BEYOND THE BLOCKCHAIN

Out-of-the-box thinking by agri-companies,
development cooperations and tech startups
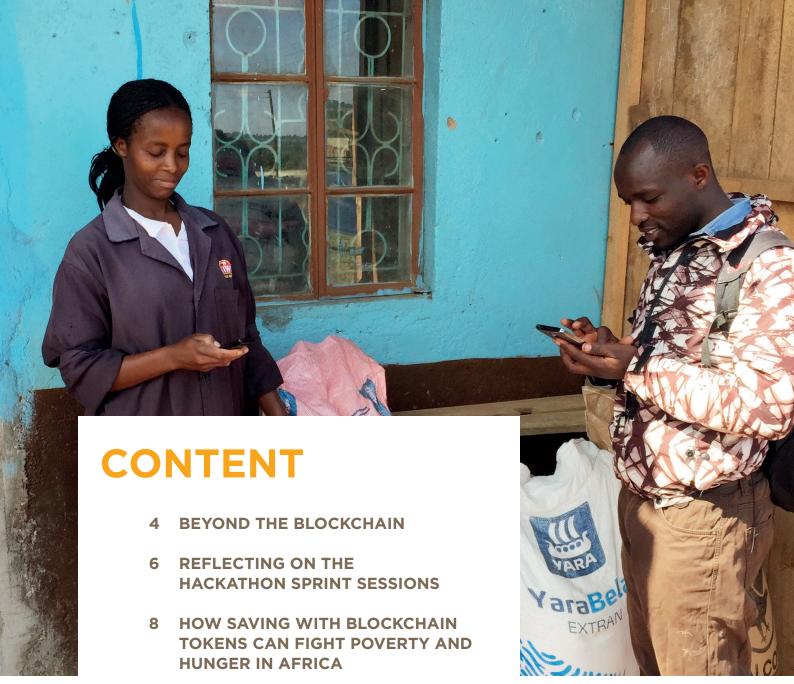
AGRI TERRA

FOR COOPERATIVES

INTRODUCTION

In the third edition of the Mauritshuis conventions, Agriterra brought together companies concerned with farmers' organisations and cooperatives. Our goal was to show the business opportunities that family farmers in developing countries have to offer. Across Asia, Africa and Latin America, many small-scale farmers are facing a reduced volume of production. Building strong chains with cooperatives, like we did with seed and sourcing companies, can help us solve this problem.

Technological developments like blockchains are increasingly helpful to involve small-scale farmers. However, scaling up the many available, successfully piloted solutions, for phytosanitary assistance or digital payments for example, is hindered by the costs. Not to mention access to (phone) connectivity and digital literacy skills. *'We think the answer lies in involving the whole value chain in a common production plan and bundling their solutions, as well as involving the farmers themselves.'* We need to earn the farmers' trust, to show them there are financial opportunities for them. And we need ambitious cooperatives to lead the way.

This magazine offers concrete examples where Agriterra can add value: from involving farmers in the development of new internet applications, train and advise farmers on subjects such as connectivity, digital literacy skills, privacy and data ownership. We also explore how farmers can be involved in the development of applications for the Internet of Things – an opportunity for farmers to start a movement to put farmers' interests first. Through out-of-the-box thinking by agri-companies, development cooperations and tech startups, Agriterra is setting the stage for a new phase in our 'Small farmers, big deal' campaign.

Kees Blokland, Agriterra

CONTENT

WHAT IS A BLOCKCHAIN?

A blockchain is a database with four important characteristics:
1. The blockchain is open to all contributors;
2. Data in the blockchain cannot be altered once the data is entered;
3. Data is distributed evenly without one particular controller and
4. Everyone has access to the same information.
The whole blockchain system is built around trusting computational power. The system shows where data comes from and who the owner of that specific data is – that's the key. This allows the participants to verify and audit transactions inexpensively and creates interesting possibilities for agriculture and transparency in supply chains.

BEYOND THE BLOCKCHAIN

On Monday 14 May, Agriterra organised the third edition of the Mauritshuis Convention in The Hague. Food specialists, tech developers, farmers, NGOs, startups, retailers and government representatives gathered to explore the area of blockchain technology. It was a chance to share knowledge, explore opportunities and make an effort to strengthen the connection between the agricultural and tech sectors.

Connecting farmers and technology

Helen Kranstauber, founder of Food Cabinet and moderator of the event, opened the event by advocating for conversation and transparency as the necessary ingredients to connect the two worlds. Next, Kees Blokland, director and founder of Agriterra, was invited on stage, where he stressed the urgency of the event and explained Agriterra's role in it: 'Agriterra facilitates partnerships between Dutch businesses and farmer cooperatives. We advise, train and exchange.'

Establishing a connection and good communication with farmers in developing countries is challenging and requires lots of paperwork and handwork to get data into the system. Reducing these costs is very important.'

There are many applications that can be used at a pilot level, but taking it to the next level requires larger budgets. Blokland advocates for a business-driven approach: *'We would like to develop an applied blockchain project, bringing all parties in a chain together in one business case to build one technology package of different services for farmers.'*

One simple application

Next, Hans Docter, Director of Sustainable Economic Development in the Dutch Ministry of Foreign Affairs, explained how the power of technology and innovation has been placed centre stage. 'It is a powerful tool for development. Administrative assistance, for example, previously involved many people and lots of paperwork, but now can be executed using one simple mobile application.'

Docter noted that the agricultural sector has been slightly affected by technological developments like this, but farmers still don't have enough access to smart technologies, especially in developing countries. 'Inclusion and fairness are important when reducing poverty. Technology and blockchain systems can make a difference!'

You snooze, you lose

After these interesting insights, the Fountainheads took us on a quick theatrical journey exploring the future and all the technological opportunities that lie ahead. Times are changing and it is up to you whether you embrace the unknown or continue your business as usual. 'Take calculated risks and start today. You snooze you lose, so get up and move.'

All about transparency

Michaël Wilde, Sustainability & Communications Manager at Eosta, and Marieke de Ruyter de Wildt, founder of The Fork, discussed what blockchain technology means to them. It is clear that blockchain technology is complex and takes time to implement. Important questions still have to be answered.

What about privacy? Who owns the data entered in the blockchain? And is the instrument solely meant to build trust? According to Wilde, 'We face a huge number of environmental and social challenges in our journey towards a more sustainable food system. We need to consider them in every business choice we make. Besides, there is no sustainability without transparency.' And, luckily, transparency is what blockchain is all about, Wilde said. 'That's why we are particularly interested in going down this road.'

De Ruyter de Wildt chimed in to help define what exactly a blockchain is – according to her, a database with four characteristics: it is open, cannot be altered, distributed evenly without one particular controller and gives everyone access to the same information. 'The whole blockchain system is built around, not trusting each other, but trusting computational power. The system shows where data comes from and who the owner of that specific data is – that's the key. Working with blockchain layers shows that you, as a brand or organisation, have nothing to hide.'

'There is no sustainability without transparency.'

Michaël Wilde
Sustainability & Communications
Management at Eosta

REFLECTING ON THE HACKATHON SPRINT SESSIONS

Throughout the day it became clear that blockchain technology brings many challenges, but also opportunities. Start experimenting and keep it simple. That is exactly what the attendees did during the sprint sessions. In three groups the professionals explored the link between blockchain technology and the world of coffee, potatoes and fruits & vegetables.

Can we put coffee in the blockchain?

'The longer the chain, the more complex and wasteful,' Marten van Gils of Fairfood began his sprint session. This is also the case in the food industry, which accounts for 1/3 of all energy consumption in the world. How do you make a sustainable choice when you have no idea what you are consuming or where your food comes from?

'It is our belief and experience that blockchains help establish trust in chains again.' Fairfood's blockchain system maps and records the journey of a thousand coconuts. Each coconut was sold with a code the customer could use to learn about the entire production process. The result: a transparent and traceable chain and liveable wages for small farmers. The perfect pilot, encouraging the creation an open-source, Wordpress-like blockchain toolkit.

'We discussed the added value, the functionality and conditions for such an open-source toolkit, using the coffee market as an example,' Van Gils shared. 'Time-saving was considered most valuable. However, throwing all the data on one pile is not enough. The most important functionality was the ability to analyse the data and provide insights.'

Van Gils concluded, 'Everyone seems to want an open-source code, but what about competitors? Is everyone willing to cooperate? Events like this are refreshing, confronting and informative. They help you look at your project from a different perspective.' He emphasised the need to keep exploring, especially in the areas of time efficiency and tokenisation applications.

New technologies for African potato farmers

In the third sprint session, attendees explored the question: how can new technologies be implemented to help small potato farmers quadruple their harvest? Ad Rietberg helped the participants dig into the subject by sharing his own business case, the Agri-wallet. An innovative mobile application that allows small farmers to save, borrow and pay for income-generating activities to increase food security and fight poverty. The group agreed that all stakeholders should invest, especially the farmer. They must always be the ones with real ownership in the chain. However, covering and including all farmers at once is not the way to go. Better to start with the more innovative and advanced farmers.

While Rietberg left the sprint feeling positive about the discussion, he stresses that there are still questions to answer: How can we link the the food industry's biggest problems, such as poverty and food security, with social-development goals? He hopes that parties from different disciplines can continue to meet each other, expand their network and share what they are doing with blockchain technology.

True Cost Accounting

In the past, consumers behaved more like loyal Labradors, willing to do anything you asked. Today they are more like cats: critical and unpredictable. Modern consumers need to understand the true costs of food to make informed decisions. But how can you calculate environmental impact? Social costs? And how can blockchain technology be of any use? This is what Michaël Wilde, Sustainability & Communications Manager at Eosta, explored during the 'True Cost Accounting' sprint session.

The conclusion of this session: use the information that is already there. For example, there is a foundation that keeps track of water usage in certain areas. Use this information and link this to your pricing. Wilde plans to continue Eosta's work with blockchain technology: 'We will most likely collaborate with blockchain partners or IT specialists and link our world of sustainable trading with social aspects in a blockchain system.'

LET'S CONTINUE

The general consensus was that the third edition of the Mauritshuis Convention was a success and opened many eyes. Cees van Rij, manager agri-advice Agriterra, hopes this meet-up will lead to something bigger. 'Today gave me a better understanding of what "blockchain" means and how you can combine it with your own field of work. This topic can really help those who want to participate in creating a meaningful food chain.' His final message: 'Let's keep going and bring all parties together to really make it happen.'

HOW SAVING WITH BLOCKCHAIN TOKENS CAN FIGHT POVERTY AND HUNGER IN AFRICA

Around 1,000 small farmers in Kenya currently use the new mobile payment system Agri-wallet. The technology provides farmers in emerging economies with an innovative, fast, secure and almost free way to access a global payment system via their mobile phone. Does this mobile bank account offer a way to end poverty and hunger in Africa?

In Africa, much of the food supply comes from hundreds of millions of small farmers, but the majority of these farmers do not have enough money to invest in good seeds, fertilizer and equipment, leading to hunger and poverty. The Dutch company Dodore wants to make a definitive change with their Agri-wallet blockchain technology. Agri-wallet gives farmers direct access to finance and allows them to save tokens (vouchers) that can only be spent on farm inputs, such as seeds and fertilizer. These investments can help farmers increase their yield by up to 600%. Agri-wallet is an initiative of fintech company Dodore. We spoke with co-founder Ad Rietberg to learn more.

'Saving for better agricultural inputs can make a huge difference: the use of better seeds and fertilizer can increase the yield of the average Kenyan farmer by 300%.'

Ad Rietberg
Founder of COIN22 and
Agri-wallet

'The seed for Agri-wallet was planted in 2010 when I saw with my own eyes that MPESA's mobile money was the changing the lives of people in Kenya. Bank accounts were not accessible to everyone, but mobile transactions meant that not everything had to be done with cash. This really changed people's lives. Anno 2018, these mobile transactions account for 25% of the Kenyan gross national product.'

Mobile wallet

'Agri-wallet works as a mobile wallet with a virtual currency based on blockchain technology. Between 10 and 20 percent of the farmers' income is paid out via farmers' cooperatives on a "savings account" via their mobile phone. This paying and saving is done in blockchain tokens that farmers can only spend with affiliated suppliers of farm products, such as seeds and fertilizer. This is important, because it is very difficult for small farmers to save money. They often get paid little and, if there is any money left, there are no separate business accounts to set aside funds for the farm. In addition, farmers often get into trouble taking out farm loans from local lenders. In practice, this loan is often not spent on the farm, but on personal expenses, which only creates more debt. Because it is not possible to spend funds in the Agri-wallet on private consumption, it is primarily a tool to enforce

financial discipline – similar to pension or insurance premium contributions.'

'Saving for better agricultural inputs can make a huge difference: the use of better seeds and fertilizer can increase the yield of the average Kenyan farmer by 300%. In combination with better knowledge, irrigation systems and pesticides, the yield can increase by 600%. To give a concrete example: with the use of good fertilizer, 600 kilos of yield can become 2,000 kilos, which is a huge profit! Farmers with Agri-wallet also have much easier access to financing via a worldwide network of investors. If they haven't saved enough, they can, for example, apply for a loan through the Rabobank Foundation.'

'Agri-wallet is now being rolled out to 1,000 active farmers in Kenya's potato sector, who have successfully completed their first transactions. To further implement the technology, we need to win the farmers' confidence. To this end this we work with organisations that already do a lot with cooperatives and buyers. For example, we received a subsidy from IFDC in combination with 2SCALE. Agriterra is also an important partner, with their specialisation in cooperatives they can provide us with valuable information about the organisation: is the cooperative well organised, are they open to improvement? Agriterra is very

good at those assessments, which helps us implement the technology in the right places.' 'We first want to make sure Agri-wallet is well established in Kenya. Next year we hope 100,000 farmers will be using it, and that the technology will also be integrated with local banks. Ultimately, we want to ensure we can apply Agri-wallet in multiple countries.'

Future plans
'If the technology is successful, there are many opportunities for further development. The data collected by this technology can help farmers optimise their production. For example, to better understand the best price-quality ratio for seeds or the perfect harvest time. The expectation is that, within five years, 90% of farmers will have a smartphone, and with this app they can collect, analyse and provide more data.'

'Another option is the development of other financial services such as crop insurance, which gives farmers more security. In the future, we also want to look at collaborations with Dutch parties, for example important seed companies that can supply seeds with better yields, fewer diseases and better resistance to drought. These parties must also see the potential to open up a very large market. A partner like Agriterra is very valuable in this. We understand the flow of money, but Agriterra understands agriculture even better and has insight into what else is needed to make an impact.'

'Meanwhile, Agri-wallet can help smallholder farmers secure a stronger position, helping to solve two hugely important Sustainable Development Goals: ending poverty and hunger.'

THE REVOLUTIONARY POTENTIAL OF THE INTERNET OF THINGS

A smart web of connected devices allows for an unprecedented level of control and automated decision-making. The project Internet of Food & Farm 2020 (IoF2020) explores the potential of Internet of Things (IoT) technologies for the European food and farming industry.

'Farmers really need to be heard, to maintain control over their own data.'

Sjaak Wolfert
Senior Scientist Data Science
& Information Management
in Agri-Food - Wageningen
University & Research

The goal is ambitious: to make precision farming a reality and to take a vital step towards a more sustainable food value chain, with higher yields and better quality produce. To break free of pesticides, improve efficiency, and increase safety through traceability we have to involve the farmers, advise and train them. Researcher Sjaak Wolfert explains.

'The Internet of Things has a lot of potential for monitoring, planning and controlling processes in agriculture, and thereby improving them. Think of moisture sensors in the soil that are connected to irrigation devices, so that the farmer doesn't need to be involved in the decision of when to irrigate crops. Many new technologies have been introduced to the agricultural chain in recent years, from sensors that monitor soil temperature to computer-controlled feeding systems for cows. There is a lot of potential, but it is still relatively expensive. We need to invest in development and infrastructure to better translate the data and knowledge models we have available into the effective interventions. There are also obstacles related to availability, the security and privacy of data and the governance thereof. Fortunately, we are working hard on new designs and innovations in connecting and translating data, so application-oriented solutions are getting closer.'

'With IoF2020 we are focused on innovative action. We're applying existing models while working on these barriers. In our pilots, we tackle technical and organisational problems and work together on solutions. Both developers and communication experts as well as the end users are involved in this process. This ensures direct feedback, shows where there are opportunities for financing and generates technical insights for users. We're working with a lead time of 4 years, and after 1 year a product is delivered. Our pilots have just started. Our first success is an Internet of Things Catalogue, containing all the technical components and how these can be linked to a practical case.'

'Farmers really need to be heard, to maintain control over their own data. This type of development gives farmers the opportunity to start a counter-movement against the "big agribusiness players", who do not always put the interests of the farmers first. Ultimately, the IoT applications will also seep to farmers in emerging countries. This is why it is important to involve farmers in the development of IoT applications, to advise them, to train them and to help them make choices. It would be nice if the adoption of IoT has taken a flight in five years and, for example, four or five of our 19 pilots have been widely adopted by partners in agribusiness. But, even then, we will still need further development and to speed up the adoption of IoT to ensure sufficient safe and healthy food and an innovative and strong agrisector.'

Are you curious to read and see more about the Internet of Things? Have a look at the IoT catalogue at iot-catalogue.com

'We focus on some key example issues and inform policy on digitalisation for agriculture.'

Chris Addison
Senior programme coordinator
Data4Ag at the Technical Centre
for Agricultural and Rural
Co-operation (CTA)

CTA, the Technical Centre for Agricultural and Rural Cooperation, believes that we have to invest in the right innovations to catalyse development. CTA's mission is to advance food security, resilience and inclusive economic growth in Africa, the Caribbean and the Pacific through innovations in sustainable agriculture. We spoke with Chris Addison, Senior programme coordinator Data4Ag at CTA.

PRECISION AGRICULTURE FOR SMALLHOLDER FARMERS

'Over the last five years, CTA has focused especially on the question of whether precision agriculture with new technologies is relevant to smallholder farmers. The digitalisation of agriculture offers smallholder farmers new ways to improve their livelihoods. But there is a lot of room to improve the efficiency of the value chain. There are enormous implications for productivity, logistics, reduction of food waste and even gender equity, and CTA is now considered a guiding force in this area.'

'The first step is farmer registration and profiling. With registration and the mapping of fields and holdings, you can geo-locate a farmer and find a telephone number to communicate with them. The farmers can improve how they organise input, such as fertilizer, and see the effect on yields. Logistics can be improved through better structures for storage and collection points. By mapping holdings, farmers can look at new opportunities for certification as well as, for example, show the origin of particular coffee beans and create new markets and sell to different countries.'

'We need to establish priorities, to decide exactly what kind of services need development support and develop policies around those decisions. Very often there are different developments going on at the same time, and it's not clear where the priorities lie. We are focused on catalysing development, so the idea is to really focus on some key example issues and to inform policy on digitalisation for agriculture.'

'We have different challenges in different areas. The number one constraint to digitalisation is inclusion: the access to (phone) connectivity and digital literacy skills. Another challenge is privacy and data rights. We have been working with farmers organisations and others to clarify the data rights of smallholder farmers. Our goal is to make it clear how data is going to be used; data ownership is very important. These are subjects Agriterra could work on.'

'The interesting part about blockchain in particular is that you don't need a trust party; there's no big overhead to make trusted transactions. Blockchains are great for transferring value (finance, crops, products). We're researching if you can wire the smallholder farmers together to help them better support themselves, rather than having to involve big corporations. But the new systems still need a lot of maintenance and management, and need keep developing all the time to keep up with the newest technology. However, there are already opportunities to make transfers without big banking and finance infrastructures. That's a good start. The challenge is to deliver these solutions to the farmers who need them the most.'

AGRI
TERRA

AGRITERRA.ORG

SMALL FARMERS
BIG DEAL
Do business with farmer
cooperatives worldwide

BILL&MELINDA
GATES foundation