



A DIGITAL HARVEST: IMPACT OF BLOCK CHAIN TECHNOLOGY ON AGRICULTURE

Dhivya C*, Jayashree V and A. Monika

*Research Scholar, Department of Agricultural Extension and Rural Sociology,
Tamil Nadu Agricultural University, Coimbatore - 03.*

**Corresponding Author Mail ID: dhivya2908@gmail.com*

Introduction

Block chain technology is a decentralized digital ledger system used to securely record transactions across multiple computers. By leveraging its inherent characteristics of transparency, immutability, and decentralized control, block chain is poised to address numerous challenges faced by the agricultural sector. From enhancing supply chain traceability to ensuring fair trade practices, block chain's potential applications are vast and transformative.

Block chain technology offers numerous innovative solutions to the challenges faced by the agricultural sector. Its applications in enhancing supply chain transparency, automating transactions, improving access to financing, and promoting sustainability are just the beginning of what could be a significant transformation in agriculture. As the technology continues to evolve and become more accessible, its adoption in agriculture is likely to grow, bringing with it increased efficiency, transparency, and sustainability.

Significant Impact on Agriculture

1. Supply Chain Management

Block chain offers a safe, unchangeable record of transactions, which improves supply chain transparency. This ensures authenticity and lowers the possibility

of cheating by tracking the path taken by agricultural products from the farm to the consumer.

Example: Businesses such as **Walmart and Nestle** utilize IBM Food Trust to monitor the source of food items, enhancing food safety and cutting down on the number of days needed to track a product's history to just a few seconds.

2. Smart Contracts

Farmer, supplier, and buyer agreements are automated and enforced via smart contracts. These contracts eliminate the need for middlemen and guarantee on-time payments by executing when specific requirements are satisfied.

Example: Platforms like **AgriDigital** in Australia manages grain sales and storage using block chain technology, enabling real-time payment and settlement. This improves transaction efficiency and trust.

3. Agricultural Financing and Insurance

Block chain can make it easier for farmers to get insurance and credit. More accurate creditworthiness and risk assessment results from transparent production history and transaction data, which promote equitable lending and insurance practices.

Example: Block chain is being used by projects like **Etherisc** to provide crop insurance. Claims are automatically processed based on weather

data stored on the blockchain, which expedites the payout process.

4. Traceability and Food Safety

The utilization of block chain technology improves food safety and traceability by offering an unchanging, transparent record of food production. By checking the food's provenance and history, consumers can make sure it satisfies safety and quality requirements.

Example: TE-FOOD, the largest end to end food traceability solution in the world on block chain technology, tracks livestock from birth to slaughter, ensuring meat products are safe and authentic.

5. Sustainable Farming Practices

By certifying and documenting sustainable practices, block chain technology can advance sustainable agriculture. Farmers that apply environmentally friendly practices can certify their products using block chain technology, drawing in customers who are willing to pay more for sustainability.

Example: Ethiopia uses block chain technology to certify the sustainable production of coffee, enabling customers to track their coffee's origin and confirm sustainable methods.

6. Commodity Trading

Block chain technology offers a safe way to record transactions and confirm the legitimacy of commodities, which can improve the efficiency and transparency of commodity trade.

Example: Agricultural commodities may be traded transparently and efficiently on platforms like **GrainChain** thanks to the usage of block chain technology and IoT cloud based solution, which also lowers deception and fosters greater party confidence.

7. Land and Property Rights

It has the potential to create a secure and transparent record of property rights and land ownership, which can help to prevent disputes and guarantee that farmers are the rightful owners of their land.

Example: Block chain is being used by projects like **Bitland** in Ghana to register land titles, which eliminates ambiguity and gives a clear record of ownership.

Benefits of Block Chain Technology in Agriculture

- **Enhanced Transparency:** It offers an unchangeable and transparent record of all transactions and procedures.
- **Improved Efficiency:** Block chain streamlines processes, reducing costs and delays by automating transactions and eliminating the need for middlemen.
- **Increased Trust and Accountability:** All data is verifiable and secure according to the immutable nature of Block chain records, which boosts stakeholder trust.
- **Better Food Safety and Quality Control:** The rapid tracing of impacted products in the event of contamination or recalls, guaranteeing prompt and efficient action.
- **Eco-Friendly Certification:** Farmers may certify their products and draw in eco-aware consumers by using this technology to record and authenticate sustainable practices.

Conclusion:

In conclusion, block chain technology offers transformative benefits to the agricultural sector, addressing longstanding challenges

and creating new opportunities for efficiency, transparency, and sustainability. The automation of transactions through smart contracts streamlines operations, reduces costs, and minimizes delays, benefiting all stakeholders from farmers to consumers. Improved access to fair financial and insurance services empowers farmers, particularly smallholders, by providing transparent and accurate assessments of creditworthiness and risk. Additionally, it promotes sustainable farming practices by verifying and recording eco-friendly methods, helping farmers meet market demands for sustainably sourced products.

As block chain technology continues to evolve, its potential to revolutionize agriculture, ultimately contributing to a more resilient and trustworthy agricultural sector.