How Blockchain Can Be Used to Address Food Security in India

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Every night, 200 million people in India go to sleep with hungry stomachs. Ranked 105th on the 2018 hunger index, India is home to the largest undernourished population in the world. These grim statistics are counter intuitive in light of India's significant gains in agriculture production, which have advanced the country from famines to food surplus, the paradox being hungry people and food surplus in the same place.

According to Nobel prize winning economist Amartya Sen, episodes of famine in India are rarely the result of food unavailability. Instead Sen observes, these episodes occur due to intervening economic factors such as unemployment, declining wages, and poor food distribution systems. Sen's conclusion is that the current predicament of food insecurity in India is less about the lack of food and more about inefficient supply chain systems.

India now produces more food than its population can consume. This is reflected in the stocks of rice, milk, sugar and-tomatoes. Present stock of 68 million tons of wheat and rice reflect

levels twice those required by standard norms for national buffer stock. Similarly, milk production has been growing at four times the rate of population growth.

India's Public Distribution System (PDS) is arguably the largest food distribution program in the world and is responsible for distributing over 19 million tons of rice and wheat-to over 27 million citizens across India. The monetary equivalent of the food grains distributed averages $13.6 billion-a-year. The government of India at the central level is responsible for warehousing grains; while state governments are responsible for grain purchasing at a central issue price (CIP) and transporting them to Fair Price Shops within the state. This system is intended to provide essential food products to poor rural populations at subsidized prices, while protecting consumers from artificial price inflation and the ubiquitous black market.

In India, exploitation is clearly visible in the public distribution system, which is a government-created system intended to ensure food security and provision of essentials to rural poor through fair price shops. The system provides the products at subsidized prices and protects the consumers against artificial price rise and the black market.

India produces around 600 million tons of fruit and vegetables out of which 25% to 30% is wasted due to the inadequate logistical support. As the World Economic Forum has noted, production of food is not the main issue in India. For the year 2015-16, India required approximately 230 million tons of food to feed its population--shockingly, the output from farms was more than 270 million tons. The vast size of the country and a burgeoning population makes it difficult for current systems--based largely on manual documentation--to work in India.
The Blockchain may provide a potential solution. Described as an electronic ledger which stores data on multiple points of storage, blockchain can decentralize the distribution woes and democratize the solution. Blockchain is the technology that underpins digital currencies like Bitcoin and Ethereum. The information is constantly loaded into the database and updated instantly resulting in records that are publicly available and transparent.

Within this framework, new data can be gathered, analyzed and stored in the blocks. A block is a record of a new transaction. Whenever a new block is added, the information is relayed to the whole network and the "chain" of blocks is updated accordingly. The main advantage of the feature, especially given the problem of a misplaced distribution system, is that previous information cannot be altered or changed. If changes are made to the content of the previous blocks it would invalidate data in *all* blocks after it. Blockchain is also useful for monitoring supply chains. By substituting a data-based system for the traditional paper-based system supply chain inefficiencies can be quickly identified and addressed in real time.

Blockchain is perfectly suited for the task at hand. It can improve the food supply chain in the complex food distribution system in India. For instance, Walmart has partnered with IBM to work on Hyperledger blockchain to track food from supplier to end customer. A similar concept can be used in India where we can we track food from Food Corporation of India to regional mom-and-pop store. Global spending on blockchain solutions has crossed $2.1 billion. Blockchain technology can also help to maintain the quality of grains because when monitoring food grain is done in real time at each stage of storage using blockchain, adulteration is virtually impossible. Transactions are immutable and also provides a time-stamped audit trail. Blockchain will help to bring transparency in an otherwise opaque network of food distribution systems in India. Blockchain is decentralized which means it is not controlled by any central authority. Since the control is not exerted by any one individual, corruption of data is difficult. According to the United Nations, up to 40% of food in India is wasted, the same amount of food that the United Kingdom consumes. It is a travesty that 21 million tons of wheat is wasted because it cannot be stored or distributed appropriately. This wasted food could easily feed millions of people in India.

Often, hunger defines who gets what in India--it is not possible to pursue happiness without addressing food insecurity. When we think of poverty in India, we wrongly assume that the country does not have enough food and chase solutions that may not work. Once we recognize the underlying problem of mismanaged food distribution, only then we can start taking the right policy actions.

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