

Study on How Blockchain Will Transform Future of Banking with Special Reference to Subsidy Distribution

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Abstract: Financial inclusion and increased standard of living have led to huge influx of customers in the Banking sector. Huge customer base means a large amount of confidential data. With the amount of cybercrimes increasing, it is imperative that banks optimise their workload by securing transactions. This can be done using blockchain. Blockchain is a way of distributing data without the need for intermediaries in a real time and secure way. Blockchain is a decentralised ledger which involves use of a lot of databases secured by high tech cryptography to record transactions. These transactions form a chain which makes it difficult to manipulate them. An entire chain has to be hacked to hack a transaction. Identical records are synced into “blocks” and a decentralised ledger is created which keeps track of every transaction in a permanent and verifiable way. Blockchain is a way of distributing data without the need for intermediaries in a real time and secure way. Recent studies suggest that blockchain, if successfully implemented can eliminate the conventional financial entities. This paper is an exploratory research on how banks as intermediary can use blockchain in their services with special reference to subsidy distribution, thereby turning a threat into an advantage. This paper explores how the public distribution system from government effected through banks can be better optimized with the use of blockchain.

Keywords: Blockchain, Decentralised Ledger, Subsidy Distribution

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I. Introduction

The concept of Blockchain came around in 1991 when Stuart Haber and W. Scott Stornetta brought up the idea of cryptographically linking blocks which were time stamped. This technology was used to notarise documents by businesses, registering intellectual Property Rights etc. This idea formed the backbone of cryptocurrency Bitcoin by a person (or group of people) using the name Satoshi Nakamoto in 2008. Satoshi Nakamoto used this existing knowledge to add an incentive layer called Bitcoin to the blockchain data structure. The identity of Satoshi Nakamoto is unknown. The invention of the blockchain eliminated the need for a trusted authority or central server. The parties in a blockchain transaction may not trust each other or know each other. But the stored data and transaction control is distributed to all of them and such management solves the double spending problem of cryptocurrencies. Double spending is a problem unique to transactions involving digital currencies. A currency may be used in two or more transactions or spend multiple times. This does not happen in the case of physical currencies as they can be vouched. Blockchain was introduced as a platform to securely deal in digital currencies. All the transactions in a blockchain are secured cryptographically in a P2P network across multiple devices which makes it difficult and expensive to manipulate data. In order to manipulate data, the consent of all the parties involved is required. The hash function of blockchain gives a unique identity to each transaction which is carried forward to the next block. So, manipulating a block will break the chain with other blocks as the hash of the prior block will not match the hash entered in the consecutive block. This protects the integrity of the transaction. information is stored on all computers and gets timestamped which allows verification and eliminates the roles of intermediaries. The concept of proof of work algorithm is the hash function.

Objectives of the study

- To study the growing scope of blockchain in banking industry
- To investigate the application of bitcoin as a currency for future transactions
- To analyze the present situation of Agricultural subsidy distribution through banks
- To suggest how blockchain can optimize the subsidy distribution process.

Methodology of the study

An exploratory study is undertaken seeking to investigate how blockchain advent may eliminate problems in subsidy distribution in the agricultural sector. The data used to arrive at suggestions is based from secondary data obtained from various published sources and websites focused on blockchain. The study explores areas of concern in subsidy distribution and tries to suggest solutions by combining the advantages of the regulated banking sector along with Blockchain technology. Literatures from Government publications, Newspapers, International Journals have been referred to arrive at the suggestions. This paper does not provide a means to an end but shows the underlying opportunities of blockchain and how it could remove the challenges of agricultural subsidies.

Scope of the study

The study aims to give an insight into Blockchain technology in the banking sector with special reference to the subsidy distribution function done by banks. The study does not provide an end but has researched on the problems faced by this sector and suggests ways to tackle them. Further studies may be explored with reference to supply chain management, trading of cryptocurrencies in banking, financial inclusion through blockchain etc.

Limitations of the study

Exploratory studies generate qualitative information and interpretation of such type of information is subject to bias and judgement. The availability of firsthand information or primary information is limited. These types of studies usually make use of a modest amount of literature that may not adequately represent the target population. Accordingly, findings of exploratory research cannot be generalized to a wider population. Findings of such type of studies are useful only to a limited extent in decision making in a practical level.

Design of the study

The study consists of four chapters namely

Chapter I: Introduction

Chapter II: Literature Review

Chapter III: Findings, Suggestions and Conclusion

II. Literature review

Blockchain- An Overview

Blockchain is a new class of information technology that combines cryptography with distributive computing both of which have existed for a couple of decades. A network of computers collaborates towards maintaining a shared and secured database. It is a technology which is a distributed secured database which consists of string of blocks each one a record of data encrypted and given a unique identifier called the hash. Mining computers on the network validate transactions add them to the block and broadcast them to the node so that all have a copy of the database. Because there is no centralized component to verify the alterations to the database the blockchain depends upon a distributed consensus algorithm. In order to make an entry on to the blockchain database all the computers must agree about its state so that no one computer can make an alteration without the consensus of the others. Once completed a block goes into a blockchain as a permanent record. Each time a block gets completed a new one is generated. There is a countless number of such blocks in the blockchain all connected to each other like links in a chain in proper linear chronological order. The blockchain was designed so that the transactions are immutable meaning they cannot be deleted. Each block contains a hash value that is dependent upon hash of the previous block so that they are all linked together. If one is changed then all the other blocks linked to it going forward is altered. This helps to make the data entered tamper proof. This is the first generation of blockchain which function largely simply as databases, but the technology is currently evolving to become much more than this as the second generation already provides the capacity to execute any computer code on the blockchain. The system is evolving to become a globally distributed cloud computing infrastructure.

Distributed ledgers

Blockchain technology is suitable for the storage of a record or transaction that involves value or in some way needs to be a secured and trusted source of information. These secured distributed records are called Distributed Ledgers and it is a consensus of replicated, shared and synchronized digital data geographically dispersed across multiple sites, countries or institutions without centralized administration or centralized data storage being maintained instead by a distributed network of computers. Such ledgers can be used for any form of asset registry such as inventory or monetary transactions. This may include the recording of hard assets such as physical property or intangible assets or any other form of valuable information. This distributed ledger

technology enables us to replace a multiplicity of private databases within each organization with one shared database that is trusted and accessible by all parties involved. Blockchain enables trust between parties that may otherwise not trust each other. The results in greater collaboration between organizations or between individual peer to peer without dependency on third party centralized institutions; Likewise, their results in transparency and many other efficiencies. This is a major significance as we currently have many centralized organizations that may be internally optimized but the inter organizational space in between them is really inefficient with huge amounts of border friction, redundancy, arbitrage and resources wasted on competition. By enabling trusted inter organizational networks these ledgers enable the formation of organization and collaboration where previously there was none, such as across whole supply chains or for different health care providers to collaborate around the patients' needs or for different transport providers to collaborate in delivering an integrated logistics network.

Smart Contracts

Second generation blockchains offer the possibility to automate the workings of these networks through smart contracts. Smart contracts are computer codes that is stored inside the blockchain which encode contractual agreements. These contracts are self-executing contracts with the terms of the agreement or operation directly written into lines of code which is stored and executed on the blockchain. Like normal computer programs these containers contain algorithms that take input of data and depending on the value of the input triggers certain events. For eg. A financial contract that takes in the input the amounts of money in a person's accounts. If it is above a certain level it increases the interest rate that they earn on their deposits. Such smart contracts can be used for automating many basic operations on the network once again eliminating the need for intermediaries' third-party institutions. This is because smart contracts are tamper proof and executes automatically.

Token economies.

Blockchain mainly is characterized as a technology with the possibilities of distributed ledgers as a shared trusted database enabling collaborating with organizations with the resulting disintermediation of centralized institutions and market exchanges. However, its implications go far above this as the blockchain concepts is more than a database. It is a new organizing paradigm for the discovery, valuation and transfer of all discrete units of value and the development of distributed organisations via token market systems. A token is a quantified unit of value that is recorded on the blockchain. Value may be of any kind. Such as likes on social media, currency, integrity of an ecosystem or might be an electrical unit. Token networks consist of network of independent nodes that act autonomously, but through incentive structures and signaling system of the market, self-organize to create emergent coordination and thus a distributed management system. For e.g. one We might create a clean air token where anyone who provides a service that contributes to the maintenance and provision of clean air can earn tokens like planting a tree whereas anybody who does the opposite has to pay tokens. So instead of having a Centralized Authority and a Clear Air Act, we have a token market that works to create signals that align people's incentives with maintaining and growing the underlying resource. In short blockchain is not just an information technology but also an institutional technology and it enables us to design incentive structures in the form of token economies and in such a way converts centralized organisation into distributed markets via token economics. This will allow human activity coordination in a decentralised fashion at a much larger scale than was possible before.

The great design innovation of blockchain is really its capacity to coordinate a network of autonomous nodes towards maintaining a shared infrastructure. This is done not just through innovation in information technology but also through the design of incentives systems which is the traditionally in the domain of economics. Through adding a layer of trust and value exchange to the internet the blockchain merges our newly developed information network with the institutional structures that sit on top of them thereby strengthening the capacity of these networks as a new mode of organizing society and economics. By merging economics and technology, it enables us to redesign institutional structures.

Importance of blockchain in banking and finance

Combining shared databases and cryptography, blockchain technology allows multiple parties that may not know each other from different geographical locations to have simultaneous access to a constantly updated digital ledger that cannot be altered. The blockchain is a powerful technology that enables Bitcoin, Litecoin, Dogecoin, and other virtual currencies to be open, anonymous, and secure. The blockchain essentially is a database about every Bitcoin transaction in detail. Usually known as a "public ledger," the log contains metadata about when and how each transaction took place. The ledger is publicly accessible through APIs and torrent sites. To prevent tampering with current and also past transactions, the database is cryptographically secured. Because of Cryptography can edit only the parts of the blockchain that they "own" - by possessing the

private keys required to write to the file. It also keeps everyone's copy of the distributed blockchain is kept in sync. The blockchain could potentially save banks billions in cash by dramatically reducing processing costs. Banks are keen to take the opportunity to reduce transaction costs and the amount of paper that they process. Implementing blockchain would be a step to making banks increasingly profitable and valuable.

All major banks are trying out blockchain which could be used for money transfers, record keeping and other back-end functions. The blockchain application changes the paper-intensive international trade finance process to an electronic decentralized ledger that gives all the participating entities, including banks, the ability to access a single source of information. It also allows them to track all documentation and validate ownership of assets digitally, as an un-alterable ledger in real time.

Fraud reduction

Blockchain is being recognized as the new technology that would reduce fraud in the financial world where 45% of financial intermediaries like stock exchanges and money transfer services are prone to financial crimes routinely. Most banking systems in the world, built on a centralized database, are more vulnerable to cyberattack because once hackers attack the one system, they get full access. This technology would get rid of some of the current crimes committed online today against our financial institutions.

Know your Customer (KYC)

Know your Customer (KYC) regulations are meant to help reduce money laundering and terrorism activities by having requirements for businesses to verify and identify their clients. Blockchain would allow an organization to access the verification details of a client by another organization, thus avoiding repetition of the KYC process. The reduction in administrative costs for compliance departments would be significant.

Smart Contracts

Blockchains help storage of any kind of digital information, including computer code that can be executed once two or more parties enter their keys. Contracts could be created, and financial transactions executed when this code is programmed, according to the set criteria.

Clearing and Settlement

The messy web that records loans and securities costs investment banks billions of dollars to run. Today, this is managed through a myriad of messages and manual reconciliation. One of the best-known examples of this restructuring is the Australian Securities Exchange, which aims to transfer a lot of its post-trade clearing and settlement on to a blockchain system.

Trade Finance

Trade finance is still mostly based on paper, such as bills of lading or letters of credit, being sent by fax or post around the world. Many think that blockchain is the obvious solution especially as numerous parties need access to the same information. This is a very important element of the supply chain, and blockchain can offer a vast number of elements in this area. Mr. Ramachandran, head of innovation for commercial banking at HSBC, predicts that it will take five years to digitize the entire trade ecosystems, such as sugar or energy, but blockchain technology has the potential to be "genuinely game changing".

Payments

Blockchain disruption could be highly transformative in the payments process. It would allow banks higher security with minimal lower costs to process payment between organizations and their clients and even between banks themselves. Blockchain would get rid of all the intermediaries in the payment processing system.

Trading Platforms

With blockchain-based technology, there would be momentous changes on our trading platforms with the risk of operational errors and fraud highly reduced. NASDAQ and the Australian Securities Exchange are some of the entities looking at blockchain solutions to cut costs and improve efficiencies.

Subsidy Distribution in India.

The subsidies provided for small farmers do not reach the right crowd. Such subsidies are usually availed by scrupulous and affluent farmers for non-farming activities. In addition, there is no proper identification given to fertilizer companies which results in such companies charging misleading higher prices to get the subsidy advantage. To avoid this, subsidies are transferred directly to the bank accounts of deserving farmers, which led to another problem of identifying deserving farmers in need of subsidies. Land records were inappropriate for such crowds. A report by RBI in Economic Times revealed that almost 45% of the small and marginal farmers have no access to agricultural subsidy though they account for 86% of the land holdings. The credit allowed for agriculture gets sidetracked for non-agriculture activities specially in the southern states and this has led to a high Debt to GDP ratio in the agriculture sector. A higher debt to GDP ratio indicates the non-probability of repayment of loans, which has resulted in a 6:7 ratio of crop loans disbursed to input requirements. Consider a situation where crop loans are availed at subsidized rate by a moneylender who lends

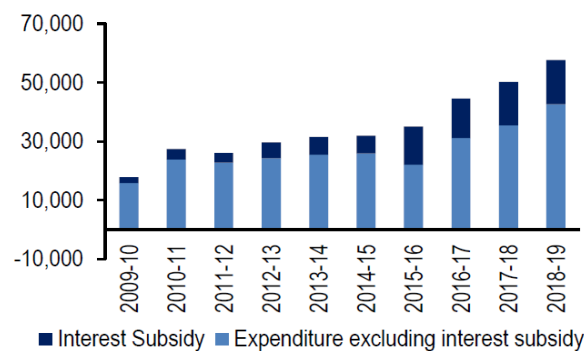
it out as small loans and large loans at higher rates of interest to small farmers thus pushing them to a credit crunch. Here the money lender has the advantage of proper documentation to obtain a loan whereas small scale farmers in real need of the benefit are unaware and unable to avail the same. This calls for a change in the agricultural loan disbursement scenario. A lot of recommendations on how this can be prevented have been suggested and implemented such as:

- Income support linked to area cultivated hand in hand with full cost recovery on inputs. This will ensure that enough funds are available for further allocation in the farm sector and crop research.
- The Minimum Support Price and Procurement prices of the produce which is fixed based on factors such as cultivation cost per hectare and costs structure across various demographics. Cost of production per quintal in various regions of the country and changes, Prices of various inputs and changes, Market prices of products and changes, Prices of commodities sold by the farmers and of those purchased by them and changes, Supply related information - area, yield and production, imports, exports and domestic availability and stocks with the Government/public agencies or industry, Demand related information - total and per capita consumption, trends and capacity of the processing industry, Prices in the international market and changes therein, demand and supply situation in the world market, Prices of the derivatives of the farm products such as sugar, jaggery, jute goods, edible/non-edible oils and cotton yarn and changes, Cost of processing of agricultural products and changes, Cost of marketing - storage, transportation, processing, marketing services, taxes/fees and margins retained by market functionaries and Macro-economic variables such as general level of prices, consumer price indices and those reflecting monetary and fiscal factors.

Allocation to the Ministry in 2018-19

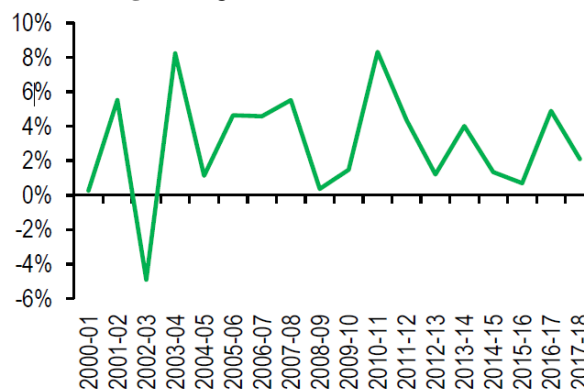
The Ministry of Agriculture and Farmers Welfare has been allocated Rs 57,600 crore in 2018-19, which is 15% more than the revised forecast in 2017-2018. This allocation is mainly for subsidies and centrally sponsored schemes. The allocation also increased due to the Interest Subsidy Scheme. The Interest Subsidy scheme allows a 2% cut of interest payable on loans to farmers on short term crops up to Rs 3 lakh rupees. If the loan is repaid within a period of one year, a further benefit of 3% is provided. The scheme was allotted Rs 15,000 crore, which totaled up to 32% of the estimated total expenditure.

Figure: Allocation to Ministry of Agriculture including Interest Subsidy (2009-2019)



Source: Secondary Data. Economic Survey 2018

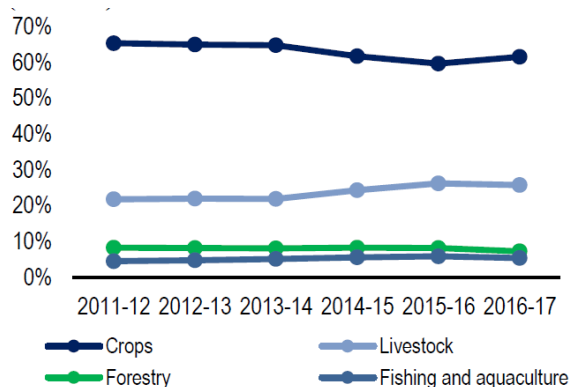
Figure: Agricultural Growth (in %)



Source: Secondary Data, Economic Survey 2018: PRS

From the above two figures, an increase in this expenditure did not guarantee the required contribution from agriculture and its allied sectors. The contribution went down from 18% to 16% in 2017-2018. In addition, the growth in agriculture remained has remained unstable.

Figure: Composition of Agriculture sector (2011-2017)



Source: Secondary Data, Economic Survey 2018.

The agriculture sector showed a decline from 65% in 2011-2012 to 60% in 2015-2016. Whereas the livestock and fisheries showed an increasing trend from 23% in 13-14 to 26% in 15-16. In 2017-2018, the Rashtriya Krishi Vikas Yojana (RKVY) the agriculture growth rate was targeted at 4% and monetary assistance was provided to states to implement increased produce, infrastructure and assets, Crop Diversification Program and Green Revolution to Eastern India along with innovation and entrepreneurship. In 2018-19, Rs 3,600 crore has been allocated to this scheme, an 18% increase over the revised estimate in 2017-18. Under the scheme, district and state agriculture plans must be prepared for development of various aspects under agriculture. The Standing Committee on Agriculture (2017) noted that only 12 states have prepared state agriculture plans as of February 2017. Further, only 38% of the district agriculture plans have been prepared. The Committee recommended that such plans need to prepare and approve without delay to avoid reduction of funds at later stage. The RBI Committee observed that the owner of the land is often not the cultivator even in the case of small and marginal holdings. For example, a landowner may get the benefit of subsidised credit at times and may be the moneylender to his cultivator. Farmers with land holdings of less than a hectare primarily borrow from informal sources of credit such as moneylenders (41%), whereas those with land holdings of two or more hectares primarily borrow from banks (60% or more) Informal sources of credit are typically offered at higher rates of interests, and may not have proper documentation. Crop insurance provided to farmers under the Pradhan Mantri Fasal Bima Yojana includes farmers and sharecroppers including those from notified areas. During 2018-2019 Rs 13,000 crore was allocated to this scheme which was an increase over the previous year allocation by 4%. This approximates to 28% of the Department expenditure. But the fact as to whether this increase in expenditure reaches the farmers and sharecroppers need to be evaluated. Only upto 5% of the agricultural households involved in rice and wheat cultivation have insured their crops. This is mainly due to lack of awareness about availability of crop insurance.

Farmers need to be educated on why crops need to be insured and what conditions usually favour different types of crops. It is targeted to provide crop insurance coverage to 30%, 40% and 50% of total cropped area in the country during 2016-17, 2017-18, and 2018-19 respectively. As per the Agricultural Statistics at a Glance 2016, out of the 2,009 lakh hectares of area sown in 2013-14, 427 lakh hectares (21%) of area was insured.

As per the Economic Survey 2018, in 2016-17, 554 lakh hectares of land was insured meeting the 30% target in 2016-17. This implies that the total cropped area in 2016-17 was lower as compared to 2013-14, resulting in meeting the target of 30%. In 2016-17, 571 lakh farmers were insured under the scheme. PMFBY is mandatory for farmers with loans and optional for those without loans like previous crop insurance schemes such as National Agricultural Insurance Scheme. Majority (76%) of the farmers insured had loans. Further, coverage of farmers without loans is low in most states where six states (such as Maharashtra and Karnataka) account for 95% of the farmers without loans insured. The Comptroller and Auditor General of India observed that coverage of farmers without loans was low under previous crop insurance schemes. It recommended that the Department should ensure coverage of more farmers including farmers without loans. The Standing Committee on Agriculture (2017) observed that the state governments are not readily accepting and adopting use of technology for assessing yield loss. It also observed that crop cutting experiments are not being carried out diligently. The Committee recommended that the Ministry to should pursue state governments to adopt

technology aids and satellite imagery for crop cutting experiments. Claims under the insurance scheme must be settled within two months from the crop harvest.¹³ The Standing Committee on Agriculture recommended that an institutional mechanism must be put in place to monitor faster settlement of pending claims. As of 2013-14, about 48% of the net sown area was under irrigation. This implies that the remaining area depends on rainfall.²⁶ Major sources of irrigation include wells (including tube-wells) (64%), and canals (26%). Further, area under irrigation consumes about 84% of the total available water in the country. Sources such as canals and tube-wells use the technique of flood irrigation, where water is allowed flow in the field and seep into the soil. This results in the wastage of water since excess water seeps into the soil or flows off the surface without being utilized. It has been recommended that farmers should move from flood irrigation to the drip or sprinkler irrigation systems (micro irrigation) to conserve water. The Pradhan Mantri Krishi Sinchai Yojana was launched in 2015 to increase the coverage of irrigated area. The Department implements the 'Per Drop More Crop' component under the scheme to increase water efficiency through micro irrigation and other interventions. In 2018-19, the Department has been allocated Rs 4,000 crore for the scheme, a 33% increase over the revised estimates of 2017-18. Budgeted allocation under the scheme has been increasing over the years. For example, in 2017-18, allocation under the scheme was revised down by 12% from Rs 3,400 crore to Rs 3,000 crore. In 2017-18, it is targeted that 12 lakh hectares of land will be brought under micro-irrigation. In 2016-17, 8.4 lakh hectares was brought under micro-irrigation, followed by 5.7 lakh hectares in 2015-16. Between 2001-02 and 2016-17, production of horticulture crops increased from 145 million tonnes to 295 million tonnes. This implies that the horticulture production grew at an average growth rate of 4.8%. In comparison, production of food grains grew at 1.7% during the same period in 2013-14, fruits and vegetables contributed to 23% of the total value of agriculture crops while other horticulture crops contributed to a further 7%. The National Mission on Horticulture seeks to promote the horticulture sector by providing availability of quality inputs such as planting material, and post-harvest interventions such as access to market. The Mission also includes provisions for Coconut Development Board, Horticulture Development Board and Development of Commercial Horticulture through production and post-harvest management, capital investment subsidy for construction, expansion, modernization of cold storages. In 2018-19, the scheme has been allocated Rs 2,536 crore.³ This is 15.8% more than the revised estimate in 2017-18.³ Over the past few years, the actual expenditure under horticulture has been lower than the budgeted allocation (except 2013-14).

III. Findings, Suggestions and Conclusion

This section conducts a detailed analysis of the solutions in order to bring about a change in the issues faced with the agricultural subsidy distribution. From the various literatures mentioned, it is evident that the Government incurs heavy financial expenditure with respect to agricultural subsidies. But the growth in the agricultural sector does not reflect. Lack of awareness, manipulations, insufficient documentation is the reason for this. Though the distribution of subsidies is done through banks, there is no proper mechanism to verify if these financial disbursements are allowed to the deserving crowd. There is also a need to track the flow of agricultural produce from farm to the retail outlets anywhere and at any time by any regulating body. Blockchains would ensure shared electronic ledger facility which would help banks to cut costs and increase transparency. The process of loan disbursal and settlement will become quick, eliminating the need for numerous middle and back office processes. Once blockchain is fully implemented, it will help in keeping a tab on the modus operandi of the agricultural loan. This will prevent credit diversion to a large extent. The information on Aadhar card can be used as a pre-requisite for blockchain implementation by Banks. The financial position of the person availing the benefit of agricultural credit can be verified and made available in the blockchain. This prevents obtaining multiple loans or even advance loans.

1. KYC information integrated through blockchain will ensure transparency and further follow up of loans. Know your Customer (KYC) verification of banks can be restructured using blockchain technology which could transform the existing process to become faster, simpler and more efficient. This is becoming a reality with corporates such as IBM have already implemented Shared Corporate Know Your Customer. Banks venturing into this can collaborate with other banks to ensure a secured decentralised way to collect and share KYC information. There could be claims that KYC on a public platform accessible by all banks may sound similar to the concept of Aadhar Cards introduced by the Indian government. The difference lies in the centralized control and management of information of Aadhar Cards by Government which makes it vulnerable to hacking, manipulation and more corruption. On the other hand, hacking through a blockchain is difficult because of the hash algorithm. The KYC helps institutions verify the identity of their clients. KYC is a regulatory legal requirement for banks for both new and existing client. The typical KYC check includes personal information, background check and ongoing account details. Each banking institution requires their own KYC verification which increases the customer acquisition costs. The distributed ledger technology of blockchain helps in emancipating the method. Once customer enters KYC details, it is approved and entered the blockchain and an

ID is generated which can be accessed by all banks. Any change in this will require approval from all parties in the blockchain. This will ensure funds availed by any person in the name of agriculture subsidy or loan is being tracked and cannot be reinvested in any other bank.

2. Cryptocurrencies can help in preventing credit diversion

A cryptocurrency is a digital currency based on blockchain technology. They are secured by cryptography which makes it highly secure and difficult to counterfeit. They are not issued by any central authority which makes them immune to any government interference or corruption. There is an expectation that crypto banking will emerge as an important aspect in the financial industry with its increasing popularity. The existing financial and banking sector will undergo a lot of improvements by offering the same services that one can find in conventional banks but in a decentralised manner. This will guarantee more efficiency, transparency and security. The use of cryptocurrencies is still under question in India. Indian banks, on the instruction of Reserve Bank of India prohibits banking services and products to customers and businesses if they have dealt with cryptocurrencies. But that does not conceal the fact that digitally stamped cryptocurrencies protect the integrity of a transaction. Consider a situation where a farmer acquires cryptocurrency created for acquiring fertilizer from banks. This currency contains information on the prices that is determined by fertilizer and the rate of subsidy that must be offered. The scope of credit diversion is greatly reduced here as any information contradictory to the cryptocurrencies will require approval from all the parties in the transaction. This will also justify the ratio of Ministry expenditure to agricultural produce.

3. Banks could liaise with fintech companies to create farmer awareness.

An example of a cocoa farmer from Ghana where digital technology transformed his life and profits will better explain the role banks could play by networking with fintech companies. The Olam Farmer Information System (OFIS) helped in increasing his produce from 9 bags to 25 bags. Banks can connect farmers to advisers who can give valuable information on the techniques on farming so that farmers can keep pace with the trends and demand. Fintech companies specialized in agriculture can give personalized recommendations to farmers on how to check the prices of their produce, trade online and how to store their produce. They can also make the agricultural sector aware of the various types of micro-loans and accounts that can be opened in the banks. Banks can also develop cryptocurrencies which may contribute to stronger financial inclusion and lesser exploitation. This will also help in reducing other supply chain intermediaries and helps banks in obtaining economies of operations.

IV. Conclusion

The infinite opportunities for farmers from Blockchain may be beyond the reach of the farming community but on adoption the benefits will outweigh the limitations and strengthen the primary sector of our economy. Innovative businesses will help the use of blockchain technology to build an objective, more reliable food supply chain from farmers to customers. This cutting-edge technology will help banks to retain their existing presence by diversifying their operations.

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