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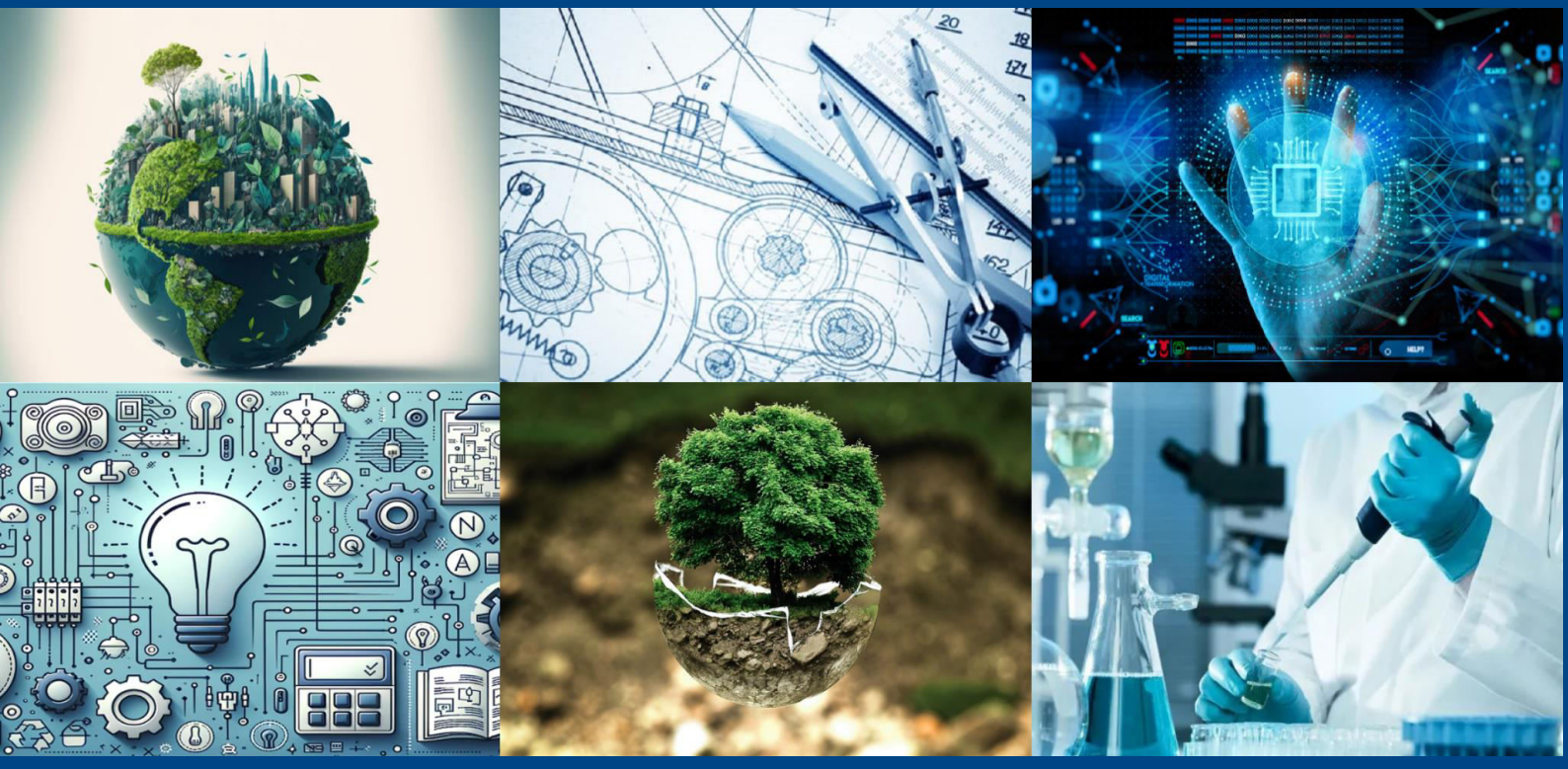

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Agriculture Product from Farmer to Consumer then Processed Food to the NGO using Block chain-Based

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ABSTRACT: In the current agricultural ecosystem, inefficiencies in the supply chain often lead to food wastage, lack of transparency, and delayed delivery to end consumers and NGOs. This project proposes a blockchain-based solution to ensure a transparent, traceable, and tamper-proof system for tracking agricultural products from farmers to consumers and then redistributing excess or processed food to NGOs.

The system leverages blockchain technology to record and verify every stage of the supply chain, starting from crop production, collection, distribution, retail, and eventual food processing. Each transaction and movement is stored immutably on the blockchain, ensuring data integrity and traceability. Consumers can verify the authenticity and origin of their food through QR code scanning. Simultaneously, surplus or unsold food is processed and efficiently redirected to NGOs, who can view real-time availability and expiration details via a secure blockchain dashboard.

By implementing smart contracts and IoT integration (for GPS and environmental monitoring), the system improves food safety, reduces waste, and fosters trust among stakeholders. This project demonstrates how blockchain can bridge the gap between agriculture, food distribution, and social impact through NGOs.

I. INTRODUCTION

In today's global economy, the agricultural supply chain plays a critical role in ensuring food security and sustainability. However, traditional systems often suffer from inefficiencies, lack of transparency, and trust issues between stakeholders such as farmers, consumers, retailers, and aid organizations. Farmers frequently receive unfair compensation, consumers lack visibility into the origin of their food, and NGOs struggle to verify the safety and authenticity of donated products. These challenges call for a modern solution that ensures fairness, accountability, and traceability throughout the supply chain.

Blockchain technology offers a promising approach to revolutionize the way agricultural products move from farms to end users. By utilizing blockchain, every transaction and process—from harvesting crops to delivering them to consumers—can be securely recorded in a distributed, immutable ledger. This enables real-time tracking of products, ensures quality assurance, and promotes ethical sourcing. The system not only enhances transparency but also reduces fraud, minimizes losses due to spoilage or mismanagement, and fosters trust among all parties involved.

The proposed project introduces a blockchain-based platform that facilitates the seamless flow of agricultural goods from farmers to consumers. It also extends the chain by redirecting surplus or unsold products for processing, which are then distributed to NGOs. These processed food items are made traceable, ensuring they are safe, nutritious, and ethically produced. Each stage—from initial harvesting, quality checks, packaging, logistics, processing, to NGO delivery—is logged in the blockchain, allowing end-to-end visibility.

Farmers benefit from this system through direct access to the market, better pricing, and reduced dependency on intermediaries. Consumers gain confidence by being able to trace the origin and journey of their food. NGOs, on the other hand, receive verified, high-quality processed food, improving the impact of their food distribution programs. The

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use of smart contracts further automates key processes like payments, quality validation, and donation triggers, improving efficiency and reducing manual errors.

II. LITERATURE REVIEW

Patients have authority over their medical records thanks to blockchain
[1]. Smart contracts based on the Ethereum blockchain allow patients control over their data in a decentralized, immutable, transparent, traceable, trustworthy, and safe way. To securely collect, store, and exchange patients' medical data, the proposed solution uses decentralized storage of interplanetary file systems (IPFS) and trusted reputation-based re-encryption oracles. Algorithms are presented together with complete implementation information. We assess the suggested smart contracts based on two key performance indicators: cost and accuracy. We also explore the generalisation elements of our technique and give security analysis. The suggested approach's drawbacks are outlined. On Github, we make the smart contract source code openly accessible IPFS.

[2] provides a blockchain-based secure storage and access solution for electronic medical data. We built an attribute-based encryption scheme for safe storage and efficient exchange of electronic medical records in IPFS storage environment based on the ciphertext policy attribute-based encryption system and IPFS storage environment, paired with blockchain technology. Our method is based on ciphertext policy attribute encryption, which effectively regulates access to electronic medical data while maintaining retrieval efficiency. Meanwhile, we store encrypted electronic medical data in the decentralized Interplanetary File System (IPFS), which not only provides storage platform security but also eliminates the single point of failure concern. Furthermore, we use blockchain technology's non-tamperable and traceable characteristics to enable safe storage and search for medical data. Our approach delivers selective security for pick keyword assaults, according to the security proof. Our approach is efficient and viable, according to performance analysis and actual data set simulation studies. Blockchain technology is being used to handle health records

[3]. a patient-centered, entirely decentralized strategy that can detect data theft, prevent data modification, and gives patients control over access. Blockchain technology is the most effective way to solve all issues and meet all demands. As a decentralized and distributed ledger, blockchain has the potential to affect billing, record sharing, medical research, identity theft, and financial data crimes in the future. Smart contracts in health care may help to simplify things even further. On the Blockchain, invocation, record generation, and validation will all take place. on a patient-driven model of record maintenance based on Blockchain technology, with smart contracts to be added in the future, allowing for more data sharing possibilities. Finding its vast reach, I hope that additional study will be conducted and actual applications will be realised.A medical data exchange and protection method based on blockchain

[4]. To enhance the hospital's electronic health system, a medical data exchange and protection strategy based on the hospital's private blockchain was developed. For starters, the system may meet a variety of security requirements, including decentralisation, openness, and tamper resistance. Doctors will be able to retain medical data or retrieve patient history data via a secure approach that respects their privacy. A symptom-matching technique is also provided between patients. It enables patients who have the same symptoms to complete mutual authentication and generate a session key for future disease communication. PBC and OpenSSL libraries are used to implement the suggested approach. Healthy Block is a blockchain-based IT architecture for electronic medical records that is resistant to network outages.

[5]. consortium blockchain to create a distributed system using existing EHRs utilizing Hyper ledger Fabric. The address of a patient record in an EHR is recorded on the same ledger held by peer nodes. Individual patients are recognized by one-of-a-kind certificates issued by local certificate authorities who operate together in a network channel. When transferring data, we employ a proxy re-encryption mechanism to preserve a patient's privacy. We created and implemented a number of chain codes to handle business logic that was agreed upon by the network's member organizations.In healthcare, a poll on blockchain-based self-sovereign patient identification

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III. METHODOLOGY

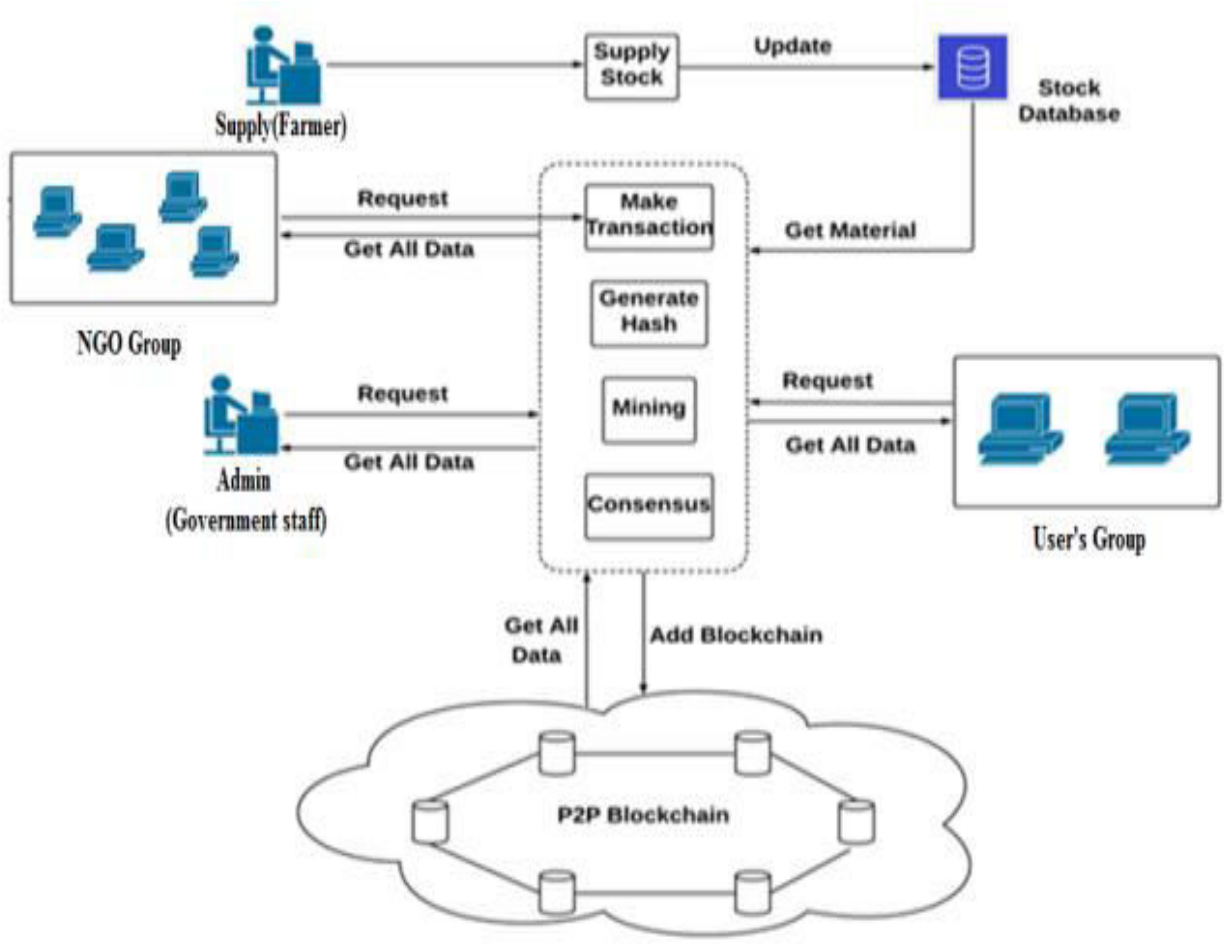
The system contains following modules:

Supply (Farmer)- A farmer is first entity in agri-food supply chain, first one to invoke smart contract for trading.

User's Group (Consumer): The maintains warehouse by (processing, storing managing) supply of goods from producers & certification of various product standards & authentication regarding quality.

NGO: NGO- To purchase consumer-products and to collect leftover food from different places.

Distributed Block chain: The Blockchain is the distributed ledger used to represent the current state of delegated access rights in the system. Permissions to interact with the Blockchain are handled by the Root Authority and the Attribute Authorities



System Architecture

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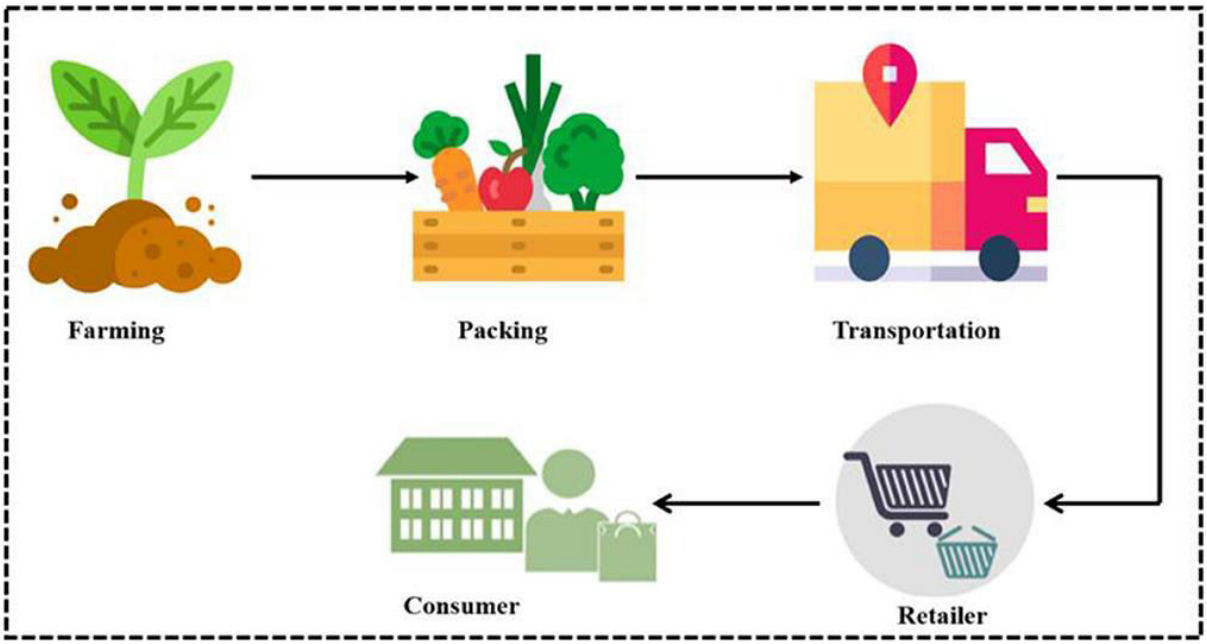
IV. RESULTS



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V. CONCLUSION AND FUTURE WORK

Conclusion:

We can implement an online system that would aid in the selling and buying of agricultural products with good cost estimation and safety aspects in mind, as well as good quality processed food for the needy, using the necessary hardware and software to benefit farmers, consumers, government employees, and non-governmental organizations. There are various study recommendations for integrating blockchain technology into agri-food supply chain transactions due to the scale of this industry and the need for more trustworthy and effective information management solutions.

Future Work:

1. **Integration of IoT Devices:** Incorporate sensors to monitor temperature, humidity, and location for real-time tracking of food products, improving quality assurance and traceability.
2. **Mobile Application Integration**: Create user-friendly, multilingual mobile apps for farmers and NGO workers with features like offline data entry, real-time notifications, and QR code scanning.
3. **Use of AI and Predictive Analytics**: Apply artificial intelligence to forecast crop yields, detect inefficiencies, and optimize supply chain decisions for both food distribution and donations
4. **Expansion to Broader Stakeholders**: Extend the blockchain network to include e-commerce platforms, food certification bodies, local governments, and international NGOs for a more holistic system.
5. **Smart Contract Enhancements:** Improve smart contracts to handle automated payments, donations, and verification processes with increased flexibility and customization..

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