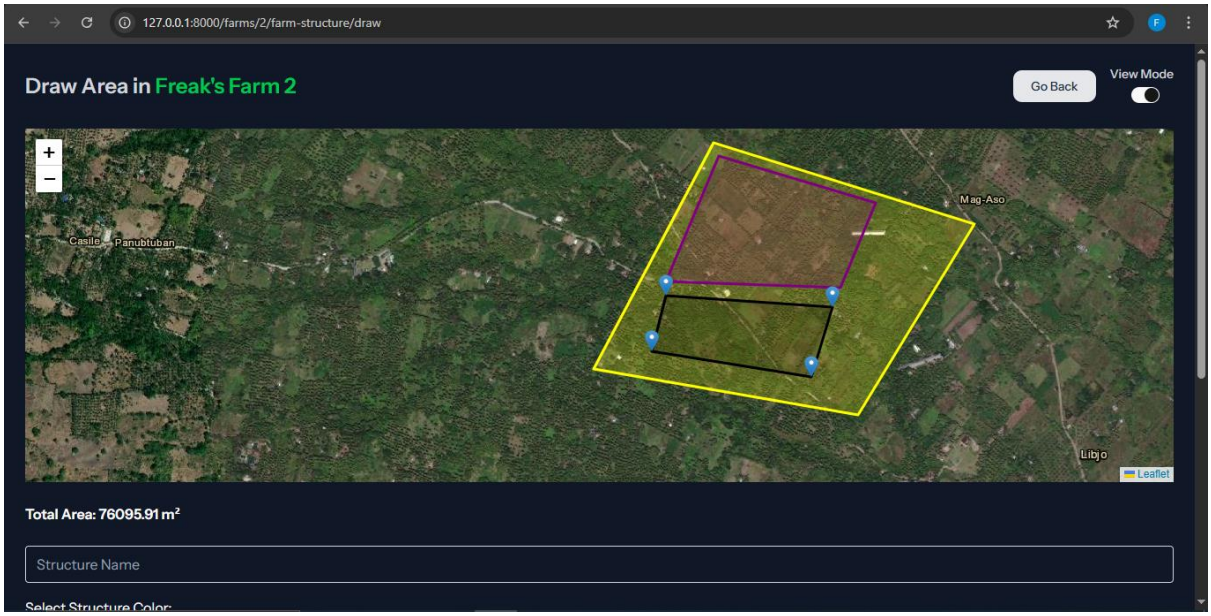
As a key contributor to OFARM during my internship, I played a multifaceted role in its development, spanning frontend and backend development, mapping, role-based access, deployment, and stakeholder engagement. My specific contributions included:

- **Frontend Development**: Built responsive interfaces using **React (TSX)** and **Tailwind CSS**, integrating **Inertia.js** for a seamless single-page application (SPA) experience with the Laravel backend. Developed interactive modules, including dashboards, area forms, product listings, theme toggles, navigation components, modals, toasts, and dynamic data tables, leveraging **Shadcn UI** for rapid prototyping.



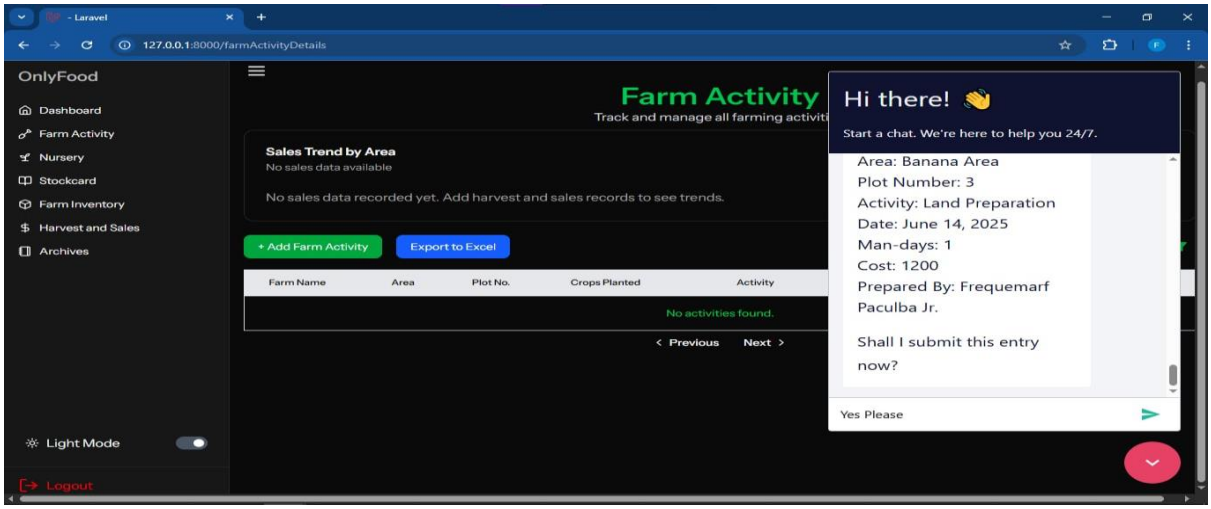
Interactive farmer dashboard built with React and Tailwind CSS.

- **Backend Development**: Utilized **Laravel** to manage authentication, routing, controllers, and data logic. Created REST-like endpoints via Inertia, structured **MySQL** database schemas and migrations, and developed features like inventory synchronization, suggested pricing, and area-based harvest tracking.
- **Mapping and Visualization**: Took ownership of the “Mapping the Farm” phase by integrating **Leaflet.js**, enabling farmers to draw and store farm plot polygons and visualize data geographically based on Area ID.



Geospatial farm mapping feature developed with Leaflet.js.

- **Role-Based Access & Admin Tools**: Configured user roles (Admins, Farmers, Encoders) using **Spatie Permissions**, building tailored dashboards and menus for each role, along with modules for user management, inventory, farm activities, and analytics.
- **AI Integration**: Explored AI-driven data storage using **Laravel Prism** and later adopted **n8n**, a no-code/low-code platform, to simplify integration of natural language data inputs via a webhook-triggered workflow hosted on a separate server.



- **Deployment**: Deployed the MVP to a virtual private server (VPS) using the **LEMP stack (Linux, Nginx, MySQL, PHP)** and configured a domain name for the server's IP address, ensuring accessibility.
- **Collaboration and Version Control**: Actively managed feature branches, performed merges, and resolved conflicts using **Git** and **GitHub**. Participated in code reviews, team discussions, and documentation to ensure smooth collaboration.
- **Stakeholder Engagement**: Presented the prototype to the Valencia farmer organization, gathering enthusiastic feedback, and participated in interviews to inform iterative improvements. Attended a startup pitch event in Cebu with the CEO, witnessing OFARM's recognition in the 2025 Filipinnovation challenge (Top 11).

Presenting OFARM at the 2025 Filipinnovation challenge in Cebu.

Goals and Objectives

OFARM aimed to empower farmers and government agencies with data-driven tools to address critical agricultural challenges. The primary objectives included:

- **Enhance Decision-Making**: Provide AI-driven crop recommendations based on soil quality, weather patterns, and market trends to optimize crop selection and reduce risks like oversupply.
- **Optimize Pricing and Market Strategies**: Offer smart pricing suggestions based on local and regional market fluctuations to maximize farmers' ROI.
- **Streamline Operations**: Simplify logistics and marketing processes, enabling farmers to efficiently get their produce to market and create professional product listings.
- **Facilitate Data Sharing**: Enable seamless sharing of farm data with government agencies and cooperatives to support real-time monitoring, risk assessment, and policy development.

While specific metrics (e.g., percentage increase in ROI) were not yet available for the MVP, the system was designed to improve farmer profitability, reduce oversupply incidents, and enhance government policy efficiency.

Research and Discovery

The research process centered on direct engagement with a farmer organization in Valencia, Negros Occidental. Through in-person interviews, we uncovered critical pain points: farmers lacked access to reliable data on seasonal trends and market demand, leading to poor planting decisions and financial losses (e.g., the corn oversupply case). These insights directly informed OFARM's core features, such as AI-driven crop recommendations and market trend analysis. Feedback from the farmer organization was overwhelmingly positive, with enthusiasm for the system's potential to provide actionable insights. Additional context from the Filipinnovation challenge highlighted the system's alignment with broader agricultural innovation goals.

Gathering feedback from farmers in Valencia to shape OFARM's features.

Key Design Decisions and Strategy

The development process was guided by an **Agile methodology**, enabling iterative progress and continuous feedback. Key design decisions included:

- **Tech Stack Selection**: Chose **React (TSX)**, **Tailwind CSS**, and **Inertia.js** for a modern, responsive frontend, paired with **Laravel** and **MySQL** for robust backend functionality. This stack balanced team familiarity with industry-standard tools, allowing rapid learning and development.
- **Rapid Prototyping**: Utilized **Shadcn UI** to quickly build UI components, enabling functional prototypes for weekly CEO check-ins and stakeholder presentations.
- **Role-Based Access**: Adopted **Spatie Permissions** to simplify role-based authentication, addressing initial challenges and ensuring tailored experiences for Admins, Farmers, and Encoders.
- **Geospatial Mapping**: Selected **Leaflet.js** for its lightweight, open-source capabilities, enabling farmers to visualize and manage farm plots efficiently.
- **AI Integration**: Transitioned from **Laravel Prism** to **n8n** for AI-driven data storage, leveraging n8n's no-code/low-code workflow automation to streamline implementation and reduce development time.

Tools and Technologies

The OFARM system was built using a robust tech stack tailored to its goals:

- **React (TSX)**: Built responsive frontend interfaces.
- **Tailwind CSS**: Styled interfaces with a utility-first approach.
- **Inertia.js**: Enabled a seamless SPA-like experience with Laravel.
- **Laravel**: Managed authentication, routing, controllers, and data logic.
- **MySQL**: Structured database schemas and migrations.
- **Leaflet.js**: Visualized farm data on interactive maps.
- **Spatie Permissions**: Configured role-based access.
- **Shadcn UI**: Facilitated rapid UI prototyping.
- **Laravel Prism**: Initially used for AI data storage.
- **n8n**: Simplified AI integration via workflow automation.
- **LEMP Stack (Linux, Nginx, MySQL, PHP)**: Powered MVP deployment.
- **Git and GitHub**: Managed version control and collaboration.
- **DNS Configuration**: Assigned a domain name for accessibility.

Challenges and Iterations

The development process presented several challenges, each met with creative problem-solving:

- **Learning Curve**: As the only team member with limited Laravel experience, I adapted to new technologies (React, Inertia.js, Tailwind CSS, Shadcn UI) within five days, leveraging LLMs like ChatGPT to accelerate learning and share knowledge with teammates new to PHP.
- **HTTP 419 Error**: Encountered a “Page Expired” error during login and form submissions. After two days of troubleshooting, I identified session mismanagement as the cause (due to an unconfigured session table with the “database” driver). Switching to the “file” driver resolved the issue, deepening my understanding of Laravel’s session and CSRF mechanisms.
- **AI Integration**: Lacked prior experience with AI agents but explored **Laravel Prism** and transitioned to **n8n** for simpler, webhook-triggered data storage. I deployed n8n on a separate server, streamlining the integration process despite time constraints.

Final Outcome

As an MVP, OFARM is deployed online and actively showcased in startup pitches, earning recognition as a Top 11 finalist in the 2025 Filipinnovation challenge. The Valencia farmer organization provided enthusiastic feedback, expressing excitement for the system's potential to deliver data-driven crop recommendations and mitigate risks like oversupply. While specific metrics (e.g., ROI improvements) are pending full deployment, the MVP demonstrates robust functionality, including interactive dashboards, geospatial mapping, and AI-driven insights. Its bright future is underscored by ongoing pitches and stakeholder interest, positioning OFARM as a transformative tool for the agricultural economy.

Deployed OFARM MVP, recognized in the 2025 Filipinnovation challenge.

Lessons Learned and Future Improvements

This project was a transformative journey in full-stack development and project management. Key lessons include:

- **Technical Growth**: Mastered a modern tech stack (Laravel, React, Inertia.js, Tailwind CSS, Leaflet.js, n8n) and tools like Git and GitHub, gaining proficiency in version control and collaboration.
- **Project Management**: Gained insights into end-to-end software development, from planning to deployment, with a focus on hosting, server setup, and workflow automation.
- **Startup Culture**: Exposure to a startup pitch in Cebu revealed how early-stage companies innovate and adapt, broadening my perspective on real-world development.
- **Problem-Solving**: Improved my ability to break down complex problems, collaborate effectively, and leverage online resources (e.g., LLMs) for rapid solutions.

If I could revisit the project, I would:

- **Plan Session Configuration Earlier**: Proactively configure Laravel's session settings to avoid issues like the HTTP 419 error.
- **Explore AI Tools Sooner**: Start with n8n earlier to streamline AI integration, saving development time.
- **Enhance Team Training**: Organize structured knowledge-sharing sessions to accelerate teammates' learning of the tech stack.

Impact and Takeaways

My contributions to OFARM—from building responsive interfaces and geospatial mapping to deploying the MVP and engaging stakeholders—demonstrated my ability to tackle complex challenges, learn rapidly, and deliver impactful solutions. The project's recognition in the Filipinnovation challenge and enthusiastic farmer feedback underscore its potential to empower local farmers and inform agricultural policy. This experience solidified my skills as a versatile developer and collaborative team member, ready to drive innovation in future projects.
