

September 2022

Technical Report



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Software Requirement Specification

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## **Chapter 1: Software Requirement Specification**

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## ***1.1. Neptunechain:***

The purpose of this Software Requirements Documentation is to provide high level and detailed descriptions of the Invest in Projects website. This Software Requirements Documentation will provide quantifiable requirements of the website for use by the designer and the users of the website.

Here is an explanation of website.

### **1.1.1. Introduction**

Neptunechain website started as a group of environmentalists that came together to give everyone a chance to participate in water markets directly. It facilitates water quality trading by connecting anyone with one-click offset assets.

The team of Neptunechain is building the road to a productive water market, vibrant and sustainable ecosystems with a robust, rapid response to the domestic water crisis. We seek fellow ecology-focused, consumer-coordinated groups to add Texas to the list of accredited water quality trading states.

### **1.1.2. Purpose**

It is a user-friendly website. The purpose of website is to create marketplace where environmentalists can own verified nutrient offsets with the click of a button.

Its purpose is to create a user-friendly online market for trading climate-related nutrient credits with the goal of driving up the cost so that corporations are incentivized to reduce pollution at its source; discouraging discharge by design.

### **1.1.3. Scope**

The website is supporting farmers and landowners who want to establish nutrient banks and earn rewards for their work to drive down pollutants.

Environmentalists or Organization can find in it a good place by building radically new systems for pollution removal and intuitive economies around water.

The website facilitates the transaction between the trusted parties.

The website provides the opportunity to quantifier (Students and Graduates) to provide evaluation on supplier's work.

It also enables verifier to audit quantifier and supplier work.

#### **1.1.4. Benefits of the Proposed System and Process of Neptunechain**

##### **Benefits of Neptunechain**

###### **For the Formers and Landowners ❖**

Earn Reward.

❖ Getting Transactions from trusted parties.

❖ Quality Water Trading

###### **For the Environmentalist and Organization**

❖ Avoid water quality catastrophes

##### **Processes of Neptunechain**

###### **Purification**

It works with farmers and purifiers to proactively address sustainable water management.

###### **Quantification**

Student and graduate led programs at land grant universities help quantify pollution reductions.

###### **Validation**

Our team facilitates water quality trading by connecting anyone with one-click offset assets.

###### **Transaction**

The blockchain records, stores, and confirms your transaction using servers across the world.

### **1.1.5. Business Organization**

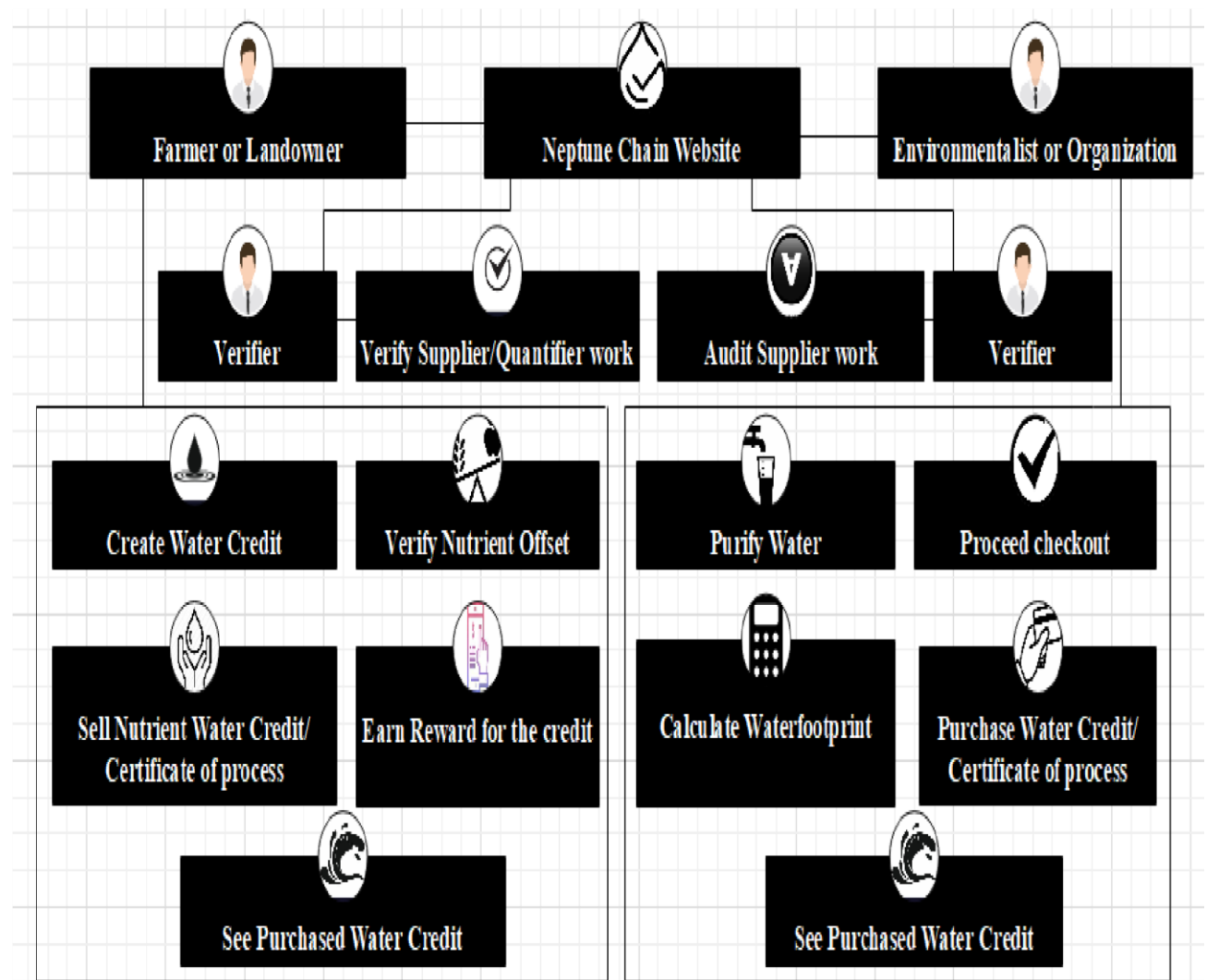
The website consists crowdfunding platform .The projects in pools complement each other as the first one will be a means of payment and exchangeable for the others. We believe that website is an ecosystem that is friendly and convenient to use for our community. The idea behind it is to create space for startups, investors which will prove that it is science, not fiction. Invest in Projects website deals in following main business areas:

- Create Water Credit
- Sell Certificate for process of nutrient pollution removal.
- Sell Water Credit
- Earn Reward for the credit
- See Purchased Water Credit
- Verify Nutrient Offset
- Purify Water
- Buy Water Credit
- Purchase Certificate for process of nutrient pollution removal.
- Proceed Checkout using Crypto Currency
- Calculate Waterfootprint
- Evaluate Supplier work (Quantification)
- Verifier quantifier and supplier work

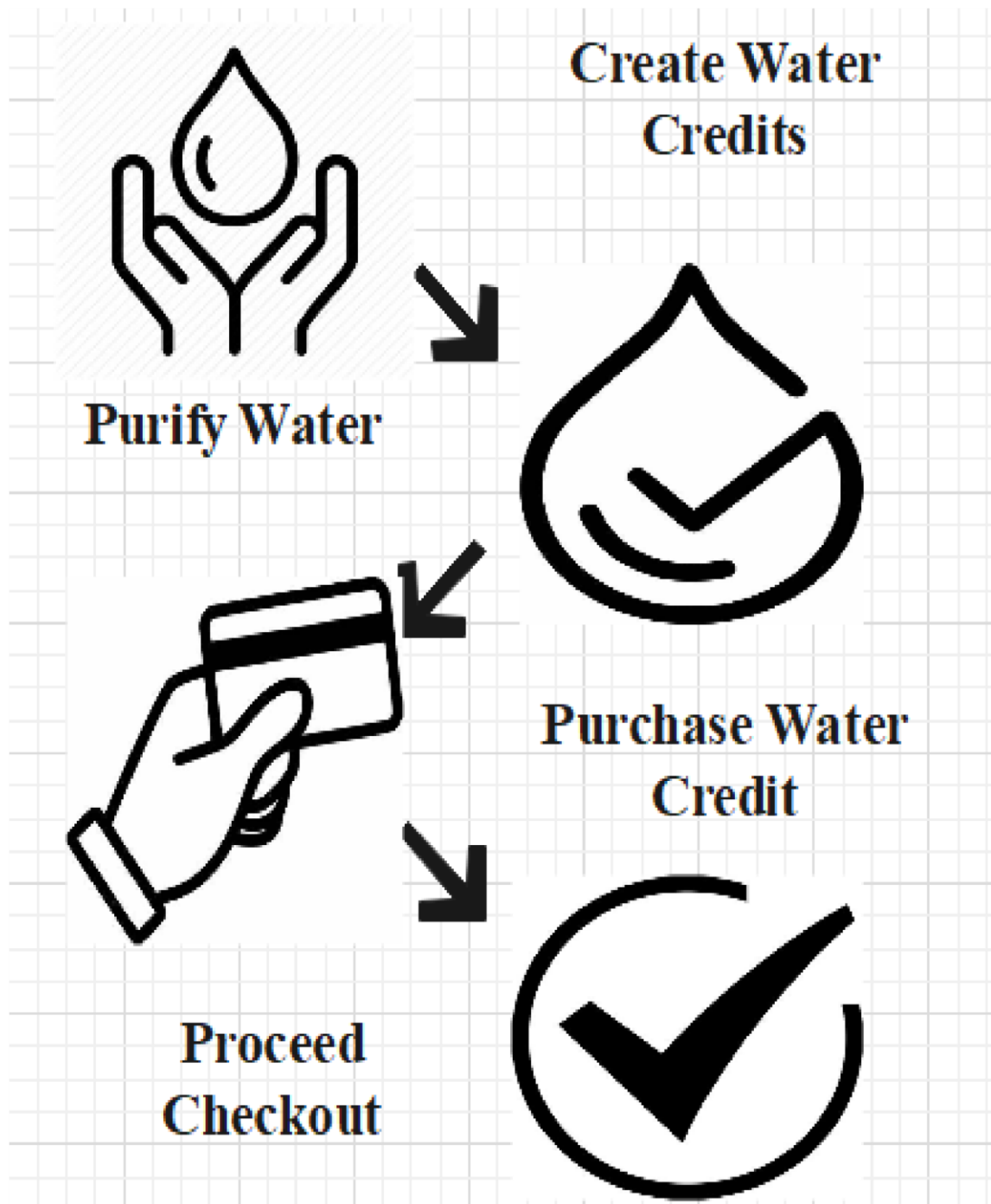
#### **Business Organization Chart**

Business Organization Chat of website is given below:





### 1.1.6. How the Website Works





### **1.1.7. Summary of Requirements :( Initial Requirements)**

The purposed system must fulfill following requirements as follow:

#### **1.1.7.1. Home Page Requirements**

Farmers and Environmentalists can access home page without the login requirement. Home page will provide various services to farmers and environmentalists. Home page will consists of Links to social media and blog.

Links to services for agriculturists and environmentalists.

#### **1.1.7.2. Accounts Page Requirements**

Website will consists of Accounts page to create or log in to your account.

Website will redirect to this page upon clicking on Create Account/Login button in top right or when redirected from another tab.

Registration and Login requirement is only for seller, as buyer can use various services without login requirement.

#### **1.1.7.3. Requirements for Seller or Farmers Tab**

Farmers can sell their nutrient credits on this website. Farmers need to login and will be Redirected to Accounts page if not logged in.

Farmers need to provide authentication of trade to create Credits, for that purpose farmers need to provide details of credit they want to sell, price for Credits, information on credits. Seller can sell certificates that represent the proof of work for nutrient pollution removal. Farmers can verify nutrient offset and can also get rewards for water credits.

#### **1.1.7.4. Requirements for Buyer or Environmentalists Tab**

Buyer can access the various services without logging in to the website. Buyer can purchase water credits by clicking on Purify Water Tab.

Buyer needs to checkout using the crypto currency to complete transaction.

Buyers can see the purchased water credits. Buyers can calculate Waterfootprint. Buyers can purchase certificate of process for nutrient pollution removal.

#### **1.1.7.5. Requirements for Quantifier or Student or Graduate Tab**

Quantifier can access website for quantification. For this purpose students or graduates can provide an objective evaluation on supplier submissions.

#### 1.1.7.6. Requirements for Verifier Tab

Verifier can access website to verify supplier and quantifier work.

#### 1.1.8. Capture "shall" Statements:

Req No. #	Initial Requirements
1	Farmer or Landowner shall be able to create Account.
2	Farmer or Landowner shall be able to Login.
3	Farmer or Landowner shall be able to create Water Credit using the land.
4	Farmer or Landowner shall be able to provide authentication for trading Water Credits.
5	Farmer or Landowner shall be able to sell Nutrient water Credits to Environmentalists or Organization.
6	Environmentalists or Organization shall be able to purify water on single click button.
7	Environmentalists or Organization shall be able to buy water credit after clicking on Purify Water.
8	Environmentalists or Organization shall be able to calculate Waterfootprint.
9	Environmentalists or Organization shall be able to proceed transactions using crypto currency after buying water credits.
10	Environmentalists or Organization shall be able to see purchased water credits.

<b>11</b>	Farmer or Landowner shall be able to see purchased water credits.
<b>12</b>	Farmer or Landowner shall be able to verify nutrient offset.
<b>13</b>	Farmer or Landowner shall be able to earn reward for water credits.
<b>14</b>	Environmentalists shall purchase certificate of process for nutrient pollution removal.
<b>15</b>	Farmer or Landowners shall sell certificate of process for nutrient pollution removal.
<b>16</b>	Student or Graduate shall audit supplier work.
<b>17</b>	Verifier shall verify supplier and quantifier (Student or Graduate) work.

#### **1.1.9. Allocate Requirements:**

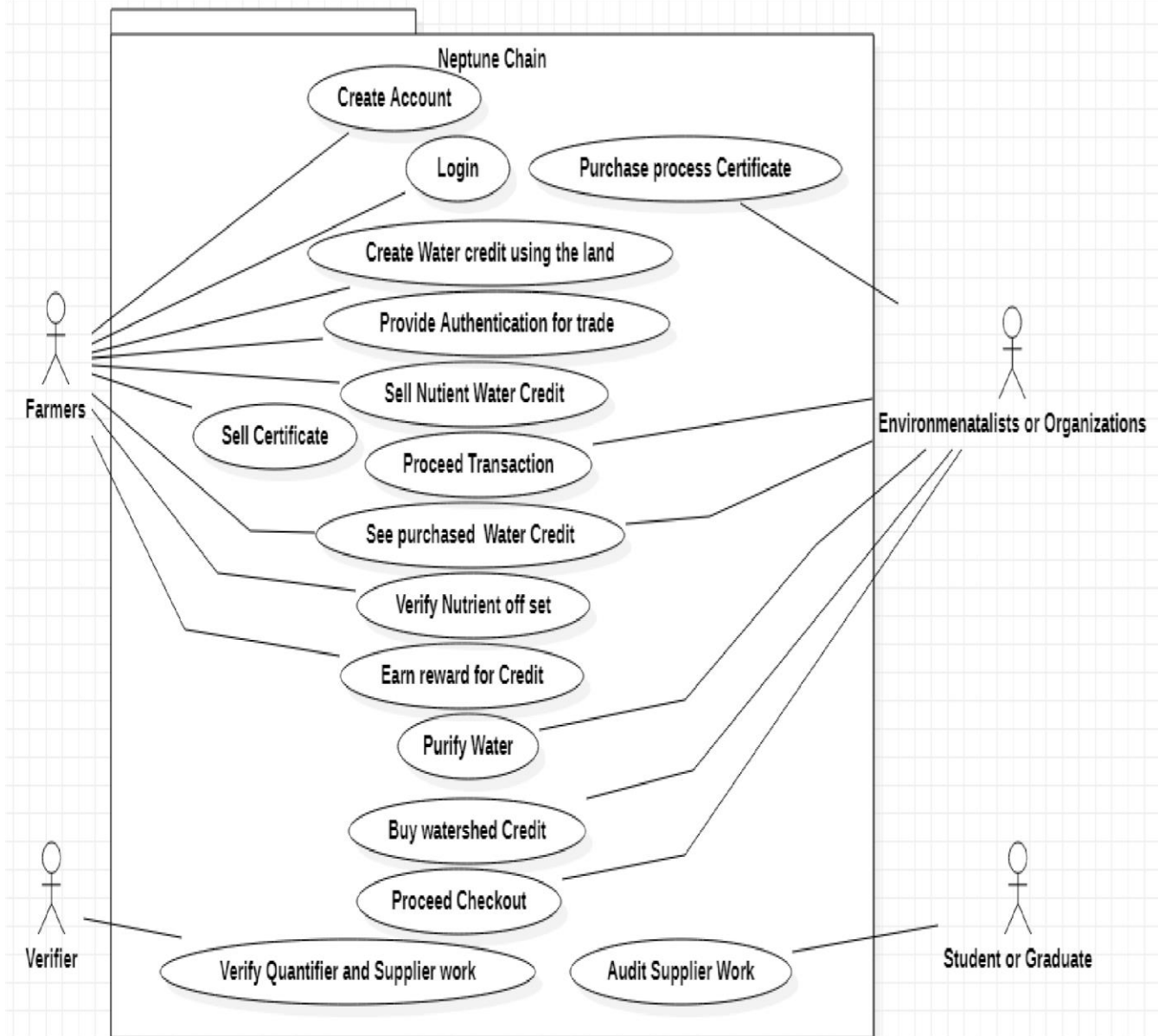
	<b>Initial Requirements</b>	<b>Allocate Requirements</b>
<b>1</b>	Farmer or Landowner shall be able to create Account.	UC_Create_Account
<b>2</b>	Farmer or Landowner shall be able to Login.	UC_Login
<b>3</b>	Farmer or Landowner shall be able to create Water Credit using the land.	UC_Create_Water_Credit_using_the_land
<b>4</b>	Farmer or Landowner shall be able to provide authentication for trading Water Credits.	UC_provide_authentication_for_trade
<b>5</b>	Farmer or Landowner shall be able to sell Nutrient water Credits to Environmentalists or Organization.	UC_Sell_Nutrient_Water_Credit

<b>6</b>	Environmentalists or Organization shall be able to purify water on single click button.	UC_Purify_Water_Credit
<b>7</b>	Environmentalists or Organization shall be able to buy water credit after clicking on Purify Water.	UC_Buy_Watershed_Credit
<b>8</b>	Environmentalists or Organization shall be able to calculate Waterfootprint.	UC_Calculate_Waterfootprint
<b>9</b>	Environmentalists or Organization shall be able to proceed transactions using crypto currency after buying water credits.	UC_Proceed_Checkout
<b>10</b>	Environmentalists or Organization shall be able to see purchased water credits.	UC_See_purchased_Water_Credit
<b>11</b>	Farmer or Landowner shall be able to see purchased water credits.	UC_See_purchased_Water_Credit
<b>12</b>	Farmer or Landowner shall be able to verify nutrient offset.	UC_Verify_Nutrient_Offset
<b>13</b>	Farmer or Landowner shall be able to earn reward for water credits.	UC_Earn_Reward
<b>14</b>	Environmentalists shall purchase certificate of process for nutrient pollution removal.	UC_Purchase_Certificate
<b>15</b>	Farmer or Landowners shall sell certificate of process for nutrient pollution removal.	UC_Sell_Certificate
<b>16</b>	Student or Graduate shall audit supplier work.	UC_Audit_Supplier_Work
<b>17</b>	Verifier shall verify supplier and quantifier (Student or Graduate) work.	UC_Verify_Supplier_and_Quantifier_Work

### **1.1.10. High Level Usecase Diagram:**

A use case scenario is a visual description, typically written in structured English or point form, of a potential business situation that a system may or may not be able to handle. A use case defines a goal-oriented set of interactions between external actors and the system under consideration.

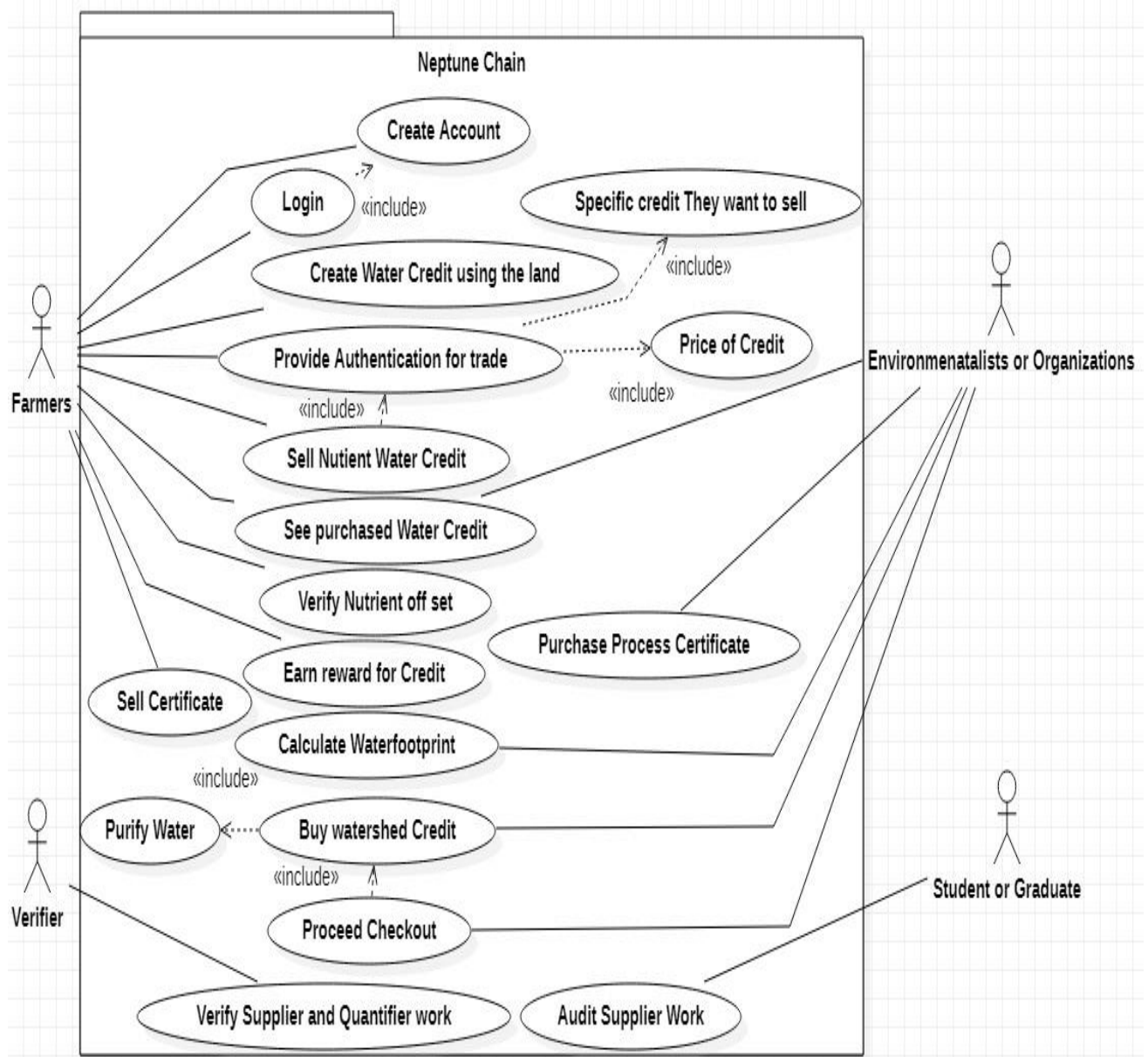
Thus, use cases capture who (actor) does what (interaction) with the system, for what purpose (goal), without dealing with system internals. A complete set of use cases specifies all the different ways to use the system, and therefore defines all behavior required of the system, bounding the scope of the system.



### 1.1.11. Analysis Level Usecase Diagram:

Analysis level Usecase diagram is actually the explanation of high level usecase diagram. In this diagram high level Usecase are expanded in a way that exhibit how high level Usecase will reach to their functionality. Two types of relationships are used in this diagram. Which are:

- Extend
- Include



### 1.1.12. Non Functional Requirements

Non Functional Requirement	Description
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<b>Availability</b>	The website shall be able to achieve 100% up time.
	Website shall be available to vendors and sellers 7 days week and 24 hours day.
	If the website is non-operational, the website shall show vendors and sellers with notification informing them that the system is unavailable.

Table 1.1.12. Availability Requirements

<b>Non Functional Requirement</b>	<b>Description</b>
<b>Usability</b>	The website shall be able to be used vendors and sellers without training.
	Vendors and sellers shall be able to use the website with few or no error.
	The system interface shall be easy to understand and navigate.
	The website shall be self-explanatory vendors and sellers shall be able to use website without any guide.

Table 1.1.12. Usability Requirements

<b>Non Functional Requirement</b>	<b>Description</b>
<b>Efficiency</b>	The website shall be able to process a notification in 1 or less second.
	The website interface between vendors and sellers and the automated website shall have maximum response time of two seconds.
	The website shall be able to accommodate 300 simultaneous investor and fundraiser.

Table 1.1.12. Efficiency Requirements



<b>Non Functional Requirement</b>	<b>Description</b>
<b>Performance</b>	The website shall be able to accessible on IMBS/s internet speed.
	Average load time of start page of website shall be less than 3 seconds.
	Average response time of website shall be less than 3 seconds.

Table 1.1.12. Performance Requirements

<b>Non Functional Requirement</b>	<b>Description</b>
<b>Maintainability</b>	The website shall not be shut down for maintenance more than once in 24 hours period.
	The website shall have 75 percent chances to maintain component in 24 hours.

Table 1.1.12. Maintainability Requirements

<b>Non Functional Requirement</b>	<b>Description</b>
<b>Robustness</b>	The estimated loss of data in case of crash shall be less than 0.01%.
	The website shall be able to handle up to 10,000 concurrent investor and fundraiser when satisfying all their requirements and up to 15000 concurrent investor and fundraiser with browsing capabilities.

Table 1.1.12. Robustness Requirements

Non Functional Requirement	Description
Reusability	Website module shall be loosely couple and easily reusable.

Table 1.1.12. Reusability Requirements

### 1.1.13. External Interface Requirements

- The user interface for the website shall constitute a web based user interface.
- That is view via browser like chrome, internet explorer
- The website shall provide a uniform look and feel between all the pages.
- The website shall not be constrained by screen size.
- The website must be ready to use on a mobile and laptop technology with adaptable layouts to match those technologies

### 1.1.14. User Stories

1. As a farmer or landowner, I want to be able to create an account so that I can use the platform.
2. As a farmer or landowner, I want to be able to log in to my account so that I can access the platform.
3. As a farmer or landowner, I want to be able to create a Water Credit using my land so that I can sell it to environmentalists or organizations.
4. As a farmer or landowner, I want to be able to provide authentication for trading Water Credits so that I can ensure that my credits are being sold legitimately.
5. As a farmer or landowner, I want to be able to sell Nutrient Water Credits to environmentalists or organizations so that I can earn money from my land.
6. As an environmentalist or organization, I want to be able to purify water on a single click button so that I can buy Water Credits.
7. As an environmentalist or organization, I want to be able to buy Water Credits after clicking on "Purify Water" so that I can support farmers and landowners and offset my water footprint.
8. As an environmentalist or organization, I want to be able to calculate my Waterfootprint so that I can understand my water usage.

9. As an environmentalist or organization, I want to be able to proceed transactions using crypto currency after buying Water Credits so that I can easily pay for my credits.
10. As an environmentalist or organization, I want to be able to see my purchased Water Credits so that I can keep track of my transactions.
11. As a farmer or landowner, I want to be able to see my sold Water Credits so that I can keep track of my transactions.
12. As a farmer or landowner, I want to be able to verify Nutrient Offset so that I can ensure that my land is being used effectively.
13. As a farmer or landowner, I want to be able to earn rewards for Water Credits so that I can be incentivized to sell more credits.
14. As an environmentalist, I want to purchase a certificate of process for nutrient pollution removal so that I can support farmers and landowners who are using sustainable practices.
15. As a farmer or landowner, I want to be able to sell my certificate of process for nutrient pollution removal so that I can earn additional income.
16. As a student or graduate, I want to be able to audit supplier work so that I can gain experience and contribute to the platform.
17. As a verifier, I want to be able to verify supplier and quantifier (Student or Graduate) work so that I can ensure that the platform is operating effectively

## Chapter 2: Design Document

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### ***2.1. Introduction:***

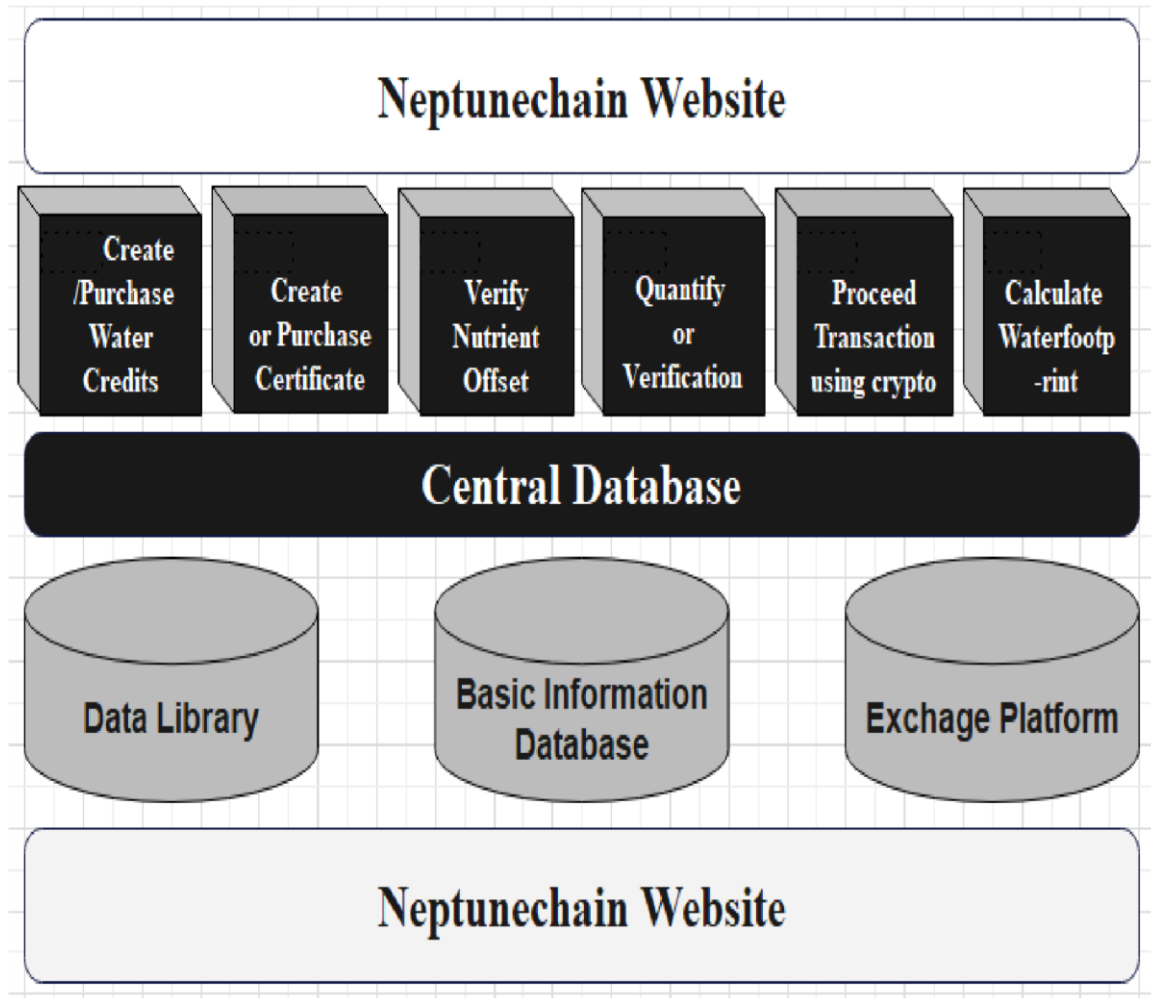
Third deliverable is all about the software design. In the previous deliverable, analysis of the system is completed. So we understand the current situation of the problem domain. Now we are ready to strive for a solution for the problem domain by using object-oriented approach. Following artifacts must be included in the 3<sup>rd</sup> deliverable.

1. Architecture Diagram
2. Design Class Diagram
3. State Transition Diagram

Now we discuss these artifacts one by one as follows:

### **2.2. Website Architecture Diagram**

This diagram helps in website planning and design, including artistic, technological, and practical considerations. It uses a hierarchy structure to show website content management and website directory structure.



2.2 Figure Architecture Diagram

### 2.3. Design Class Diagram

Classes are the work-horses of the design effort—they actually perform the real work of the system. The other design elements—subsystems, packages and collaborations simply describe how classes are grouped or how they interoperate.

Capsules are also stereotyped classes, used to represent concurrent threads of execution in real-time systems. In such cases, other design classes are 'passive' classes, used within the execution context provided by the 'active' capsules. When the software architect and designer choose not to use a design approach based on capsules, it is still possible to model concurrent behavior using 'active' classes.

Active classes are design classes, which coordinate and drive the behavior of the passive classes - an active class is a class whose instances are active objects, owning their own thread of control. Class diagram of our system is:

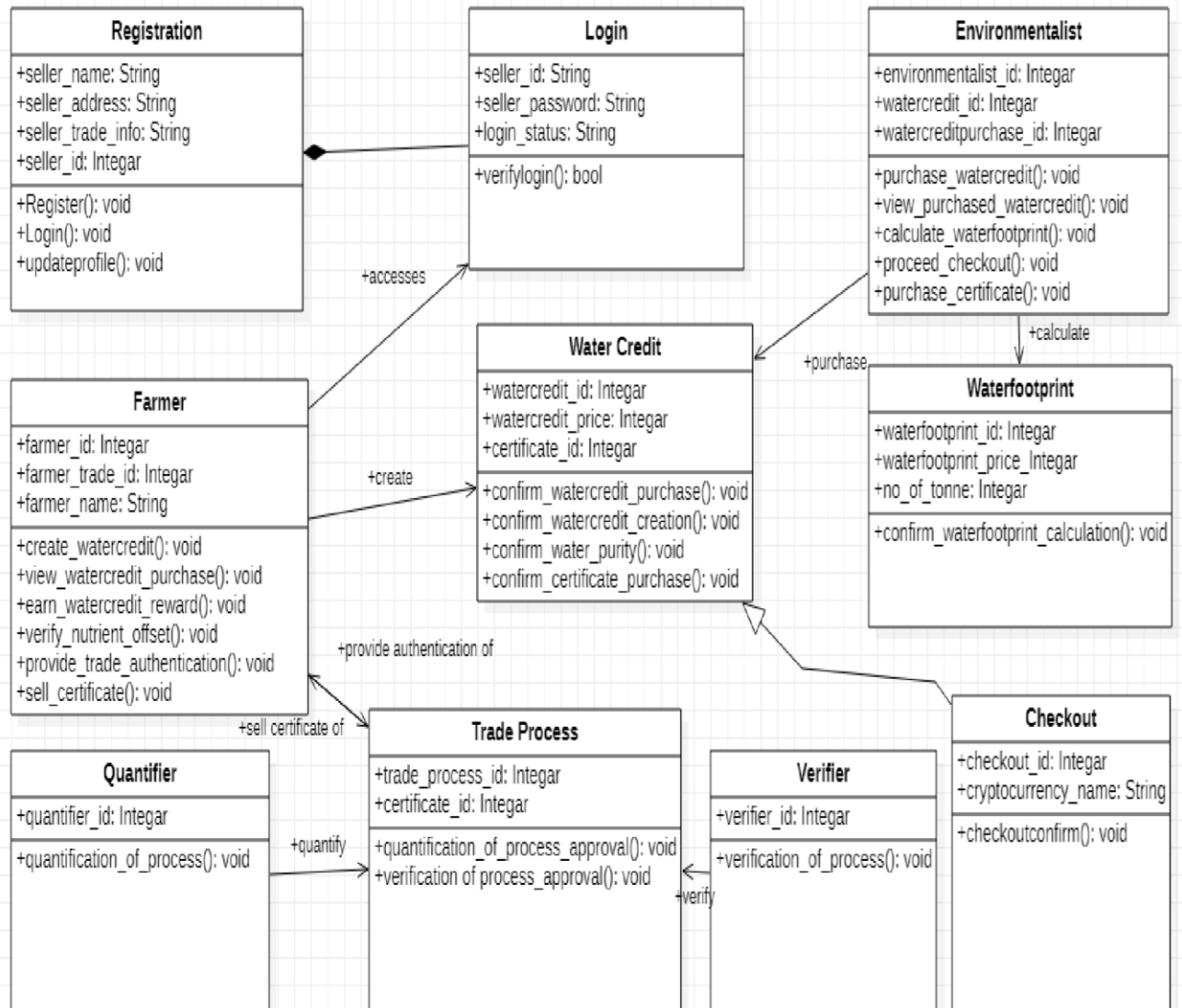


Figure 2.3: Class Diagram

## 2.4. State chart diagram

For some operations, the behavior of the operation depends upon the state the receiver object is in. A state machine is a tool for describing the states the object can assume and the events that cause the object to move from one state to another. State machines are most useful for describing active classes. The use of state machines is particularly important for defining the behavior. A simple state machine of our System is shown:

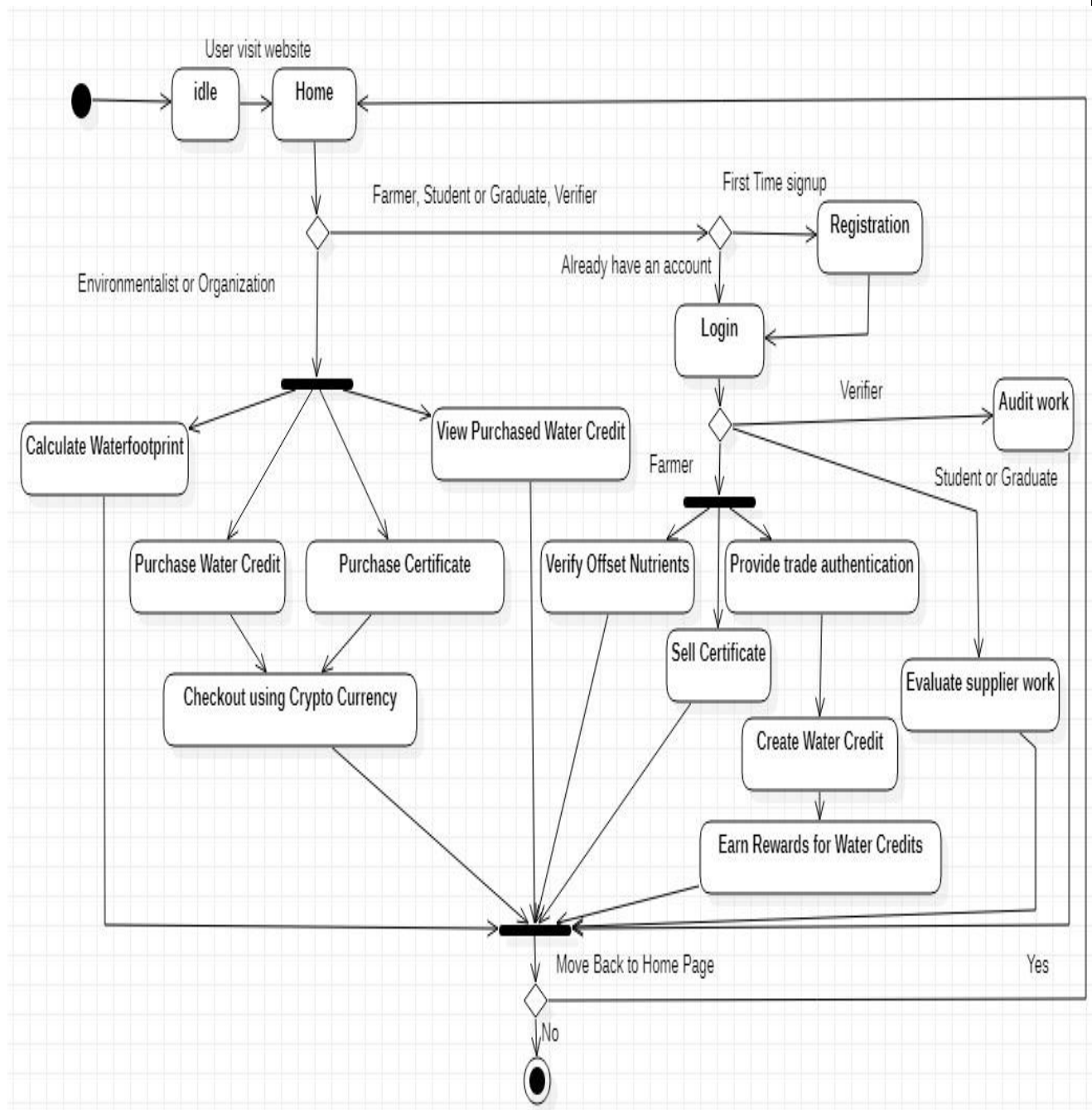


Figure 2.4: State chart Diagram