

# Application of Blockchain in Agriculture

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**Abstract:** To provide transparency, traceability, authenticity, efficient record fetching, and accessing and to avoid corruption, we need a universal ledger system that could be open to all individuals involved in the processing of crops from fields till the processed good. Some more issues in agriculture are-

1. Lack of access to advanced farming.
  2. Lack of cold storage facilities.
  3. Inefficient distributed network.
  4. Lack of inclusion of farmers into the mainstream.
  5. Lack of awareness of the smart payment mode. Thus we need block chain for maintaining a-
1. A decentralized market place to enable farmers to consume trade.
  2. A public, private network.
  3. A supply chain solution to track quality, quantity, food check, information of crop, etc.
  4. A smart contract has needed for a global connection.

As a result, there will be a healthy environment for trade. There will be greater involvement of the farmers in the market. Security in business could increase. The farmers could not exploit. There will be a stellar record. So every item could be tracked at each level of processing by the help of this.

**Keywords—**Transparency, traceability, Smart payments, Highly interconnected network.

## 1. Introduction

Blockchain technology is part of the industry 4.0, which refers to the automation and data exchange in the production process. Industry 4.0 integrates the internet of

things, cyber physical systems, cognitive computing, as well as cloud computing. Blockchain technology is gaining popularity with the rise of crypto currencies such as bit coin.

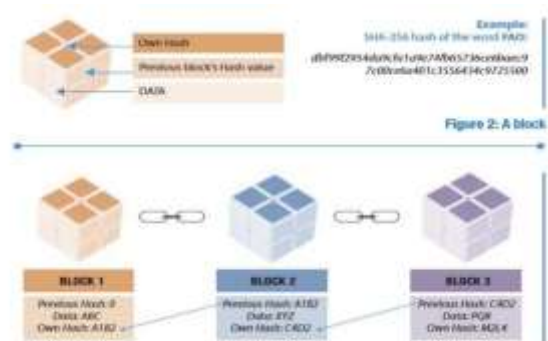


Fig 1 : BLOCKCHAIN INTRODUCTION

Even though the first use of blockchain was in crypto currencies, its application to other transactions holds great potential. One of the areas where blockchain can be applied is in agriculture. This paper seeks to explore the use of block technology in agriculture and agricultural products.

## 2. Ensuring Food Safety

Blockchain technology can use to ensure food safety within the agricultural supply chain. Blockchain technology improves traceability and transparency, allowing parties within the agricultural value chain to identify the poor processes and bad actors[1]. It ensures that ideal conditions have maintained from the farms up to the market. The ability to trace the origin of food products becomes valuable in case of a food safety outbreak. Industry regulators will be able to pinpoint the contaminant's source and determine the scope of the affected products.[2] The early identification of the cause of contamination will enable food companies to swing into action quickly to prevent illness and thus save lives. Such a

timely response will also help limit food wastage and will save money by containing a financial fallout. There is already clear vested interest from both producers and consumers, and companies such as IBM and Walmart have begun work in the area of food safety by employing blockchain technology.

### 3. Traceability of the Origins of Agricultural Products

Traceability enhances retailer and consumer confidence in the product. If the entire supply chain for agricultural products has embedded in a blockchain-driven ecosystem, it can start from the registration of products, payment, and transportation. Retailers can then verify that the product they are receiving is precise; they paid for it since every step of the transaction process has been recorded in the blockchain. Any claim by a supplier about the origins of his products can confirm by tracing the journey of the product from the farmer up to a point it got to the shop, thus alleviate concerns of misrepresentation. For a consumer, a transparently distributed ledger will make them have confidence in the origins of their food as well as the efficiency of its production.[3] In monitoring the consumer food chain, consumers will better inform of the source of their food, their dates of manufacture as well as the efficiency of the creation of the product. Startups such as Provenance are already using blockchain to provide concrete proof of the origin of their food supplies. Provenance uses blockchain to secure and keep track of its food supply chains and make such information public, thus ensure the process is inclusive of all partners in the supply chain.[4] Provenance uses the ledger to create a comprehensive documentation of ingredients, supply chain materials, and products, thus give their customers greater transparency about the authenticity and origin of their products. The startup provides the buyers with a fully transparent record in the format of a real-time data platform. It allows the buyers each step in the journey of the product. For example, they can see the current location of the product, the current owner, and the period the product was with a particular person.



**FIG 2 : BLOCKCHAIN FOR FARMERS**

### 4. Prevention of Food Fraud

The straightforwardness offered by blockchain models has a critical job in forestalling, nourishment misrepresentation. What happens, for the most part, through false marking. As the interest for anti-infection free, natural, and GMO-nourishment takes off, false labeling is getting healthy. With blockchain innovation and the web of things, it is conceivable to screen the whole store network productively. Indeed, even the littlest exchanges happening at the distribution center, ranch, or manufacturing plant can check, and data by IoT innovations, such as RFID labels and sensors, and the data conveyed over the inventory chain.[5] Blockchain will, along these lines, spare goliath, delivering organizations a large number of cash by guaranteeing proficiency that decreases instances of misrepresentation in the several connections engaged with the stock chains.

### 5. Reduction in Transaction Costs and Fair Pricing

Blockchain innovation decreases exchange costs and prompts reasonable evaluating. Blockchain empowers item purchasers to manage their providers and make installments through a versatile exchange. Purchasers and providers will, in this way, think that it's simpler to haggle reasonable costs for their farming items. The rancher will get a second installment for their horticultural produce, and the retailer will similarly address a reasonable price for the agrarian issues provided.

The retailer gets the chance to set aside cash because innovation kills specialists or go-between. Blockchain technology ultimately allows the farmers and producers to justify the premiums they set for certain agricultural products.[6] The square change will likewise help lessen the exchange cost brought by the intensely divided market for horticultural items. The demand for farming merchandise is vigorously subject to expressly knowing a

gathering along with the store network before one can confide in them to work together. The trust and responsibility the record makes are accessible to all meetings dispose of or diminishes the need to assess each group separately on their reliability and their capacity to execute the arrangement.

### 6. Better Pricing and Payment Options

For agri-trade members, the use of blockchain innovation will help give quicker installment alternatives at decreased expenses. Over the globe, ranchers experience a monstrous postponement in the arrival of assets for their produce submitted to different national horticultural sheets. Adding to the ranchers' hopelessness is the expensive nature installment choices, for example, wire moves. A portion of these wasteful aspects can explain by blockchain. There are now blockchain-based applications planned by particular designers to distributed store moves that are secure, close momentary, and are modest. [7] By utilizing savvy contracts, installments are by and large consequently activated when the purchaser affirms the satisfaction of specific conditions.

### 7. Verification of Authenticity of Agricultural Inputs

Blockchain innovation can utilize to check the legitimacy of rural sources of info. As a general rule, ranchers don't know whether the sources of info they purchase are bona fide. Retailers at the neighborhood level are similarly offering counterfeit contributions to ranchers to make tremendous benefits to the detriment of the ranchers. Now and again, even the retailers may not know about the items delivered to them by providers are real. Indeed, even large organizations that produce rural data sources are losing a large number of dollars because of duplication or pilferage, which additionally adversely influences the organization's brand picture. The use of blockchain can be an answer to this issue as it will expand the recognizability of each info sold, from the producer to the last purchaser. The utilization of blockchain will make it workable for ranchers and retailers to think about the realness and the inception of the information sources they purchase by basically utilizing their cell phones to check the blockchain standardized tag on every item.[8]

### 8. Land Title Registration

Another territory of use of blockchain in farming is land title enlistment. All-inclusive, the way toward enlisting the deal or acquisition of land is frequently awkward and generally vulnerable to extortion. Land cartels are causing an enormous threat to land enrollment, making it hard for

purchasers to know whether the land they are purchasing or renting is without prosecution.

Blockchain can carry productivity to all accounts, including area since the framework will be progressively straightforward because the recorded information is open and freely accessible

[9]. The use of blockchain to land enrollment has just embraced and one of the primary movers in this field—a startup from Sweden to assemble blockchain answer for land enlistment and recordkeeping[10]. Record keeping is consistently working, and exorbitant henceforth blockchain will bring about immense cost investment funds. There will likewise be simpler contracting for renting lands if there will be brilliantly contracting among ranchers and corporate cultivating firms. Ethereum is a case of a blockchain venture that has worked to understand the capability of keen contracting.



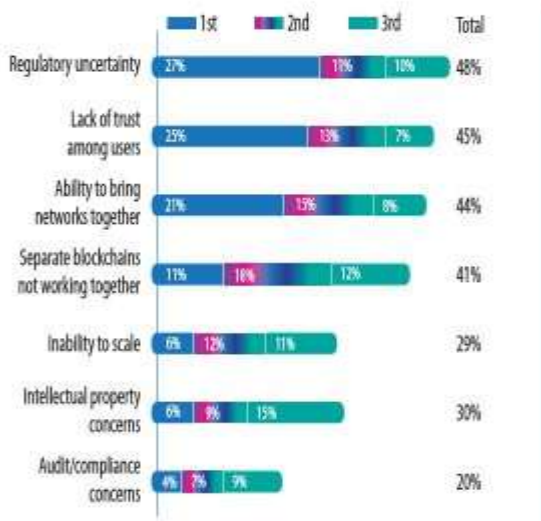
**FIG 3 : BLOCKCHAIN FOR LAND REGISTRATION**

### 9. Disbursement of Subsidies

Over the globe, agribusiness depends intensely on government sponsorships. Each money related year, governments apportion a part of their financial limit to back agribusiness related appropriations given to ranchers. The inquiry is, in every case, the amount of these appropriations that arrives at the rancher. Regularly a significant part of the cash is snatched via cartels who buy vast amounts of horticultural information sources, for example, composts, exhaust the compelling stock ranchers to proceed to purchase from these contributions from the cartels. The utilization of block chain will anyway improve straightforwardness in the appropriation and conveyance of sponsorships. That will guarantee that the focused-on payment of endowments arrives at the nearby rancher and help plug pilferages innate in the current system[11].

**Conclusion**

Blockchain innovation has a high potential for progress inside the farming area. Blockchain can utilize to guarantee sanitation as a result of the recognizability of the wellspring of tainting. Different applications incorporate the recognizability of the source of a farming item and confirm the genuineness of horticultural information sources. Blockchain can likewise be utilized in the payment of endowments to ranchers to guarantee that ranchers advantage from such projects. Blockchain innovation will offer to cultivate better costs and better installment strategies and unravel the difficulties experienced in land title deals and buy enrollment. Blockchain application is still generally new, particularly to the rural segment; there even enormous difficulties. One of these difficulties must do with guidelines over the globe as there is not a setup framework to manage blockchain exchanges. [12] Nevertheless, the use of blockchain in horticulture holds promising prizes.



**FIG 4: BLOCKCHAIN BARRIERS**

**Acknowledgment**

We declare that there is no conflict of interest regarding the publication of this paper. Also, all the provided information in this paper is right under my knowledge.

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