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THE ROLE OF BLOCKCHAIN IN SCM PROCESS WITH RESPECT TO AGRICULTURAL DOMAIN

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Abstract

Agriculture is one of the many fields where blockchain has applications. It ensures food safety by providing traceability, an information system, and integrity, as well as reducing food waste during the process. The study discovered that while a Blockchain model exists, only a few countries are capable of implementing it. This article will examine the many applications and existing blockchain models in the agriculture sector and propose a new paradigm.

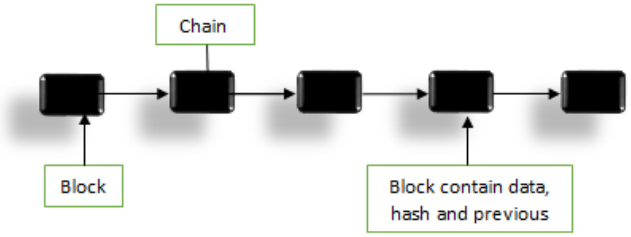
Keywords: Agriculture, Farmers, Blockchain, Supply Chain Management.

I. INTRODUCTION

Agriculture is the principal source of revenue for farmers, and agriculture employs over 75 percent of the population. Farmers must enhance their produce while lowering their costs as the population grows. The ideal answer for increasing earnings with sophisticated technology (AI, IOT) will be Blockchain technology. It provides reliable data for farming and food tracking.

In 2009, both the industrial and academic sectors began to pay more attention to bitcoin. Due to the fact that it employs blockchain technology, blockchain was later split from bitcoin. It saves information in a digital format. It ensures data integrity and establishes confidence between parties. Data is stored in blockson the blockchain. Cryptography is the link between them. A data field, a hash value field, a block number field, and a prior field are all included in each block.

The process of managing a supply network is known as supply chain management.



The hash value of the previous blocks is stored in the prior field. Blockchain has already proven its worth in the agricultural sector, and it will continue to do so in the future.

The process of delivering a product from a raw material to a customer is known as supply chain management. Developing a plan, sourcing raw materials, production, distribution, and returns are the five important parts of SCM. It is beneficial to save unnecessary costs and offer products to customers more quickly. Aligning flows, integrating functions, coordinating processes, building complex systems, and managing resources are all functions of SCM.

The use of blockchain in supply chain management is to give businesses and customers with transparency and accurate asset tracking. It can help with finance, contracting, enhancing efficiency and speed, and minimising downtime.

We shall explain how sophisticated technologies can be used in agriculture in this paper. In Maharashtra, we hope for smart agriculture.

II. LITERATURE REVIEW

According to a literature assessment, Maharashtra has yet to utilise blockchain in the agriculture industry. During our investigation, we discovered that Intellias, a foreign company, has shown blockchain in the agriculture industry utilising advanced technologies. Budaun (Uttar Pradesh) later deployed it for wheat and rice crops utilising various IOT technologies. Farmers benefit from blockchain because it ensures traceability, security, and transparency. According to Maharashtra agriculture minister Radhakrishna Vikhe Patil, "If we employ accurate market survey and intelligence, it becomes easier to improve the agricultural supply chain." They have used smart technologies to ensure the long-term viability of agriculture growth.

Problem statement-

- How to construct a model for agriculture using advanced technology.
- If we demonstrate blockchain, will it give greater benefits to farmers?

III. OBJECTIVES

1. To Study the use of blockchain technology.
2. To identify the role of blockchain technology for supply chain management in agricultural domain.
3. To suggest the blockchain model for supply chain of agriculture product.

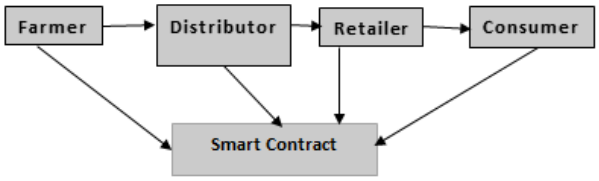
IV. RESEARCH METHODOLOGY

The research is based on preliminary findings. Secondary data is gathered from a variety of sources, including the internet and research articles.

V. DESIGN THE FRAMEWORK MODEL FOR AGRICULTURE SECTOR-

In Maharashtra, the traditional agricultural system includes a middleman who gains financially. Farmers are having greater troubles since they are not receiving proper pricing for their crops; as a result, we created a model that would utilize modern technology.

A food supply chain is a network made up of producers, processors, distributors, retailers, and consumers who work together to manufacture and distribute a certain product. Each entity in the supply chain plays a vital role since they are interdependent.



Each entity's responsibility in each stage of SCM is depicted in the diagram below.

Each entity's role is detailed below.

SUPPLY CHAIN MANAGEMENT FOR AGRICULTURE		
Entities	**Steps**	**DLT method**
Farmers	Collect data about product (soil, seeds, fertilizers and so on)	Initial data
Distributor	Include track time, vehicle route, safety measures.	Transportation data + Previous
Retailer	Place QR code on each product package which contains details of that particular product.	Financial data + Previous data
Consumer	Scan that QR code and get all the information about product	Get detail of all the stages.

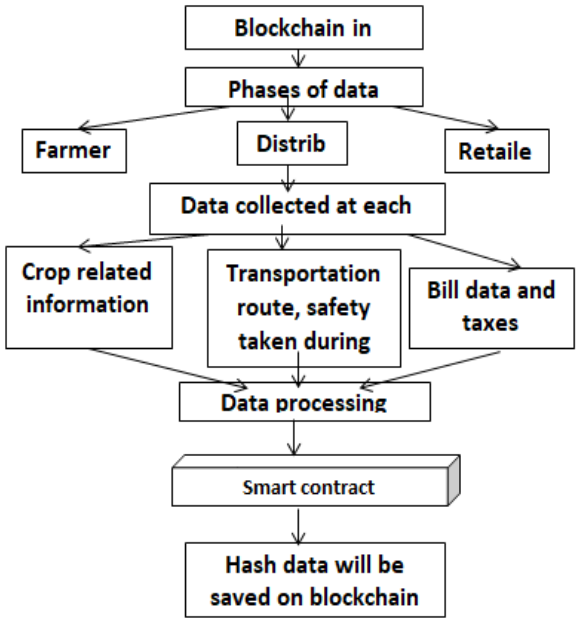
Each entity's function-

- Producer- Keep track of product growth (seeds, soil type, and pesticides), which will be validated and documented by DLT.
- Distributor- Once the product has been obtained from the manufacturer, it is transported to the retailer. The transaction between the distributor and the end recipient will be recorded in the blockchain.
- Retailer- They will employ a machine learning system to forecast how much inventory they will need. According to this, they will install a QR code on the goods that contains product information.
- Consumer- Scan the QR code to acquire entire product information (when, where, who, and how the product is made).

Blockchain is well renowned for its openness and trustworthiness because it collects data at multiple stages. Smart contracts will bind all parties in the supply chain management to one another.

How can we use blockchain in SCM.

Each level of the blockchain will collect data from farmers, merchants, and distributors, process that data using smart contracts, save hash data in the blockchain, and take appropriate action.



Steps to store the data into blockchain:-

- Information technology (IT) devices will be used to generate data.
- Data cleansing (data processing) - Data must be in a systematic format.
- Using a machine learning algorithm to analyse data.
- Information will be stored on a blockchain.

Smart contracts-

In simple terms, a smart contract is code written on the blockchain that includes if-else/when-then statements (condition). When a network of computers meets a predetermined condition, the network takes action. As a result, each participant has a vision of how their transaction will appear on the blockchain. Participants are required to adhere to them.

ADVANTAGES

1. **Security-** Because blockchain data cannot be tampered with, it prevents fraud and unauthorised access while also ensuring their safety.
2. **Ensure more equitable pricing throughout the process-** As we all know, blockchain establishes confidence between farmers and third parties when it comes to transactions. As a result of this technology, everyone will have a better understanding of proper pricing, and it will be more equitable in the end.
3. **Provides product traceability—** Traceability refers to the ability to track items or products. It is beneficial to identify supply chain flaws.
4. **Better transparency-** Blockchain is a distributed database that provides transparency to all users. It will offer data at each level of the supply chain management process. It will keep you up to date on all of the product's updates. Maintaining records online became increasingly useful**.**

VII. I.IMITATIONS

1. **Lack of expertise and training platforms-** IT expertise is required to deploy Blockchain technology in the agriculture sector. We needed a platform for training so that our farmers could learn how to use this technology.
2. **Required IT equipment costs-** In this case, we needed IoT devices, systems, and so forth. It is fairly costly, so gather all of the necessary items for blockchain.
3. **It will become more difficult for SMEs to adopt new technology-** Workers in small and medium businesses are used to advanced technology, but it will be more difficult for them to accept new technologies.
4. **High market uncertainty-** We are utilising new technologies, yet we are unable to foresee the future of the product. To accomplish so, we'll need to do a thorough market analysis, after which we'll be able to make some predictions.
5. **Blockchain technology can be slow-** Transaction speeds can be too slow in some cases. Transactions take longer to complete in IT.

VIII. CONCLUSION

This research reveals that foreign countries have previously adopted blockchain technology in agriculture, while India has yet to do so. Because blockchain is a new technology, it still has some problems and roadblocks to overcome. It will be fascinating to watch how such problems will be solved, and how blockchain will be implemented using new technology while retaining food safety, traceability, and other factors.

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