Testimony of

Mr. Jason E. Kelley

General Manager, Global Strategic Partners and Blockchain

Global Business Services, IBM

to

The House Agriculture Committee, United States House of Representatives

Hearing on

21st Century Food Systems: Controlled Environment Agriculture's Role in Protecting Domestic Food Supply Chains and Infrastructure

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Introduction

Good morning, Chairman Scott, Ranking Member Thompson, and distinguished members of the Committee. Thank you very much for the opportunity to testify before the Committee on this important topic.

My name is Jason Kelley, and I am IBM's General Manger for Global Strategic Partners and Blockchain for Global Business Services, and in addition to serving in corporate America, I've also had the great privilege and honor to serve my country as a U.S. Army Airborne Ranger. Today, I have the pleasure of managing a global team at IBM that is responsible for over 750 client engagements around blockchain. These transformative projects include supply chain, financial services, government, healthcare, travel and transportation, insurance, chemicals and petroleum, and more.

Within the food industry, IBM uses blockchain technologies to reimagine data transparency with a new level of digital interactions in the food supply chain ecosystem. Our partners today include not only household names like Dole and Walmart, but also small farms, like the ones in California where the majority of our leafy greens originate. These food suppliers share common goals: deliver fresher, safer food to consumers and ensure unsafe food is quickly identifiable and traceable. We are also pleased to work with others that share our vision for transforming food safety through responsible technology. PLANT-AG, who is also testifying here today, is one of those clients.

The challenges that have risen during this pandemic greatly heighten the need to enhance America's ability to adopt a more collaborative digital, traceable, and safer food system. That is why I appreciate the Committee's desire to explore blockchain technology – especially its applications beyond cryptocurrency and financial technology – because blockchain has the potential to vastly reduce the cost and complexity of food safety. With blockchain, we can enable open transparency for tracking the movement of food, monitoring the processes of production and reclamation, and administering the enforcement of effective food safety and sustainability practices.

Today, I come before you to share those experiences and how the right digital infrastructure can enable a more resilient, sustainable, and safer food supply chain. My testimony will cover what blockchain is and what it is not; its key benefits, including greater trust and security, better efficiencies and resiliency, and improved sustainability; and, examples of it in use today.

What is blockchain?

Businesses – and government – run on data. The faster it's received and the more accurate it is, the better. Enter blockchain, a secure cloud-based technology that is ideal for securely delivering data when multiple entities need it, and where and how they need it most. Blockchain provides immediate, shared, and completely transparent information to the specific, trusted person who is permissioned to see it.

IBM defines blockchain as a shared, immutable ledger for recording transactions and tracking assets with transparency, which builds trust. Tracking assets is inclusive of the assets themselves, as well as the ability to have transparency in securely tracking orders, payments, accounts, produce, and the associated data across industries, geographies, and more.

Each member invited to be part of the blockchain network has an exact copy of the ledger. Any information of a transaction that a member wants to share – the who, what, where, when, how much, and even the condition of a transaction, such as the temperature of a food shipment – is recorded as a "data block" on the ledger, which is propagated throughout the network.

Each block is connected to the ones before and after it. These blocks form a chain of data that can track an asset as it moves from place to place or ownership changes hands. The blocks confirm the exact time

and sequence of transactions, and the blocks link securely together to prevent any block from being altered or being inserted between two existing blocks.

Importantly, no participant can change or tamper with a transaction after it's been recorded to the shared ledger. If a transaction record includes an error, a new transaction must be added to reverse the error, and both transactions are then visible.

Therefore, all permissioned participants in an interaction have a trusted, up-to-date ledger that reflects the most recent transactions and these transactions, once entered, cannot be changed.

Blockchain's power to transform is that it enables co-development of a shared copy of the truth. What a group can achieve together far exceeds what any individual member can achieve by themselves. Furthermore, to speed this sharing of information, a set of rules — called a smart contract — can be stored on the blockchain and executed automatically.

Smart contracts are simply programs stored on a blockchain that run when predetermined conditions are met. They typically are used to automate the execution of an agreement so that all participants can be immediately certain of the outcome, without any intermediary's involvement or time loss. They can also automate a workflow, triggering the next action when conditions are met.

Blockchain is neither bitcoin nor a panacea

While most people who have heard of blockchain associate it with the cryptocurrency bitcoin, that use case is not what I'm talking about today. While bitcoin does run on blockchain technologies, it is important to understand that not all blockchain technologies are the same. For example, bitcoin operates with a network of pseudonymous participants, where shielding one's identity is the outcome.

The blockchain I am discussing is one built on open standards technology that is designed to be used as a trusted network to handle interactions between known parties. By way of comparison, the Internet uses a protocol (TCP/IP) to direct network traffic, which provides part of the backbone necessary to allow users to access the application layer (websites and platforms). Similarly, blockchains serve as the backbone protocol of new peer-to-peer network arrangements that allow for a wide range of uses, from

cryptocurrency-based transactions, like those made possible by bitcoin, to supply chain management and verification.

While blockchain is not a panacea for all the challenges presented by food trust and safety issues, a digital infrastructure based on blockchain protocols can provide substantial improvements in value over the status quo. It can provide a trusted capability for transparency and timely sharing of secure data.

Furthermore, the sharing of trusted, secure data with provenance from multiple stakeholders that blockchain enables can also be critically helpful to accelerate trustworthy artificial intelligence (AI) applications. Blockchain's immutable, transparent digital record offers greater insight into the framework behind the AI, reducing possible distrust and mystery that some ascribe to the technology. It also creates greater trust in the development of AI as the data used to train the AI models can be decentralized, verified, and transparent. Accordingly, integrating AI on a digital infrastructure built on blockchain can help unlock further value over the current status quo.

Blockchain benefits -- greater trust and security, better efficiencies and resiliency, and improved sustainability

That value and the use case I am discussing today is how blockchain could help advance end-to-end food traceability and, ultimately, transparency to drive consumer protection and trust. It can do this by enabling:

1. Greater trust and security
2. Better efficiencies and resiliency
3. Improved sustainability

Greater trust and security

An ecosystem of trust is critical for all participants in the food supply chain, from source to consumption. This includes a very expansive and collaborative value chain of farmers to distributors, to logistic partners, to retailers, to the family sitting down at their table to eat. For example, food recalls are an immense safety problem and a threat to profitability. Last year, *Food Safety* magazine counted 337 food

safety recalls in the US.[1] Companies surveyed put costs at up to USD 30 million per incident[2], stemming from direct costs, plus such indirect costs as penalties, lawsuits, lost sales, and brand damage. In addition to the societal and business impact, huge stocks of food are wasted and consumer trust is crushed.

Tracing food across the supply chain takes days, if not weeks, as companies struggle to find and manage a mix of digital and paper-based food data documentation across a complex and growing network of suppliers and distributors.

With a digitized food system infrastructure, network participants could have access to tools and data to improve food safety and become proactive contributors to bettering the food system as a whole. Further, with permissioned blockchain, the members of this members-only network can rest assured that they are receiving accurate and timely data and that their confidential blockchain records will be shared only with network members that have specifically been granted access. And, consensus on data accuracy is required from all network members, and all validated transactions are immutable because they are recorded permanently. No one, not even a system administrator, can delete a transaction or make an edit without their action and identity being known.

This means that if a food safety issue is reported, it would immediately identify who is impacted and who should take action. One example would be our work with PLANT-AG, where our blockchain platform could capture and share seed and farming level data for fresh produce with PLANT-AG's instrumented greenhouse facilities to enable better visibility and trust.

Better efficiencies and resiliency

Inefficiency in the food system is a pervasive problem worldwide, made more apparent by the COVID-19 crisis, which has stressed the global supply chain.[3] With so many participants, there are endless opportunities to lose efficiency and profits. Inefficiencies negatively affect consumer pricing, the carbon

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[1] *Food Safety Magazine: A Look Back at 2019 Food Recalls* - https://www.food-safety.com/articles/6487-a-look-back-at-2019-food-recalls

[2] *SF&WB: Evaluating the real costs of a food product recall* - https://www.snackandbakery.com/articles/92105-evaluating-the-real-costs-of-a-food-product-recall

[3] *BCG Henderson Institute: Tackling the 1.6-Billion-Ton Food Loss and Waste Crisis* - https://www.bcg.com/publications/2018/tackling-1.6-billion-ton-food-loss-and-waste-crisis

footprint, food waste, and expected freshness. According to the United Nations, 1.4 billion tons of perishable food is wasted each year due to inefficiencies found with the food supply chain.[4]

With a distributed ledger that is shared among members of a network, time-wasting record reconciliations are eliminated. While one unexpected event could cause a cascading array of supply chain disruptions, blockchain can mitigate this through "smart contracts." As shared earlier, a smart contract can be automatically triggered when pre-defined business conditions are met. This gives near real-time visibility into operations and the ability to take action earlier should there be an exception.

Using blockchain, all food system participants could know the provenance, real-time location, and status of their food products. Further, integrating AI on the blockchain, retailers could receive recommendations on what products to recall from store shelves because of expiration and maintain inventory visibility during demand spikes, for example by automating re-ordering when certain demand thresholds are met. Armed with better data on a blockchain, companies could also use AI to develop more accurate supply and demand forecasting models, localize the sourcing of ingredients and restructure contracts. Enabling a blockchain system that tracks product loss, waste, and expiration dates could save $150 billion annually in food waste.[5]

Improved sustainability

Across the globe, consumers are demanding to know more about their food — where it came from, the effect of its production methods on the environment, and how workers and animals were treated in the process. In fact, 54 percent of consumers say it's at least somewhat important that the food they buy is produced in an environmentally sustainable way.[6] Sustainability is no longer a bonus; it's imperative for both the consumers who demand it and for future business models.

A digital food supply chain powered by blockchain enables new levels of trust and transparency across the food ecosystem, increasing awareness of sustainability opportunities and practices during each step

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[4] *Supply Chain Digital: Billions of tons of food wasted in global supply chain* - https://supplychaindigital.com/logistics-1/billions-tons-food-wasted-global-supply-chain

[5] *IBM: 7 Benefits of IBM Food Trust* - https://www.ibm.com/blockchain/resources/7-benefits-ibm-food-trust/

[6] *Food Insight: Interest in Sustainability, Plant-Based Diets Among Trends in IFIC Foundation's 2019 Food & Health Survey* - https://foodinsight.org/interest-in-sustainability-plant-based-diets-among-trends-in-ific-foundation-2019-food-and-health-survey/

of the food chain. For example, farmers, producers, and other food actors can automatically digitize and easily share audits, certificates, and other records, proving that they utilize and promote sustainable and ethical practices. And, distributors, transporters, and retailers can be better informed to make sustainable choices. Using AI on the blockchain, applications can suggest the most sustainable or cost-effective shipping method and recommend local or alternative sourcing.

Furthermore, the cost of unsustainable food practices creates unnecessary investment and expenditures. "True Cost Accounting" sheds light on the price of unsustainable food practices. Unsustainable sourcing and biodiversity loss, due to unsustainable production methods, result in hidden costs. Research shows that consumers unknowingly pay twice as much for their food due to such costs. With the global population expected to boom from 7 to 10 billion by 2056, companies are looking for ways to decrease their ecological footprints and blockchain can help.[7]

Blockchain at work – examples of improved supply chains

In 2017, IBM built digitalized supply chains or "food trust" for our clients based on blockchain technologies. This experience has shown that when using blockchain, we can track Walmart's leafy greens, Nestle's Gerber-branded sweet potato, apple and pumpkin baby foods, and more. We can trace these foods to their origins in seconds versus traditional methods that can take a week or longer. This trust now includes more than 100 growers, producers, and sellers, including grocery giants Walmart and Albertsons.

Look at the seafood supply chain – it's rippled with inaccuracies. According to research by the environmental advocacy group Oceana[8], as many as one in five of the fish samples tested were mislabeled.

Blockchain is helping to bring order and transparency to one of the world's most complex supply chains – as close to 80 percent of the seafood Americans eat is either imported out-right, or it has been exported and re-imported for processing. Working with Hampton Bays, New York-based Manna Fish

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[7] *IBM Focus on Sustainability* - https://www.ibm.com/downloads/cas/R8VDMJ4Y

[8] *National Geographic: What is seafood fraud?* - https://www.nationalgeographic.com/environment/2019/03/study-finds-seafood-mislabeled-illegal/

Farms, IBM is building a traceability network for sustainably-raised aquacultured fish and shellfish on blockchain.

Furthermore, this digital platform could help reward the fisherman, sustainable aquaculture farms, and their trusted networks for their efforts. Before blockchain, there was no way to prove that you got your catch onto ice a little faster than your peers, or that you used more sustainable methods. Now, there is.

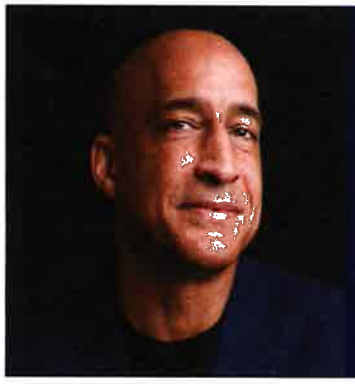
Blockchain can help advance end-to-end food traceability and, ultimately, transparency to drive consumer loyalty, protection and trust.

Conclusion

Let me close with my appreciation again to this Committee for exploring how digital infrastructure can accelerate improvements in our food supply chain. I have also spoken to leaders at the U.S. Food and Drug Administration and support their efforts to find and implement tangible strategies to modernize the food industry. The U.S. Department of Agriculture is also making positive strides, including a blockchain traceability "farm to store" pilot with Walmart and IBM.

We applaud all of these conversations and many others we are having with farmers, fishers, distributors, transporters, retailers, regulators, and other stakeholders in the food supply network. We are happy to support these conversations as we believe blockchain is a game-changer for food safety.

Again, thank you for the opportunity to discuss such an important topic.



IBM **Strategic Partners**

Jason Kelley

General Manager, IBM Strategic Partners

Jason Kelley, General Manager, IBM Global Strategic Partners, is responsible for the strategy, organization, and business performance of IBM strategic alliances, building on his successful track record in blockchain, AI, IoT, 5G, and other emerging technologies across clients, industries, and network ecosystems. Prior to this role, Mr. Kelley led IBM Blockchain Services, partnering with organizations and consortia to unleash exponential business value through rapid adoption of blockchain-enabled digital ledgers and digital identity capabilities. Mr. Kelley has been a successful entrepreneur as well as a business unit creator for IBM, having led IBM Services Solutions, Design & Innovation, helping clients transform to differentiate and lead in the market through digital reinvention. His teams bring endless energy, creativity, and outcomes for IBM clients globally delivering unique business capability with the marriage of hybrid cloud and emerging technologies. Mr. Kelley continues building successful and strategic teams internally as well as externally to IBM.

In addition to his executive responsibilities, Mr. Kelley is the IBM Texas Senior State Executive. In this role, he represents IBM in education and government relations advocacy and creates constituent relationships with key state government and community leaders.

A holder of four U.S. Patents, Mr. Kelley is also a U.S. Army Airborne Ranger veteran, serves on a number of boards, is Co-Chair of the Nation Security Innovation Council, leads the community of black employees & mentors (BEAM) globally for the IBM Services organization, and serves as co-chair of the IBM global Veterans council.

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In accordance with Rule XI, clause 2(g)(5)* of the *Rules of the House of Representatives*, witnesses are asked to disclose the following information. Please complete this form electronically by filling in the provided blanks.

Committee: Agriculture

Subcommittee:

Hearing Date: 07/29/2021

Hearing Title :

"21st Century Food Systems: Controlled Environment Agriculture's Role in Protecting Domestic Food Supply Chains and Infrastructure"

Witness Name: Mr. Jason Kelley

Position/Title: General Manager, IBM Strategic Partners

Witness Type: ○ Governmental ● Non-governmental

Are you representing yourself or an organization? ○ Self ● Organization

If you are representing an organization, please list what entity or entities you are representing:

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Please complete the following fields. If necessary, attach additional sheet(s) to provide more information.

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Please list any federal grants or contracts (including subgrants or subcontracts) related to the hearing's subject matter that you, the organization(s) you represent, or entities for which you serve as a fiduciary have received in the past thirty-six months from the date of the hearing. Include the source and amount of each grant or contract.

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☑ I have attached a written statement of proposed testimony.

☑ I have attached my curriculum vitae or biography.

* Rule XI, clause 2(g)(5), of the U.S. House of Representatives provides:

(5)(A) Each committee shall, to the greatest extent practicable, require witnesses who appear before it to submit in advance written statements of proposed testimony and to limit their initial presentations to the committee to brief summaries thereof.

(B) In the case of a witness appearing in a non-governmental capacity, a written statement of proposed testimony shall include—(i) a curriculum vitae; (ii) a disclosure of any Federal grants or contracts, or contracts, grants, or payments originating with a foreign government, received during the past 36 months by the witness or by an entity represented by the witness and related to the subject matter of the hearing; and (iii) a disclosure of whether the witness is a fiduciary (including, but not limited to, a director, officer, advisor, or resident agent) of any organization or entity that has an interest in the subject matter of the hearing.

(C) The disclosure referred to in subdivision (B)(iii) shall include— (i) the amount and source of each Federal grant (or subgrant thereof) or contract (or subcontract thereof) related to the subject matter of the hearing; and (ii) the amount and country of origin of any payment or contract related to the subject matter of the hearing originating with a foreign government.

(D) Such statements, with appropriate redactions to protect the privacy or security of the witness, shall be made publicly available in electronic form 24 hours before the witness appears to the extent practicable, but not later than one day after the witness appears.