Block Chain Technology And Inclusive Tamper Proof Digitization Of Land Records In Indian Scenario

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Disclaimer: - the views expressed here are personal and have nothing to do with my official position. The views are expressed while exercising article 19(1) of our constitution (freedom of speech and expression) and article 51 a (h) (to develop scientific temper, humanism and the spirit of inquiry and reform) with the purpose of learning and innovative research and development in this field.

Abstract

Management of land and revenue records has been going on since time immemorial. From the dawn human settlement which began with neo lithic age with the discovery of wheel and pottery system human lives come to an ease as they learn agriculture. As per the study conducted by Centre for ecological economics and natural resources (CEENR), the evolution of land takes place in the mid-Paleozoic era, between 480 and 360 million years ago. It is an important development in History with far-reaching consequences for the evolution of terrestrial organisms. Human beings started inhabiting South Asia approximately 30,000 years ago. Around 7000 B.C., the known Neolithic settlements appeared on the subcontinent in Mehrgarh and other sites in western Pakistan. These gradually into the Indus valley civilization.   So in precise we can say that from new Stone Age (neo-lithic) to copper age to this postmodern electronic age of knowledge economy and information society, the improvements and changes in the administration and management of land records have been made from time to time. At present, once again the need for improvement and new thinking in this system is being felt. In the twenty first, technical intervention will be an integral part of these reforms. With the advancement in technology, we have shifted to paperless mode so much as all the record is being digitized and every service is being provided through online mode. There is a need to make use of Block Chain technology in offices for record (information/data) building, storage and issuance of documents/ certificates etc. in a safe, secure and tamper proof manner. The same technology may be used in revenue department for temper proof revenue extracts; mutations; registration etc. which may help in resolving day to day ownership disputes.

Block chain Technology is one of the various technologies that can prove to be vital in the management of land records and revenue records. The traditional land record management system is a slow and laborious process, involves many intermediaries and have maximum chances of fraudulent and fake land entries or transfers. The data of the land is to be stored in a single place leading to security issues also. Block chain is a perfect domain for the land record management, preservation and land transfer process. In this study, a land registration system using block chain is proposed to overcome the traditional limitations of land registration and management system. Land being an important source of asset based production, the use of block chain technology can help to improve this sector in its work implementation as well as its characteristics significantly for a seamless and hassle free work flow to achieve a reliable system. Block chain is a way of passing data (such as records, events or transactions) from one party to another in a very secure way. It is an electronic record of information that requires digital security. All data stored in the block chain is immutable. Once a piece of data enters into a block chain, it is practically impossible to alter its value. The block chain has changed the model from centralized way of traditional business to the decentralized model of the block chain, which means there it can run without any central authority. It works on peer to peer model rather than peer-mediator-peer. It has thus become the most used model in different industries such as construction industry, banking sector, capital markets, cybersecuirty, health care and pharmaceuticals, agriculture, telecom, insurance sector, real estate and governance etc. as it is the safest, fastest, transparent and it is also the most comfortable to implement. As per the report and data published by FIAN International in November 2020, it has been extensively used in mapping of the digitization projects in the land sector by countries like Australia, Canada, Georgia, Honduras, Japan, Sweden, United Arab Emirates, United Kingdom, USA, Ukraine, Bangladesh, India etc.

Keywords:- block chain, decentralized, record of rights, Jamabandhi, mutation, cryptography.

INTRODUCTION

From wars, treaties, invasions, immigration and settlement in India, land records have been subject of modification from various sources, cultures and civilizations in various periods of our history. From the earlier times, the economy of India was purely based on agriculture, thus the land revenue was the predominant and pivotal source of revenue. The history of the present land revenue and land records management prevalent in India is very old. Suffice it to say in brief that its roots extend to the land revenue system of Sher Shah Suri and Mughals. On the other hand, the effect of land revenue management system was also practiced by Katyurs, Chands and Gurkhas. The first land settlement operations were introduced in 16th century by the then ruler of Delhi Sher Shah Suri, he innovated the ideas and later on his vision was further streamlined during the reign of Akbar when his prominent minister, Todar Mal (zabti system) re-organized the entire land revenue system. This system was such progressive that the Britishers also inherited and continued it, but made the certain changes for betterment. The permanent settlement introduced by Lord Cornwallis in Bengal in 1793 had three main land revenue systems, such as zamindari system, mahalwari system and ryotwari system. After independence, along with the zamindari ablotion, ceiling act and multiple land reform based acts and rules were made, but there was no significant change in the prevailing systems of land records management, in which the need was felt. Two schools of thought prevail in this regard today –a rejectionist one who believes that there is no need for any change in the present land records management and maintenance system. They argue that the present system has served the test of times and is their collective heritage along with the unique revenue terminology, which despite being complex, needs to be preserved and maintained in circulation. The other school being reformist who believes in the demystification of revenue records along with the utilization of readable versions of narratives and revenue terminologies at the level of common understanding along with the effective utilization of information and communication technology in it. This school argues that the personnel of the revenue department have become well versed and have acquired some kind of expertise. So in this sequence, by using modern technology in land records management, digitization of land records have been made possible which make it easy and accessible. There must be added a third school by the

name of either revolutionist or revisionists and block chain technology must be fully adopted for the effective and inclusive digitization, management and preservation of land records. Initially the circulation of block chain technology was limited to only bitcions i.e. crypto currencies but now its application to varied other progressive fields has also began to yield magical results.

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AN INTERFACE OF BLOCK CHAIN TECHNOLOGY

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The underpin of block chain technology have been around since at least the early 1980s , the technologies development and substantial public interest began in earnest fourteen years ago on 31st of October , 2008 , with the publication of the bitcions white paper by Satoshi Nakamoto. In it, Nakamoto described the concept of bitcion as a peer to peer currency transaction model. Since then, hundreds of other currencies as well as other services have been launched using the block chain technology.

A block chain is a decentralized, distributed and public digital ledger that is used to record transactions across many computers so that the record cannot be altered retroactively without the alteration of all subsequent blocks and the consensus of the network. Besides allowing crypto currencies to be transferred, block chain allows for a variety of types of digital information or data (digital assets) to be shared or distributed. Thus in the block chain the nature of work built a trustworthy platform where users are the owners of the chain. Block chain occurs in three phases of the project—pre-construction, construction and post construction. In the first stage, the data is gathered and stored and protected. In the second phase, the records and data collected is authenticated and secured to prevent breaching. In the third stage, final changes are recorded in the block chain model. This forms the basis for further upgrades for the block and a more secure source of information and records are for its protection. The block chain is a distributed ledger, every block in the network has an identical or almost identical copy of the ledger, and this ensures that if a block in the network is compromised or damaged, it can also be restored. Every block could receive a complete copy of the data base from the system through the form of the sub system.

The critical features of the block chain technology that makes it today's potential technology are:

- **Persisten**t: data recorded cannot be deleted or altered and are saved permanently, hence it cannot be corrupted.
- **Time stamped records**: Entire data entry in the block chain is recorded digitally at the time of occurrence.
- **Approachable:** Data records are easily accessible to the partipants; they can view data or add data according to the consent granted.
- **Decentralized**: The network is maintained by a group of blocks; therefore, there is no single governing authority. Any data can be stored securely, essential documents, contracts, etc. and can be directly controlled with the help of the private key.
- Block chains are less likely to breakdown as a direct attack on the whole network of block is difficult for heckars,no involvement of third party , no chance of scams, transparent as every change in the block chain can be easily monitored, hence enhanced security are other features of block chain technology.

Block Chain is mainly divided into three main types and they are as follows

1. **Public Block Chain:** it is fully decentralized and any one can do transactions. any individual can join the network irrespective of location, nationality etc.
2. **Private Block Chain:** it is also referred to as permissioned Block Chain, members need to seek permission to join the network as transactions are private and are accessible only to the participants.
3. **Consortium Block Chain**: it is also referred as permissioned Block Chain, but the difference is that, consortium block chains are monitored by the group and not by any individual.

BLOCK CHAIN IS NEED OF HOUR IN LAND MANAGEMENT, DIGITISATION AND REVENUE RECORD KEEPING

Public record keeping is a pillar of government and provides evidence of the actions and decisions of the governmental officers. Open inspection of the public records ensures that the government is accountable to the people it serves. Trust in government begins with the trust in public records. Land records are extremely valuable as permanent evidence of the land use and ownership. Land records have legal, environmental and financial value that can extend for hundreds of years or forever.

The technologies and processes that comprise public record keeping must ensure that records remain authentic, reliable, integral, litigation free and accessible, especially for archival records which must be retained indefinitely. Technology selected for use in governmental applications must be thoroughly vetted and must adhere to the requirements that underpin essential functions of the government.

Federal think tank in india **NITI Aayog** in its draft discussion paper Block Chain: The Indian Strategy "towards enabling ease of doing business, ease of living and ease of governance" published in January 2020 recommends the use of block chain technology for the digitization, management, registration and preservation of revenue land records. The report says , despite the fact that the technology is still in a nascent stage of its development and adoption as it continues to evolve , it is important for stakeholders such as policy makers , regulators , industry and citizens to understand the functional definition of the entire suite of block chain or distributed ledger technologies along with legal and regulatory issues and other implementation prerequisites. Equally important is the fact that this technology may not be universally more efficient and thus specific use cases need to be identified where it adds value and those where it does not. On a national scale , the union government , policy think tank NITI Aayog has been working on building the country's largest block chain network (**India Chain)** aiming to reduce fraud and building transparency in the system. India Chain will be linked to India Stack, a set of codes developed around India's unique identity project Aadhar.

In 2018, the **Uttar Pradesh Government announced plans to introduce the Block Chain** based record keeping system to secure the land registries and revenue records. A major reason is that 67 percent of the total 220 million people in the state are dependable upon the land to earn a living. Similarly, another state **Andhra Pradesh** is also working with private firms to secure land records in its new capital, **Amravati, using Block Chain**. In the same year of 2018, **United Nations Development Program (UNDP)** said that it had been working on the project to integrate block chain technology into the land registry in India (Panchkula **Haryana**) as part of efforts to make it more reliable.

As per the report published in the newspaper **The Hindu on 11th of June 2022,** the state government in **Telegana** also intends to make land records more temper proof by moving them to a Block Chain platform in a phased manner. The Dharni Project special officer Rajat Kumar Saini was speaking at a panel discussion on Ushering Mass Block Chain Adoption __ The Indian Way at the international Block Chain Congress, argued that 'say, a person 'X' is there on a land record. This has to be changed to 'Y' and there are five steps for going from X to Y, to mutate the land. So once, all these five steps are done or recorded, it would make a block. Then that block shall be validated in the layer of block chain. Once it has been validated, only then the records shall be changed". The Telegana state government, he pointed out, does not intend to move all land records to a block chain platform in an instant. Only the validated transactions would be moved to the block chain. Slowly and gradually, as we get comfortable and land records become clearer and cleaner, we would be moving the entire land records to the block chain" he said.

Below in the table were are putting up the details of countries along with regions regarding the details of mapping of digitization and block chain projects in the land sector __ a case study report published by **FIAN INTERNATIONAL** in November 2020.

S.no.	country	Location/ Name of project	Donor/company involved	Time frame	status
1	Australia	Regional New south wales	Chroma way	2018-19	Proof of concept (POC) completed / pilot planned
2	Canada	Regional (Pelotas and Morro Redondo cities	Inter-American development bank/ Chroma way	2109-	POC ongoing
3	Japan	Regional	Propy	2019-	Pilot ongoing
4	United Kingdom	Unknown	Methods R3, Consensys	2018-	POC Completed/ Pilot Ongoing
5	USA	Regional (two cities in Wyoming)	Medici Land Governance	2018	Pilot ongoing.
6	Pakistan	Punjab Land Records Management and Information Systems Project	Digital Land Registry, E-Services	2016/17-21	World Bank
7	India	Regional(Haryana)	UNDP/Block scale solutions	2018	POC Completed
8	India	Regional (Andhra Pradesh)	Zebi Data, Chromaway Consensys	2017-18	Pilot completed
9	India	Regional (Telegana)	…	2017-18	POC Completed
10	India	Regional Uttar Pradesh	…	2018	unknown
11	India	Regional (Maharashtra	XinFin	2018-19	POC Completed
12	India	Regional Madya Pardesh	…..	2019	unknown
13	India	Regional Goa	….	2018	unknown
14	India	Regional Rajasthan	….	2018	Unknown

MAIN REVENUE RECORDS

Maintenance, preservation and updation of land records must be done through the application of Block Chain Technology in accordance with the revenue acts and rules issues time to time by the respective states of Indian Union as land is included under entry 18 of state list under article 246 of seventh schedule of our republican constitution. Revenue department across Indian states despite diversity maintains the following major and necessary type of documents.

- **Record of Rights**: The record prepared at the time of settlement operations in an estate or village is called record of rights (Misalhaquat). It contains the details of persons who are land holders, tenants or assignees of land revenue and who receive rates, cessses or other payments due from such persons. It also contain genealogical tree (Shajra Nasab), map of estate, village etc. This is the most important record so far as the evidential value is concerned.

- **Jamabandhi:** it is the amended edition of the record of rights (usually four years updation) and actually part of record of rights which gives the list of land holders and tenancy holders with details of fields, rents paid by each tenant and land revenue paid by each land holder. It is prepared after every four years and hence also called Jamabandhi Caharsala.

- **Girdawari:** Known as harvest inspection is conducted twice in a year for kharief and Rabi crops. It is carried out by patwaris after spot inspection of each field for recording the condition of the standing crop including Kharaba.

- **Mutation Register**: It is printed register with Patwari, separately maintained for each village consisting of normally 100 leaves. Each leave has a foil and counter foil and is duly numbered. The title page depicts the name of village, tehsil, district and date of issue etc. The foil is known as parat Sarkar and counter foil as parat Patwar. The parat Patwar has to be entered by the Patwari as per the existing entries of the latest Jambandhi and parat Sarkar are made as per the orders passed by the revenue officers on mutations. There are as many as twenty five mutations mentioned in standing order and before writing up of Jamabandhi of any village or Mauza, all changes which have taken place in record since the previous Jamabandhi, are updated through the orders passed on mutation.

Besides these, the various revenue terminologies used in revenue literature which needs demystification or proper understanding before the overall adoption of Block Chain Technology in the field of revenue land records are as under

- Abadi Deh means inhabitant site of village
- Badastur means unaltered
- Banjar means uncultivated land
- Banjar Jadid means new fellow 9 land not cultivated for four continuous harvest though it was cultivated earlier)
- Banjar Cadim means old fallow (if continued to be uncultivated for next four harvests)
- Barani means dependent of rainfall
- Bigha means a measure of land area (it is different in different areas)
- Biswa means one twentieth of a bigha.
- Biswani means one twentieth of biswa.
- Chahi means irrigated from well.
- Chahi Nehri means irrigated partly from well and partly from canal.
- Chari means a kind of millet grown for fodder.
- Chowkidar means village watchman.
- Chkota means lump grain rent or rent consisting of a fixed amount of grain in the Rabi and kharief.
- Gair mumkin means barren.

- ➢ Girdawar means kanungo or supervisor of patwaris.
- ➢ Gosha means corner.
- ➢ Kharaba means portion of crop which has fallen to come.
- ➢ Khasra means list of fields, field register.
- ➢ Khata means holding of tenant.
- ➢ Khewat means a list of owner's holding.
- ➢ Khewat/khatauni means a combined khewat and khatauni
- ➢ Khud kast means cultivated by self.
- ➢ Killabandhi means rectangular measurement.
- ➢ Lumberdar means village headman.
- ➢ Latha girdawri means cloth copy of the patwaris map.
- ➢ Mauza means village.
- ➢ Min means a portion or part.
- ➢ Missal Haqiyat means a record of rights.
- ➢ Massavi means mapping sheet.
- ➢ Taccavi means loan granted by a government to landowner for agriculture purposes.
- ➢ Wattar means diagonal line etc. etc.

EXISTING LAND RECORD SYSTEM

India has a land disputes over all levels of courts, comprising of discourse over a land of 2.5 million hectares involving 7.7 million people, which contains a total of 66% of all the pending court cases in India (Buterin v, 2014). An average pendency extends from an average of 20 years, from the undertaking till the last hearing resolution. As a result land registration authenticity is providing a serious difficulty in the country. The critical process in the land registration is the sale deed process, which involves five significant organizations, which include the government, two parties of interest, banks, registrar, witnesses and other minor organizations such as stamp vendors, advocates, agents, documents writer. This process affects the efficiency in transferring the ownership of land from one party to other, drastically as it can almost 30 days in transferring the total property, which poses a risk in the data loss or modification. As per the report of CAG, some 124325 cases were pending for property registration in 2015. The entire registration process spans over three departments i.e. revenue and mutation department, registration department and cadastral survey department. The process of acquiring necessary documents from these departments is a cumbersome exercise and mostly records are also not updated in uniformity across all departments. Moreover the Revenue Department (collection of land revenue and maintainace of record of rights), Survey and Settlement Department (maintaining spatial land records and cities and village maps), and Registration Department (registration and maintainace of property documents and deeds, evaluation and collection of stamp duty) __ most of the times runs parerell and lack requires synchronization.

The digitization of land records across all the states was proposed and the same was started in 2008, to integrate all the three departments, to digitize all the physical records and synchronize the records. The same is called digital India land records modernization program. The programme was due to be completed in 2016, however due to the enormous nature of documentation in land records and unclear land titles, the programme was re-introduced under the digital india flagship programme and is called digital india land records modernization programme. The programme is extended to 2020-22 and an additional budget of 950 crore has been allocated in the 2021 budget. The proposed framework under DLRMP is to have a single window for land records and to integrate all mutation entries and conclusive titles.

DRAWBACKS OF EXISTING METHOD

The draw backs of existing land record system are as under

- o It is long, tedious and costly process.
- o It is very much time consuming.
- o This process is less secure as compared to the block chain technology.
- o It has no transparency.
- o It is not fully error free and is under cyber threat.
- o This process is less synchronized.
- o Still the presumptive nature of sale deeds and other transfer deeds haunts.
- o A very poor condition of record of rights.
- o Non maintainace of cadastral maps as per the light of day.
- o This process has very less data integrity.
- o Scope of dead capital and benami transactions still on higher side.
- o Lack of technical competency and physical infrastrure.
- o A government official lacks understanding, training and orientation.

BLOCK CHAIN THE ONLY WAY OUT

India is rapidly developing in each sector and becoming economically stable and the block chain technology assists in dealing with various public areas. In India the block chain technology was first introduced in Andhra Pradesh and they collaborated with Chromway, a Sweden based company to build software for improving the land management system using block chain technology and was soon followed in Uttar Pardesh, Haryana, Telegana, Maharashtra, Madya Pardesh, Goa and Rajasthan.

Since Block Chain is a temper resistant method, it makes easier for users to buy , sell and obtain information about the land and its purchasing history. Its benefits in the field of land record management system are as under

- ➢ The property owner can verify their own land registration in block chain to see if they are entitled to transfer legal ownership to others or sell their property.
- ➢ Both buyer and seller are users in the block chain channel and may communicate with each other easily because it unites users on a single platform.
- ➢ Banks can use the block chain technology to check the status of the asset's current legal owner.
- ➢ Property and land records verification becomes much more accessible and simple.
- ➢ Once the verification is complete, buyers and sellers can proceed to the next step of registration process which is transaction.
- ➢ A smart contract is used to complete the purchase of land.
- ➢ The seller gives the buyer ownership of property using the block.
- ➢ The payment process is finished automatically by sending funds from the buyer's bank to the seller's bank.
- ➢ Using the block chain smart contract platform, everyone including the buyer, seller and bank may check the status of contract. With the help of a smart contract platform, legal steps can be executed automatically.
- ➢ Having land data in central locations, all agencies can access for speedy processing of services and mutation requests.

- There will be no requirement for authenticated copies of documents to be provided by trusted authorities such as notaries.
- Farmers will be confident that their land ownership will not be altered by rouge individuals.
- Farmers can readily receive loans. As soon as the farmer repays the loan, the details pertaining to obligations in the record of rights can be updated. This allows farmers take benefit of various services.
- When the agricultural, horticultural and animal husbandry departments services are recorded on the block chain, these departments will be able to ensure that the needs of farmers are addressed.
- Property registration block chain data will be available for verification in the registration software's work flow system as well as to the general public. This will give all the information on the property chain, from the first buyer to the last. The purchaser does not need to rely on any untrustworthy persons or agencies to verify the legitimacy of the seller's paper work.
- Citizens and the registration department would have access to a repository of transparent, reliable and temper proof property registration documents.
- It ensures everyone has simple access to their land records.
- It lowers human interference in land record administration, which reduces illegal tampering and corruption.
- Land records administration is decentralized and reaches to everyone.
- Block chain technology has the potential to solve difficulties in land record management such as tempering with records, loss of data due to fire or disaster, purposeful harm to records, destruction archives and theft of records.
- Concerns relating to income claims, conversion of agricultural land into non-agricultural land, demarcation, arbitration, removing of illegal encroachments from the land will be easier
- Block Chain technology relies heavily on hash functions which converts any data into fix size.
- The risk of cyber-attacks in the field of land records can be minimized or contained.

IMPLEMENTATION APPROACHES

First and foremost, it is vital to understand how the block chain will be developed for land record administration as well as who will be transferred to the block chain. To handle land records, every person/office/institution with a connection to land, its regulation or management must be included to the block chain. A short list is provided below.

- Khatedar or Bhumidar
- Land management committee
- Gaon sabha.
- Patwari/Lekhpal.
- Qanungo
- Naib Tehsildar.
- Tehsildar(Assistant Collector –II)
- Assistant Collector (I) in charge of pargana.
- Sub- Registrar.
- Revenue Accountant.
- Amin.
- Bakil Navis.
- Collector.
- Additional Collector.
- Commissioner.

- Assistant Commissioner.
- Board of Revenue.
- Governments Departments.

After this, the various activities to be done in land-lekh and land management need to be done through or added to the block chain.

THE PERMANENT SETTLEMENT AS FINAL SOLUTION

So Block Chain Technology can prove to be effective in creating, updating, managing and maintaining the precious revenue records. But to transition the age old legacy records, we need to ensure every aspect of these records must be indisputable to start with. While Block Chain could ensure integrity and indisputability of future changes, it cannot resolve the differences that exist today. The incompatibility between the revenue records and actual spot positions must be addressed through neo-permanent land settlement as the final solution.

CONCLUSION

Block Chain technology in the land records and its resources has been an essential aspect of today's world. Once the land transfer task, the information automatically updates and saved on that Block Chain platform and this process is the safest and temper free model of the operating system. No one can damage the legal right of ownership and no one can damage the data asset; others cannot make change in that transactions and ownership. The history of past transfers of ownership uses to help in verifying current legal owner of the land. There is no need for any authority in the Block Chain, which is a huge advantage in today's world. There is no need of any middle person or intermediary and is simply called a de-centralized ledger.

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