Opportunities of Blockchain for Agriculture

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On 15th May 2019, CTA organised the 55th Brussels Development Briefing – part of a series of bi-monthly Development Briefings on ACP-EU rural and agricultural issues. Around 160 participants gathered in Brussels to discuss the progress on implementation of the Sustainable Development Goals, specifically in relation to sustainable agriculture and SDG2.

Opportunities of Blockchain for Agriculture

This Briefing looked at the opportunities and challenges of Blockchain technology for agriculture and the food system and new opportunities which can benefit smallholders, particularly with the private sector, and adoption of the whole food systems approach, including a stronger consideration of the tradeoffs which need to be made. Policies are important as well as awareness and knowledge sharing about the technology and its implications.

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- CTA
- European Commission (DG Europeaid)
- ACP Secretariat
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Isolina Boto

Patrick Gomes

Isolina Boto, Manager of the CTA Brussels Office and Coordinator of the Brussels Briefings, welcomed all participants and online followers and panellists and thanked the co-organisers, especially BMZ supporting technically and financially this Briefing. In introducing the Briefing, she referred to the complexity of the topic which is very technical and wide but extremely interesting. As shown by the mapping done by GIZ, blockchain technology applies to a wide range of areas, from heath, education, identity, humanitarian aid, all in fine important for agriculture. However, she added that we could only focus on some areas and only partially due to the complexity of the issue and look especially into the supply chain, traceability issues, finance, governance and legal aspects. Looking at the challenges and opportunities that this technology brings is crucial, and in this context, she acknowledged the presence of some big companies (Cargill and IBM) which already apply Blockchain at a significant scale. She also reminded that for CTA it is important

to share lessons learned and best practices that could to be brought to scale in Africa, Caribbean and Pacific and develop new partnerships in this technology. She also encouraged participants to provide input to the Reader.

Patrick Gomes, Secretary-General of the ACP Secretariat, welcomed the participation of ACP Ambassadors and technical staff. He stressed the usefulness and success of the Briefings which are a flagship and should be institutionalised as a platform on south-south and triangular cooperation and exchange. He confirmed that the ACP Group is very proud to be a facilitator and catalyst to enhance meaningful exchanges benefiting the countries. It is very important to look at the opportunities Blockchain brings to producers and to all actors in the chain. Innovation must support the entire farming system and the benefits need to be shared along the chain. He referred to some areas and examples where the Blockchain technology could bring benefits such as the traceability in the forestry

Wim Olthof

Andreas Pletziger

Michael Hailu

sector to tackle the depletion of species that need to be protected. Food contamination and food losses are other key areas and we need to ensure that the food that reaches consumers is healthy and without contaminants. Blockchain can improve the commercialisation side allowing formalisation of contracts and ensure more efficient and faster payments. Transport bottlenecks (which had affected negatively the sugar and banana sectors) can be reduced or solved. On policy and governance, strict rules are needed to promote an equitable use of technology which benefits all actors in the chain. He concluded by advocating for a systemic and holistic approach to technological innovation able to transform agriculture in ACP countries.

Wim Olthof, Deputy Head of Unit, Rural Development, Food Security, Nutrition at Europeaid, European Commission stressed the importance to discuss this new topic which is considered revolutionary but also challenging. It is important to explore the issues related to the governance dimension. He shared the EU initiatives involving blockchain which are mainly at EU level within the context of the EU single market. He referred to the EU digital market and the European Blockchain Partnership of 26 Member States cooperating on infrastructure to support cross-border digital services. Collaboration is also happening on security and privacy standards. The European Commission established the EU Blockchain Observatory mapping

initiatives and sharing knowledge on the technology as well as the International Association for Trusted Blockchain Applications (INATBA). At international level, in 2017 the Digital for Development Initiative was launched to mainstream digitalisation in all sectors, including agriculture. The task force on AU-EU digital economy was set up last year and the rural Africa task force established to enhance EU-Africa cooperation also includes digital aspects. Both have associated to the discussions a wide range of stakeholders such as research, private sector, finance, etc. He concluded that the merit of the Briefing is to learn from those who have gained experience across sectors and look on how we can apply these technologies in the EC development cooperation for the benefit of increased incomes, livelihoods and efficiency of the farmers.

Andreas Pletziger, Senior Policy Officer in BMZ stressed the importance of agriculture and supply chains for BMZ and the increasing role that ICTs and digitalisation play in agriculture. In 10-20 years from now consumers will be able to know exactly where any product in their shopping basket was grown, if it was sustainably cultivated and if pesticides were used. Furthermore, they will know which farmers sold, cultivated and harvested the crop and if they received a fair price for their products, if it has been processed and what their carbon footprint is.

One of the main challenges in Africa for the next decade is to create enough jobs to make it more attractive and profitable, especially for youth, and ensure prosperity, stability and peace while feeding an increasing population. Digital technologies and applications can connect rural population with global markets, innovations, services and education. However, digitalisation shouldn't be seen as an end. Several legal, social and economic criteria need to be considered before the technology can be used in development cooperation. If it is not mature yet, Blockchain has significant potential in terms of enhancing security, reducing corruption, and increase efficiency and allowing cheaper and faster transnational payments. GIZ is developing several projects on blockchain applications. In 2018, the Blockchain Lab was established in order to develop governance and operating models for blockchain applications in development cooperation. It focuses on sustainable change, insurance, energy and environmental auditing. We are focusing on some African countries to ensure traceability and sustainability of supply chains to ease contracts and links between producers and international markets. To be successful, digital approaches need to be holistic and link to other sectors and to the private sector. Collaboration is essential.

Michael Hailu, Director of CTA, thanked the organisers and audience for their interest in this area. He

H.E. Prof. Kaire Mbuende

Mischa Tripoli

highlighted that digitalisation can be a game changer in agricultural transformation. It offers opportunities across the chain in profitability, resilience and opens opportunities for women and youth. CTA has been engaged in this area for many years. This year started with a major event led by the Government of Germany where the focus was digitalization for agriculture. The ministerial communiqué called for mobilising the public and private sector and called for FAO and other organisations to join forces. CTA is also finalising a major report in Africa with Dalberg Advisors looking what status of digital innovations across various ecosystems, the potential of the technology and the measures the different stakeholders must take to advance in this area. The African Green Revolution Forum (AGRF) in Ghana has also as its main theme "Grow Digital" and CTA is one of the partners. From all these efforts more resources and investment will be captured to benefit smallholder farmers and create opportunities for rural dwellers and youth. Since 2017, CTA identifies and pilots emerging technologies and successful applications, to document them and share experiences as to see the relevance for smallholders. CTA selected 4 out of 60 cases from a call for proposals across ACP regions.

The first panel, chaired by the **H.E. Prof. Kaire Mbuende**, Chair of the ACP Committee of Ambassadors and Ambassador of Namibia to the EU, featured various perspectives on the adoption of blockchain technology in agriculture and the agrifood industry. The Ambassador highlighted the need for ACP countries to use the technology to become more competitive and to look at the variety of applications.

Mischa Tripoli, Economist, Trade and Markets Division, FAO provided an overview of the opportunities and challenges for blockchain in the agri-food industry.

Trade is complex, time-consuming and expensive. To illustrate this, he gave the example of one cross-border transaction which includes 20 different entities, 100 pages of documentation and 5000 data field interactions resulting in payment terms of two to four weeks with the implications it has for businesses and small-scale producers. These problems are related to inefficient means of sharing data. Existing challenges include the lack of transparency and traceability in supply chains, and the fact that food fraud alone has financial costs of approximately US$40 billion annually.

Blockchain is a database that is replicated in a network and uses consensus to decide what is true and what is not. As a result, the share ledger provides immutable and traceable data entries, can reduce the number of intermediaries and provide close to real-time transactions. Distributed Ledger Technologies (DLTs) can bring greater transparency, traceability, efficiency, accountability and trust to the exchange of value and

information by providing a secure platform to share data.

Several applications in agriculture include supply chain management, food safety, trade finance, agricultural financial services, market information, land registries and international agreements related to agriculture.

Blockchain can be used to enhance traceability and higher quality transactions. Each recorded transaction between supply chain actors can be added by actors. Although data is as accurate as it is recorded into distributed ledger.

A DLT enabled agricultural supply chain can be tracked by digital fingertip, QR codes, RFID chips and new innovations facial recognition for livestock and crypto-anchors, DNA markers. All this is an area of development with problems of cost and scalability.

Blockchain can disintermediate transactions in agricultural supply chains as DLTs and smart contracts provide similar outcomes for trade finance and agricultural financial services (payment services, agricultural insurance, credit and derivatives). This leads to greater access to financial services for smallholders and MSMEs and reduced transaction costs for sellers and banks. It facilitates trade with frictionless and real-time payments. A single ledger for all trade documentation facilitates instantaneous documentation flows.

Chris Addison

Digital identity, digital assets, or data, recorded from activity in agricultural supply chains can enhance market information and market transparency, provide supply chain actors with detailed records on their operations. Physical assets can be used as collateral to access financial services. DLTs provide a secure, fast and immutable method to register land titles.

DLTs can improve the implementation and monitoring of international agreements through enhanced accountability and transparency (i.e. WTO agreements on agriculture, customs duties, compliance with the WTO SPS agreement, rules of origin, intellectual property rights and geographic indications, Paris Agreement on Climate Change, SDGs)

On the way forward Mischa recommended: (i) to look at improving the knowledge base of public sector on the application of DLTs for food and agriculture; (ii) to address the numerous technical, regulatory, institutional, infrastructure and capacity development related challenges for widespread adoption; (iii) to create an enabling environment that ensures the productivity gains generated by DLTs are shared by all market participants, including smallholder farmers, processors and MSMEs. This can be achieved by promoting international cooperation through public-private sector partnerships and support to research and development; by providing policy guidance on the use of DLTs

in supply chains and developing appropriate regulations and standards with the private sector. Finally, there is a need to improve digital infrastructure and skills.

Chris Addison, Senior Expert, Data4Ag, CTA explained why blockchain is so important for the transformation of agriculture. He reminded the audience that when Tim Berners-Lee was working on building the world wide web, he soon recognised that there was a major issue in going digital and this was how to build trust in a virtual environment.

We have seen over the last two years an extra slip into web addresses (https) this extra slip has given us more confidence in the security of the website, because the protocol controlling the hypertext we view in our browser has changed and is more secure. We may not understand how this works, but we have more confidence in https websites. Databases pose a similar problem. We do not have confidence in entries in a database as they can be changed or be hacked, we do not have got the trust element in the record in databases (blockchain can give us more security). The development of crypto codes which could link entries in a database and make a distributed ledger, where copies of the database were made across a network, make these entries more secure. This is the origin of blockchain. As the system is difficult to hack, the records are considered

immutable. If any changes are made, they are obvious as the other copies of the ledger don't match.

Several reports are available on marketwatch.com showing headline figures for global market forecasts for blockchain with a $1.2. billion market in 2018 due to grow with a compound annual growth rate of 82% a year to 23.3 billion in 2023. In agriculture the market represents 60.3 million (2018) and will be 429.7 million (2023). But this is in all aspects in agriculture.

Then he zoomed in on what is happening in ACP countries. There are several applications ranging from food safety and certification, resilience (insurance applications) to access to finance. It provides also more confidence from larger buyers in smallholders because the records generate more confidence. Transfer of finance across borders, remittances and crowdfunding plays a role as well as logistics and land ownership, critical in sustainable agriculture.

He then spoke about the features of blockchain supporting social enterprise. Advantages include trust system-immutability, transparency, the fact that there is no need for a central organisation and that the smart contracts allow automatic payment without human intervention. It is crucial to strengthen the link between producer and consumer and important that they validate this information jointly in a transparent way.

Louis de Bruin

Challenges include the entry cost, the fact that in addition to public blockchains and open data, private networks are also developing, and we do not understand all the implications of the technology. Skills building and awareness of technology is still a constraint in ACP countries, the lack of resources and policies in place.

It is critical to look at ownership of data and communication through standards and interoperability across such a myriad of actors. The consumer needs to have confidence. Crucial is the date stamp of the transaction that cannot be changed. The more we link to censors, Internet of Things (IoT) and QR code the better for the producers. CTA works with Uganda Igara Tea where digital balances are used at the point of collection and confirms that farmers are involved and informed these handovers of product are the points at which blockchain transactions could be most powerful. On smart contracts, it is important that initial algorithms are known and open as the successive ones are generated without human intervention.

The speaker gave some examples of blockchain applications happening in ACP countries.

- *AgUnity PNG*, Solomon Islands and Kenya looking at fair contracts building trust of farmers in cooperatives and the ledger where buyer and farmer are registering in the same system.

- *Etherisc* looks at insurance and finance where it pays with specific conditions.

- *EthicHub* looking at the unbankable, attracting investors on crowdfunding. It includes a guarantee fund for investors to cover the risk of investors.

- *WWF* is tracking and tracing on tuna packaging, QR codes are being used to track how fish was caught.

- *Fair Food* is looking at coconut and coffee traceability.

- *Land LayBy* in Ghana and Kenya is supporting a registration for land ownership.

- *Agri-wallet* is looking at savings and credit status in Kenya, linked with M-Pesa using cryptocurrency and is used for agricultural inputs. Diaspora can contribute funds to support development of farmers savings.

Louis de Bruin, Blockchain Thought Leader Europe, IBM Global Business Services share with the audience the perspective of an agribusiness. For him, Blockchain is the only way to come together to tackle enormous and complex challenges we face today working closely with IoT and Artificial Intelligence (AI) and doesn't stand in isolation.

IBM has realised the limitations of existing Blockchain technologies such as Bitcoins and introduced hyperledger fabric adopted by the Linux Foundation which is an

opensource technology. Hundreds of companies, large and small, are working together and have adopted it as the technology of choice. Machines have proven to work but large scale blockchains work is much more challenging. We need standards and approaches that we are all happy about. IBM works on this through the International Association of Trusted Blockchain Applications, of which it is a founding member. Driver platforms to upscaling Blockchain (TradeLens for container logistics worldwide used for transportation) are promising as no single organisation is managing this process. It is managed by transport, customs, banks, shippers and customers. The hundreds of organisations using it show that Blockchain is a very good solution. IBM is working with Maersk, the largest shipping container in the world. World Wire IBM's financial Blockchain application aims to do the clearing and settlement of international payments in seconds. Companies that have joined IBM Food Trust are significant: Walmart, Carrefour, Nestlé, Unilever, Driscoll's, Kroger and Tyson Foods and it is already making large waves.

Not all technology is open but by supporting Hyperledger fabric instead the platform is open (although referred to as a permissioned blockchain technology this is different from a private blockchain).

IBM Food Trust is aimed at ensuring food is safe and fair traded and as

Alice Namuli Blazevic

low-carbon footprint as possible. Aiming at providing end-to-end global traceability to improve efficiency in business operations. Creating trusted connection (immutable ledger) with shared value for all ecosystem's participants, including strong consumers focus. Use of valuable existing standards (e.g. GS1) and offering connectors for interoperability with new systems. Traceability, food recall as quick as possible and certificate management to ensure authenticity (who issued unique certificate and always go a step back in the chain and accountability). Members are major players who use form their suppliers to use the Blockchain technology as it happened with the Internet. IBM Food Trust Certification is the first use case and it is already available, and organisations can join. The goal with blockchain is not about a few but about the 2.7 billion customers that purchase food in the world, over 600 regulators involved and 570 million growers, millions food suppliers, processors and retailers of participants and millions of transactions happening as we speak.

Alice Namuli Blazevic, Expert Blockchain and AI, KATS, Uganda spoke about the blockchain legislation in Uganda. She stressed the importance of agriculture to Uganda's economy, contributing 26% to GDP and employing about 70% of the population.

Uganda is experiencing a lot of growth in the blockchain industry and pockets of blockchain innovation are fast springing up in innovation hubs across the country, as the public and private sector alike seek effective new systems of record with trust embedded. The use of Blockchain technologies could more than double production which could raise the per capita income and bring Uganda closer to middle income status.

Blockchain technology is well suited to provide traceability of products. It makes it possible to know with high confidence, the origin, storage and expiration date of the product. Start-ups like *Avenews-Gti*, a decentralized ecosystem for agricultural trade, provide a digital trading platform based on blockchain technology. It connects food wholesalers to food producers without third parties or middlemen, reducing distribution costs, creating financial security, and providing chain transparency.

The social network blockchain company, *FaceCoin*, offers a smart futures contract platform that helps farmers and the unbanked on the continent through token offerings. *Food Asset Coin Eco-System*, as the program is called, allows investors to issue tokens to African farmers which can be used to purchase fertilizer products.

Carico Café Connoisseur, a Ugandan company has started using blockchain, to certify shipments of coffee to try to meet growing demand from consumers for more information about where products come from.

It is helping to boost farmers' incomes, as consumers are usually prepared to pay more for goods that can been traced back to their origins. They also offer transparent tamperproof and easy to track goods along the supply chain.

The newest entrant is a revolutionary project led by a London listed company, Block Commodities (NEX: BLCC) is deploying Blockchain to create an ecosystem designed to help farmers access agriculture finance. Block Commodities is partnering with *Pure Grow Africa*, a leading supplier of high-quality agricultural produce (dry edible beans) based in Uganda, supporting the development of the blockchain-powered ecosystem which lies at the core of its mission to help Africa grow.

The scheme will benefit 1000 smallholder farmers selected by Pure Grow to integrate Block's blockchain ecosystem. The farmers will be given cryptocurrency loan with which to purchase fertilizer and they will start repayments only after harvesting. Access to fertilizers and seeds could double the income of smallholder farmers which could raise the per capita income.

On the policy side, in the past year the country has hosted various blockchain conferences, various blockchain associations and communities with a lot of support from government at Cabinet level. Even without regulations in place, most of the blockchain technologies and cryptocurrencies are not facing

Pat Roy Mooney

much resistance from regulators in Uganda, unlike in most countries across the continent. The government is in the process of developing policy guidelines and encouraging industries to utilize the technology and the Ministry of ICT has moved to constitute a 'National Blockchain Taskforce" to come up with a policy to streamline the use of blockchain. It is anticipated that after the policy has been crafted, adequate legislation will be enacted to augment the policy framework. The government is also in the process of introducing tax mechanisms and incentives that encourage the private sector to invest in blockchain. This would open new opportunities for public-private partnership.

The government is also availing education and training opportunities to build the necessary manpower, and more investment in new start-ups to support their growth and in return boost the economy. For Uganda to maximize its full potential of the use of blockchain technology, support and collaboration is needed within the whole eco-system, including but not limited to investment capital, multi-stakeholder collaboration at national and continent level, development of regulatory standards and codes of conduct, enabling/training talent, support for the role of incubators, innovation hubs, educational institutions etc.

Pat Roy Mooney, Founder, ETC Group shared a very inspiring presentation of devil's advocate. His book "Too big to feed" shows

corporate concentration in agribusiness and the reason is new technology and blockchain. His second study: "Blocking the chain" is not against the technology per se. but provides a cautionary word on the pace of development and who is regulating and asks if we understand the technologies well enough to regulate them.

He also discussed how technology will impact our food systems. For example, the takeover of the largest food retailer by Amazon, a merger that we wouldn't have anticipated, was facilitated by technology and IBM is not directly associated with the food system either. There is awareness and concern on how fast it is moving and what we do not know. A number of issues should be explored further: (i) energy cost of blockchain who will have access to technologies and who benefits the most, the equity problem; efficiencies doesn't mean equity; (ii) implications of land use and land tenure could be beneficial but could also mean that smallholders find that the land is in the internet and sold or manipulated by others in other parts of the world, speculation of land could change; (iii) how far does the chain goes when you deal with the multinational enterprises when you deal in soybeans, maize, corn, rice, palm oil and make issue in and may use with thousands of products. How easy is this tracking? Scandals in Europe on highly processed food products branded the same but with different countries in various countries. Half of food eaten in Germany and UK is

highly processed. Does Blockchain give a false image of equity? Is there evidence that we can know about working conditions, areas that need to be understood if we want to help smallholder producers. Will the blockchain make a fair price? The context must be widened to include management of big data, digital DNA, genomes coding and the use of a wider range of technologies. Do we need to have an international organisation on cyber information? We need to create capacity at the UN for technology assessment so that we can have confidence. He referred to similar initiatives and organisations which were setup in the 1990s but do not exist anymore. They should have the capacity to monitor and advise and monitor enterprises.

The **Questions and Answers** of the first panel focused on is more data shared a good thing. Market transparency is critical. Blockchain makes more difficult the fraud so has a self-discipline effect. A new initiative on global governance would be advisable.

Questions were raised on the position of smallholders in respect of blockchain initiatives. The fact that they are organised and in platforms makes it easier for farmers. The restorative power that the technology created was recognised and the fact that it makes cooperatives and groups vivid again. Farmers feel empowered, do not need to go to finance institutions, do not deal with middlemen and farmers

H.E. Mrs. Sheila Sealy Monteith

Anthi Tsilimeni-Archangelidi

Theo de Jager

know the end price. Consumers are happy to contribute to pay a price and know the effects on farmers. Comments highlighted as well the link of the technology with youth and the need to monitor international agreements compliance. Youth is getting more involved in agriculture through innovations.

The second panel chaired by **H.E. Mrs. Sheila Sealy Monteith**, Ambassador of Jamaica to the EU, looked at specific examples of successful applications of the blockchain technology of interest to the ACP countries. Ambassador reminded the audience that in 2017, the ACP Secretariat had already supported Blockchain applications in the area of culture.

Anthi Tsilimeni-Archangelidi, Business Analyst, EMEA Business Applications, Cargill, gave the perspective of the industry on the blockchain potential and successes. In the past two years, Cargill has gone through a transformative journey, experimented new areas such as machine learning, IoT, AI, big data and Blockchain and look at technology with a purpose, improving the traceability and transparency of goods to address the world's most pressing food challenges. They contributed to open-source projects, codes and sponsored the hyperledger project offering traceable turkeys from farm to fork in North America and involved in Digital Supply Chain Platforms.

Annually Cargill moves 223 million of tons of goods affecting 20% of the global food. Digital supply chain from the farm to the fork and offer practical business applications. Three supply flows: (i) information flow: to transform form paper to digital process, monitoring process which is tracking information and signed data entry (Blockchain 1.0) and coordinating process which implies creating documents from data sets, i.e. accepting/rejecting information (Blockchain 2.0 and 3.0); (ii) Physical flow: Tracking goods identity (provenance, location, analysis traced) and consequences of product's characteristics i.e. contract default thanksgiving 2017-2018; (iii) Financial flow: tracking payments and triggering of financial transactions in real time. Blockchain is only one component of the solution: a legal framework needs to be developed. Best practices imply: to check if blockchain is what you need (standardize across the value chain, digitalize by applying business logic and automating); to embrace partnerships as supply chains rely on many actors for the quality of data; and to build on open standards for solutions benefiting the whole industry.

Theo de Jager, President, World Farmer's Organisation (WFO), presented his insights on what opportunities blockchain offer to farmers. He shared his experience to go to a highly digitalised farm, with drones and screens sending data back to the operations room. There is nobody in the farm. The drones reported a problem of stress of beetroot. 92% stress related to insects. Suggested a drone flying lower to confirm. Sprayed with insecticide in an area of only 2.2. square meters. The data from the field suggested not to irrigate. There were tractors without drivers. If you put a stick in the soil the tractor stopped giving a signal to the operations room of an obstacle in the way. The farmer could still overwrite the suggestion.

"When I misjudge or miscalculate, I pay a price in my farm. How can I trust the system?" he said. The nature of the chain has changed and if you cannot keep up at the cutting edge of the technology, you don't remain in business. Where does it leave Africa with vast majority of farmers being smallholders? Africa has weather, the land, water, land, people but lack knowledge, expertise, experience in financing. Africa got more than a trillion euros in development agriculture for the last 18 years. It needs the confidence capital needs, currently there is a lack of trust, the incorruptible part of blockchain will help. A new generation of young farmers understand and love the technology and taking it to new horizons, with Blockchain we can bring the incorruptible flow of into and data into our value chains. From input providers, financiers and crop insurers, whose business are based on data and down to value chain, processing, logistics, all the way to consumers, you can bring trust into the system, and it is brought in the complete picture. The first thing a farmer has in mind when he wakes up is the risks he will be exposed to: weather, resource prices market,

Sander Govers

Annette Houtekamer

labour, location, biological, health, financial, policy, infrastructure risks. And each of those must be considered and managed. If this could be shown as a dashboard on a tablet, what difference it will make to the farmer. According to availability of resources and prices, proposed the best crop to plant, no rely anymore on the seed seller.

Blockchain must be seen with IoT Robotics, big data and AI shaping the farmer and the productions system of tomorrow. We are moving from business intelligence to business analytics, to trust the system and be sure all relevant data has been considered in taking a decision. In financing, our model has not worked well in Africa, there is no collateral so lack of finance and investment is a major issue. Blockchain helps to do value chain financing if you trust immutable data and incorruptible flow. Then smallholders in cooperatives become bankable.

Sander Govers, Moyee Coffee "Fair Chain", Ethiopia discussed the increasing price transparency through blockchain in the coffee chain in Ethiopia. Moyee Coffee is a social enterprise aiming at restoring the balance in the coffee value chain, which is broken. Value-addition is done in the global North and only 10% of value remains in producing countries. They want to restore the balance (a fair chain) and reach 50-50% share by roasting and packing coffee is done in Addis Ababa, improving the quality and applying an inclusive business

model. Roasting and packing is one in Addis Ababa and export value is tripling. Blockchain can give proof of impact. By making the supply chain transparent, with the value made from farmer to consumer they show who the stakeholders are and who gets what.

All farmers have a digital identity and all information is logged (quantities, prices) and payments are made immediately. The farmers have a track record, so by logging all transactions it makes possible to them to get loans from banks. Blockchain helps to make farmers bankable. The product is fully traceable, with digital payments and soon they will introduce tokens (a small coin per bag of coffee) this has a 50 cents value in the digital wallet and the consumer has the choice to keep it as discount for the next purchase, share it or donate to a project. Token can be lent to a farmer to buy seedlings for additional income and pay back this micro loan. The consumer has the option to be involved in the value chain. The Blockchain has a promise of trust, full transparency and traceability. It can be used with any crop and any supply chain.

Annette Houtekamer, Expert in Inclusive Insurance, Ibisa (Inclusive Blockchain Insurance using Space Assets).

Ibisa was launched in 2018 with seed funds from the European Space agency and targets 4 million beneficiaries by 2023. She stressed

how insurance protection is key for farmers as they are risk takers every day (climate-led risks). Crop micro insurance today is expensive, cumbersome and hardly available. The current business model does not scale-down well to micro-insurance. More than 500 million farmers worldwide are exposed to weather risks and there is no sustainable solution for them. IBISA is a scalable alternative to insurance for crop protection, where risk is mutualized. IBISA is based on a peer-to-peer risk-sharing system supported by blockchain and Earth Observation technologies to enable profitable crop protection products and drastically reduce costs typically incurred by traditional insurer- centric paradigms. Ibisa works with 16 Strategic Partnerships worldwide to diversify risks. 2600 farmers are enrolled for a pilot phase through local partners in India, Niger and by end of 2019 deployment will be done in Bangladesh, Kenya and Guatemala. The market size is 500 million small-scale farmers who need crop protection which represents € 8000 million untapped market (the average membership premium being 16 per year) With 10 million customers (2% market share) we reach a turnover of € 160 million/year. The product is modelled according to the real demands of farmers, it is mobile and has low overheads. Premium payments are made in small instalments without the need to file a claim. Every month IBISA assesses the loss in the communities using satellite earth observation data. The assessment triggers the pay-out,

Erik Árokszállási

proportional to the loss, without need to file a claim and the farmer receives it in her mobile money wallet. She gave various examples on market adoption: (i) DHAN is a Development Organization working in India since 1997 with 1,2 million families spread over 14 states in India which provides access to insurance products and partners with IBISA; (ii)

Niger pilot is co-financed by the Luxembourg Government and it is in partnership with DRAXIS and RBM. Le Réseau Billital Maroobé has 80 professional organizations with a total membership of 750,000 members and acts on behalf of 2,500,000 beneficiaries. Technologies used are Earth Observation, parametric insurance and Blockchain. A maximum number of administrative tasks are automated in a decentralized and transparent way, reducing the risk of error and ensuring resiliency, trust and scalability.

Challenges are legal and regulatory in each country. Peer to Peer-risk sharing is not clearly subjected to insurance regulation and is a topic of study on IAIS (International Association of Insurance Supervisors). IBISA has already applied most of the regulatory constraints associated to the insurance, such as minimum solvency calculation, transparency and customer protection.

Erik Árokszállási, CEO, TE-FOOD International focused his presentation on ERBA work on the

livestock blockchain, especially on tracking livestock diseases. African swine flu or fever spread last year in summer in China. It was a big outbreak that's already spread out in Southeast Asian countries, Europe and to South Africa. There is a problem with centralising the information to the extent that it is controlled by a corporation. It is very important to identify the animal swine flu cases for the stakeholders and to write down how to take care of the compensation and how to plan the actions they have to follow in case of the epidemic. The agriculture sector decided that they should know everything happening in an epidemic. They should register and report on what they are doing if they had symptoms in livestock.

A decentralized system would allow them to track the compensations, payments and subsidies because this is one of the most important motivations for the farmers to be a part of this decentralized structure. Non-profit organisations are also supporting the farmers. At the end of the supply chain, the consumers are looking at transparency in the food supply. Combining the blockchain tracking with Artificial Intelligence means that the direction, the speed and even the economic impact of the epidemic can be assessed. Actual virtualisation of millions of the data that the transactions generate is possible. In Europe, African and Latin American countries, they have found that advanced technology is not the final solution but a part of it. Applications generate a high number

of questions when implementing projects. We need a motivational, educational and regulatory side so that government should cooperate at local and the global level and work together to ensure good communication.

In the **Questions and Answers** of the second panel, the Ambassador of Kenya praised the quality of presentations and raised the importance of the Moyee coffee objective to share the profits from coffee by increasing roasting capacity in Ethiopia. The ambassador stressed that adding value across value chains in the ACP was essential.

Pat Mooney raised the question to Ibisa on what challenges they faced with the insurance model. Was it just restricted to legal problems or they were also restricted in which crops could be insured.

Alice Blazevic, the Ugandan law expert, raised that the other challenge for this kind of blockchain applications were new privacy laws in Africa and that many have an impact on all the nature of the business blockchain because it's all about collecting data. It is important to ensure that you do not break privacy law.

Ibisa explained that they need historic satellite data to make the insurance algorithms. This is usually not older than 5 to 10 years whereas in a traditional insurance you usually go back 40 years to be sure that you

have a proper validated model, so they are creating some guesstimates to produce the models.

Having said that she confirmed that Ibisa can ensure any crop because they don't ensure typical parts of land and specific crops as they want to allow people to do intercropping.

Michael Hailu closed the Briefing by thanking the moderators, speakers and audience for the valuable insights and different perspectives shared. He stressed that the technology has to support a well-defined business and policy. It is critical to establish trust across the value chain, strengthen partnerships and bring different technologies together to make blockchain effective and efficient. Credibility of the original information is critical.

We need to ensure that the technology is inclusive and takes interest of disadvantaged communities, women and smallholders as shown by the excellent cases shared on insurance and coffee value chain.

We need to take advantage of transparency, inclusiveness and opportunities offered by the technology.

From CTA perspective, he called for sharing more specific use cases that bring partnerships together in local and international markets, to encourage innovative applications from start-ups in ACP countries and support small-scale applications.

Further information available online: