Communicating digital agriculture innovations – a blockchain exchange

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Digital agriculture is the latest terminology used to describe tools used to digitally collect, store, analyze and share electronic data and information along agricultural value chains. It evolved from ICT4Agriculture, e-agriculture, and smart farming and includes notions like precision agriculture and e-extension.

In a shift from the past, digital agriculture projects – even where digital is at the core – now focus their communication and outreach activities on wider outcomes, largely avoiding technical details on specific tools or interventions. Doing this well poses challenge to communicators, researchers and project managers. This note shares some insights gained as part of a recent CTA dialogue around three pilot blockchain in agriculture projects.

For more than 20 years, CTA and other organizations invested in activities to support digital ICT innovations and applications to transform agriculture and rural development. After widespread testing, piloting, communicating and disseminating the approaches and tools that work, today we see digital tools and solutions widely applied and, in some cases, becoming routine[1].

Over time, we can observe an evolution in the ways these innovations are communicated. In the early days, stories and reports – and conferences – focused on the different tools and technologies, describing what they did and how they could be used[2]. Nowadays, the digital elements, while still important, are less prominent as reporters emphasize the outcomes that ICTs contribute to.

In recent months, CTA facilitated a dialogue among researchers, managers and diverse communication experts to explore strategies and approaches to communicating a still novel ICT application – blockchain.

CTAs blockchain4Ag project aims to:
- **Promote** agricultural value chain engagements and use of digital technologies in the agricultural sector.
- **Educate** financial institutions, businesses, start-ups, and policymakers, about blockchain.
- **Test blockchain** solutions by working closely with leading country-level outgrower and agricultural finance schemes.
- **Support developers** and startups to engage in the blockchain space, create actionable training programs, massive online open courses and training of trainer activities.
- **Develop ecosystems** promoting blockchain in agriculture in Africa, the Caribbean and Pacific countries.

As part of its B4Ag project (see box), CTA recently supported 4 projects that aim to test and develop proof of concept blockchain solutions in developing country agri-food systems. In April and May

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[1] Email, the Internet, laptops, video, radio, satellites, GIS, web 2.0 and social media and even DVD technologies were among the digital tools promoted over the years.

[2] See for example the hundreds of articles published in CTA's *ICT Update* magazine over the past 18 years: https://cgspace.cgiar.org/handle/10568/51822

2020, the project teams joined up with a group of communication experts to look at ways to capitalize learning and communication around the projects[3].

This activity had two main elements: First, a 'blockchain to blockchain' exchange on the different project experiences and their plans and, second, a communication assessment exercise among three of the projects to rapidly examine their communication challenges and priorities. The whole activity was conducted digitally due to limitations imposed by the COVID-19 pandemic.

Blockchain exchange

Phase one was an exchange among the CTA-supported blockchain projects:

- Blockchain-based vegetable traceability pilot in Trinidad and Tobago; led by the Caribbean Agribusiness Development Company (CADCO).
- Using blockchain-distributed systems to deploy spatial risk indicators for coffee supply chain management in Uganda; led by the International Center for Tropical Agriculture (CIAT).
- Blockchain technology for cocoa farming of quality and excellence: towards reward, trust, transparency and traceability from farmers to consumers; led by Bioversity International.

> About blockchain
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> Blockchain is a digital ledger that provides data storage and exchange through a secure, decentralised platform, enhancing transparency, traceability and trust.
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> By cutting out intermediaries and automating agreements, blockchain offers novel ways to manage supply and other chains, connecting growers to consumers and all actors along the way.

The **Trinidad and Tobago vegetable project** brings together 5 stakeholders in the chain: vegetable producers, WOODSMAN CARIBBEAN LTD - a food processing and distribution company, H2K Agro - an organic agricultural inputs production company; NAMDEVCO - a government owned agricultural market development organization, and PRICESMART Inc - a large membership retail club serving consumers. The project is led by a regional Agribusiness Development Company (CADCO) and uses a blockchain solution provided by TE-FOOD in Germany. The project aims to increase confidence of consumers and value chain actors in the vegetable products as well as the competitiveness of the enterprise (Woodsman) mediating between the various groups.

Through the project, Woodsman provides organic production technology, blockchain-based software, and operational methods and processes to ensure that all value chain partners have access to unchangeable data and information on the history of the production process: the sourcing of raw materials, handling and processing, allowing the partners and consumers to view the immutable data and information, thereby creating transparency, verification and confidence in the products. Its main selling point: A safe and secure traceable single or multi-ingredient agri-food production system OR Proven healthy and safe home-delivered food, traceable to the very seedlings with the help of blockchain.

Driven by continuing risks to value chain actors, the **Uganda coffee project** offers a system called the 'Metrix' that brings together an informal data-sharing consortium of diverse and competing private sector value-chain actors and researchers. The Metrix enables its members to improve their

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[3] Read a brief write-up and reflection on the process by Ewen Le Borgne:
https://agilefacil.wordpress.com/2020/05/21/what-trust-experience-and-a-bit-of-failing-forward-can-do

understanding of various risks by *combining insights from their own data with other data sources through a safe Blockchain technology*. Any organization generating or curating farm level data can exploit the Metrix to make risks more visible and thus easier to understand and manage. Most important, it helps reduce farmers' risks by having spatial aggregated risk indicators guide the services they can benefit from.

Led by CIAT, it uses a blockchain to reinforce trust, transparency and traceability allowing members to share data secure in the knowledge it won't be abused. Its main selling point: An unhackable solution that combines multi-data-sources to show up risks to each participating actor of the Coffee Value Chain. It delivers improved insights on risks by combining stakeholders' data with other data sources. Improved insights lead to smarter interventions and benefits to the whole chain

The **cocoa project** works with value chain partners in Sierra Leone and Trinidad and Tobago, using blockchain technology to support and promote quality products that consumers will value – and buy. The technology is used to address some of the key challenges in the value chain, including: a lack of financial resources to invest in good agricultural practices, limited contractual power and access to price information, limited communication with other key players of the value chain, and low transparency for consumers who want to know more about the origins of the chocolate product.

Led by Bioversity International, it brings together the Cocoa Development Company of Trinidad and Tobago Limited, the Produce Monitoring Board of Sierra Leone, the Cocoa of Excellence programme and the International Cocoa Awards. The blockchain solution is provided by AgUnity. Its main selling point: For cocoa producers, buyers, chocolate makers and consumers seeking transparency and traceability of cocoa origin, quality and price, the solution provides the tools and on-line platform to securely access information so transactions can be made efficiently and value communicated to all value chain actors, creating direct connections between producers and consumers.

Beyond these projects, the Blockchain for Agriculture initiative supports the Agritrust portal containing information and cases from more than 50 applications as well as a dialogue platform led by Fairfood. From these activities and projects, blockchain technology can be seen to add value in different nodes of agricultural value chains (see figure 1).
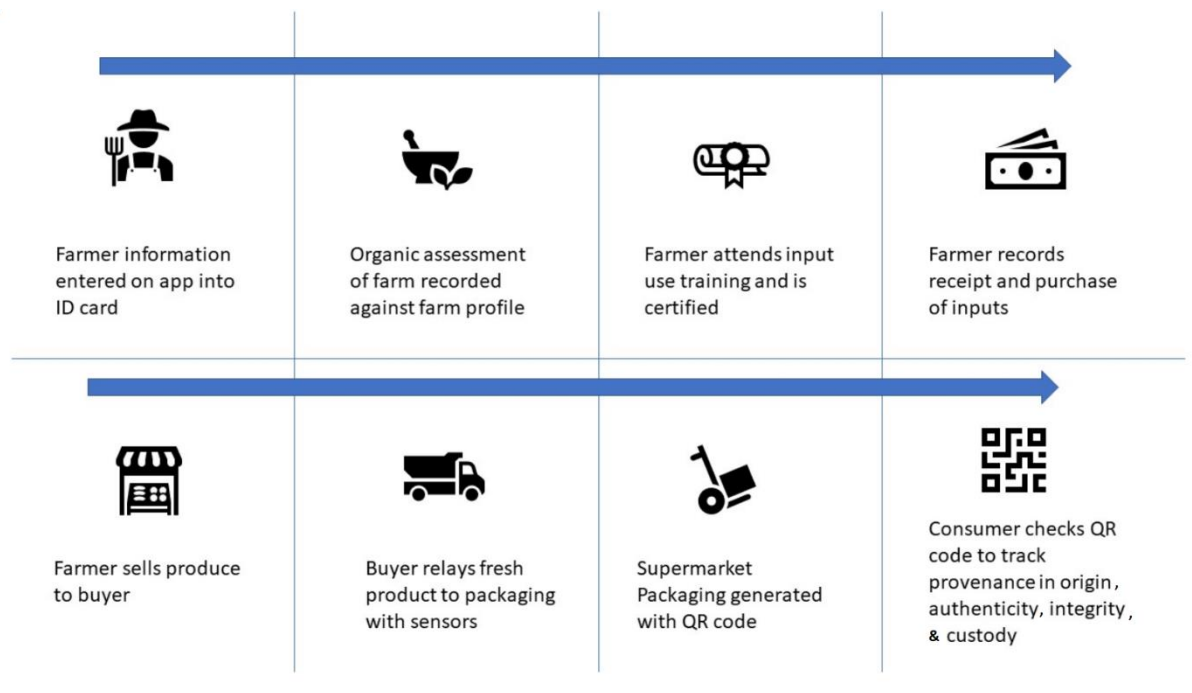
Figure 1: Example showing where blockchain is applied in a value chain

Blockchain is used in ID systems. Sometimes farmers control these through smartphone apps; in other cases, farmers are issued with IDs though farmers' associations. Certification of product characteristics such as being organic, for carbon offsets, labour use and fair trade may also be recorded on the blockchain. Some certification systems include training where the proof of completion is recorded on the blockchain. Input use and associated transactions by farmers may be further recorded on the blockchain. Several applications record transactions between farmers and buyers. Sensors may be used to record how products are treated during from farm to fork. Thus, evidence of a working cold chain is maintained by recording temperature from an automated sensor which logs temperature readings on the blockchain. At the product packers, QR codes or RFID tags are added and automated scanners can record the local logistics of the final product. Finally, consumers may be able to access a mobile application allowing them to view some or all of these transactions from farm to fork, reinforcing their trust in the product.

While enhanced traceability can also be achieved through other database-driven approaches, compared to blockchains, these tend to be less effective in distributing value and empowering farmers and farmer organisations.

Communicating blockchain projects

Phase 2 drew on the blockchain exchange by pairing each of the 3 projects with a small group of communication experts. Their task was to pin down the project essentials from a communication perspective, identifying priority messages, audiences and strategies to take forward the project results (after about a year of activity). Extrapolating from the blockchain projects, participants also explored what priority digital agriculture pitches for specific audiences such as agribusiness entrepreneurs, investors and digital innovators would look like.

What communication goals/objectives do the projects have? At this phase of their development, each of the projects has a tested proof of concept they are keen to extend. The key goals they identified for communication included:

- Grow consumer demand for the product (vegetables)
- Identify partner development agents to expand the product to new markets (vegetables)

- Promote the added value of the blockchain to farmers and value chain actors essential to deliver the project (vegetables)
- Explain project goals and expected outcomes to potential investors, donors and partners for scaling up (coffee)
- Attract companies with farm-level data to join the project (coffee)
- Show how using the project and its blockchain technology actually reduces risks in a target value chain (coffee)
- Inspire other organizations and projects seeking to transform agribusiness or exploit blockchain technology (coffee)
- Reinforce the project's operations by communicating in a simple language with the target stakeholders (coffee)
- Demonstrate the benefits of project participation to (potential) value chain participants: Increased control over quality; transparent and efficient transactions; quality recognition; brand awareness by consumers (cocoa)

To attract customers, contributors, funds and partners, the projects identified several key actors they need to engage, including:

1. **Consumers** are critical direct target audiences for the vegetable and cocoa projects, both of whom offer trusted quality products. Both projects need consumers to buy into the value proposition that the farm to plate chains can be relied on to deliver safe, high quality food.
2. **Value chain agribusiness** and other actors are critical nodes in all three projects and they are expected to implement improved practices and derive business benefits from the blockchain-based platforms. All projects require these businesses to understand the blockchain technology, see the benefits and to adjust their operations to exploit it. For the Uganda coffee project, these actors are expected to buy into a data-sharing model that safeguards their contributions while extending their analytical capabilities.
3. **Public development agencies** are a key audience for the vegetables project, tasked to promote the products to new markets, thus strengthening and benefitting the value chain and the producers.
4. **Donors** who appreciate the benefits of the project and want to pay for them to continue and be expanded are important to the coffee project. Unlikely themselves to contribute data into the system, these funders need to see how the project outputs enhance agribusiness efficiency and ultimately provide better services for producers and farmers.
5. **Producer cooperatives and associations** at the interface between supply chains and producers are important to the coffee project. They may be able to contribute data to the project's shared network and they consume and translate the project's outputs so farmers can benefit. They need to be convinced that the project can be trusted with their members' data and of the relevance of the project outputs.
6. **Producers** are key actors in the vegetable and cocoa projects, expected to take up the various interventions, improve their practices and benefit from the enhanced markets for their certified products that the project facilitates.

Other audiences include media, researchers and academia, public bodies as well as ICT entrepreneurs and companies able to promote and support digital solutions.

Looking forward, some of the **communication pathways** identified for the projects are:

- Blockchain 'explainer' video and other materials for value chain actors that show how it saves money, secures data and trust, and leads to specific outputs. These could combine elements of storytelling and testimonials from different actors. Intended to convince and

reassure potential project contributors and partners about the project. May be used also to engage ICT and digital companies that often work with target actors in other capacities.

- Project concept notes with value propositions, initial evidence and pilot outcomes so potential funders and donors will invest. Focusing on innovation, potential for scale and development returns.
- Project and technology stories, articles and other engagements with media and journalists, helping them understand the different dimensions and, ultimately, working with and through them to raise awareness and interest more broadly.
- Research and academic presentations and articles to share and validate insights and lessons, attract partners to contribute and perhaps to inspire similar projects elsewhere.
- Face to face meetings, training and other events to engage producers, farmers, extension, governments and other stakeholders; showing and explaining the project and its elements to diverse partners likely to contribute to or extend the project.
- More general project updates and information sharing on social media, organizational websites and the like, reaching diverse groups.
- Promotion and publicity materials – online, social media, in-store, etc – for consumers, encouraging them to buy the trusted products with confidence. These may be delivered through consumer-facing associations, clubs or high-profile activities reaching specific consumer segments.
- Multimedia storytelling for different audiences and levels is a promising way to explain the key attributes and benefits of the projects and to overcome any worries around the digital platforms used.

Reflections – what did we learn?

In the projects we worked with, the technology – blockchain – is fundamental to improving trust, shared value, traceability and transparency in the different value chains. However, in discussions it was almost always in the background. For the immediate project goals we worked with, communicating to increase understanding or explaining blockchain was not the top priority.

Instead, the business and development benefits and outcomes, operational efficiencies, stronger relationships and new capabilities were the value propositions likely to attract organizations to join, finance and contribute to the projects. This applies as much to agri-entrepreneurs as to donors: The projects are not so much selling blockchain technology as the potential of the projects to benefit the business, sector or target beneficiaries.

Where a priority audience has a technology interest, it is useful to more clearly differentiate blockchain applications from other tools like databases that can do some of the same traceability tasks as blockchains. In particular, the value sharing that blockchains offer is a significant extra benefit over standard databases.

Media is both an audience and a pathway to reach other audiences. In the current phase, engaging media is an important way to raise general awareness on the projects. Later, they can be a channel to reach many key audiences, contributing to promoting and explaining project value propositions to different stakeholders. It is important that journalists are able to understand the issues the project deals with and, perhaps how technology contributes to these. This enables them to effectively communicate on to their audiences.

As part of a monitoring and evaluation plan, it is essential to collect relevant data to understand and assess project impact. Assessing the impacts of the technology is more difficult as such distributed

ledger technologies or blockchains provide 'trust' outcomes and benefits that are difficult to quantify and measure and use as evidence to communicate success. In such projects, showing direct links between use of a blockchain and a project's outcomes or impacts is difficult.

For such projects, it is useful to consider the diverse 'personas' of the various target audiences and stakeholders, setting out how they judge success and what levels of understanding of project business models and technology platforms they really need. As the main benefits of distributed ledger technology and blockchain to value chains are trust, security, immutability, transparency and coordination,[4] it is not enough to just demonstrate economic returns on investments. The contributions these systems make to inclusion, shared value, data protection, development goals and adherence to the principles for digital development are just as important.

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