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Plowterra

Langara College · Web and Mobile App Design and Development Program
2024 Spring Semester · WMDD-4980 Project 2

Designed and developed by team **Voyagers**

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Proudly designed by team Voyagers

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Project Overview

Background

Farm payroll presents significant challenges, often burdened by time-consuming manual processes prone to errors. Interviews with farm owners reveal frustrations with the time-consuming nature of pen-and-paper calculations and manual SMS notifications, especially during busy seasons.

We believe that digitizing payroll systems will streamline processes and improve accuracy. By automating calculations and simplifying communication, it will alleviate administrative burdens for farm owners.



Opportunity

The opportunity for implementing a digital payroll system in agriculture is vast and compelling. By addressing the inefficiencies of manual methods, such a system offers farmers the chance to streamline operations, boost productivity, and eliminate errors. Beyond convenience, it opens doors to data-driven insights and integration, empowering users to make informed decisions and optimize their workforce management strategies. This presents not only a technological upgrade but a transformative shift towards modernized, efficient, and sustainable farm management practices.

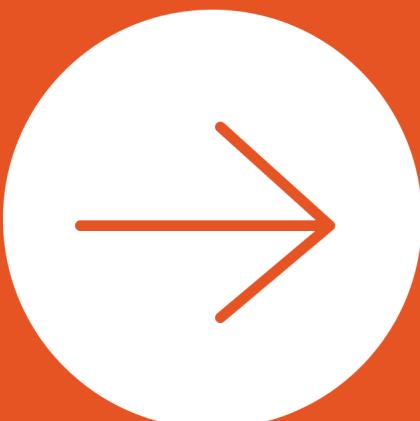


Solution

Plowterra is a web-based payroll system tailored for farm owners and managers. It simplifies daily tasks like logging picker harvest amounts, automating SMS notifications, and automatically calculating piecework payroll. Additionally, Plowterra provides valuable data analytics for insights into farm operations, empowering users to streamline processes and enhance efficiency.

Target Market

Plowterra targets Colombian farmers seeking to streamline payroll management and is designed to address the challenges of manual systems. With Colombia's diverse agricultural sector in mind, Plowterra caters to farms of all sizes, from small family-run operations to larger commercial enterprises, and is also available in Spanish.



Main Features

Daily Harvest Log

Here we digitize and simplify the process for farm owners or administrators to track daily harvest amounts by recording data about the quantity of produce collected by each picker. Users can easily record picker harvest data, ensuring accurate and organized record-keeping essential for efficient farm management. Additionally, it sends timely **SMS** notifications to pickers to ensure transparency in collection data.

Picker Management

Farm picker management is simplified by allowing farm owners or administrators to record data such as name, ID, emergency contact, and phone number. With this feature, it is easier to manage the performance of every picker, enhancing productivity and efficiency.

Payroll Management

This feature simplifies payroll processing for farm owners or administrators. Automated calculations and streamlined record-keeping ensure accurate payroll reports, saving time and reducing errors, avoiding possible misunderstandings related to the amount of money that every picker should be paid. The picker will receive an **SMS** with this sensitive information. This feature enhances efficiency, compliance, and fair compensation for farm pickers, empowering users to focus on strategic growth.

Harvest Season Management

By organizing different seasons, users can manage the harvest of various products within a single farm or during different periods of time. Real-time tracking facilitates efficient planning and monitoring of harvest activities, leading to better decision-making and increased productivity. By streamlining harvest management, Plowterra empowers owners to maximize yields and profitability.

Competitor Analysis

We analyzed existing farm payroll management products in the market, focusing on five key features:

- 1 Harvest Logging
- 2 Payroll
- 3 SMS Notification
- 4 Data Analytics
- 5 Multi-language Support

FieldClock

Designed for the rigors of outdoor work and the technical skills of all users. However it does not offer multiple languages and sms notifications



Hectre

Hectre has its main target market in the United States and it is designed for orchard management only.



Croptracker

Croptracker is a all-in-one farm management app for growers of fruit and vegetables. However the yearly price is USD\$ 21,380 per user.



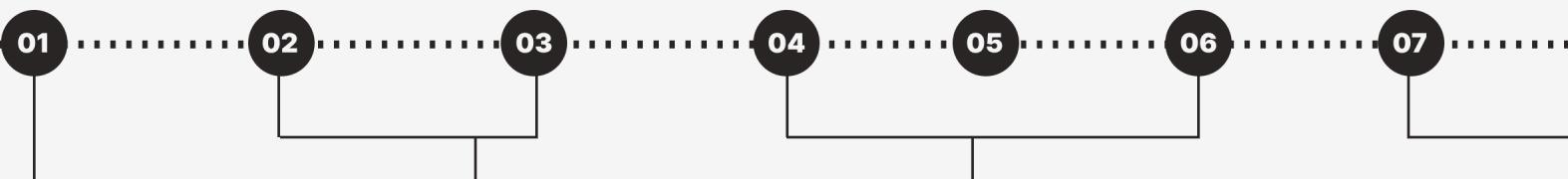
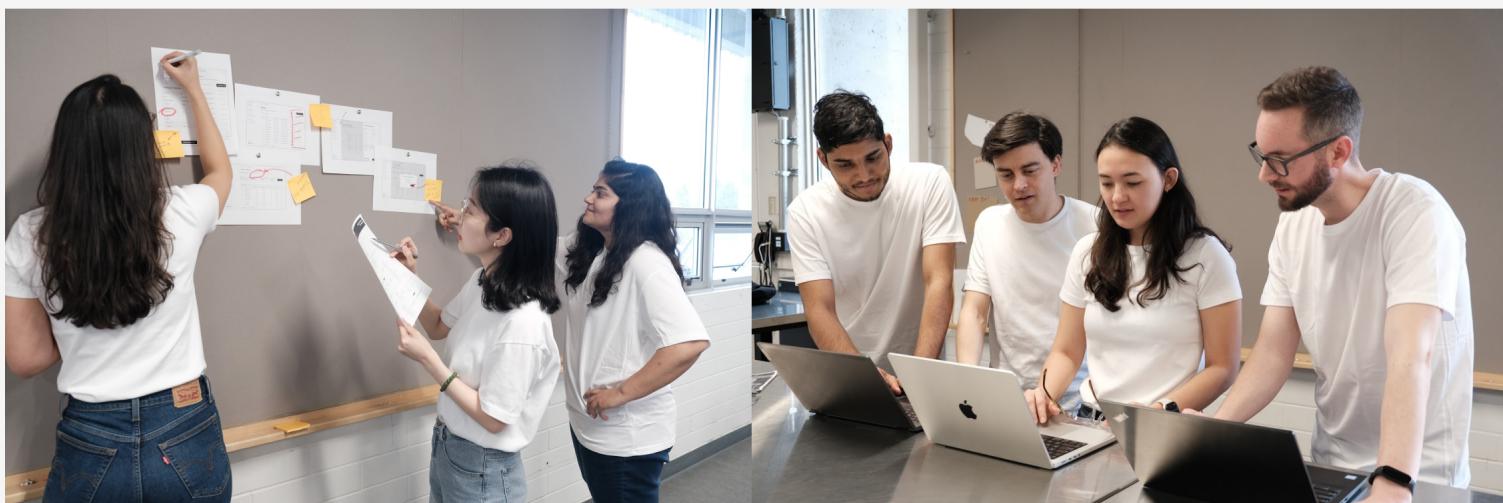
Traction Ag

Traction Ag is a all-in-one cloud based farm management software. However it only focus on farm accounting aspect.



Project Timeline

Over the past 12 weeks, we've embarked on a structured journey to transform **Plowterra** from concept into a fully functional and user-friendly product.



01 Research & Brainstorming

We embarked on a foundational exploration, engaging in market research, brainstorming project concepts, conducting user interviews, and establishing teamwork protocols.

Specific Tasks

1. Market Research
2. Project Ideas
3. User Interviews
4. Team Work Guidelines

02 Design Kick-off & Pre-development

We launched the design phase and began pre-development efforts, focusing on crafting user flows, developing wireframes, selecting our technology stack, and outlining our system's architecture and database design.

Specific Tasks

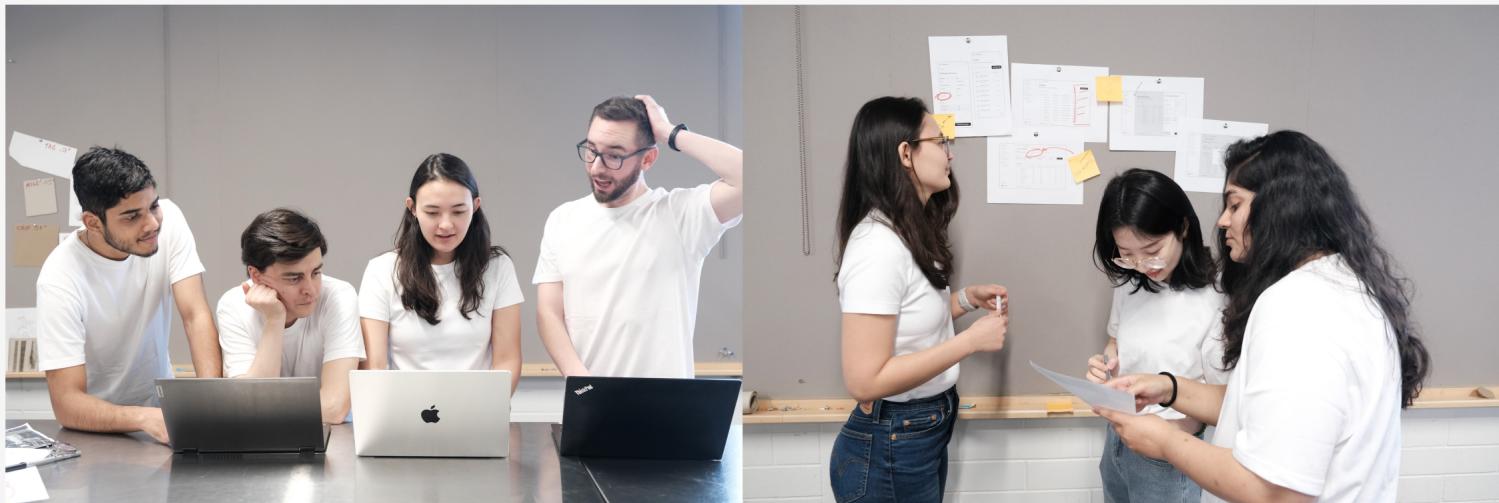
1. User Flow
2. Wireframes
3. Tech Stack
4. System Architecture
5. Database Scheme

03 Mockup, Prototype & Backend Development

Our efforts pivoted towards visual identity and backend infrastructure, creating a logo and UI kit, developing mockups and prototypes, and initiating backend development.

Specific Tasks

1. Logo & UI Kit
2. Mockups
3. Prototype
4. API Development



08

Design Hand-off & Frontend Development

We transitioned our designs for frontend development, completed a draft of the project proposal, and began frontend coding.

09

Alpha Milestone

We reached a pivotal Alpha Milestone, finalizing our project proposal, creating social media assets, and refining our design and style guides for a polished user experience.

10

11

Beta Milestone

Finally, we hit the Beta Milestone, culminating in the completion of development, focusing on bug fixes, and preparing a presentation deck to showcase our project's journey and achievements.

12

Launch & Final Presentation

Specific Tasks

1. Design Hand-off
2. Project Proposal (Draft)
3. Frontend Development
4. Light/Dark Theme
5. Multi Language Support

Specific Tasks

1. Project Proposal
2. Social Media Asset
3. UI Polishing
4. Development Improvements

Specific Tasks

1. Presentation Deck
2. Development Completed
3. Bug Fixing

Design Overview

Persona 1



Jose Delgado

Bio

Jose is a dedicated coffee plantation owner based in Antioquia, Colombia. With over 20 years of experience in the industry, he has refined his skills in coffee farming and plantation management.

Despite his successes, Jose has encountered challenges, particularly in managing harvest data and payroll. The manual processes have been time-consuming and error-prone.

Pain Points and frustrations

- Frustrated with tracking the varying amounts of coffee picked by each worker daily
- Finds manual payroll management time-consuming and error-prone, especially during the harvest season

Needs and expectation

- Simple and easy way of collecting harvest data
- Real-time access to harvest and payroll data
- Payments for pickers can be processed automatically based on accurate weekly data, reducing manual labor and error
- Enhanced communication with workers, such as SMS notifications for pickers

Persona 2



Maria Elena

Bio

Maria is a small scale cacao farmer in the region of Santander, Colombia. She took over the family's cacao orchard and has been passionate about producing premium cacao ever since.

Maria has been searching for innovative technology to streamline plantation operations and enhance managerial efficiency.

Pain Points and frustrations

- Frustrated by burdensome manual payroll during peak harvest seasons, resulting in delays and potential errors in payroll processing
- Struggles to accurately track daily crop yields per worker, leading to errors and delays in payroll computations

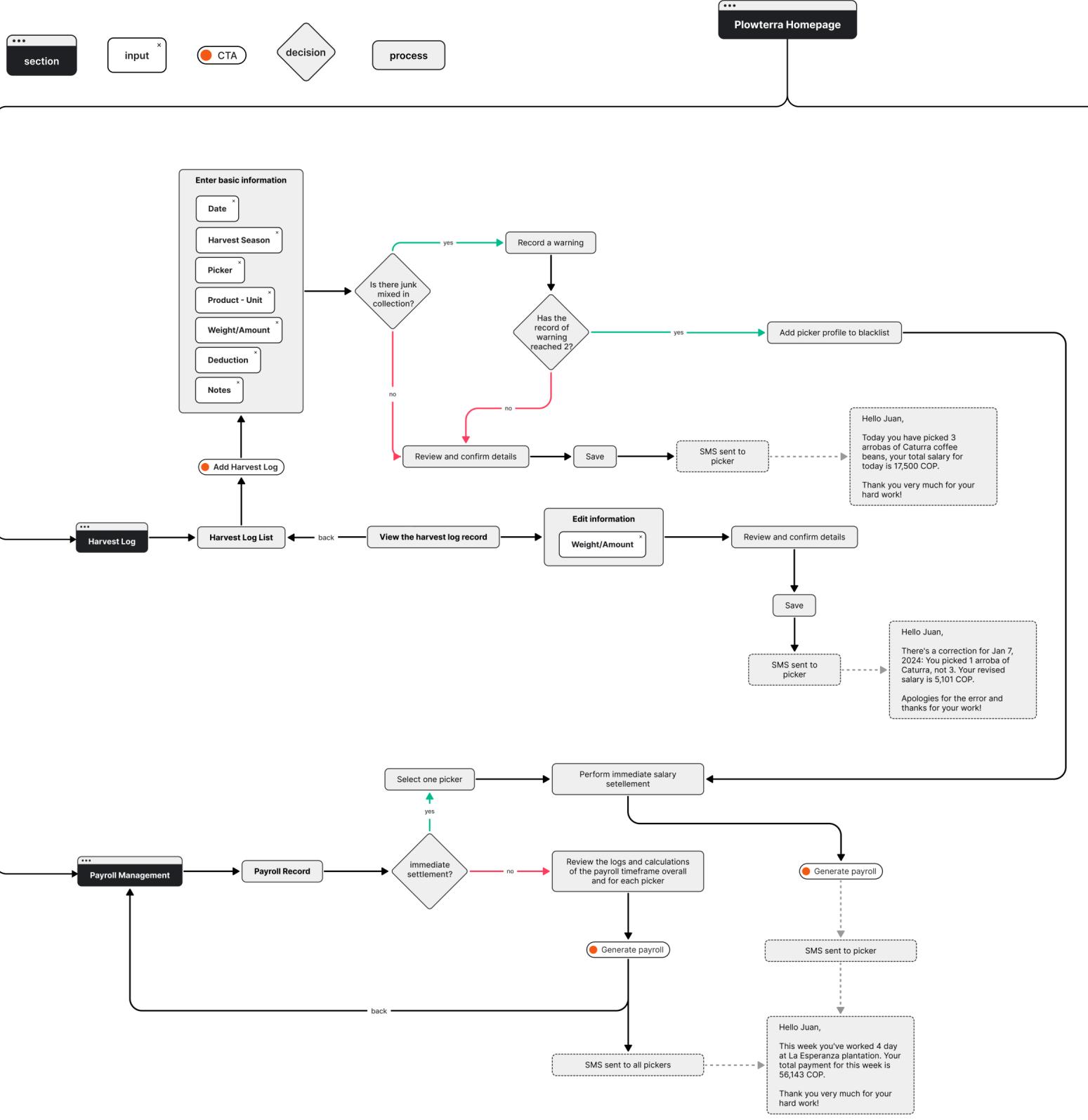
Needs and expectation

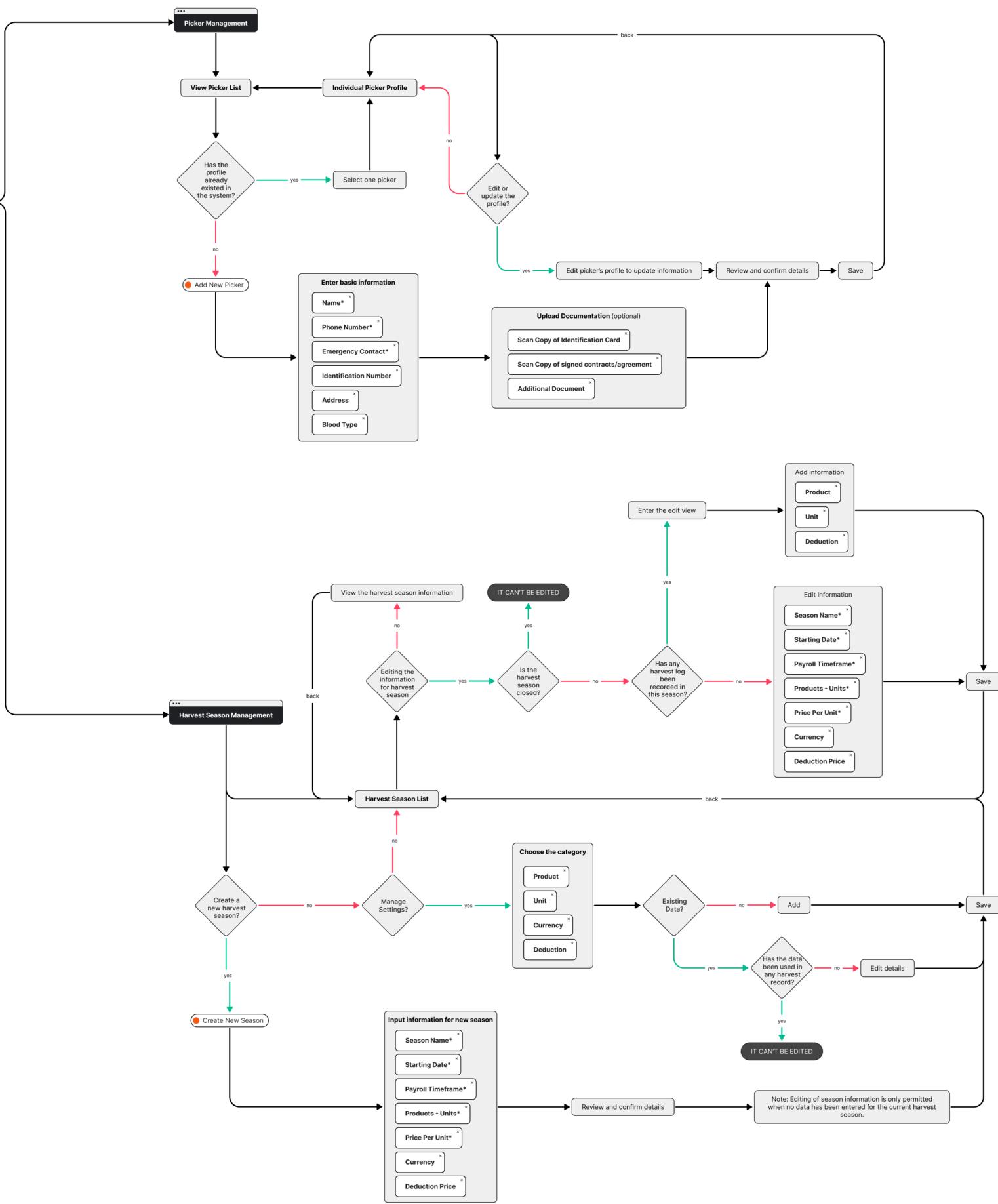
- A user-friendly system that streamlines data entry procedures and increases accuracy
- Calculates payroll automatically based on recorded harvest data to ensure punctuality and accuracy
- Incorporates communication features such as SMS notifications to keep pickers informed about payroll updates

In conclusion, Plowterra caters to the diverse needs of Colombian farm owners like Jose and María, offering intuitive solutions to streamline operations and tackle common challenges. To explore further, let's dive into the user flow outlined in the proposal.



User Flow





Wireframes

Daily Harvest Log

The Daily Harvest Log feature simplifies daily harvest tracking for farm owners, enhancing efficiency in agricultural operations.

Desktop View:

Blossom Rio / Harvest Log

Harvest Log

Add and view picker's daily collection data here.

Date: Jan 31, 2024 | Search:

No	Name	Product	Amount	Deduction (\$)	Date	Action
1	Santiago Ramirez	Coffee	50 lb	5	31 Jan, 2024	VIEW MORE
2	Camila Garcia	Coffee	132 lb	7	31 Jan, 2024	VIEW MORE
3	Isabella Perez	Coffee	61 lb	-	31 Jan, 2024	VIEW MORE
4	Sara Martinez	Coffee	87 lb	5	31 Jan, 2024	VIEW MORE
5	Sofia Rodriguez	Coffee	73 lb	5	31 Jan, 2024	VIEW MORE
6	Daniela Gomez	Coffee	90 lb	7	31 Jan, 2024	VIEW MORE

Rows per page: 10 | 1 - 6 of 6

[Add New Log](#)

Mobile View:

Blossom Rio / Harvest Log

Harvest Log

Date: Jan 31, 2024 | Action: [Add Log](#)

Name	Product	Amount (lb)	Action
Santiago Ramirez	Coffee	50	DETAILS
Camila Garcia	Coffee	132	DETAILS
Isabella Perez	Coffee	61	DETAILS
Sara Martinez	Coffee	87	DETAILS
Sofia Rodriguez	Coffee	73	DETAILS
Daniela Gomez	Coffee	90	DETAILS

1 / 1

Picker Management

Picker Management feature optimizes farm worker organization and performance monitoring for increased productivity.

Desktop View:

Blossom Rio / Pickers

Picker

Add and view picker's profile and information here.

Sort: Latest to Oldest | Search:

No	Name	Phone Number	Emergency Contact	Action
1	Santiago Ramirez	(312) 555-0143	Luisa Ramirez (sister)	(312) 555-0144
2	Valeria Torres	(312) 555-0278	Miguel Torres (father)	(312) 555-0279
3	Gabriel Antonio	(312) 555-0392	Ana Antonio (sister)	(312) 555-0393
4	Catalina Rodriguez	(312) 555-0425	Juan Rodriguez (brother)	(312) 555-0279
5	Andrés Castillo	(312) 555-0561	Elena Castillo (spouse)	(312) 555-0562
6	Maria Lopez	(312) 555-0674	Carlos Lopez (husband)	(312) 555-0675
7	Daniela Ortiz	(312) 555-0853	Francisco Ortiz (uncle)	(312) 555-0854
8	Laura Jimenez	(312) 555-1020	Oscar Jimenez (father)	(312) 555-1021
9	Isabella Perez	(312) 555-1045	Jose Perez (spouse)	(312) 555-1046
10	Camila Garcia	(312) 555-1070	Sara Martinez (cousin)	(312) 555-1071

Rows per page: 10 | 1 - 10 of 51

[Add New Picker](#)

Mobile View:

Picker

Add and view picker's profile and information here.

Sort: Latest to Oldest | Action: [Add Picker](#)

Picker List	Action
SR Santiago Ramirez (312) 555-0143	VIEW MORE
SR Santiago Ramirez (312) 555-0143	VIEW MORE
SR Santiago Ramirez (312) 555-0143	VIEW MORE
SR Santiago Ramirez (312) 555-0143	VIEW MORE
SR Santiago Ramirez (312) 555-0143	VIEW MORE
SR Santiago Ramirez (312) 555-0143	VIEW MORE
SR Santiago Ramirez (312) 555-0143	VIEW MORE
SR Santiago Ramirez (312) 555-0143	VIEW MORE
SR Santiago Ramirez (312) 555-0143	VIEW MORE
SR Santiago Ramirez (312) 555-0143	VIEW MORE

1 / 1

Payroll Management

The Payroll Management feature automates payroll processing, ensuring accurate calculations and reducing manual errors, thereby streamlining administrative tasks for farm owners.

Pay Period	Total Amount (\$)	Total harvest	Deductions (\$)	Pickers	Pay date
Sep 16 - Sep 30	9,375	1,720 kg	253	8 45	Sep 30 VIEW DETAILS
Sep 01 - Sep 15	11,473	2,103 kg	353	8 65	Sep 15 VIEW DETAILS
Aug 16 - Aug 31	8,593	1,533 kg	253	8 43	Aug 31 VIEW DETAILS
Aug 01 - Aug 15	8,284	1,627 kg	524	8 63	Aug 15 VIEW DETAILS
July 16 - July 31	10,384	1,977 kg	234	8 32	July 31 VIEW DETAILS
July 01 - July 15	9,245	1,701 kg	522	8 52	July 15 VIEW DETAILS
Jun 16 - Jun 30	8,743	1,511 kg	535	8 48	Jun 30 VIEW DETAILS
Jun 01 - Jun 15	11,538	2,011 kg	235	8 60	Jun 15 VIEW DETAILS
May 16 - May 31	7,356	1,107 kg	245	8 40	May 31 VIEW DETAILS
May 01 - May 15	8,357	1,311 kg	145	8 56	May 15 VIEW DETAILS

Harvest Season Management

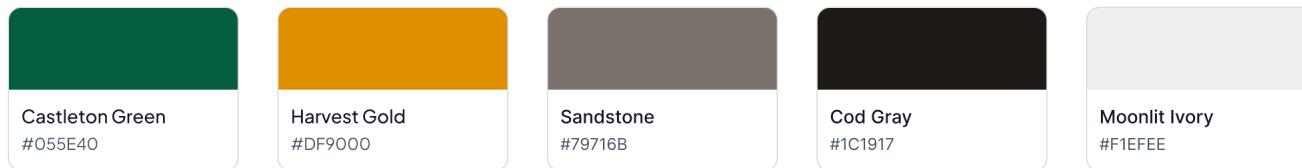
The Harvest Management feature provides real-time tracking and analysis of crop yields, enabling farm owners to efficiently plan and monitor harvest activities, ultimately maximizing productivity and yields.

No	Name	Status	Product	Start Date	End Date
1	2024 First Bloom Gather I	Active	Carnation	01 Jan 2024	- VIEW MORE
2	2024 First Bloom Gather II	Active	Lily	01 Jan 2024	- VIEW MORE

Branding



Color Palette



Typography

Plus Jakarta Sans

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
0 1 2 3 4 5 6 7 8 9 ! @ # \$ % ^ & * ()

Aa

Aa

Aa

Aa

Regular
Font weight: 400

Medium
Font weight: 500

Semibold
Font weight: 600

Bold
Font weight: 700

Display 1

Font size: 44px / 2.75rem | Line height: 56px / 3.5rem | Tracking: -1.2%

Display 2

Font size: 36px / 2.25rem | Line height: 44px / 2.75rem | Tracking: -0.75%

Body Text 1

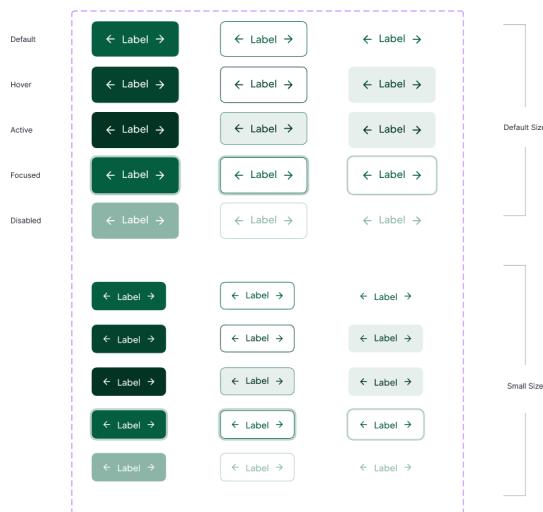
Font size: 16px / 1rem | Line height: 24px / 1.5rem | Tracking: 0%

Body Text 2

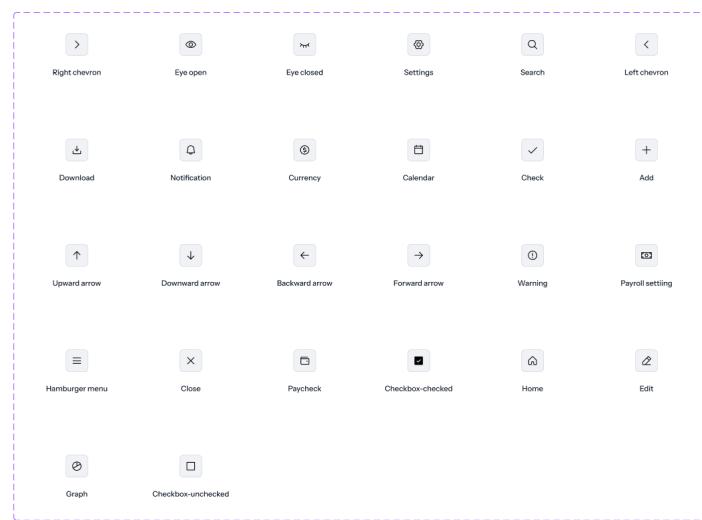
Font size: 12px / 0.75rem | Line height: 18px / 1.125rem | Tracking: 0%

UI Kit

Buttons



Icons



Components

Rows per page: 10 ▾
10
20
50

Only 1 day left for upcoming payroll Run the Payroll

Ready to run the payroll?

2023 Spring Q3 Oct 1 - Oct 15 \$8,600

Cancel Confirm

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Scan here for detailed
Plowterra design system!



Mockups



Daily Harvest Log

The Daily Harvest Log feature simplifies daily harvest tracking for farm owners, enhancing efficiency in agricultural operations.

The Daily Harvest Log feature is designed to simplify daily harvest tracking for farm owners. It includes a main navigation bar with sections like Home, Harvest Log, Pickers, Payroll, and Harvest Season. The Harvest Log screen displays a table of harvested items with columns for No., Name, Product, and Amount. The Add Harvest Entry screen allows users to input details such as Harvest Season Name, Date, Picker, Product, Unit, Amount, Deduction, and Note.

The Picker Management feature optimizes farm worker organization and performance monitoring. It includes a main navigation bar with sections like Home, Harvest Log, Pickers, Payroll, and Harvest Season. The Picker screen lists workers with columns for No., Name, Phone Number, and Emergency contact. The Picker profile screen provides detailed information for each worker, including Emergency Contact Person, Emergency Contact Number, Blood Type, Identification Number, Address, Emergency Contact Person, Emergency Contact Number, and Identification Number.



Picker Management

Picker Management feature optimizes farm worker organization and performance monitoring for increased productivity.

Payroll Management

The Payroll Management feature automates payroll processing, ensuring accurate calculations and reducing manual errors, thereby streamlining administrative tasks for farm owners.

NO.	PICKER	GROSS PAY (\$)	HARVEST AMOUNT	DEDUCTIONS (\$)	NET PAY (\$)
1	Santiago Ramirez	1,972	50kg	40	1,932
2	Valeria Torres	1,972	50kg	40	1,932
3	Gabriel Antonio	1,972	50kg	40	1,932
4	Catalina Rodriguez	1,972	50kg	40	1,932
5	Andrés Castillo	1,972	50kg	40	1,932
6	Maria Lopez	1,972	50kg	40	1,932

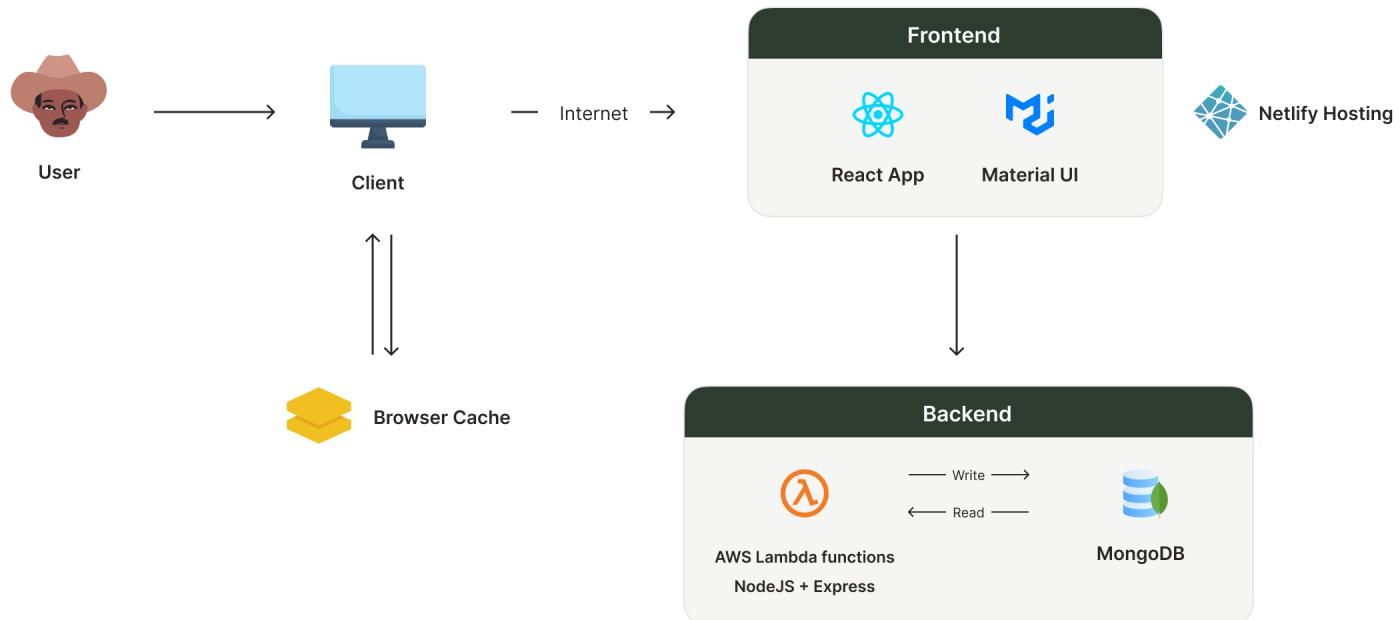
NO.	SEASON NAME	STATUS	PRODUCT
1	2024 Spring Q1	Active	Coffee
2	2024 First Bloom Gather I	Active	Carnation
3	2024 First Bloom Gather II	Active	Lily
4	2023 Winter Q4	Closed	Coffee
5	2023 Fall Q3	Closed	Maize
6	2023 Summer Q2	Closed	Coffee
7	2023 Spring Q1	Closed	Carnation

Harvest Season Management

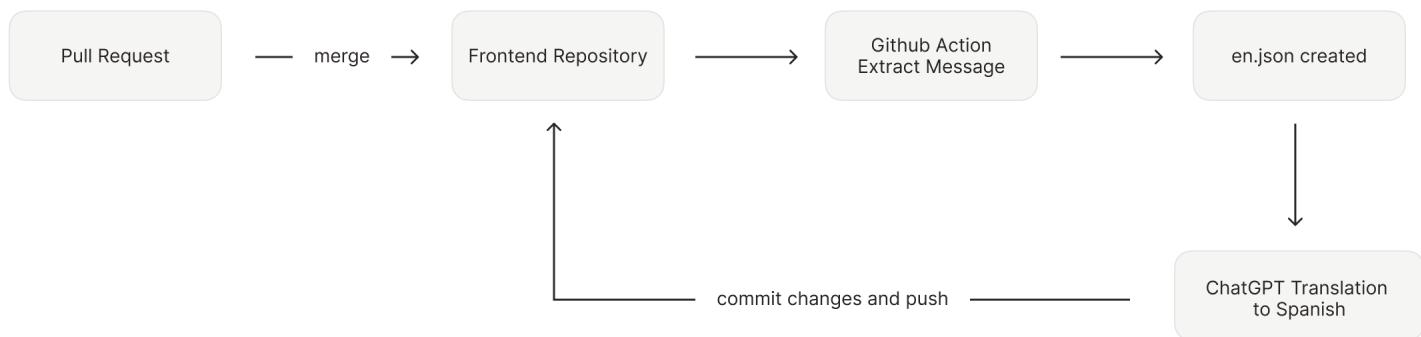
The Harvest Management feature provides real-time tracking and analysis of crop yields, enabling farm owners to efficiently plan and monitor harvest activities, ultimately maximizing productivity and yields.

Technical Overview

System Architecture



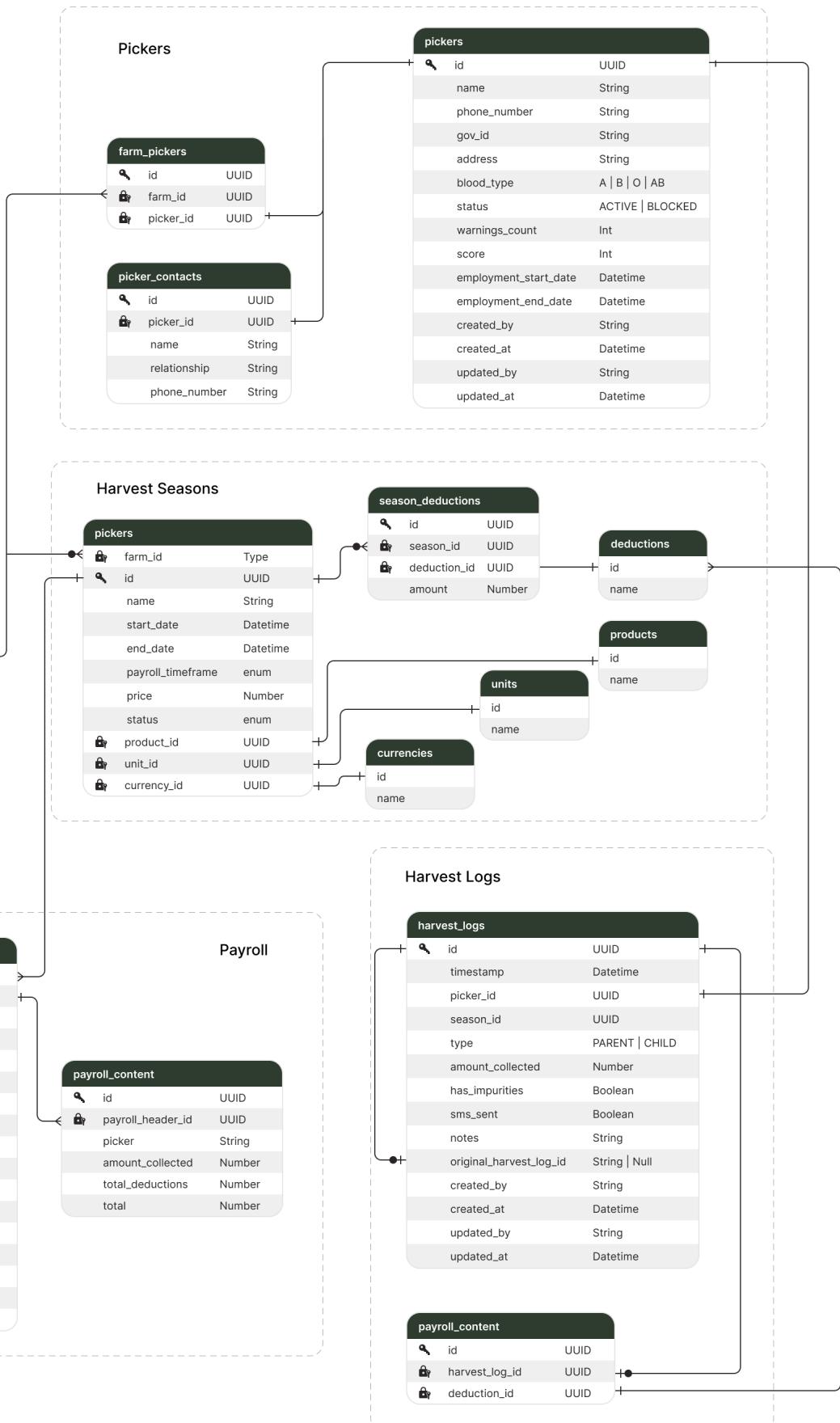
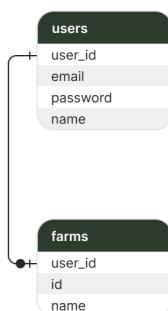
Automated Translation



Data Model

1:1	+—————+
1:0.1	+————●—
1:N	+————◀
1:1.N	+————◀
1:0..N	+————●—
N:N	————◀
1..N:1..N	————◀
0..N:0..N	————●—◀

Organization



Tech Stack

Frontend Development

The frontend was developed using React and TypeScript. To speed up the process of building UI components, we utilized the Material UI library. For local server setup and optimization during the development phase, we made use of Vite. To ensure a smooth release to production, we relied on Netlify, which provided high accessibility.



React

TypeScript

Material UI

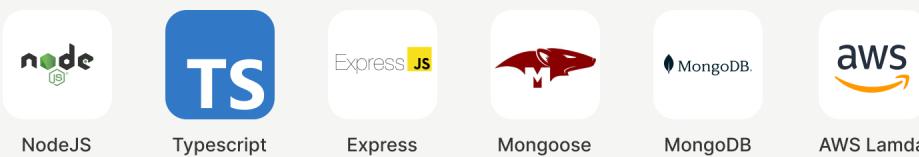
Vite

Netlify

Backend Development

Node.js was chosen to build the backend with, a popular JavaScript runtime environment for creating server-side applications. This allowed the team to quickly create RESTful APIs using Express, a simple and flexible framework for Node.js with a rich library of features. These APIs are served by AWS Lambda.

Plowterra's database lives on MongoDB using Atlas, a popular NoSQL solution. Mongoose was implemented to connect the database and enforce data schema.



NodeJS

TypeScript

Express

Mongoose

MongoDB

AWS Lamda

Design

Figma is used to create wireframes, mockups, and prototypes of Plowterra, while also allowing designers and developers to share thoughts about the frontend implementation through comments.

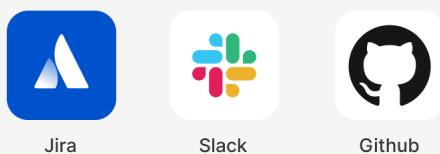
We use Photoshop, Illustrator for branding and marketing assets, such as social media post, banner, and illustration for landing page, and we also use InDesign for our project proposal.



Project Management

Jira was used for sprint planning, managing and tracking progress on a scrum board. It was also used as a central hub for important project guidelines, links and other documents.

Slack was utilized as the main communication platform, with channels for development and design. Git and GitHub was used for code version control and issue management and tracking.



Business Model

Ethics & Social Responsibility

Ethics

Workers can request information about logged quantities and calculations to ensure transparency.

Social Responsibility

We have prioritized creating an app that is accessible to as many people as possible. Our app will be available on any platform or device.

Sustainability

We offer our users a digital alternative to pen-and-paper systems, thereby encouraging paper conservation. Additionally, we assist users in gaining insights from data analytics, enabling them to make data-driven decisions for their plantations, enhancing water and energy efficiency.



Customer Success

Our onboarding process is meticulously crafted to ensure that users are well-prepared to efficiently utilize our app, with a gentle learning curve. Starting from the initial welcome email to personalized setup guidance, tutorial videos, and live demos, users receive comprehensive support. We also incorporate active feedback collection and follow-up check-ins to ensure continuous improvement and user satisfaction.

Marketing Strategy

1 Costumer Referrals

By encouraging the sharing of authentic testimonials and real-world achievements, Plowterra not only strengthens its market presence but also builds a community of engaged and satisfied customers who are the true embodiment of the brand's values and mission.

This approach fosters a deeper connection between Plowterra and its customers, enhancing loyalty and driving brand advocacy through genuine, relatable success stories.

2 Community Engagement

Host educational workshops and seminars in key farming communities across Colombia.

These events can demonstrate Plowterra's features in action, offering farmers hands-on experience and direct engagement with the platform, while also fostering community relationships.

3 Localized Content Marketing

Develop and distribute content tailored to the Colombian farming industry, including success stories from local users, tips for optimizing harvests and payrolls, and updates on agricultural trends.

Utilize local media outlets, agricultural blogs, and social media channels to share this content, ensuring it resonates with the Colombian farming context.

Our Offer

Plowterra offers a subscription-based model designed to accommodate the diverse needs of farmers in Colombia, ensuring access to its comprehensive web and mobile application for managing harvest records and payrolls efficiently.

Basic Plan

ideal plan for small farms

\$ 1499 / year

- ✓ 1 active season allowed
- ✓ Up to 19 pickers
- ✓ Picker notifications via SMS
- ✓ Analytics dashboard without customization
- ✓ 24/7 customer support

Premium Plan

Advanced features and analytics

\$ 1799 / year

- ✓ All features from Basic Plan
- ✓ Unlimited number of pickers
- ✓ Unlimited active season manage
- ✓ Customizable dashboard options
- ✓ 24/7 customer support

We also offer a 30 day free trial for the Premium Plan.

Future Features

Explore upcoming enhancements such as inventory management and crop yield forecasting, designed to further optimize farm operations and maximize productivity.

1 Manage Multiple Plantations

Enjoy an enriched experience with extensive control over plantations, allowing you to allocate various roles to users and manage permissions effectively.

2 Crop Yield Forecasting

Utilize advanced analytics to predict future crop yields based on historical data and environmental factors, aiding in strategic planning and resource allocation.

3 Weather Integration

Integrate real-time weather data to provide insights into weather patterns, enabling proactive decision-making and risk management for farmers.

Follow us for more!



Hi, we are the Voyagers!

Design Team



Jiali Cai Lead Designer

As a designer with a strong love for graphic, branding, and applying aesthetics to bring new meaning to user-centred design, I specialize in functional user interfaces and graphic design, dedicated to bringing brand vision to life.

[in/lizjialicai/](https://www.linkedin.com/in/lizjialicai/) | [Portfolio: designbylizette.com](http://designbylizette.com)



Pooja Chauhan Designer

I am a Product Designer with a background in Computer Science who believes in the power of design to create a positive impact. My expertise lies in designing user-centered solutions that are both intuitive and visually appealing.

[in/poojachauhan21/](https://www.linkedin.com/in/poojachauhan21/) | [Portfolio: designbypooja.com](http://designbypooja.com)



Zhixin Jiang Designer

As a UX designer with a knack for infusing creativity and user-centricity into project, ensuring seamless experiences that resonate with audiences.

[in/yanicejiang/](https://www.linkedin.com/in/yanicejiang/) | [Portfolio: designbyyanice.com](http://designbyyanice.com)



Ziwei Liao Designer

Moving forward as a designer who thrive on creativity and empathy, crafting user experiences that spark joy and resonate deeply with diverse audiences.

[in/elisetobetoup](https://www.linkedin.com/in/elisetobetoup/) | [Portfolio: eliseliaoatuxdesign.com](http://eliseliaoatuxdesign.com)

Development Team



Wonnyo Hamester Lead Developer

I'm a Full-Stack developer who enjoys learning from diverse industries and crafting innovative solutions. I love cats and believe that pineapple has no place on pizza.

[in/wonnyo/](#) | [@whamester](#)



Reinhardt Botha Project Manager / Full-Stack Developer

My curiosity for finding creative solutions to problems stemmed from Geographic Information Systems and led me down the rabbit hole to become a Full-Stack Developer. Sprinkle some communication and leadership skills on top of that, and I find myself guiding teams to deliver exceptional work.

[in/wrbotha/](#) | [@ReinhardtBotha](#)



Bryan Caldeira Developer

As a Full Stack Web Developer, I have honed my expertise across a diverse spectrum of programming languages and frameworks, including JavaScript, Python, Django, Flask, and the MERN stack, alongside proficiency in SQL. Driven by a profound love and passion for problem-solving, I possess the capability to not only deliver but also bring your visionary ideas to life with creativity and precision.

[in/bryan-candeira/](#) | [@BryanCaldeira](#) | [Portfolio: bryancaldeira.dev](#)



Alberth Rodriguez Developer

As an industrial engineer, I am very clear that everything can be done in a better way. Nowadays, the best way to improve efficiency and effectiveness is through technology. That's why I am taking the web and mobile app designer and development program at Langara.

[in/alfaroso/](#) | [@ALFAROSO](#)

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