BLOCKCHAIN IN AGRI-FOOD: BUILDING TRUST AND ADOPTION THROUGH STAKEHOLDER ENGAGEMENT

A blog on the TRUSTyFOOD Project

24 NOVEMBER 2025

VU ATHENA INSTITUTE

BLOCKCHAIN IN AGRI-FOOD: BUILDING TRUST AND ADOPTION THROUGH STAKEHOLDER ENGAGEMENT

Author

Trust Saidi

Levi Kingfisher

Linda van de Burgwal

Contact

Linda van de Burgwal | l.h.m.vande.burgwal@vu.nl

About the Athena Institute

The Athena Institute at Vrije Universiteit Amsterdam addresses complex societal challenges through transdisciplinary and participatory approaches. Athena researchers develop methodologies that facilitate meaningful exchanges between scientific and non-scientific actors, enabling the integration of diverse perspectives into research and innovation processes. By actively involving stakeholders—from policymakers and professionals to citizens and communities—Athena facilitates collaborative action aimed at creating a more inclusive, healthy, and sustainable world.

Athena Institute
Faculty of Science
Vrije Universiteit (VU) Amsterdam
De Boelelaan 1085
1081 HV Amsterdam
The Netherlands

BLOCKCHAIN IN AGRI-FOOD: Building Trust and Adoption Through Stakeholder Engagement

Blockchain technology is heralded as a game-changer in the agri-food sector, with its potential to revolutionise transparency, sustainability and trust across complex, global supply chains. However, while its decentralised, immutable and secure architecture offers immense promise, the transformative potential of blockchain technology cannot be realised in isolation. A key ingredient is often overlooked: stakeholder engagement. Without the active involvement of all key players such as farmers, processors, retailers, regulators and consumers, blockchain risks becoming just another overhyped innovation that fails to deliver on its promises.

The big promise of blockchain in the agri-food systems

Blockchain's potential in the agri-food sector is vast. Its immutable records and decentralised nature offer unparalleled opportunities for creating trust among stakeholders. By providing real-time traceability and secure, tamper-proof data, blockchain can address some of the most pressing challenges in the food system, such as food fraud, inefficiencies in supply chains and lack of transparency in sustainability claims. For example, it can allow consumers to verify the origins of their food, ensuring that their purchases align with their values, whether that means prioritising organic, fair-trade or sustainably sourced products.

Moreover, blockchain has the potential to create fairer systems for farmers and producers. Through smart contracts, payments can be automated and distributed equitably, reducing delays and ensuring that small-scale producers receive fair remuneration. Additionally, blockchain can verify compliance with environmental standards, helping to promote sustainable practices and support certification schemes like organic, fair-trade or carbon-neutral labeling.

Despite these benefits, the question remains: why has not blockchain been widely adopted in the agri-food sector? The answer lies in the complexity of the technology and the agri- food system itself. Blockchain offers technological tools for transformation, but the challenges of integrating it into a highly fragmented and interconnected system are not technical alone but they are social, economic and political. This is where stakeholder engagement becomes critical.

Why is stakeholder engagement non-negotiable?

Blockchain adoption is not merely a matter of adding a new technology to the agri-food sector. It represents a systemic shift, requiring the alignment of diverse stakeholders with varying needs, priorities and levels of digital maturity. Farmers, suppliers, processors, logistics providers, retailers, regulators and consumers all play vital roles in the food system. Without their active participation, blockchain risks becoming a one-size-fits-all solution that fails to

address the nuanced challenges faced by each group. The TRUSTyFOOD project recognised this fundamental truth and adopted a participatory approach to blockchain adoption. Through sectoral working groups and local focus groups, the project engaged stakeholders at multiple levels to co-create a roadmap for blockchain integration in the agri-food sector. This collaborative approach ensured that diverse voices were heard, from smallholder farmers to policymakers, and that the solutions developed were grounded in real-world needs and challenges.

What stakeholders told us: Insights from TRUSTyFOOD project

In the beginning of the TRUSTyFOOD project, stakeholders participated in visioning workshops to imagine an ideal food system for the future, where blockchain plays a central role. Their collective aspirations included:

Vision	**What is it about?**
High-Quality Data Access	A decentralized system that ensures all stakeholders, from farmers to consumers, have access to accurate and reliable data.
Fair Compensation via Smart Contracts	Blockchain-enabled smart contracts that guarantee equitable remuneration for farmers and producers, eliminating middlemen and delays.
Verification of Sustainable Practices:	Blockchain as a tool to monitor and validate eco-friendly farming methods, promoting accountability and encouraging widespread adoption of sustainable practices.
Harmonized Global Regulations	A unified regulatory framework to simplify compliance and reduce barriers to cross-border food trade
Integration with Advanced Technologies	Combining blockchain with internet of things, sensors and artificial intelligence for real-time monitoring, predictive analytics and automation.

These visions painted a picture of what blockchain could achieve, a food system that is transparent, equitable and sustainable. However, these aspirations also highlighted the significant hurdles that need to be addressed to make this vision a reality.

Facing reality: barriers and drivers

Stakeholders identified a range of barriers that hinder blockchain adoption in the agri-food sector: The key ones are as follows:

- Data fragmentation: The lack of centralised, standardised and high-quality data across the sector is a significant challenge. Blockchain cannot function effectively without reliable and integrated data inputs.
- High implementation costs: The financial burden of setting up and maintaining blockchain systems, including infrastructure, training and ongoing maintenance, remains prohibitive for many small-scale farmers and producers.
- Regulatory uncertainty: The absence of clear, harmonised regulations across jurisdictions creates confusion and deters investment.

- Mistrust: Blockchain's association with speculative cryptocurrencies and non-fungible tokens has damaged its reputation, leading to skepticism among stakeholders.

Despite these barriers, stakeholders also identified key drivers that could accelerate blockchain adoption: These include the following.

- Consumer demand for sustainability: Increasingly, consumers seek transparency and ethical practices in the food they purchase. Blockchain's ability to provide verifiable information aligns with this trend.
- Trust and transparency: Blockchain's core features such as immutability, traceability, and data security make it a powerful tool for building trust among stakeholders.
- Farmer empowerment: Blockchain offers the potential for fair pricing, equitable benefit-sharing, and reduced reliance on intermediaries, empowering small-scale producers.
- Regulatory pressure: Growing demands for compliance with sustainability and food safety standards can drive blockchain adoption as a tool for meeting these requirements.

Co-creating solutions: strategies for adoption

The stakeholders proposed various strategies for overcoming the barriers in the adopting of blockchain in the agrifood sector while leveraging on the drivers. Three strategic priorities emerged from these discussions:

- Building trust through transparency and traceability: Trust is the cornerstone of blockchain's value proposition. Stakeholders emphasized the need for blockchain systems that deliver high-quality, reliable and accessible data while ensuring privacy and security.
- Making sustainability affordable and accessible: For blockchain to drive sustainable practices, it must be accompanied by financial incentives and accessible technologies. Policymakers and industry leaders must address the high costs of adoption, particularly for smallholders, through subsidies, grants or other mechanisms.
- Harmonising regulations for simplicity and consistency: A clear, harmonised regulatory framework is essential for blockchain adoption. This includes aligning regulations across jurisdictions to enable seamless cross-border trade and ensuring that blockchain standards are tailored to the specific needs of the agri-food sector.

A call to action

The TRUSTyFOOD project highlights a crucial lesson: Blockchain's potential to revolutionise the agri-food sector lies not just in its technology, but in the process of stakeholder engagement. This participatory approach ensures that blockchain solutions are aligned with the diverse needs of the food system's many actors. Without the voices of farmers, food processors, retailers, regulators and consumers, blockchain risks becoming yet another technological solution that fails to gain traction due to a lack of relevance and buy-in. To realise the transformative promise of blockchain, a collective effort is required: Policymakers should establish clear and harmonised regulations that provide a stable framework for blockchain adoption while addressing privacy, security and data ownership concerns. Industry leaders should invest in education, capacity-building and infrastructure to support farmers, SMEs, and other stakeholders in adopting blockchain. Researchers and innovators should prioritise co-

design and user-centric approaches, ensuring that blockchain solutions are developed with, rather than for, stakeholders. The future of food systems is not just digital, it is participatory, emphasizing collaboration, inclusion and transparency. Blockchain technology has the potential to transform the agri-food sector, but only if stakeholder engagement is firmly in place. By working together, we can build a food system that is not only smarter but also fairer and more sustainable for all.

REFERENCE

Kingfisher, L., Nguyen Thi, T. T., Lehtonen, S., Saidi, T., van de Burgwal, L., & Loeber, A. (2025). Tensions in stakeholder perspectives on blockchain technology in sustainable food system transformation. Frontiers in Blockchain, 8, 1569106.