



**AgriClear**  
a rumsan company

**Our mission is to:**

Help agro-enterprises build trust with  
their end-consumers with data backed  
claims and stories.

**AgriClear:Whitepaper**

**Prepared by**

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## Executive Summary

AgriClear is a mobile-based system which helps in tracking good agricultural habits & practices from farm to finger. It uses distributed ledger technology (DLT) and seeks to transform Nepal's existing farming processes by keeping track of agro-supply channels in the network via blockchain technology. It allows customers to scan labels with smartphones to access detailed supply chain information like agro input used, harvesting date, origin etc.

Food safety has become one of the significant concerns among individuals all across the world. With the excessive use of pesticides and other hazardous chemicals, a threat to the quality and safety of foods and agriculture products has increased rapidly. So, transparency in the Food Supply Chain is an important issue which needs to be considered as it creates trust among all stakeholders, thereby defining and differentiating product quality. But there are not any digital agtech services available in the market to help the farmers and agro-businesses to differentiate their products. The transparent supply chain with the ability to perform end-to-end tracking is very important and AgriClear helps to create a unique identity of agricultural products.

AgriClear provides solutions to the various problems faced by farmers, traders and the consumers and connects them through a transparent and traceable blockchain ledger. Blockchain provides the integrity of all the data; it stores all the transactional data provided by each microservice to the blockchain network.

AgriClear targets to track safe, authentic and organic agricultural products. The platform is not only targeted for Nepalese market but also is ready to explore the needs of the international supply chain market. In the long run, the crop activities and cash flow details of the farms can facilitate farmers with easy access to agriculture loans and insurances. AgriClear can be extended for these financial institutions where they can get all this information for verifying and providing loans and insurances to the farmers. Similarly, we plan to collaborate with agro certifying bodies where they can issue certificates to farms and products from the AgriClear platform.



## Food Transparency: The Need for Today's World

According to the Food and Agriculture Organization (United Nations), 1 out of 10 people fall ill after eating contaminated food and about 420,000 die every year, out of which 125,000 are children below five years of age. These numbers demonstrate how the food that we enjoy so much can make us sick and result in the death of our loved ones. Food supply chain is complex as it goes through multiple production steps and travels across continents. Every step of the way, food related raw materials and finished products are at high risk of contamination. If they are deemed contaminated, it is very difficult and near impossible to identify the source(s) of contamination. Because of this complexity, we are often exposed to contaminated food due to fraudulent practices and even adulteration.

In order to satisfy the growing demand of agricultural products, farmers often use intensive farming practices and banned chemicals to increase productivity. These practices are not only producing unhealthy products but also degrading the quality of our soil, water, and ecosystems. Thus, it is high time that we promote sustainable agriculture practices at the highest possible level.

At the same degree, consumers nowadays are very concerned about what arrives at their table. They are more aligned towards safe, local and organic agro-products. But there aren't many digital agtech services for farmers and agro-enterprises to differentiate their products in the market and have a competitive advantage over cheaper imports. Therefore, farmers are forced to sell far below the cost of production. In Nepal, agricultural produce struggles to get reasonable market prices against cheaper imports, especially vegetables. On one hand, the majority of agro-products are rotting in the farmlands due to the failure to fetch better price rates. On the other hand, despite the consumer's preference for local produce if high prices are justifiable by its transparency, farmers are not able to create trust among the stakeholders involved. Due to this, consumers are encouraged to buy comparatively cheaper products rather than high-quality products which are highly-priced.



To mitigate these challenges of food contamination and adulteration, it is imperative that we create a transparent supply chain with the ability to perform end-to-end tracking and knowing the sources of the food we eat, who and how it was produced and handled. Supply chain tracking has been adopted by many countries and has now been a global interest of the food industry.



## What is AgriClear?

### Introduction

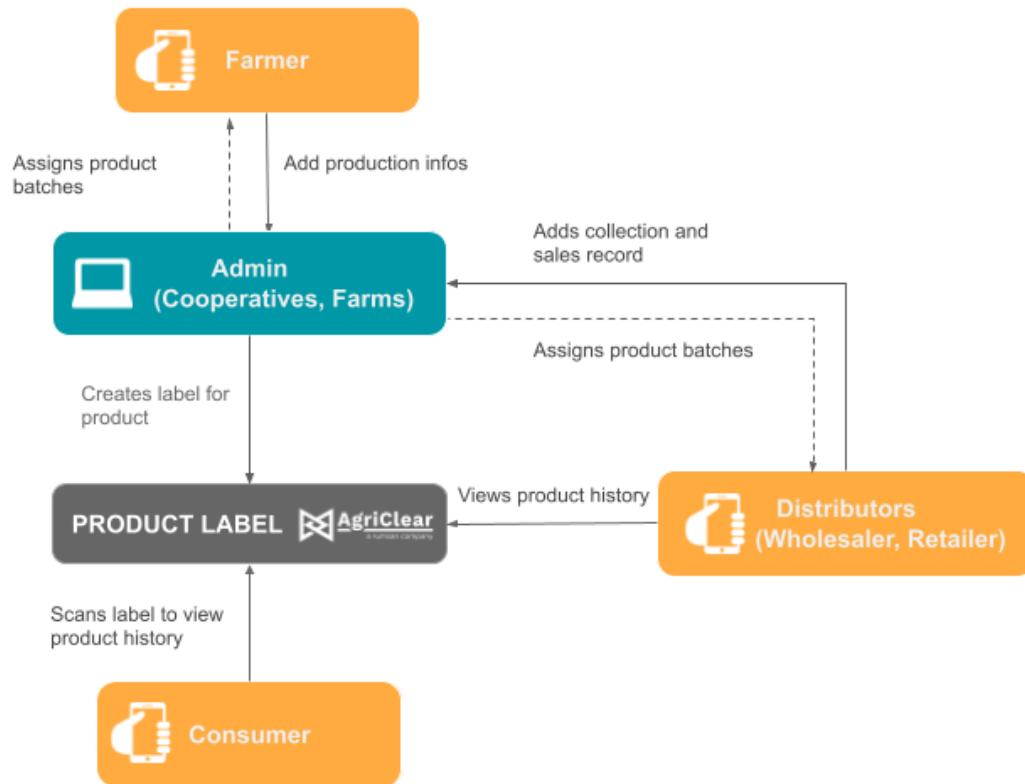
AgriClear is a blockchain-based platform to track and trace activities performed during production and distribution of agricultural products. It provides verifiable evidence of food traceability which gives the consumers increased trust in the products that they buy. It also rewards the farmers who employ good agricultural practices. With AgriClear, farmers, distributors, aggregators, regulators, retailers and end consumers will know the status of the product from seedling to delivery.

The blockchain-based AgriClear offers the following value propositions to farmers, consumers, and other stakeholders in the supply chain:

1. Consumers know the story behind the journey of products they are buying – type of soil, fertilizers, seed etc. used for plant products, type of feeding materials, antibiotics or vaccines were used to rear livestock. Farms can also digitally manage the chain of custody of their agro-products during distribution e.g., who transported the agro-product, how it was processed, and if the handlers were certified.
2. Transparency in the supply chain helps agro businesses build trust with their consumers and their trading partners thereby increasing their brand value and consumer base.
3. Reduce fraudulent practices including falsified certifications and labeling. This reduces the burden on regulators, who have to spend significant resources in field inspections, testing, and enforcement actions.

### How does it work?


AgriClear keeps track of all the relevant information from the point of production to the final delivery of the goods to the consumer and ensures transparency in agricultural operations and goods. AgriClear is used by multiple actors involved in the production and distribution phases of agro-products.



*Image: AgriClear Workflow*

1. The farm labourer
2. Farm Admin or Farmers
3. Processing/Industrial User
4. Distributor/Agro-trader and
5. End Consumers

In the initial stage, farmers can create multiple farms according to their needs via a web app. They also give access to farm laborers (if any) and distributors involved in the supply chain. Farmers can add a wide variety of crops and livestock that they produce in the system. If the farmer is growing crops, they keep track of everything from the types of soil, seeds, fertilizers used during the production phase to the harvesting of the crops in the system. Similarly, suppose a farmer raises animals such as goats, sheeps, or any other livestock. In that case, they keep track of all the



relevant details in the AgriClear system such as the type of animal breed, vaccinations that are provided to them, their feeding habits, and so on. Farm laborers can also record this information via a mobile responsive app. Once the production cycle ends, the products are handed over and assigned to respective traders or distributors or processing industries according to the need of business.

Then, the processing industry or the distributor records multiple ranges of data generated in this phase like processing methods used, processing date, the place from where and at what time the product is transferred, and how long the goods are stored etc. of the recorded data and information through the use of blockchain technology and examines the relevancy of data and information. An agro-product can be handed over to multiple traders or processing units or distributors according to the needs of the business.

Each batch of the agro-product is given a unique QR code. These users, at the time of packaging, can print labels with these unique QR codes which are then pasted in the packages. Ultimately, when it reaches the end-consumers, they can scan the QR code and get access to all the product's history.

All of this information recorded in the supply chain of the agro-products are securely stored in blockchain making it tamperproof.



## Product Features

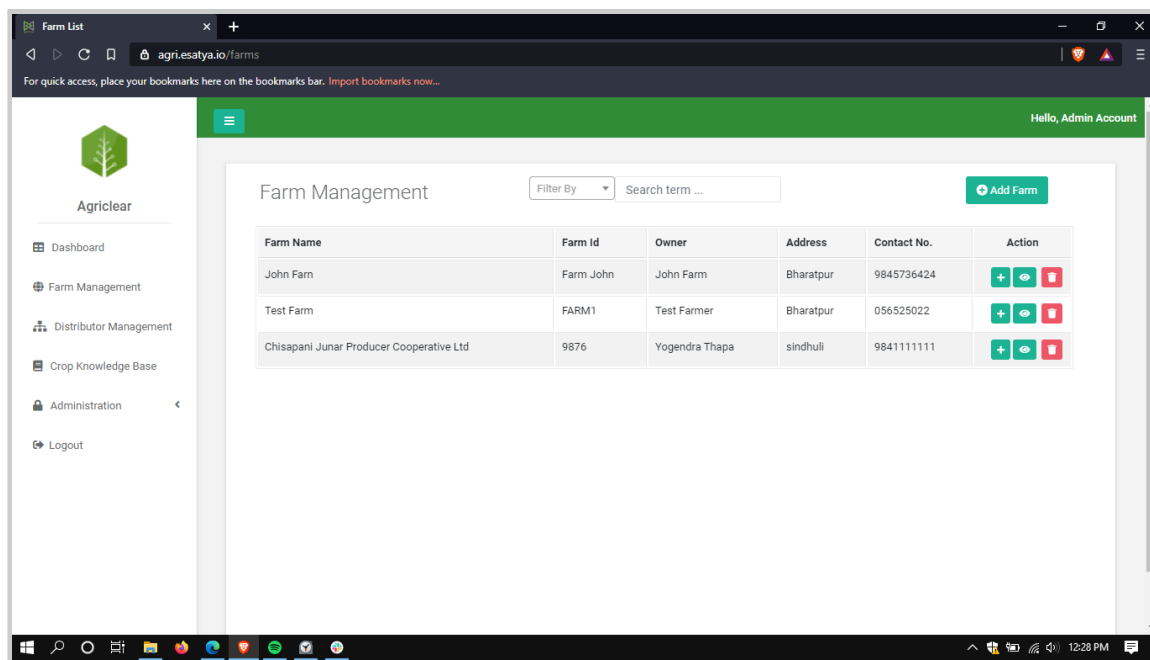


Image: Farm Management Page of AgriClear System

AgriClear's solution connects stakeholders through a transparent and traceable blockchain ledger. AgriClear platform includes an online dashboard to manage and monitor supply chain and a digital wallet to record information. It has following features –

1. *Farm Management System.* Farm Management System digitizes and manages farm, crop, farmers, and distributor databases. Farmers can track crop activities of their farms against the crop calendar.
2. *Transparency and Traceability.* AgriClear maintains a chain of custody of agro-products, including the life cycle records like chemicals used and harvest date. Consumers can track and identify the provenance of the agro-products to farmer level by simply scanning a QR code.
3. *Digital Agro Advisory Service.* AgriClear provides customized meteorological information to enhance their productivity and minimize loss.

4. *Agro Knowledgebase.* AgriClear provides information on detailed crop and livestock rearing like planting period, special husbandry practices, harvesting periods, etc. specific to ecological zones. The locally adapted crop calendar can help farmers standardize farming practices to increase productivity.
5. *Analytical Dashboard & Reporting.* Digital data is turned into structured information which helps evaluate current status and historical condition. It helps stakeholders make data-informed decisions by forecasting future trends and potential issues.

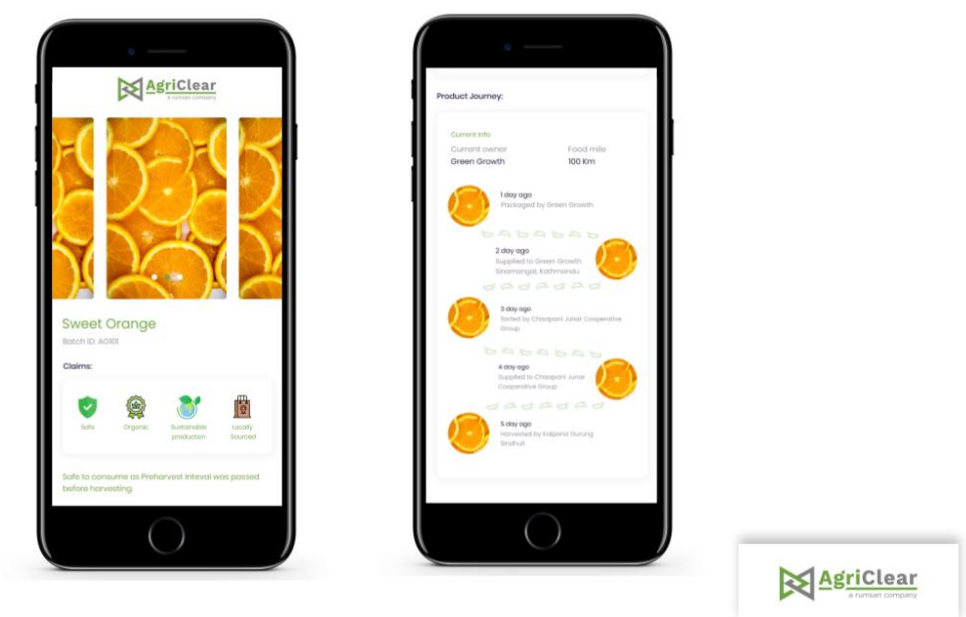



Image: Consumer View of Sweet Orange ([Image Link](#))

## Consumer Segment

AgriClear can be used by multiple agro businesses to track their respective activities and information. AgriClear has identified following consumer segments –

1. *Commercial Farmers.* Vegetable cultivation is becoming more commercial and most produce is destined to urban areas. Farmers grow vegetables in their farm and bring them to the collection/wholesale market, where either wholesaler or their agent purchase produce on price prevalent in the market. These farmers commercially sell their produce in the market. They need to be accountable towards the consumers with produce and the other side needs to



know about the price as well to reap rewards. The farmers will use the AgriClear mobile app to record production information according to crop cycle. The app will not only record data but help farmers follow good agricultural practices.

2. *Agro Traders.* These include organized entrepreneurs, aggregators, wholesalers and retailers who are engaged in getting produce from the farm to consumers using various linkages. They operate directly or have agents, buy produce from the traders, and the farmers. They will work with retailers so that produce reaches customers. Agro-traders can track the information generated during the distribution phase of the agro products and generate respective labels with QR codes to make all the information in the supply chain available to end-consumers. It will help them create their brand value and build trust with consumers.
3. *Consumers.* The problem is, consumers do not know anything about the origins of their food, how the food was grown and how many intermediaries that food went through before it reached the shelves. The discerning consumers want this information for more transparency in the produce that they are eating. Consumers purchasing produce can take a picture of a unique QR code on the produce packaging to discover everything they want to know about the production, freshness, and farming practices that went into the production of their food.
4. *Third Parties.* Third parties like financial institutions, regulators, N/GOs and researchers can use disaggregated data produced by tracking the agri supply chain to make data informed decisions.



## Technology and System Architecture

### Why are We Using Blockchain in Agriclear?

One of the rarely spoken of sectors that blockchain can disrupt is Agriculture which represents 6.4% of the entire world's economic production employing 40% of the total global workforce and its total worldwide production is around \$5 trillion dollars.<sup>1</sup>

In recent years, the agriculture sector has been plagued by numerous catastrophes. As the quality and safety of agricultural products have a direct impact on people's health, its concerns are growing in Nepal and throughout the world. With the excessive use of pesticides and other hazardous chemicals, consumers are skeptical about the quality of the food they are consuming.

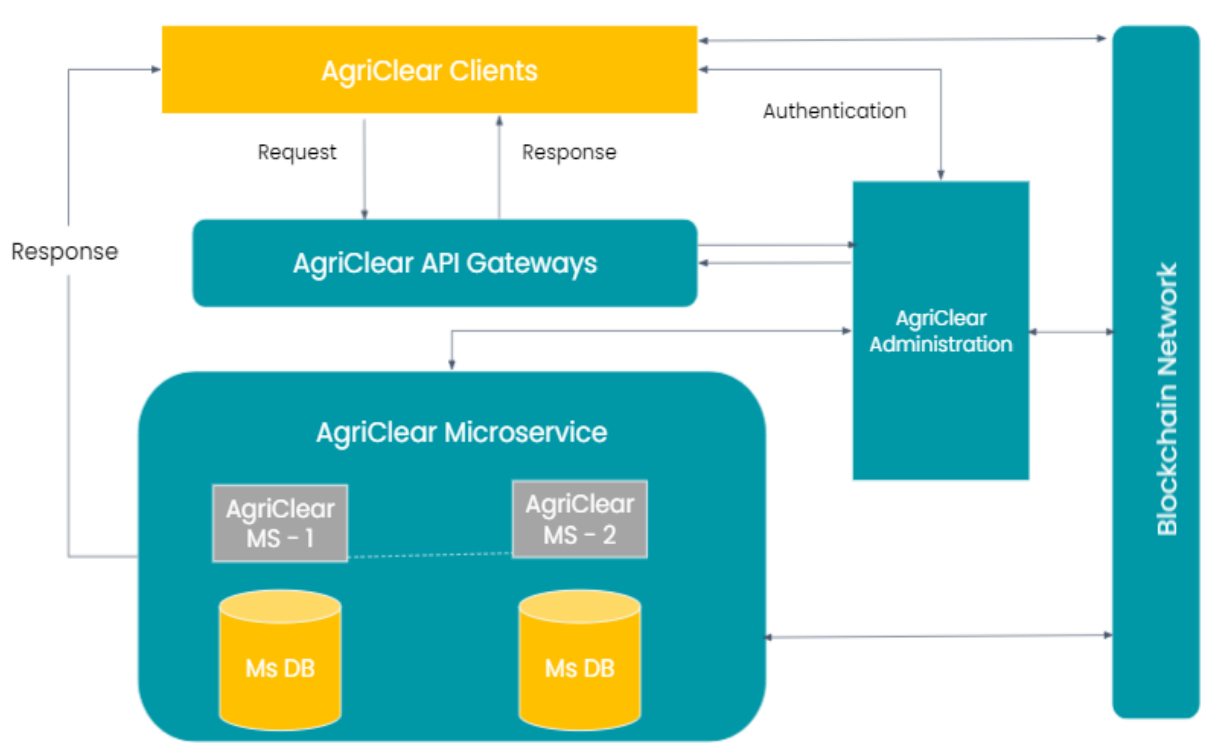
Bright Food, China's second-largest food manufacturer, has already implemented BrightCode to track Cupids Farm Milk, its most popular dairy product. It informs customers about the provenance of its dairy products. The use of technology in the agriculture sector is increasing because consumers nowadays are more concerned about their health and prefer to consume high-quality, nutritious foods. So, the transparency and traceability of products from the point of production to the final consumers has become crucial.

With the use of blockchain technology, AgriClear is attempting to transform Nepal's existing farming practices by keeping track of all the supply channels in the network. Similarly, farmers and distributors also can maintain track of all activities, differentiate their product quality from competitors', and win consumer trust. Along with that, it aids consumers in understanding the quality and safety of the foods they consume and helps determine the value of their purchase.

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<sup>1</sup> <https://medium.com/swlh/blockchain-for-agriculture-5b0a0baa0aa3>

## Agriclear Microservice Architecture




Link: <https://app.diagrams.net/#G1wnqXwKM12VDUldfw3zs2diSh-KJ0ljL8>

Agriclear is a multi-user application used by farmers, distributors, processing units, enterprises, agriclear admin, etc. The system of Agriclear consists of four blocks i.e.

- Micro Service
- Blockchain Network
- Central API gateway
- Agriclear Administrator

The Agriclear System revolves around these four blocks. There are many components in the system; each one is designed as an independent microservice and serves the data to the Agriclear clients (farmers, distributors, or end-users).

As blockchain provides the integrity of all the data; it stores all the transactional data provided by each microservice to the blockchain network.



After the data is stored, the Agriclear client can directly validate the data received from each microservice blockchain network and also can query all the services provided by each microservice through a central API gateway.

But before that, every client must have a blockchain wallet in their app to access the Agriclear API. To access the Agriclear microservice client has to be authenticated through Agriclear Administration. Agriclear administration uses wallet-based authentication for each request sent by the client.



## Future Goals

In Nepal there are many agro-products like tea, coffee, apple etc which are highly appreciated in the domestic as well as international markets. Also, the demand for local and authentic products is ever increasing in the urban Nepalese population. Recently, we are focusing on this section of the market which can further benefit and motivate businesses and farmers involved in good agricultural practices. We are conducting a few pilot projects, taking reviews and feedback from the users and consumers and upgrading the platform.

In the long run, we plan to extend our services for farmers by helping them with access to finance. The crop activities and cash flow details of the farms can facilitate farmers with easy access to agriculture loans and insurances. Our platform will be extended for these financial institutions where they can get all this information for verifying and providing loans and insurances to the farmers.

Furthermore, we are also planning to collaborate with agro certification bodies that provide certification to the farms and agro products like Organic, safe, GAP certified, Halal etc. The tracking of good agricultural habits made by AgriClear will help create a unique identity of agricultural products. By collaborating with these certification bodies we can provide different authorized certificates to the farms and their products through the AgriClear platform.

Also, establishing good communication within all the actors in the supply chain is very important specially with the end-consumers. We plan to add-in to our platform further by developing a consumer app to help them connect directly with farmers. They can message, provide additional contributions according to their willingness. This will further help make the emotional strings stronger with the brands.

## Contact Us

If you are interested to learn more or collaborate with AgriClear, Contact:

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## About Rumsan Group of Companies

Rumsan Group is a diversified multi-business company. We are committed to supporting promising start-ups and investing in digital innovation. We envision creating societal impact through frontier technologies. We support and invest in promising ideas and innovators to make a bigger impact. We specialize in digital solutions for agriculture, education, finance, healthcare, media and development sectors.

