

Blockchain & Agriculture

Priyanshu Mishra

Chandra Shekhar Azad University of Agriculture and Technology, Kanpur

ARTICLE ID: 16

Introduction

Imagine shopping at a super market, you come across a variety of vegetables and fruits. What if I told you that with the help of a technology you can trace the entire journey of that commodity from farmland to the market? Sounds fascinating? This disruptive technology is the **Blockchain**.

What Is Blockchain?

Blockchain is a decentralised, transparent and an immutable information storing platform which stores information in the form of blocks which cannot be tampered with. Blockchain can be related as a large excel spreadsheet which cannot be tampered by any random person. Cryptographic security is used to ensure that participants can only view information on the ledger that they are authorized to see. Blockchain technology has been mushrooming over the years and is one of those emerging technologies which is finding newer applications every day and many of these applications are addressing the problem of authentic information sharing. Perhaps, the most ubiquitous application of information sharing in a business scenario takes place as part of the supply chain process.



Blockchain Terminology for Entities

In this agricultural supply chain system, the buy/sell transactions are going to be augmented using Blockchain. Here are the entities of this system defined as per the Blockchain parlance.

- **Node** - Every individual party involved in the buy/sell process will be connected to a computer to initiate the transaction. This computer is a Node.
- **Address** - In a Blockchain based system, multiple parties will be involved and each one will have a node. Each node will be represented with a unique address and this address is generated when the node is added to the chain.
- **Asset** - An asset is a tangible thing which has a value (be it money, or dimension that can be verified). These assets will be involved in the transactions within the Blockchain. In the case of Agri supply chain, the assets are crop and money.
- **Transaction** - Each operation in the Blockchain is a transaction. Creating an asset, initiating an asset exchange process, or confirming an asset exchange process. Each of these is an individual transaction.
- **Ledger** - Blockchain is a distributed ledger system which means that everyone involved in the chain will have their copy of each transaction and these transactions are immutable. A ledger is the copy of the list of Transactions in the entire chain.
- **Exchange** - This is the process of giving your asset and expecting something which equals to the value of your asset from the other party. Farmer selling his crop, of a definite quantity, to the distributor and getting money of equivalent & predetermined value is an example of an exchange. In Blockchain, an exchange is initiated and after it is completed and verified, is added to the chain.

Agriculture Supply Chain & How Can Blockchain Revolutionize

- **Conventional Agriculture Supply Chain Scenario:** A farmer sells his produce to a distributor who in turn, stocks it across his various warehouses and supplies it to the retailers. The distribution network takes care of linking the farmer and retailer via a supply chain. This supply chain network has the geographical reach, as well as the scale up capability to take care of fluctuating supply and demand.



- **Problems Associated With The Current Supply Chain Network:-** The agriculture supply chain & logistics is replete with rampant corruption, malpractices and oligopoly which often results in farmers not getting remunerative prices for their produce albeit the presence of lucrative markets. If transparency is ensured then any rise in demand due to real external factors can be capitalized by all the parties instead of only a few who might try to game the system in their favor. This will provide an accurate reflection of the efficiency of the system to gauge whether the system is working for all the participating entities or only favouring a few.

Where Can Blockchain Be Put To Use:

- **Food Safety:** Block chain stores data in the form of blocks, this data is transparent for the stakeholders involved in the transaction. Hence if there is an issue of food contamination or an outbreak of a diseased fruit it can easily be traced back to where it originated, this would ensure food safety in a wholesome manner. This way the financial loss associated with unsafe food can also be tackled with in an effective manner.
- **Traceability:** Tracing food back to the farmland from the supermarkets on a large scale could become a reality with the help of blockchain. You could know about where the food came from, who grew it etc. If blockchain enters this domain this could prevent food fraud, false labelling and redundant middlemen.
- **Logistics:** Agriculture products generally have a very low shelf life also the supply chain is uncertain and is dependent upon various parameters. Smart logistic systems which are transparent and immutable built upon blockchain technology can help revive this sector.

Revamping the Agriculture Sector:

1. **Maximum Reach:** All the parties collaborate to extend the reach of the supply chain for attracting lucrative markets.
2. **Maximum Profit:** All the parties work in close coordination so that they can meet the surge in demands and share the resulting gains in profit while ensuring maximum reach and quality.
3. **Maximum Quality:** All the parties work in an optimized manner to ensure that the end product at the hands of the retail customer is of the highest quality.

Conclusion:

The cognitive IT Technologies when amalgamated with Blockchain technology allows deep, transparent and real time supply chain traceability, this can eventually help to solve the plethora of problems persistent in the agriculture domain today.