PREMIER UNIVERSITY, CHATTOGRAM
Department of Computer Science & Engineering

SEISDL Project Report

On

-'ORGANIKUS'-

A place for newbies to start gardening and crop production

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Author's Declaration of Originality

We hereby declare that the report work entitled **"A place for newbies to start gardening as well as determine the hardiness zone with production estimation"** submitted to the Premier University, is a record of an original work done by us under the guidance of Mr. Anik Sen, Assistant Professor, Department of Computer Science & Engineering, Premier University, Chattogram. We can assure that the result of this report has not been submitted to any other university.

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CERTIFICATION

The report entitled **"Organikus - A place for newbies to start gardening as well as determine the hardiness zone with production estimation"** submitted by, Mohiuddin Tamim, ID: 1903610201763, Ami Biswas, ID: 1703310201400, Zubayer Bin Rashid, ID: 1903610201782 has been accepted as satisfactory in fulfillment of the course SEISDL.

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It is my genuine gratefulness and warmest regard that

I dedicate this work to my beloved

Father and Mother

Table of Contents

List of Figures

Abstract

Organikus is a project for newbies to gardening which is loaded with features. We focused on the main features and completed those. One of the feature is the hardiness zone which gives idea about which crop or plant will be suitable to cultivate in the specific location. It is based on climate as well as users zip code.The second feature is the project generation and showing user the estimation of the project which includes total capital, crop percentage and many more.

Keywords: hardiness zone, plantation project helper, total investment estimation

CHAPTER 1

INTRODUCTION

1.1 Introduction

Organikus is a helpful project for beginners in gardening which consists of a lot of features that will guide them though out the cultivation process. We focused on the main two features which will guide the user. One of the features is related to planting and another feature is related to the business side where all the costing or revenue related estimation is done.

In the first feature, its the hardiness zone which uses a zip code to generate the crops or plants that are suitable to cultivate for a definite location or area. We matriculated that there's an equation that can find the hardiness zone for a definite location or area. The most recent Plant Hardiness zones map (McKenney et al, 2001) was developed by mapping a plant hardiness or suitability index. This index comes from a formula originally developed by Oullet and Sherk, (1967a,b,c). Their formula is:

$$Y = -67.62 + 1.734X + 0.1868X + 69.77X + 1.256X + 0.006119X + 22.37X - 0.01832X \tag{1.1}$$

where:

- Y = estimated index of suitability
- X1 = monthly mean of the daily minimum temperatures (°C) of the coldest month
- X2 = mean frost free period above 0°C in days
- X3 = amount of rainfall (R) from June to November, inclusive, in terms of R/(R+a) where a=25.4 if R is in millimeters and a=1 if R is in inches

- X4 = monthly mean of the daily maximum temperatures (°C) of the warmest month
- X5 = winter factor expressed in terms of (0°C - X)Rjan where Rjan represents the rainfall in January expressed in mm
- X6 = mean maximum snow depth in terms of S/(S+a) where a=25.4 if S is in millimeters and a=1 if S is in inches
- X7 = maximum wind gust in (km/hr) in 30 years

But this wasn't possible to generate this in our project because we couldn't find any free weather API which will provide all the details needed to run the equation.
The second feature is generating the project, where user will give details about his/her project and generate the estimation of the business side of project as well as can know the proper utilization of his land.

1.2 Motivation

There are a lot of features that we can provide which will guide the user though out the cultivation process. In this increment, we worked on the hardiness zone and the estimation of the revenue and capital which will help to operate a business sleekly.
User will get help in utilizing his land or space which will guide him to cultivate plants or crops according to the hardiness zone data. By using the feature he/she can estimate the revenue and cash flow which will help a lot in generating a successful business plan.

1.3 Application

The user will login to the page if he/she already registered or else they will sign up for a new account. After logging in there will be option to view all the projects user created and can also create new project from there. While creating new project user will fill-up details about the project and crops, then user can see the final outcome from the project result. In another case, when the user want to estimate the hardiness zone, the user will input his area zip code which will generate a map confirming his location and then show the hardiness value as well as the crops or plants that are suitable for users area or location.

1.4 Summary

In this chapter, we have given a brief overview of our project and the working principles of it. We mentioned our work on the hardiness zone and the estimation for business. Using these features user can think of starting a business which will stand off with other businesses around the Bangladesh or it can be users personal project too.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Organikus is a useful project for new gardeners that includes a number of features that will aid them through the growing process. Here, we focused on the work of main two features which are hardiness zone calculation and project costing and revenue estimation for business purpose.

2.2 Background Study

A factor which has caused youths to shun agriculture, is the lack of a reliable market for the agricultural produce which their parents and close friends may have cultivated. There are cases where farmers may have been advised to plant potatoes: they may have done so, but when it is time for harvesting they become flustered and discouraged because the local market cannot consume their produce and there may not be a vent through a regional market. The produce is domestically consumed and the balance shared with friends and relatives. This makes the entire ordeal an economic disaster for the farmer: especially if he/she would have expected a strong economic return. There is a myriad of reasons for this phenomenon but We will highlight a few. A person originated from an area where agricultural activities provide the prime sustenance for its habitation and have heard parents say to their children, “If you fail to do well in school, I will give you a hoe”. We also heard a few teachers say to their students, “If you don’t do your schoolwork, I will advise your parents to give you a long pencil to write in the soil”. Referring to the hoe for ploughing

the land. This myth which was then propagated, has shown up agriculture as a degrading activity, causing younger persons to see agriculture as dirty and derogatory and of little delight and interest.
We all live in a geographical area with a specific climate, like us in Bangladesh with four! Not every plant will grow well in our climate zone. Some plants cannot tolerate the heat (or cold, for those of us in northern states), or the precipitation, or ground composition. This is why we see certain kinds of plants, flowers, and food grown only in specific regions, such as citrus in Florida. Oranges don't tolerate freezing temperatures.
Plant Hardiness Zone is extremely helpful to gardeners in helping to compare the zone they live in, to the zone where a plant is supposed to grow well. This is of particular interest in states with more unusual climates, like Florida, where it rarely freezes and has high humidity. If these zones didn't exist, it would be extremely difficult and disappointing for growers using a trial-and-error method of finding out what they can and cannot grow. While there are factors that the map does not take into consideration, such as snow cover and length of freeze time, overall it is a very useful tool for gardeners throughout the Bangladesh.
If we are considering planting a garden, or any kind of landscaping, using the Plant Hardiness Zone map would be greatly beneficial in choosing our plants. It can help us learn more about the area in which we live and make wiser choices in what to plant or not plant in our area. Save ourselves time, money and much frustration by consulting the Plant Hardiness Zone map and we can look forward to a beautiful garden in the future. [1]

2.2.1 Organikus: Hardiness-Zone

The first attempts to create a geographical hardiness zone system were undertaken by two researchers at the Arnold Arboretum in Boston: the first was published in 1927 by Alfred Rehder, and the second by Donald Wyman in 1938. The Arnold map was subsequently updated in 1951, 1967, and finally 1971, but eventually fell out of use completely.But In 1960, the US Department of Agriculture got into the act, publishing its first map, based on the data from 450 weather stations around the country. Unfortunately, they used different criteria from the Arnold Arboretum for establishing their zones, resulting in two conflicting maps. [2]
In order to help growers find the best places to grow, the USDA has devised a map that divides North America into eleven separate planting zones. These zones are called Plant Hardiness Zones and each one is an average of ten degrees warmer or colder in the winter than the zone adjacent to it. [3]

Micro-Climate: A microclimate is the climate of a very small or restricted area, especially when this differs from the climate of the surrounding area.Water, mass and windblocks are three things that can create micro-climates. Here are a list of other examples:

- A pond or a rock pile can store heat and release it when the air temperature gets cold
- Valleys, swales and berms can reduce direct wind and trap moisture
- Parking lots can store heat in the day and release it at night. A treeline can reduce wind and increase moisture slightly
- Large buildings can also function like a treeline, reducing wind and storing and releasing heat
- A city creates a large micro-climate. In many cases a full zone or more warmer than the forest and farmland around it.

When we lived in the suburbs the weather was a few degrees warmer. Cities and suburbs create a micro-climate. The buildings stop wind, the asphalt holds heat, as do the buildings. It creates weather that is more moderate, than even 5 miles away in the country.Larger cities can even impact rain, wind and snow by creating micro updrafts and downdrafts. Most city plantings will be 1/2 to one full zone warmer than their map location, but they may also suffer from too much heat and not enough water. Just like a rural location, track your temperatures, rain and wind.Watch for trends more than averages. It's the extremes that cause trouble.
Water holds heat, and also absorbs heat. It can reduce highs and lows evening temperatures, and increasing local humidity. Larger bodies of water do it best, but smaller water bodies, even a small pond can impact your micro-climate. [4]

2.3 Summary

The main feature that Organikus offers is the Hardiness-Zone which is really helpful for the users to find suitable crops or fruits for production. We are working with hardiness zone here which gives an estimation but if we could estimate it using micro-climate which would help us a lot in giving the exact estimation of the crops or plant that would be suitable for growing. But in reality this is not possible because it require a lot of values to be calculated and it would be really costly. So, in real life its not possible for us to get those values by any resource. But in future, with sufficient resource this can be implemented.

CHAPTER 3

METHODOLOGY/PROPOSED METHOD/WORKFLOW

3.1 Introduction

Organikus provide tools for new gardeners to start gardening in a proper way. We provide features that will help thought the process of cultivation as well as estimating the business outcome of the project.

3.2 Proposed Methodology

The features we focused on are helpful in many terms. Firstly the hardiness zone, where we take a zip input from user in Bangladesh then we call API of an website where we send our zip from where we get place name, longitude, latitude and many more. Using the longitude and latitude we can call map API from the map-box website [5]. Then we show the map in the web page. Afterwards, we show the hardiness zone result which is generating from our database. Then it filters the plant depending on the zone and shows in the web page i.e. it filters the plant that are suitable for the specific zone.
In the project generation and estimation, A customer can utilize his/her space or area to grow maximum crops. This will be generated by website. Depending on the crop user selects then yearly expense, estimated profit and others prediction is given to the user so that user can understand which will be more profitable for him/her.

3.3 Hardiness-Zone DFD

Data Flow diagram of hardiness-zone is shown

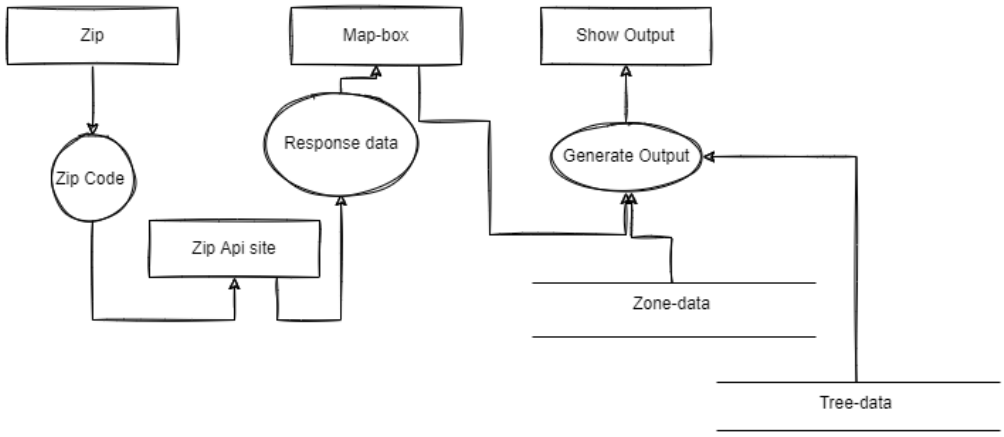

Figure 3.1. DFD of Hardiness Zone.

In the data flow diagram of hardiness-zone, the zip code is taken from user and processed to sent in zip API site. Then as response data we get the longitude and latitude. Then it calls the API of map-box website. Then using this process we get a map as response. Then using the zip we get hardiness zone result from zone data and from tree data we get suitable plant for plantation by processing all the data that we got.

3.4 Projects DFD

Data Flow diagram of project-data is shown

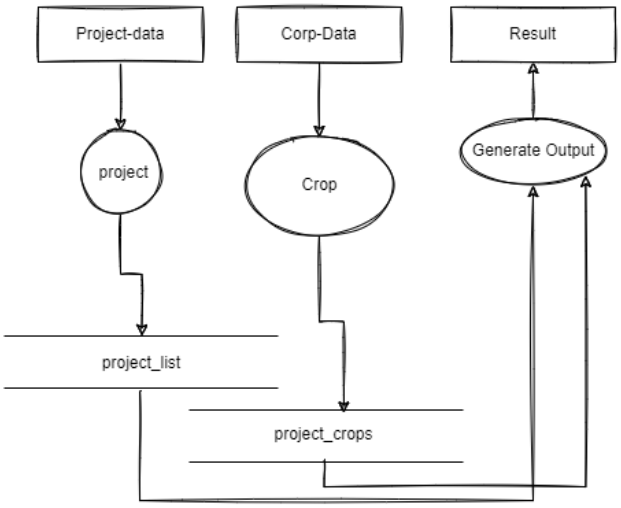

Figure 3.2. DFD of project data.

In the DFD of project, from the project-data we receive project-name, project-location, operation-type, project-area and then store in the database. In the same way, we receive crop-name, crop-code and percentage and then we will store in project-crop. Afterwards, we take data from project-list and project-crop and generate the output in the result.

3.5 Summary

The features that we mentioned are great working tool for the user. Here the working procedure by which user can find hardiness value and take decision according to that. User can also estimate the business outcome with the values that user input and its automatically generated and shown to the user.

CHAPTER 4

EXPERIMENTAL RESULTS AND DISCUSSION

4.1 Introduction

Organikus is the loaded feature for newbies, which will help them to grow plants in a proper way. We will show the working procedures of the features in this chapter.

4.2 Result of Hardiness-zone page

Figure 4.1. Initial stage.

Here in the page above after logging in, if the user want to find the hardiness zone then he/she needs to access this page.

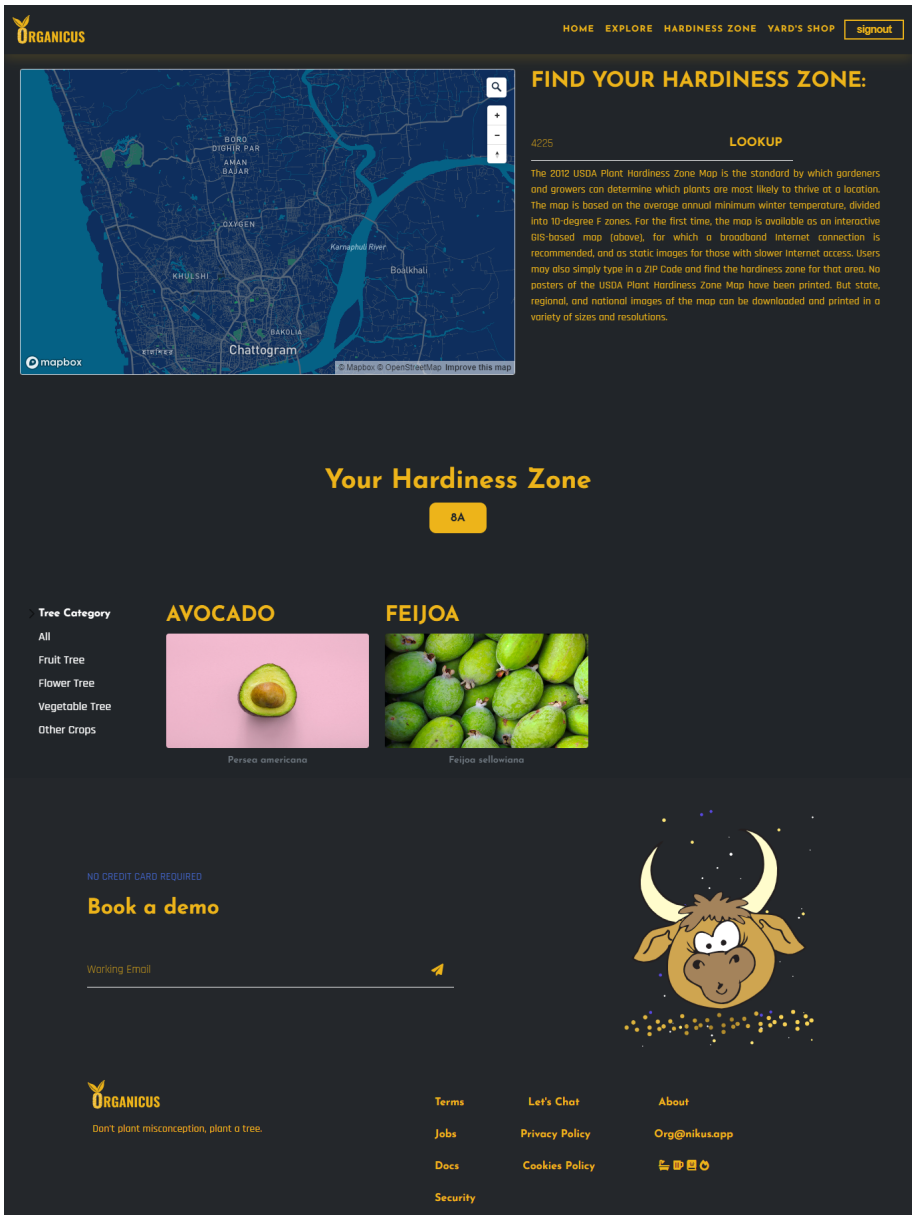

Figure 4.2. After giving input zip code.

After giving input the zip code, the hardiness zone will be calculated and then the suitable crops or plants will be shown to the user.

4.3 Result of generate-project page

In this page user will need to input the project-name, project-location, operation type and site area and submit it. Which will be later stored in the database.

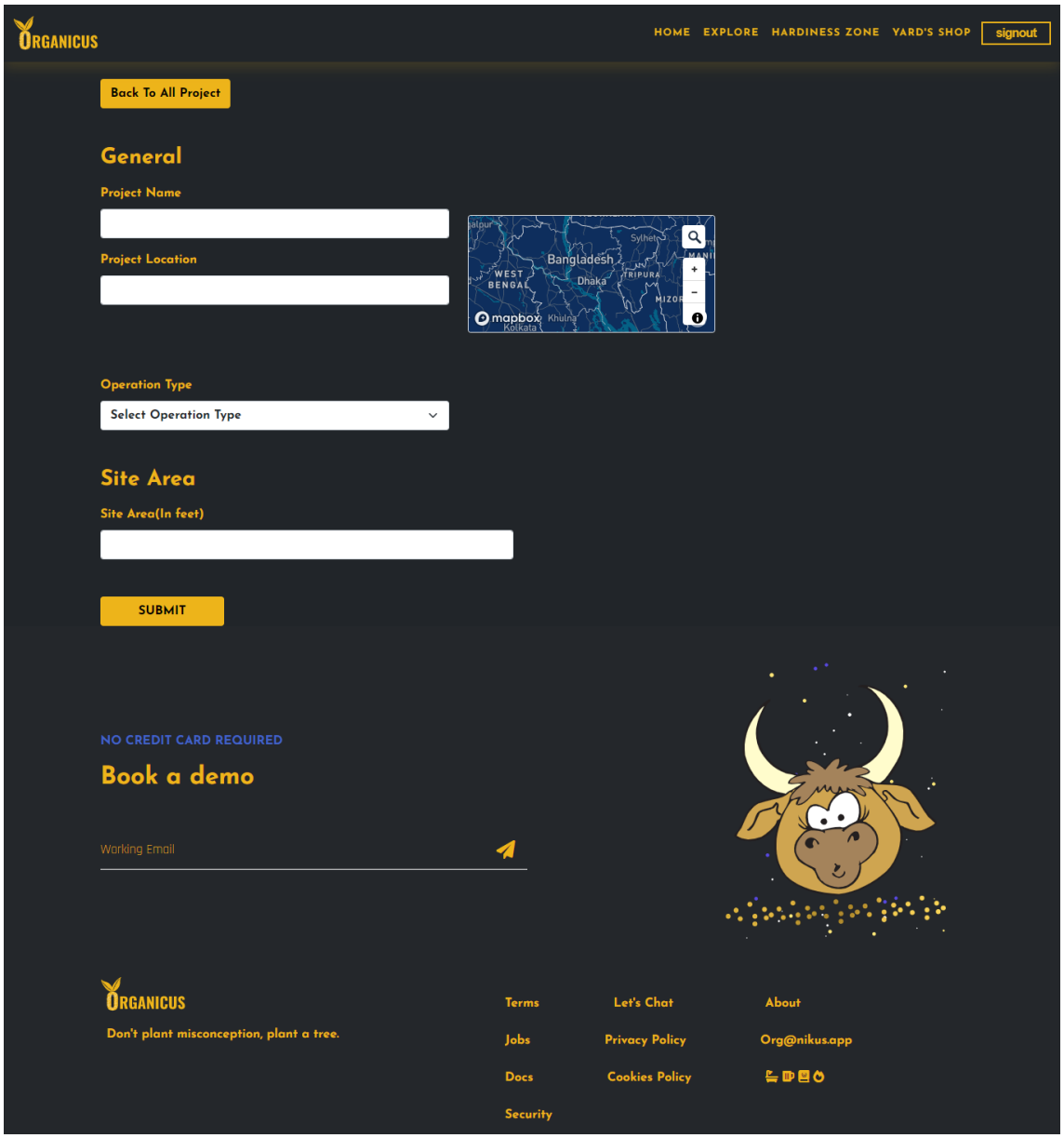

Figure 4.3. User need to fill the input fields and submit.

4.4 Result of generate-crop page

In this page user will give input the crop-name, crop-code and percentage, which will be sent to the database.

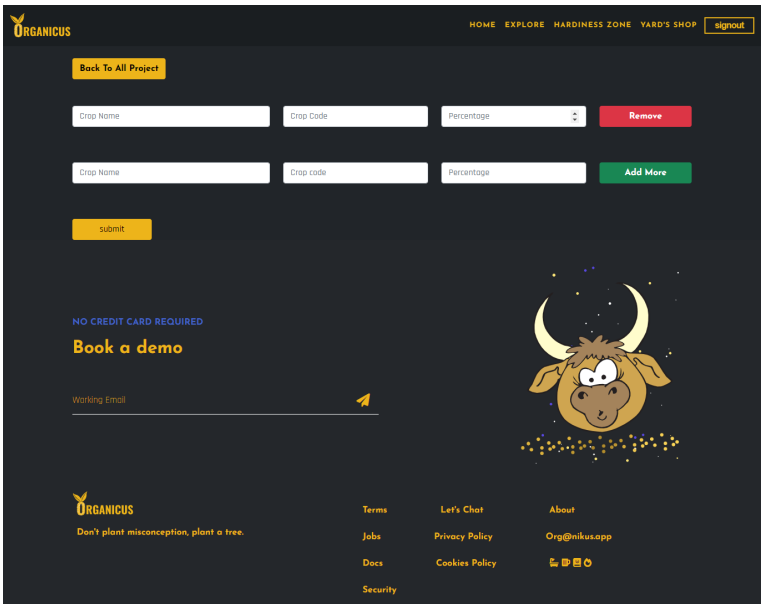

Figure 4.4. User need to fill the input fields and submit.

4.5 Result of All project page

In this page user can see all the projects created and can view the result of its estimation.

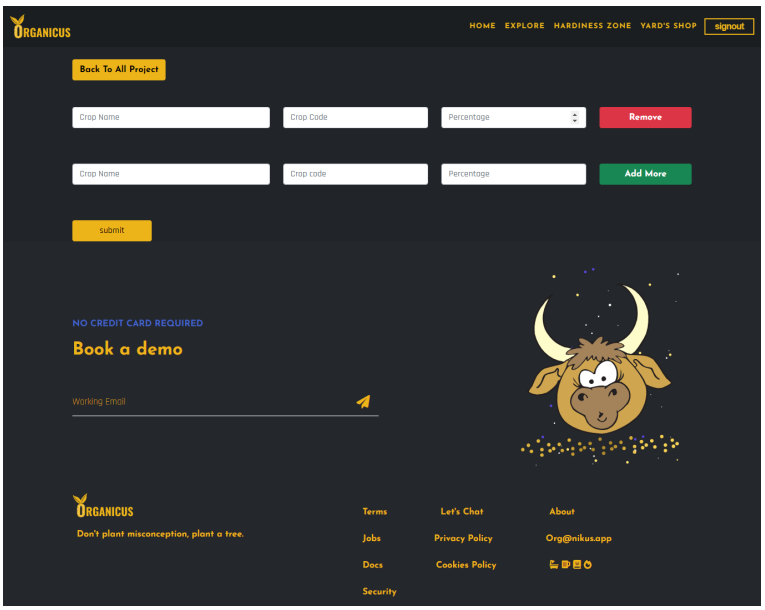

Figure 4.5. User can see created projects or add one.

4.6 Result of project result page

In this page user can see the estimation of the project he/she want to create and can take decisions based on this estimation.

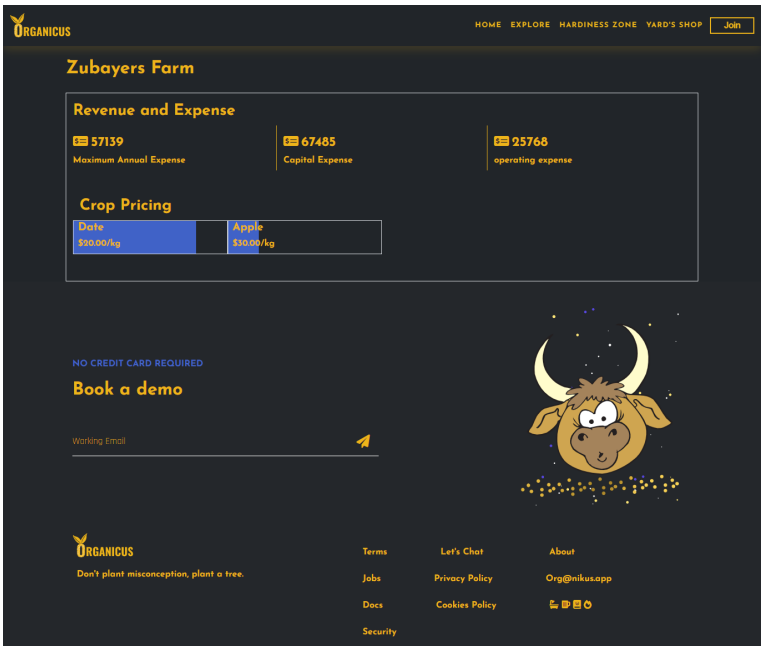

Figure 4.6. User can see generated estimation data.

4.7 Summary

After completing the Organikus project, we could matriculate more about the hardiness-zone and faced different obstacles while implementing it. But we could debug those and solve the problem. We also provided users with a project generation feature that will help to estimate the project outcome in terms of business and if its a personal project then it would be very helpful too. We could learn a lot of things on completing this project and could understand the ways to debug, implement as well as increase critical thinking.

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