Requirements

Problem Statement

Farmers growing organic crops do not get a fair price for their produce and lack capital at hand when the sowing season starts. The investment opportunities in Agriculture are untapped and have a particularly good return on Investment. With the growing demand for organic produce, the authenticity of organically grown food is questionable. Current certification processes are quite tedious and opaque which needs to change in this world of technologies.

Solution

We at Organic Chain aim to build an Ethereum-based Decentralized Blockchain application connected with IoT (internet of things) devices that will facilitate farmers to tokenize their produce, open investment opportunities in the agricultural sector and acts as a marketplace bringing produces and consumers to the same place. Frequent data feed from IoT devices will keep track of crop and soil health along with the kind of pesticide and insecticides applied to the crop and will eventually prove the authenticity of the organic produce.

Stakeholders

Farmer

- Adds the farm on the application and tokenize the produce.
- Works on the farm to produce the crops and keep IoT devices up and running for continuous data feed.

Investor

- Investments at the initial stages of sowing and bags a steady and safe Return on Investment.

Consumer

- Use the marketplace to purchase proven organic produce.

Access Rules

Function/ Role	Sign Up	Create Farm	Farm Activity	Generate Token	Invest	Buy
Farmer	✓	✓	✓	✓		
Investor					✓	
Consumer						✓

Data

Here we define the data stored by smart contract.

- User

Name	Role

For the user list, we have a mapping of address => User structure.

- Farm

Id	Area Covered	Crop Name	Token %

For the farm list, we have a mapping of address => array of Farm structure.

- Farm Activity

Farm Id	Date	Activity Name

Every time a farmer performs any task on the farm like watering, manuring, and de-weeding an entry in farm activity will be created.

- Crop Readings

Farm Id	Date	Protein	Moisture	Oil Content

At regular intervals, the data feed from IoT devices will fetch crop health parameters.

- Soil Readings

Farm Id	Date	pH	Moisture	NPK	Carbon Content

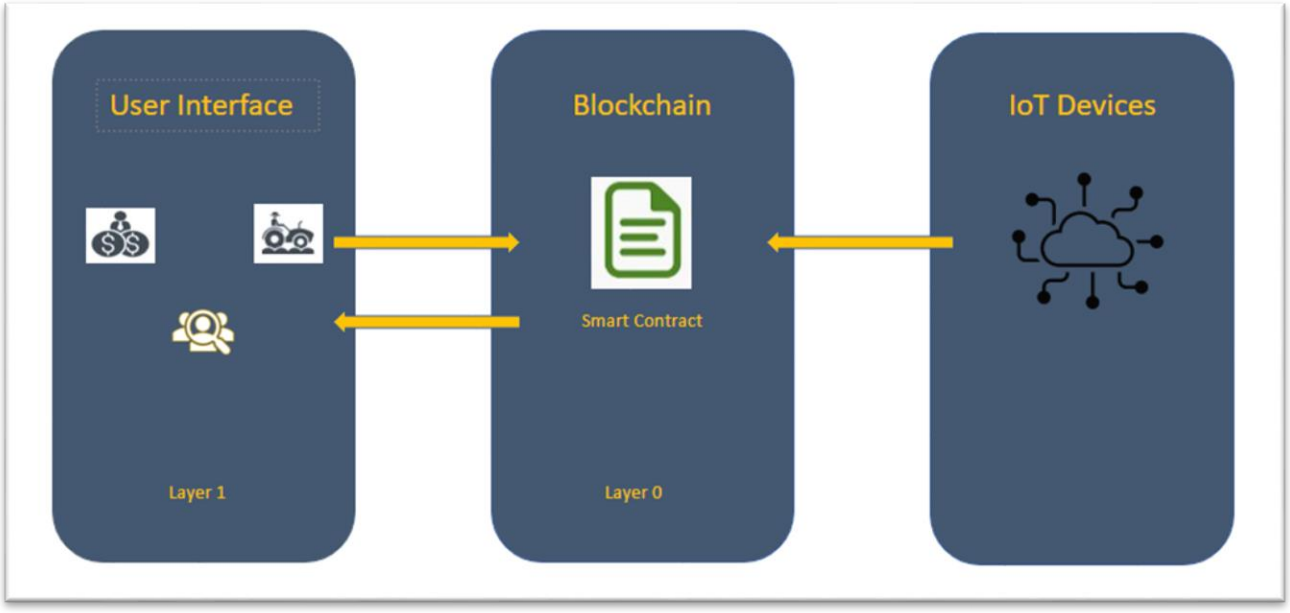
*NPK - Nitrogen, Phosphorus, Potassium percent.

* pH - the potential of hydrogen.

Technologies & Usage

At Organic Chain, we use ERC20 utility tokens to tokenize the farm's produce. Blockchain as a technology ensures that the history of farm soil health and crop health is recorded and maintained to produce the all-important Organic certificate. React.js UI (User Interface) framework is being used to develop the web application.

Architecture



User Stories

The Farmer submits the details of the farm to the Dapp (Decentralized Application) which then generates the token based on the crop, and area of the farm. The Dapp distributes tokens based on the percentage of produce the farmer wants to tokenize.

Tokens held by Dapp are made available for investors to buy, and once that happens, the amount paid by investors is credited to farmers' accounts for cultivating the crops.

Once the crop is harvested, Dapp calculates how to distribute it among farmers and investors based on the number of tokens they hold. Dapp also updates the farms' production and quality of soil and crop.

Continuous data feed from IoT maintains a history of soil and crop health.