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Next Gen Land Reform Agenda for Vikshit Bharat 2047

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ABSTRACT:
India's land governance system remains constrained by fragmented institutional structures, outdated records, unclear titles, and limited coordination among revenue, registration, settlement, forest, and judicial authorities. Despite historical land reforms addressing agrarian inequality, contemporary challenges include fraudulent registrations, encroachment on public lands, prolonged litigation, and inefficient land transactions. This paper examines the structural limitations of existing land administration and proposes a technology-driven reform framework based on blockchain-enabled land records, GIS-based mapping, artificial intelligence-assisted verification, and integrated departmental databases. The proposed approach aims to establish transparent, secure, and efficient land management by enabling conclusive titles, real-time updates, and improved governance for Vikshit Bharat 2047.

KEYWORDS: Land Reforms, Blockchain, DLC Rate, Mutation, FRA, LARR 2013

INTRODUCTION

In India land management system lying in government control is highly fragmented. Various departments deal into various facets of land management. Land sale deed registration is done by Sub Registrar. Land conversion from agriculture to residential, commercial etc. is done by Revenue department led by District Collector, Sub Divisional Officer and Tehsildar in the District. Land Revenue Act has defined various categories of land such as Oran, Forest, Ongor (A type of marshy land), Riverine, Wetland, Talaab and Hill etc. The land classification list is maintained by Revenue Department. Settlement Department lies at top which classifies ownership, type of land and creation and division of new Khasras and revision of land records at periodic intervals.

However, all such departments operate in isolation. Many a time the settlement of rights is not properly done and often land ownership in revenue records is entered based on actual capture of land by particular person. For example, if an encroacher sits over forest land, often forest land is earmarked or erroneously entered in the name of encroacher in land revenue records. Encroacher often in connivance with revenue or settlement department keeps increasing the area of encroachment. Even if such thing doesn't happen on actual ground position but in land revenue records the game continues. While the encroached forest land enters into revenue records with clean title in the name of encroacher, no intimation is given to forest department regarding such thing happening in its backyard. Land revenue records are very minimally placed in public domain. Land tile history search process is often cumbersome and complex. Historical and legacy land record data is not online and neither in public domain. If an erroneous sale deed happens,

there is no process of immediately putting objections by bonafide owner of the such land. Only process available is via legal suit in revenue courts.

Majority of suburban/village population is very poorly aware of land revenue laws and land records and they cannot live track the status of their bonafide land ownership. Most of the agriculture. Abadi land in rural areas is still existing in the name of forefathers. Records are not regularly updated. While settlement /revenue department may erroneously put forest land in the name of encroacher as clean revenue records. Forest department under no way comes to know that its land has been put in the name of some encroacher in revenue records. Now, encroacher with its clear and clear land title in its favor often does sale deed to a third person and the chain continues. The whole nexus come into knowledge of forest department when the of process actual possession of starts and is objected by forest department. The process of such long chain error is costly and complex and often detrimental to the buyer of such land. Registrar having observed clear title approves the sale deed, has no quick mechanism at its disposal to check what has happened in revenue records. Under Registration and Stamps Act he/she is not responsible to do so. Under the scenario land disputes are piling up in courts which is detrimental in attracting in private capital investment and landscape development. The process is putting hindrance on Ease of Doing Business and Vikshit Bharat goal by 2047. The Economic Survey of India recommends accelerating land reforms by digitizing land records, ensuring clear land titles, simplifying land leasing laws, and promoting transparent land markets. These measures improve agricultural productivity, reduce disputes, facilitate investment, enhance farmers' access to credit, and support faster industrialization and inclusive economic growth.

ASSESSEMENT OF LAND REFORMS

The evolution of land reforms in India reflects changing political and economic priorities across different historical periods. In ancient India, land was largely controlled by village communities and the king, with cultivators enjoying customary rights. During the medieval period, particularly under the Delhi Sultanate and Mughals, systems such as Iqta, Jagir, and Zabt emphasized revenue collection, often placing heavy burdens on peasants while limiting ownership rights. The British colonial period institutionalized exploitative land revenue systems—Zamindari, Ryotwari, and Mahalwari—primarily to maximize revenue. The Permanent Settlement (1793) created absentee landlords, leading to tenant exploitation, indebtedness, and widespread rural poverty. These systems laid the foundation for agrarian inequality. After Independence, land reforms sought to dismantle colonial agrarian structures through the abolition of intermediaries, tenancy reforms, land ceiling laws, consolidation of holdings, and distribution of surplus land. The abolition of zamindari was largely successful, benefiting millions of cultivators. However, tenancy reforms remained weak due to informal leasing and poor implementation. Land ceiling laws had limited success because of benami transfers, legal loopholes, exemptions, and prolonged litigation. States such as West Bengal (Operation Barga) and Kerala achieved relatively better outcomes due to strong political commitment. Despite these reforms, challenges persist, including fragmented holdings, outdated land records, insecure land titles, gender inequality in land ownership, and frequent land disputes. Thus, while land reforms weakened feudal structures and improved tenure security, they have not fully achieved equitable land distribution or sustainable rural development. A new generation of reforms focusing on digitized land records, conclusive land titles, legal leasing, women's land rights, and efficient dispute resolution is essential to meet the needs of modern agriculture and inclusive economic growth. The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (LARR) strengthened landowners' rights through fair compensation, rehabilitation, and consent

requirements. However, complex procedures, delays, litigation, and limited applicability have slowed infrastructure projects. Reforms should simplify acquisition, ensure faster dispute resolution, strengthen rehabilitation, improve transparency, and balance development needs with protection of affected communities.

LAND ISSUES PREVLENT IN INDIA

[A] Case of fraudulent land registrations

Majority of land and property related documents still exist in hard paper which can often be duplicated. There is no easy process to check their authenticity. Sale deed at Registrar office may happen over fake documents. Registrar has no mechanism to live check the authenticity of documents presented. The Saler may scam the buyer. Buyer cannot do much after the sale deed when still much of the sale deed amount transaction happen in cash which forms no prosecutable record. Buyer comes to know of the scam when revenue department rejects claim of mutation. Secondly there is time lag between sale deed and process of mutation to be completed. During the time period the land/property still remains in the of seller. A fraudulent seller can sell the same piece of property multiple times to different buyer and complete the sale deed without getting caught. While it is open secret that the cash /black money transaction form majority part of land/property sale deed transaction due to gap between DLC and market rates. To save stamp duty sale deed amount is often undervalued. Scammed buyer cannot recover the black /cash money from fraudulent seller even if later being prosecuted as cash transaction has no record exists.

[B] Case of DLC and Market Rates

Revenue department notifies land circle rates/District Level Committee (DLC) rates as minimum land rates for registration, sale, acquisition, valuation and various other purposes. However, the DLC rate revision based upon past historical average data, changes in land use patter, average market price etc. rather than dynamic market price conditions. While the DLC rate may be same in under developed and rural areas the gap between DLC rate and market rate of land /property is huge in Urban and fast developing areas. This gives a channel of use of large chunk of black/cash money in property transactions process which not only promotes flow of black money buy also artificially inflates property prices leading to huge gap between average income and property prices as seen in cities like Gurugram, Delhi and Bengaluru etc. Often genuine buyers are trapped into cash transactions in lurch of low registration prices and taxes. Lower DLC rates has led to dispute in land acquisition by Government for public infrastructure projects. Lack of adequate compensation which is often based on DLC rates is a major concern. Several big-ticket capex projects are stuck.

[C] Land related court cases

Land based litigations form one third of total case pendency in India. Civil suits are often costly and time consuming reducing the inherent opportunity cost. The case pendency in revenue courts like court of collector, sub divisional officer, tehsildar court, revenue appellate court and revenue board are gruesome and often actual figure in unknown. Cases operate in isolation. This reduces opportunity costliness business cost, reduces process of contract enforcement and brings down Ease of doing business. Land litigation needs to be taken seriously in form of Judicial impact of assessment of land transactions under Vikshit Bharat Agenda 2047.Any error out of land title mutation, Patta grant ,division of Khasra ,error in Jamabandi , settlement of land rights has dire potential of increasing judicial pendency. Further non integration of financial institutions like Banks, NBFCs and loan advance agencies with land database registry often creates land disputes.

[D] Forest Rights Act (FRA),2006 and Land grabbing nexus

At many places Forest Rights Act 2006 has become tool of forest land grabbing instead of getting suitable land rights and removing historical injustice for traditional forest dwellers. Many State governments announce populist FRA Patta distribution of program on 9th August (World Tribal Day). While as per FRA Act such rights give are immutable and non-transferrable (except family hierarchy). However, having clear land title in revenue records may in future become stepping stone for sale deeds and transfers of property to non-bonafide buyer often for commercial activities in future. Land registrar has no tool at its disposal to check the violation of FRA Act. Consequently, FRA Pattas in revenue records may in future become a tool for continuous sale deed and encroachment on forest land to property developers. FRA Pattas have got no sunset clause in a particular village. It keeps on renewing in the name of father, brother, wife, son and daughter etc. each trying to get up to four hectares of forest land. There is no sunset clause over eligibility for FRA Pattas. A lot of pristine forest land have been encroached in various National Parks, Sanctuaries and Reserved Forests.

The story of land grabbing at Gochar, Oran, Angor, Talab, Nadi,Pahad, Hill, Wetland and Community land etc. has followed even much worse pattern and condition is dire. These lands have historically not been properly managed. Fragmented ownership lies between Panchayati Raj, Urban/Rural bodies and Revenue Department etc. Unlike forest laws (forest falls under concurrent list of constitution), revenue laws are too weak and often favor encroachers. Legal provisions exist of allotment/regularization of old encroachments. In some states like Rajasthan, provisions exit in Land Revenue Laws for allotment of government land for agriculture/residential/industrial purposes etc. Hundreds of hectares of notified forest land which have not entered in revenue records i.e. not mutated, have continued to be allotted to private (real or virtual) encroachers. Several of these forest land use has been changed into residential and commercial purposes. Boundary lines are still unclear in maps and ground as well. This has brought into huge land related litigations pending in various courts of the country.

The consequent result has been a cycle of forest/government /community land grabbing is increasing day by day. Several land mafia and power brokers have come into picture. Many a time populist government programs of Patta giving Abhiyan has been a key source of illegal government land encroachment.

BLOCKCHAIN AND LAND MANAGEMENT

Blockchain is a decentralized digital ledger that securely records transactions across multiple computers. Its transparent, tamper-resistant structure ensures data integrity, reduces fraud, eliminates intermediaries, and enables trusted peer-to-peer transactions. A blockchain based land records model developed tracks ownership details, area, rights and liabilities on a parcel of land along with existing history shall be stored on Blockchain ledger after approval by Revenue Department. Certificate details by Revenue Department shall be stored on blockchain ledger and can be used by other agencies like banks for real time verification. Ownership change transaction through loan, sale/gift deed, mortgage, release of mortgage, crop updating is initiated by other departments. Blockchain ledger would contain 360-degree view of all information regarding land parcel as depicted by figure-1 (https://blockchain.gov.in/):

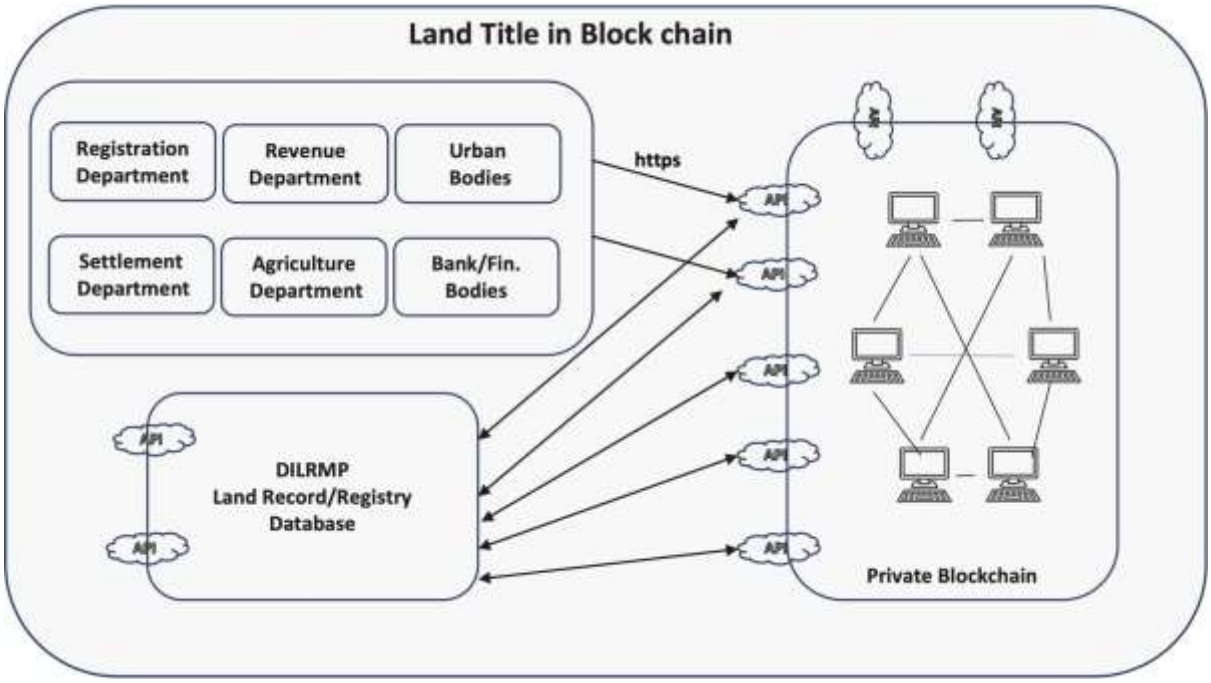


Figure 1: Land management in Blokchain database

Nandana Venkat Ramana[1] emphasizes the need for market-based guidance systems to ensure that circle rates accurately reflect property values and reduce undervaluation in transactions. Sen and Kumari[2] demonstrated blockchain improve transparency, security, and trust while reducing land registration disputes significantly. Burns, Rajabifard, and Shojaei[3] emphasized governance reforms alongside technical innovations for effective land administration systems. Mishra et al.[4] proposed blockchain ensuring transparent, immutable, and secure digital land record management systems nationwide. Mahto[5] highlighted blockchain's decentralized framework enhancing security, transparency, efficiency, and reliability in Indian land registration. Ramya et al.[6] implemented permissioned blockchain reducing document forgery through secure, timestamped land registration records. Draft Registration Bill, 2025 of Bihar, and the Supreme Court's Bihar judgment[7,8] reinforce digital registration, uphold India's presumptive titling framework, and highlight blockchain's potential to prevent fraud and strengthen public trust. Singapore, Estonia, and the UAE have modernized land administration through fully digital systems for land sale, purchase, mutation, registration, and title verification. Estonia leads with blockchain-backed digital land records, Singapore ensures transparent e-conveyancing, while the UAE integrates GIS and smart property services, improving efficiency, transparency, security, and ease of transactions.

NEXT GEN LAND REFORM AGENDA

[A] Reforms in Land settlement process

Land settlement process is reform is a key step in next gen land reforms. The proposed land settlement process architecture is depicted as per figure-2

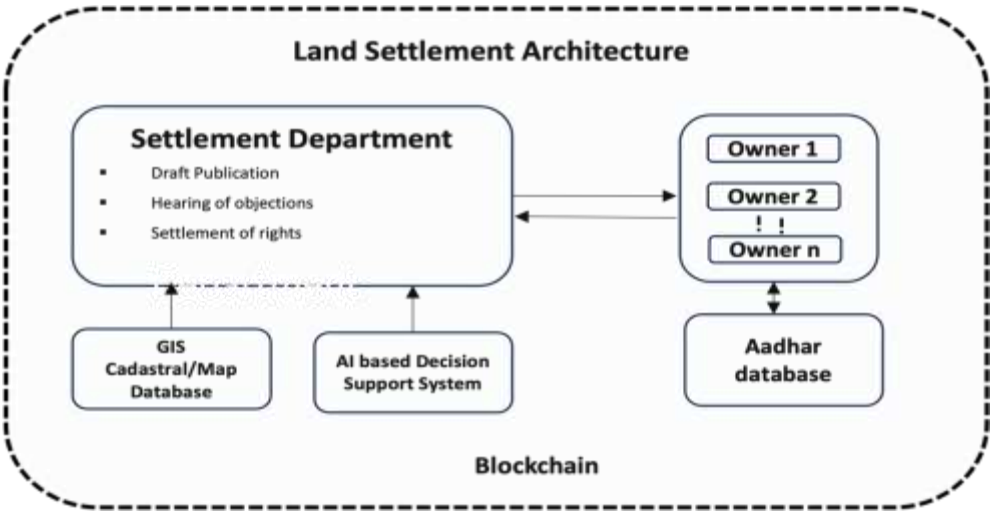


Figure 2: Land settlement system

Settlement Department draft publishes intent on settlement of land rights via public online platform. The moment such publication is made alert is sent to concerned parties which is linked to Aadhar database. Process and hearing of objections and settlement of rights are recorded in public land registry blockchain database. The process of settlement of rights is supported by AI based Decision Support System (DSS) and GIS based Cadastral/Map database for various categories of land whether prohibited, permitted or regulated.

[B] Modernization of Land /Property Records

GIS Based Cadastral Map Database

To mitigate land record related challenges revenue land /property records from old to new needs to be digitalized and geotagged and be put in in public blockchain database. Further land /property owners both private and government need to be given proper id for their land/property and linked to Aadhar database. Any change in land /property records gets automatic alert and gets updated in blockchain date base. Further, land records need to georeferenced both old and new to Khasra level scale i.e. 1:100 (or less) using advanced GIS based tools. Land categorization data need to be put in public blockchain platform and need to be made accessible for land use planning. Land Use Assessment and planning may be done by development of AI based advanced GIS layers for each category of land up to Khasra scale on all kinds of land. Furthermore, Masterplan regarding land use planning need to developed up to village level so that land use change pattern can be best directed in a planned manner. Rajasthan Government has taken aspirational program of Mukhyamantri Viksit Gram/Shahari Ward Abhiyaan that promotes holistic rural and urban development through village-level land categorisation, Village Master Plans, and Smart Village initiatives, ensuring planned infrastructure, efficient land use, digital governance, and citizen participation Viksit Rajasthan @2047, wherein village level land use master plan is being prepared with use of advanced GIS tool for land assessment and use planning for next generation of economic development. A type land map of village /urban area can be prepared as per figure-3:

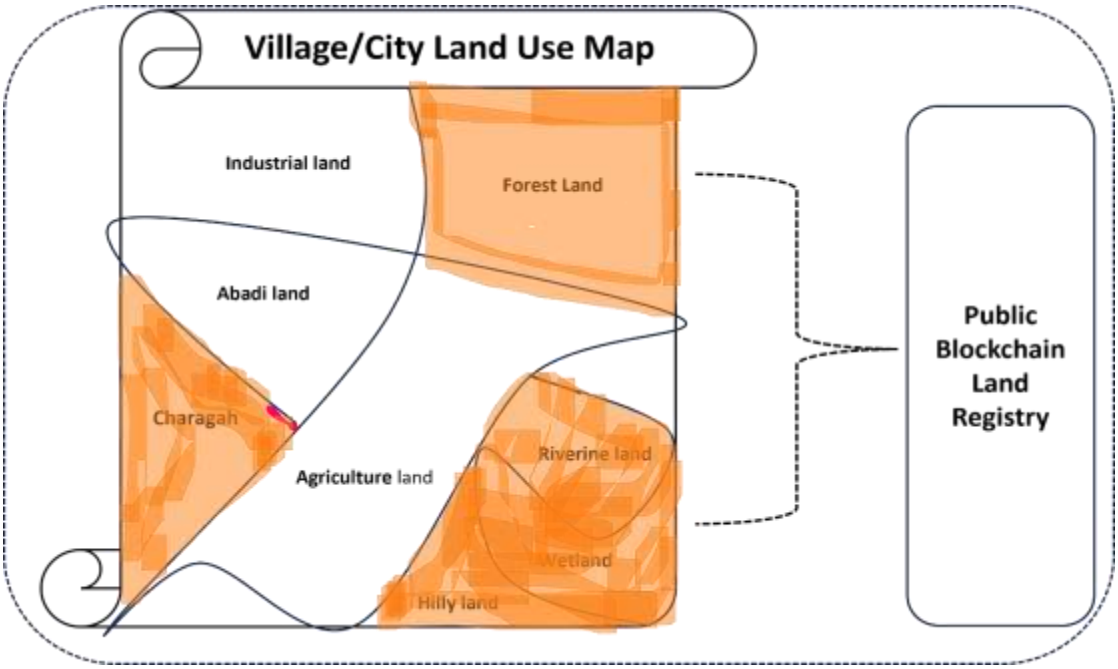


Figure 3: GIS based land Cadastral Map

The proposed GIS based land cadastral map presents a layer based holistic picture of the village /city land map. Various categories of land for example forest, wetland, charagah, road and agriculture land have clearly categorized as GIS layers superimposed with Khasra layers. A land buyer or planner clearly knows what type of land and where to make investment decisions. Further, the database feeds into Public Land Registry Database for better management and land use planning

[C] Land Registration Reforms

Land registration forms key part of registration and transfer of property via sale/gift deed. The proposed next gen process architecture as per figure-4:

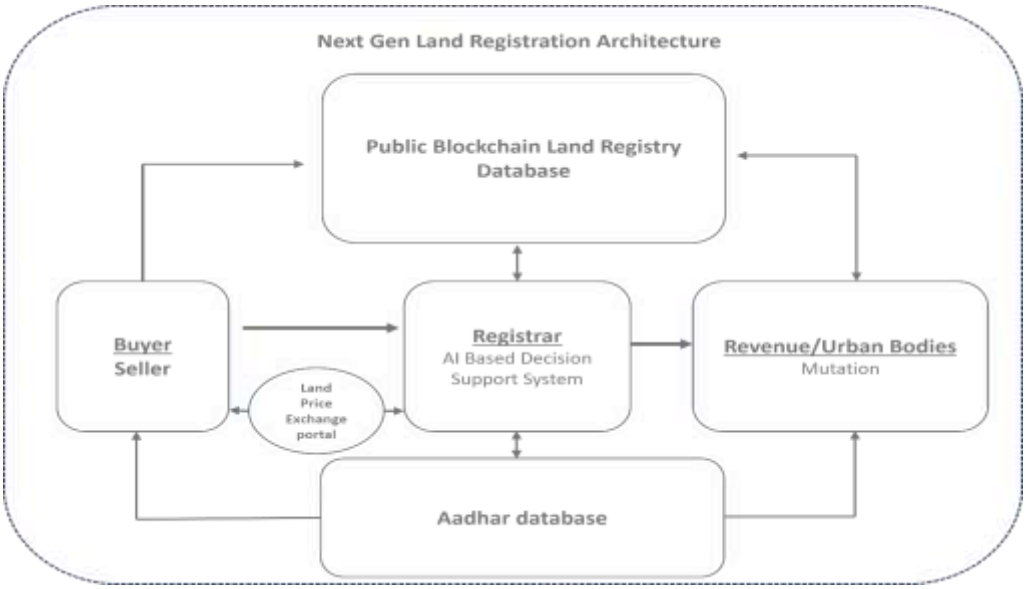


Figure 4 : Land registration process flow architecture

Buyer/Seller: Both can check land title history, location of land, bank loans, prior sale deeds, court cases, any legal issues or category/type of land via access land registry database and make an informed decision prior to sale or purchase. Further, actual land value can be known before hand as per Land Price Exchange portal.

Registrar: Land registering authority shall have live details of land/property under sale/gift or transfer. Artificial Intelligence based decision support system ensures giving summary, history and, risk assessment and clear details of land/property under sale considerations for making the decision to register the property nor not. A separate legal reform in Registration and Stamps Act need to made by made by State Governments for the purpose.

Revenue/Urban Authorities: Process of mutation is more streamlined and evidence based. Buyer can no longer denied mutation as the title is clear and all complexities related to land mutation has been sorted out at prior stage itself. Revenue/Urban authorities can access Adhar database and Public Land Registry for informed decision regarding mutation.

[D] Land/Property Mutation Reforms:

While registration of a land does not provide conclusive proof of ownership as per various legal provisions' other hand it cannot refuse the registration even if fraudulent land sale deeds. Ultimate transfer of ownership is based upon actual name change /mutation as per Transfer of Property Act. However, the buyer comes to know of the fraudulent transaction after sale deed registration when change in ownership is rejected. During time lag between Registration and Transfer of ownership fraudulent seller may sell the same land multiple times to buyers. The proposed process flow architectures ensure no such fraudulent transaction happen as per figure 5:

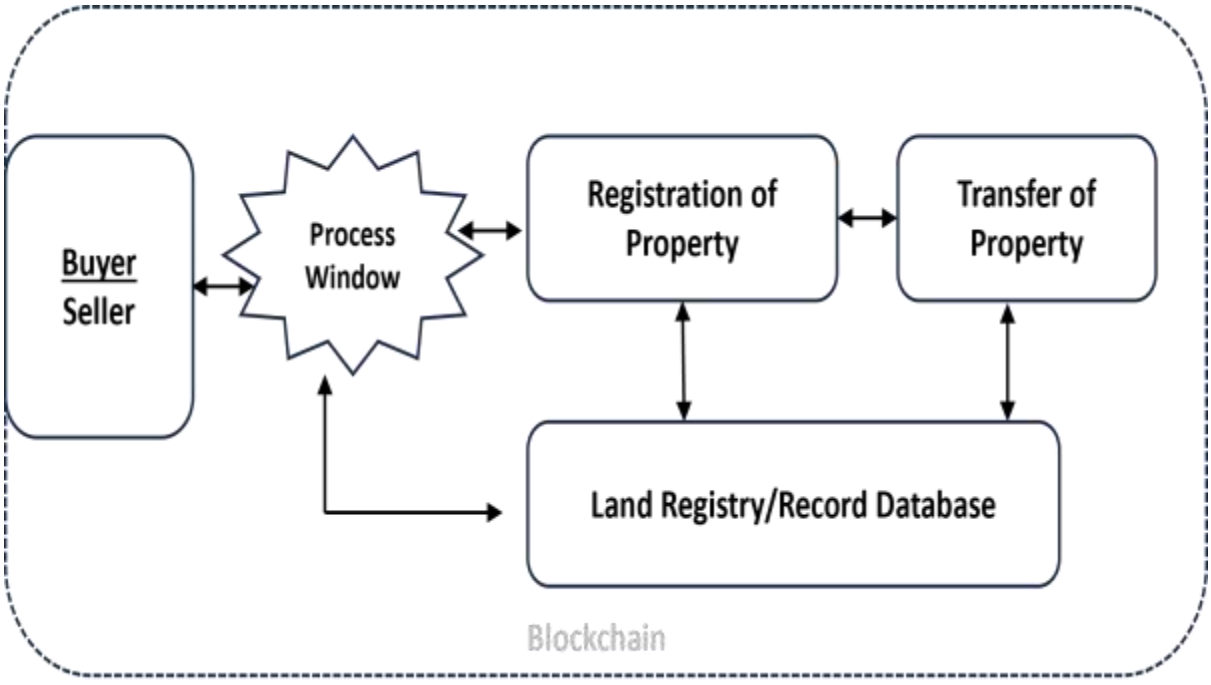


Figure 5 : Land registration and transfer of property top architecture

Under the process architecture the registration and mutation (transfer of property) happen in a synchronous manner and avoids time land, duplicity and fraudulent sale deeds.

Property/Land gets automatically gets provisionally mutated in favor of buyer immediately after sale/gift deed. Further it gives channel of filing objections in case of erroneous mutation. The proposed process flow for mutation process as per figure 6:

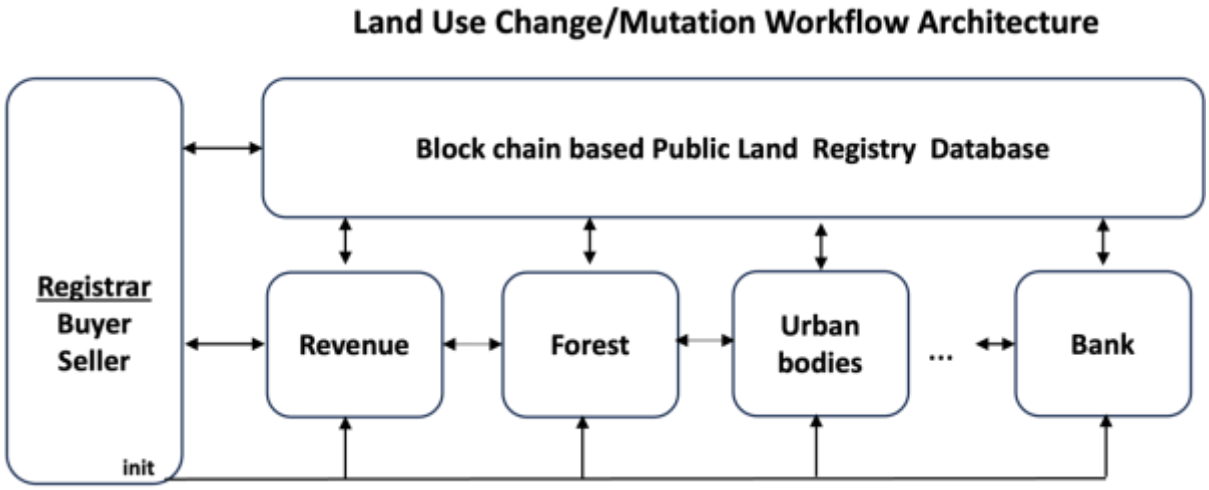


Figure 6: Land mutation process flow architecture

The moment sale of land happens successfully at Registrar office the **init** signal introduces land mutation chain among concerned departments. Based on No Objection from each department, mutation is automatically done and updated in Blockchain based Public Land Registry Database. The time complexity of mutation is as follows:

$T_{mutation}=Max(T_{revenue}, T_{forest}, T_{urban}, T_{bank}$ …..)

The process gives the buyer informed details of property under consideration of sale. Details are public and online and easily accessible. Register authority can check fraudulent and multiple sale frauds at its level based upon live decision support system powered by AI and Blockchain system. Further prohibited lands like forest, wetland, Eco sensitive zone etc. are well available to buyer, registering authority and seller too. Legal reforms in Transfer of Property Act and Registration of Property Act need to be take of.

[E] Issue of Forest Rights Act (FRA) Pattas

To avoid present anomaly in grant and illegal transfer of FRA Pattas, the proposed process architecture is as per figure-6. The process of fraudulent registration gets automatically gets rejected. FRA patta database exists searchable family history that effectively puts sunset clause of multiple FRA Patta applications.

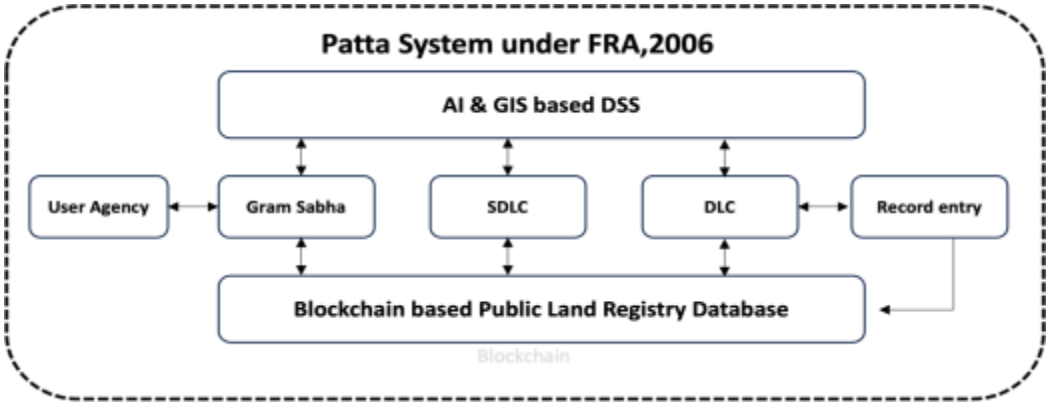


Figure 7: Process flow architecture for Patta under FRA,2006

Under the proposed process architecture, the bonafide forest dweller, makes an application to Gram Sabha for Patta. Gram Sabha supported by AI and GIS based Decision Support System (DSS) and access to Public Land Registry database makes an informed decision regarding claim for forest land Patta. If found correct, same is again verified by Sub Division and District Level Committee for award of Patta. Final decision regarding award of Patta is updated in Land registry database. The process rejected evergreen and duplicity of forest land Pattas and puts a sunset on ever going demand of Pattas. Further, the update in Public Land Registry database ensures no further sale or illegal transfer of such Pattas except permitted under rule.

[F] DLC Rates Reform and Land Price Discovery

DLC rates need to be modernized and linked to market indicators. For non-developed areas/rural areas where market players are not operational, historical average may be taken price discovery can based on land /property resources on public platform. A land exchange architecture can be modelled as per figure-8 for area based actual price discovery

The process is based on matured land bidding/sale average data available on land registration database, land auction data base and DLC rate database etc. Registration charges shall be based upon previous day closing price at 12PM.The registration charges which is currently around 5-6% may be proportionally linked to the previous day closing land price at land exchange portal. Buyer can make informed decision of price of land under consideration of purchase and avoid paying higher price of the same. Government may not lose the revenue as overall stamp duty is same due to dynamic nature of land price and stamp duties. The process avoids flow of cash/black money in land transactions.

[1]Vijay Shankar Pandey belongs to Indian Forest Service (IFS) 2016 batch and currently serves as Deputy Conservator of Forests, Udaipur, Rajasthan.

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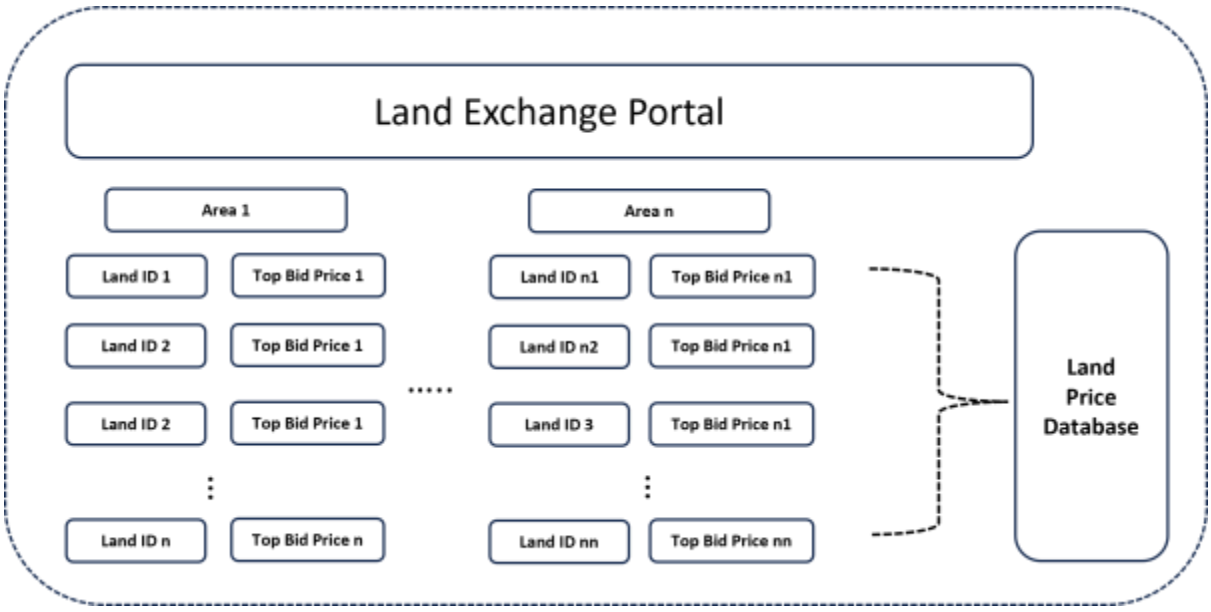


Figure 8: Land price discovery dashboard

CONCLUSION

Next Gen Land reforms are key to Vikshit Bharat 2047.Land management is poorly managed in India which is a key hindrance to Ease of Doing business. Land related disputes form one third judicial pendency in the country. Fragmented and poor land management hindered large capital investment in land sector and has reduced potential for economic growth and development. Further, lack of proper management has led to urban sprawls and unregulated growth of real estate. Next Gen land reforms are based on use of technology like Blockchain, creation of blockchain based land registry database, land price discovery system, reducing land dispute cases and give long term land use planning using GIS and Artificial Intelligence. This requires robust adoption of public blockchain, database management and development /adoption of AI based decision support systems. Next Gen land reforms are key to Vikshit Bharat 2047 dream.

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