

Ethereum Based Land Registry System for Bangladesh

Roti Islam Shithy

B.Sc. in Computer Science & Engineering (CSE)
American International University-Bangladesh
Dhaka, Bangladesh

Ashiquzzaman

B.Sc. in Electrical and Electronic Engineering (EEE)
American International University-Bangladesh
Dhaka, Bangladesh

Heranur Khanam Pipash

B.Sc. in Computer Science & Engineering (CSE)
American International University-Bangladesh
Dhaka, Bangladesh

Khan Md. Elme

B.Sc. in Electrical and Electronic Engineering (EEE)
American International University-Bangladesh
Dhaka, Bangladesh

Dewan Mahnaaz Mahmud

B.Sc. in Electrical and Electronic Engineering (EEE)
American International University-Bangladesh
Dhaka, Bangladesh

Abstract:- Land registration and ownership management in Bangladesh as well as many countries of the world is a very complicated process. This process is very slow as different departments of government are involved here to manage this system. Also many intermediaries make this process more slow. Land registration and ownership management still manual in Bangladesh, India and many other countries. A digital, immutable, transparent and trustworthy record keeping system can handle all of these problems. Blockchain provides all of this facilities as well as blockchain is a decentralized platform. In this paper a blockchain based architecture is proposed to manage the ownership and land registration system of Bangladesh.

Keywords:- Blockchain, Ethereum, Land registration, Ownership management.

I. INTRODUCTION

This Bangladesh is a small country of 1,48,460 square km and It has a huge population, over 163 million (2019). Where people face huge crisis of land, in this small country land ownership is totally managed manually here by different department of government. People often suffer to identify real owner of any land due to lack of proper documentation. Many frauds claim false ownership of others land and raise disputes among people. These types of cases take long time to resolve. Bangladeshi land administration system is so corrupt and lengthy process. It may take up to 2 years to update an ownership change record from sub-register office to central data base [8]. Also, this manual system is less transparent and time killing process. Again, these documents can be damaged any time by man-made or natural disaster. To overcome this problem ministry of land (Bangladesh) has taken a project named “Delta plan formulation project”. Its’ main purpose is to ensure efficient, transparent and people friendly digital land management system [11]. Blockchain provide the

platform where data can store digitally and at the same time immutably as well as transparently. Ethereum is an open source public blockchain. Anyone can join in this platform. The transaction is totally transparent here. The authors of this paper proposed an Ethereum based land registration and ownership management system especially for Bangladesh, but it this system can implement in any parts of the world. This paper is organized in such a way that in section (II) it presents related work, in section (III) it presents land registration system of Bangladesh, in section (IV) it presents problems with the existing system of land registration. In section (V) land administration, survey and management of Bangladesh is presented, problems of present land administration and management in Bangladesh is discussed in section (VI), in section (VII) it presents proposed Blockchain based land registration and ownership management system. And finally future work and conclusion are presented in section (VIII) and in section (IX) respectively.

II. RELATED WORK

Land registration is a very complex process in everywhere. Also many countries maintain manual process of land registration and ownership management system. These manual time killing and complex process have many problems. To find the solution of these problems many authors proposed many solutions. The researchers of [2] proposed an Ethereum based land registry system for India where an individual can sell or purchase any land without the assistance of any middle people. In India, another blockchain based architecture has also been proposed by the authors of [6] by showing that how can the Indian government implement a blockchain based land titling system. Nino Lazuashvili et al. proposed an open land registration system through Ethereum in 2019 [3]. A blockchain based algorithm is proposed for India where the different departments can work at a same time to integrate their work easily [4]. The

Republic of Georgia and the technological provider of Bitcoin, Bitfury together lead a one-year pilot project to move the country's land enrollment frameworks in a Blockchain based stage [5]. Meghali Nandi et al. also proposed a Blockchain based land record keeping system in India and the implementation has been done by using Ethereum Blockchain [1].

III. PRESENT LAND REGISTRATION SYSTEM OF BANGLADESH

Bangladeshi land registration process is one of the complicated systems in Bangladesh. Most of the time it creates dispute among people. The process of land registration in Bangladesh executed under the registration Act 1908. The Bangladeshi land registration working process step by step is described below [7]:

- When someone wants to buy any land, the buyer must to visit manually the local Sub Registry Office and check all the related information about the land ownership of the land he wants to buy.
- After that the buyer and seller need to finalize and notarize the deal. Then the buyer needs to collect the inspection and non-encumbrance certificate from RS mutation and relevant sub-registry office respectively.
- After that the buyer needs to pay the stamp duty to the Accounts Department of the sub-registry office. The final transaction is drafted on stamp paper after paying capital gains tax, VAT, and registration fees in a bank.
- At last, the Sub Registry Office registers the deed. After mutation is in all actuality, the purchaser needs to register the adjustment in proprietorship at the Land Revenue Office.

IV. PROBLEMS WITH THE EXISTING SYSTEM OF LAND REGISTRATION

The current land registration system is fully managed manually. It often creates disputes among the land owners. It is failed to show the real scenario and day by day the number of false ownership claimer increased. Also these manual records can damage any time by man-made and natural disaster. Among all of these problems, some serious problems is discussed below:

- Government of Bangladesh is failed to synchronize the information in different departments of land registration at the same time.
- Absence of openness to the possession history for a resource diminishes trust during exchanges with obscure gatherings.
- This manual process is a very lengthy and time killing process. Individuals frequently need to offer incentives to govt. authorities for getting their enlistment measure done on schedule.
- Current inaccurate digital records are ineffective in preventing fraud and facilitating illicit transactions.

V. LAND ADMINISTRATION, SURVEY AND MANAGEMENT OF BANGLADESH

A. Existing land system

The population growth is very high in Bangladesh, a developing country in South Asia. In urban areas and other areas of the country, it spreads jumbling and spontaneous land development. The rapid population growth continues to lower the country's land-man ratio [10]. Bangladesh also has a very high rate of land transfer and land conversion. Rapid population growth and rapid land transformation demand an effective land management system. The conventional land system, however, cannot keep up with the increasing demand and changing situation on the land market [10]. Unplanned development is exacerbated by inadequate land management systems, which ultimately causes issues in community life. Bangladesh's land survey scheme is carried out in a conventional way. Land surveys are referred to as the land settlement and are handled by the Land Records and Surveys Directorate (DLRS). A settlement official is responsible for tracking surveys in rivers and major urban areas with several shifts in ownership [9]. Two activities are involved - land calculation and the drawing of a map - at the International Conference on Electrical Engineering and Information and Technology for Communication (ICEEICT)[9]. At present, three different Ministries practice land administration and management in Bangladesh, namely the Ministry of Land (MoL); Ministry of Law, Justice and Parliamentary Affairs (MLJPA); and Ministry of Establishment (MoE). The land record system in Bangladesh forms an integral part of land administration, encompassing preparation of Record-of-Rights (ROR) through surveying and mapping of land plots, registration of deeds during the transfer of land and updating ownership records [10]. The Land Record and Survey Directorate (DLRS) is planning ROR under the MoL. However, the Upazila administration under MoE is responsible for updating ROR (mutation). In addition, transfer deed registration is subject to the duty of the MLJPA Registration Department. Preparing land records, updating RORs and registering land transfer is an important part of land management and should be well organized [10]. These offices operate independently, however, with little communication between them. The entire procedure is outdated and old-fashioned and new equipment is little used. The land measurements are made by some people named Amin, who measure the land and collect land data from the owner. In 10 phases, the land verification process can be represented. The first stage is an intrusive survey of the area, location and characteristics of land by Amin and 2 chainmen, followed by a boundary demarcation [9]. First, the land would be weighed with tape. The tape is put on the territory and is measured for the length of the field. The length measured is then registered and the data are sent to the office and the map of the newly measured ground is then revised [10]. The second stage is the preliminary recording, where Amin completes a form of the Khaitan column (the register of rights) which contains information on the plot number, Khaitan number, property, place, crop, name of the owner, farming practice etc. The third stage includes the transmission of the draft Khaitan to the owner and describing the entries. If it is okay, Tehsildar listens to every owner, takes care of any

discrepancies and, if happy, attests to the Khatian, by red. A re-survey is begun otherwise. Senior amin documents all details of a draft after the completion of this stage. The owner is provided with a version approved by Khaitan. After this point, cases will be heard by ASO and decisions reported in violet if there are any objections. After this process, there is an appeal, and Upazilla receives ZSO and ASO requests. The district where judgments are coloured in black will receive the appeals. After that, maps of Entails are corrected and the permanent inspectors amalgamate and separate James (interests). The Khitans and maps were printed after this point. Finally, the ROR copies will be moved to DC and to the Land offices of the Union [10]. Step by land surveying systems flow chart [9] is shown in figure 1. Land registration is a deed of the maintenance, record of isolated transactions, of a public registry. Sub register(SR), by means of a certificate with the property value mark, registers the transfer of any parcel of land as a real property tax (IPTT). If a land transfers notice (LT) is reported at the registration bureau, it must be forwarded to the Advisory Office (AC, Land) of the Adjunct Commissioner. The adjustment is the method of checking and updating the ROR on land ownership transfer and on land ownership subdivision and merging. Via the mutation method the AC (Land), which works under Deputy Commissioner, partially updates and revises the land records [10]. The DLRS send the Khitans, mauza charts, to the DC office, after finalization of land records in the survey service. Currently, the AC (Land) Office also has a record room. The lands documents form the basis on which a master plan, a structural plan, infrastructure improvement plans, property tax assessment, etc. may be carried out further and are prepared. In addition, these records are used by organizations that provide utility services as a basis for the functioning of public and private growth [9].

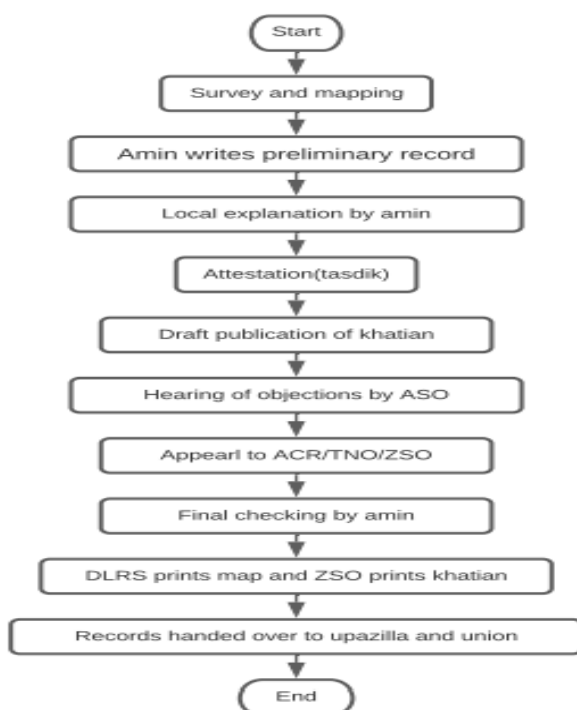


Figure 1: Flow chart of land survey system

B. Mutation types

There are two ways of mutation [10]:

- Mutation according to LT; and
- Mutation in response to an application to the Upazilla Land office.

Bangladesh's land management scheme is outdated and redundant. The whole structure is largely reliant on the workforce. Land management consists of the preservation of land records, sales and acquisitions of the land. Land ownership transfer in different forms, land development and preservation, management of land disputes, land map changes, tax collection and profits and many more.

C. Land owner types

There are two types of landowner [9]:

- Individual land owner
- Organization based land owner.

The landowners must receive different services from the land offices, irrespective of their styles. The services include obtaining land deeds, measuring land, selling and purchasing practices, resolving disputes over land, etc. The landowner must go to the land office for all facilities. The landowner must apply to the land office for land deeds to obtain the land deeds. The application shall be accepted by the Land Office and the Land Act shall be drafted accordingly. The owner must go to the Land Office to complete the transfer of land ownership in order to sell and purchase the land.

VI. PROBLEMS OF PRESENT LAND ADMINISTRATION AND MANAGEMENT IN BANGLADESH

Problems of present Land Administration and Management in Bangladesh are described below [9] [10]:

- The ministries and agencies responsible for land management and administration are currently operating independently, with no cooperation between them. The whole procedure is manual, time-consuming and laborious. Conventional land survey techniques, land-record preparation and updating, and preservation of all associated data for individual parcels of land make land management and administration incomplete and inefficient.
- The distortion of various stages of land records (e.g. plot-to-plot surveys, the planning and drawing by traditional methods of records, protests, scrap-and-checks, prints, etc.) often impedes the control over land creation and the taxation of lands. Khatian is not definitive proof of ownership; at record time, they merely form the basis for ownership.
- Under the prevailing legal system, Khitans along with deeds and mutated
- documents together are relevant for ownership decision by a Civil court (Mia, 1996). The lengthy and complex process of ownership determination enhances conflicts. The present system of registered transfer deed of land does not prove ownership or transferable rights of the seller rather put the risk of false transfer.

- Deeds are full of words that are unnecessary, useless and trivial to them. Maintaining the registration documents isolated and delay is a protracted process for the transmission by the Registration Office of LT notices to the AC (Land) Office and then upgrading the ROR. Consequently, revision is necessary in order to update a more complicated and time-consuming land record.
- All the existing phases of traditional ROR preparation are prone to distortion and alteration. Inadequate and inappropriate land registrations in Bangladesh increase the complexity of land protection and land transfer as the deed system does not provide the final evidence of ownership (Alam, 1992; Hossain, 1995). If an individual loses because of errors or mistakes in the deed, no compensation is given.
- The outdated method and the lack of use of technology have increased corruption in the system. Without modern ideas, machinery and innovations, the entire system is manually operated. Therefore, in the management of land, there are immense conflicts and confusions. As land is the most precious land for anybody, the quarrel and fight over the land will continue for decades.
- Bangladesh's current land management scheme is beyond modern technology. An immense amount of money is spent every year to settle land disputes. In addition, at various levels in this field, there is the accusing problem of corruption. All these issues can be easily tested if the DLMS in this country can be correctly adopted. DLMS adoption will fundamentally change the country's system of land management. It saves time and human effort to accomplish every mission to the advantage of modern technology.

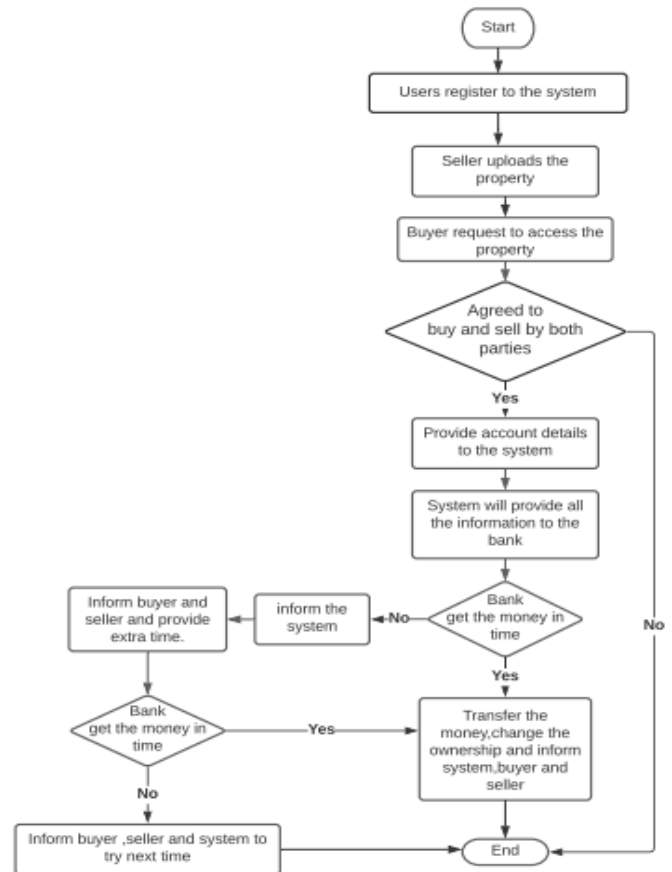


Figure 2: Flow chart of land registration system

B. Step wise explanation of the proposed system

Step wise proposed land registration system is shown in figure 2 and it is described below.

- Step 1: Buyer and seller need to register themselves as a buyer and seller respectively in the system.
- Step 2: Buyer will search for land through the system and seller will uploads the picture of the land and all the documents are related to the land in the system.
- Step 3: If a buyer is interested in any land he will contact the seller through the system to buy the specific land.
- Step 4: After that, if the buyer and seller both are agreed to transfer the land, they will provide their account details as well as the transaction details to the system and system will transfer them to the bank.
- Step 5: If the bank received the desire money from the buyer it will transfer the money to seller account and by using smart contract it will transfer the ownership of the land. After that it will inform both buyer and seller that the money transaction is successful and ownership is changed. If the bank does not receive money it will inform the system and by adding more time the system will inform the buyer and seller. After that, if the buyer

VII. PROPOSED BLOCKCHAIN BASED LAND REGISTRATION AND OWNERSHIP MANAGEMENT SYSTEM

A. The stakeholders of proposed system

The stakeholders involved in the proposed system are:

- Buyer: The person who is registered in the system as a buyer and interested to buy any property. He will contact with the seller through this system and buy land
- Seller: The person who is registered in the system as a seller and interested to sell his property. He will provide the proper details of the land he wants to sell.
- Banks: Banks are proposed to work as a node. As Bangladesh does not support any cryptocurrency, the banks will work as a money transaction medium here. It will transfer the money from buyer account to seller account as well as it will transfer the taxes in respective places via this system.

provides the money in time the ownership will exchanged and if he does not provide the money he cannot be able to buy the land this time.

VIII. FUTURE WORK

The authors of this paper show the possible use of Ethereum blockchain in land application. In this paper the working procedure of the proposed system is described. In the proposed system, systems backend working procedure is not well explained. Ethereum is a public blockchain. It is so transparent in everywhere. Some of the privacy issues may come. So in future, backend architecture can well organize and privacy issues can solve by using proper algorithm. Banks are involved in this system. Smart contract can be written according to need of banks job. For achieve more flexibility, artificial intelligence can be added in this system.

IX. CONCLUSION

Land is an unmovable state object. 80% of land related cases are being unsolved every year. This creates a huge dispute among people. Also the manual process of land management system is very complicated and time wasting process. Records are also not secured here. Any man-made or natural disaster can destroy these records any time. Blockchain provides an immutable, secure, transparent and distributed record keeping platform. Many countries try to convert their existing land registration system in blockchain. The authors of this paper also try to show the possible way to convert their lands property registration and ownership management system by using blockchain.

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