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Using a domain model of social tenure to record land rights: A Case Study of Itaji-Ekiti, Ekiti State, Nigeria

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Abstract

Formal land registration systems have failed to accommodate the wide range of land tenure claims found in developing countries, including land rights under customary and informal tenure systems, thereby leaving the rural people with insecure tenure. To reduce poverty, empower the poor, and ensure economic growth, security of tenure is beneficial. This paper investigates how the Social Tenure Domain Model (STDM) can be applied to record customary and informal land rights at Itaji-Ekiti, Nigeria. Primary data was collected by administering questionnaires on a house-to-house basis and conducting interviews with land rights holders. Spatial data was recorded using a handheld Global Positioning System (GPS) Garmin Oregon 300 and a mobile application (Topographic Mapper). Secondary data was collected from reports, journal articles, published books and the Google Earth image repository. The data collected through the administered questionnaires was used to analyse perceptions of tenure by the holders of land rights. This study provides additional knowledge for researchers in the field of Cadastral Surveying, as it tested the applicability of the STDM. The model will also help the government of Nigeria with the necessary data for the upgrading of informal settlements, which will provide integrity in land administration.

Keywords: *Tenure security, Social Tenure Domain Model (STDM), customary tenure, informal tenure, land tools, land administration.*

1. Introduction

Land tenure systems are used to protect an interest in land, and for effective land governance and management (Atilola, 2010). In the wake of a high rate of urbanization in African countries and ever-increasing pressure on land (Nwuba & Nuhu, 2018), proper administration and management of a country's land assets are vital (FAO, 2011) to ensure environmental sustainability in both rural and urban areas (Atilola, 2010). Most people live in urban areas - 55% of the total world population with a predicted increase to 68% by 2050 (Augustinus, 2010). The majority of urban dwellers live in informal settlements or slum areas (*ibid*). This category of people has no registered land rights, which shows that either the existing cadastre is not in their favour, or does not accommodate their land

rights. Less than 30% of developing countries are covered by the cadastre (Lemmen, Augustinus, Haile, and Van Oosterom, 2009), which implies that 70% of the land in developing countries is not covered by any formal land registration system (Lemmen and Augustinus, 2009; Augustinus, 2010; Lemmen, 2010; Zevenbergen *et al*., 2013). Of the world's population, 75% have no access to formal land registration systems (Enemark *et al*, 2014). Women, the poor and the vulnerable are most affected (Zevenbergen *et a*l. 2013). The implication of this is that 70% are affected by tenure insecurity, failure in land service delivery, and poor land management (*ibid*). The tenure found in real-life situations among the 70% group is not "parcel-based polygons" that can be easily supported by the conventional land administration system (Augustinus, 2010).

In ensuring security of tenure, title documents may be helpful, because they provide confidence to land market operators (Nwuba & Nuhu, 2018). For example, in China, land certificates are considered essential to protect land rights, as they enable land rights holders to invest in agricultural land (Rao et al., 2017). Fifteen years ago, less than 15% of the land is registered by title deed in Africa, while in sub-Saharan Africa the figure is less than 1% (Tibaijuka, 2004). In Nigeria, less than 3% of the land is officially registered by title deed (Atilola, 2010, 2013; Kolawole, 2013), even though the British administration introduced the system of title deeds in Nigeria in 1863 (Federal Ministry of Housing Urban Development, 2006). Considering how long the practice of land registration has existed, and its importance to land market operators, title registration is low (*ibid*). World Bank (2017), ranked Nigerian land administration system as 169 out of 190 countries in terms of the ease of registering land. The procedure for registration of titles includes 12 steps, 68, 9 days and 10, 5% of land value, hence the need to overhaul Nigerian Land Administration System (NLAS) to make it more efficient.

The over-reliance on conventional techniques to record land rights of the urban and rural poor is the major constraint in providing tenure security (Enemark *et al*., 2014). The application of cadastral surveying methods in developing countries is expensive and not in conformity with the needs of the urban and rural poor (*ibid*). The result of this is a lack of tenure security, food security, and essential amenities (Enemark, McLaren and van der Molen, 2009; Lemmen, 2010). Providing tenure security does not necessarily require centimetre accuracy; all that is required is recognition and documentation of rights in land (*ibid*). Spatial accuracy can differ for different purposes: surveyors can provide maps of different accuracy for different purposes which can be later upgraded to the required accuracy, based on need (Lemmen, 2010; FAO, 2012). Alternative approaches involve the use of high-resolution satellite imagery (HRSI) to identify, demarcate, record and define boundaries of land parcels. Using alternative approaches is not only to record registered and off-register rights, including customary rights, but also to provide a platform in which the four functions of land administration (tenure, value, use and development) are managed (Williamson and Ting, 2001; Enemark, 2005, 2007; Enemark, Williamson & Wallace, 2005; Deininger *et al*., 2010; Williamson *et al*., 2010; Zevenbergen, 2010).

The problem associated with conventional land administration, as discussed in preceding paragraphs, brought about a shift in the paradigm of the land administration system in developing countries. This called for a new approach of a pro-poor land administration system. This aimed at addressing the inefficiency and ineffectiveness of the conventional land administration system. Pro-poor land administration systems address issues of tenure security, the high cost of boundary demarcation, lack of indigenous knowledge in land administration, localised approaches and application of pro-poor land tools (Payne et al., 2009; Williamson et al., 2010). Evidence shows that pro-poor land administration is gaining ground in Sub-Saharan African countries. Many governments of sub-Saharan African countries are redesigning their land administration system to include pro-poor approaches, such as the Namibian Communal Land Administration System (NCLAS) (Kapitango & Meijs, 2010), the Land Administration Reform in Ghana (Independent Evaluation Group, 2013), Rwanda's Land Tenure Regularization (LTR) (Sagashya & English, 2010), the Rural Land Certification in Ethiopia (Deininger *et al*. 2008), the Land Tenure Reform in Mozambique (Norfolk and Tanner, 2007), and land reform in South Africa (Benjaminsen *et al*, 2009).

1.1. Motivation

Three of the sustainable development goals (SDGs) have land as a component. These are (United Nations, 2015):

- Goal 1: End poverty in all its forms everywhere;
- Goal 2: End hunger, produce food security, improve nutrition and promote sustainable agriculture; and
- Goal 5: Achieve gender equality and empower all women and girls.

This study was motivated by recent land conflicts and the need for reduction of poverty. Regarding land conflicts, in a recent land dispute between Itaji-Ekiti and Ayede-Ekiti, three people were killed (Ogundele, 2017). This dispute lasted for 30 days, but with the intervention of security agents, the conflict was subdued. This conflict was caused by trespassing and the breach of an existing court judgement by the Ayede-Ekiti. Communal boundaries are identified by natural features (trees, rivers, and mountains). This conflict would not have happened if their land rights were recognised, recorded and respected. In Nigeria, 2 846 people have died as a result of land conflicts between 2006 and 2014, while in 2015 alone, 111 deaths due to land issues were recorded (Nigeria Watch, 2016). This tells us that people's land rights are not respected, and tenure insecurity exists in Nigeria.

Itaji-Ekiti and Ayede-Ekiti have co-existed for many centuries. History has it that Ayede-Ekiti is a tenant to Itaji-Ekiti, meaning that Itaji-Ekiti gave Ayede-Ekiti land for settlement. In the year 1934, a land dispute occurred between the two communities and the court case lasted for three years. In 1937 there was a judgement in favour of Itaji-Ekiti that Ayede-Ekiti could no longer extend their community towards the southern part of Itaji-Ekiti. In 2017, a similar land dispute occurred between the two communities towards the southern part of Itaji-Ekiti farmland. Residents of Ayede-Ekiti left their community to attack the people of Orisumbare Street, Itaji-Ekiti, on their farms, which resulted in the death of three persons from the Ayede-Ekiti community, and one person from Itaji-Ekiti was

seriously injured (Ogundele, 2017). The present land dispute case is in the State High Court of Ado-Ekiti, Ekiti State, Nigeria. The state similarly set up a panel of enquiry to examine the dispute between the two communities. The panel consists of the Surveyor General (SG) of the State, a retired High Court judge, representative of the boundary commission and stakeholders such as land professional and land administrators.

Regarding poverty reduction, poverty is reported to be predominant in rural areas. Between 2009 and 2010, 69.0% of the rural population of Nigeria was considered to be poor, while in urban areas the poverty rate was 51.2% (National Bureau Of Statistics, 2009). The two scenarios discussed require the application of alternative approaches to see if they will offer a more affordable solution. For this to be achieved, a more flexible system is adapted to accommodate the variety of land tenure types found in reality. This is where the STDM comes in to address such gaps created by the formal land administration system (LAS). Hence this paper investigates alternative ways in which land rights in customary and informal land tenure can be recorded.

Gender equality and empowerment of all women and girls is SDG number 5, and it has one target and two indicators which have land as a component. The aim is to give women and girls equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources. In view of the foregoing, achieving this goal requires that women's land rights should be recognised, respected and recorded. The Nigerian development agenda is in support of the SDGs, with their office being directly under the control of the Vice-President of Nigeria.

1.2. The Social Tenure Domain Model (STDM)

The United Nations Human Settlement Programme (UN-HABITAT) and Global Land Tools Network (GLTN) promoted the recognition of a continuum of land rights, and that they should be respected and recorded with an informal conventional land administration system. They also further said that the continuum of land rights required a new land information management system (UN-HABITAT, 2008). The STDM was designed to cater for the technological gap in land administration system (Lemmen, Augustinus, Van Oosterom, and Van der Molen, 2007).

The STDM is designed to model the tenure relationships between land and humans (Griffith-Charles, 2011; UN-Habitat, 2014). The two forms of modelling of the STDM are: (1) to describe the human-land tenure relationships; and (2) to provide a platform for the interactions between different land registration systems (Van Oosterom, and Lemmen, 2006). STDM was developed to provide support for the implementation of the concepts of a continuum of land rights. The benefits of using the STDM are (1) it helps to record land administration information from multiple sources; (2) it helps to enlarge the scope of land administration by providing a land information management framework; (3) it helps to achieve the SDGs; (4) it opens up new land markets; and (5) it helps to reduce poverty (Lemmen, 2010). The STDM is based on the Land Administrative Domain Model (LADM) (Uitermark et al., 2010; Babalola et al., 2015), and is the standard conceptual model consisting of

three packages and one sub-package, used to define terminology for LAS that provides a shared explanation of various formal, customary and informal types of tenure *(ibid*). The LADM combines land management information from different sources in a logical manner. Both STDM and LADM are developed to aid the LAS in developing countries. This they hope to achieve by providing the low-cost cadastral survey in rural and urban areas of developing countries. Overall it aims to provide security of tenure for all.

The STDM has been used to record land rights in customary land tenure systems and informal settlements (Griffith-Charles, 2011; Zevenbergen et al., 2013; Mwanyungu et al., 2017). The GLTN and UN-HABITAT have successfully conducted a pilot study using STDM to record the land rights of people living in Saint Lucia, Saint Vincent and the Grenadines (UN-HABITAT & GLTN, 2012), as well as in rural Uganda and rural Kenya (UN-HABITAT, 2012; UN-Habitat & GLTN, 2012). In this study, the STDM is used to record land rights in Itaji-Ekiti. In all these studies, the HRSI was employed to describe the human-land relationship without altering the existing tenure system. The use of HRSI has proven to be an effective and efficient alternative approach to the demarcation of boundaries which supports the formal land administration system.

2. The need for an alternative approach to the land registration system

Land administration in Nigeria is guided by the Land Use Act (LUA) of 1978. Despite over four decades of operation, LUA has failed to achieve some of its objectives which include ensuring unified and simplified land tenure concepts and land administration procedures throughout the country, achieving equitable distribution of, and access to land rights for all citizens, regardless of wealth or position, facilitating greater government control over land use and development, and reducing land conflicts among citizens (Butler, 2012). In Nigeria, there are many challenges to the land registration system (Awolaja, N.D; Udoka, 2017), including governance issues (Birner & Okumo, 2012), and the association of formal land registration with economic power and not tenure security (Feder & Nishio, 1999). These challenges hinder many landowners from registering their land (Nwuba & Nuhu, 2018). Thontteh & Omirin, (2015) found that the introduction of the Electronic Document Management System (EDMS) in Lagos, Nigeria, improved land registration. The reform improved tenure security and public confidence in transactions, it centralised and consolidated file storage, and reduced waiting time for obtaining land information. This, however, does not reduce land disputes, the number of applications processed, and revenue generated by the government *(ibid*). This means government continues to generate huge revenue from land registration at the expense of ensuring tenure security. Another study on land registration challenges in Kaduna state revealed a low level of land registration (Nwuba & Nuhu, 2018). The challenges to land registration were attributed to ignorance on the part of landowners, high costs for registration, lengthy processes and delays in processing registration (*ibid*). This study extends the research to apply pro-poor land tools in a rural community, to provide an affordable land registration for both urban and rural poor.

Considering the increase in the world population (see section 1), the urban growth rate is highest in the developing countries (UN-HABITAT, 2008). The growth rate in urban cities will result in urban poverty and inequality which will increase the number of slums in urban centres. For example, Asia is the home of more than half of the world's slum population (581 million) followed by sub-Saharan Africa (199 million). The pertinent issue with the increase in population size of urban cities is the increase in the need for housing, basic infrastructure and services. This is further worsened by the fact that the land industry does not have the required land tools and solutions to meet the present need in slum areas and informal settlements. To meet this 21st-century challenge of urbanisation, new management land tools are required; this is where the STDM fills the technical gap in land registration (Augustinus, 2010).

The SDGs 1, 2, and 5 have land as a component, with a commitment to achieving significant improvement by ending poverty, hunger and achieving gender equality by empowering women and girls (see section 1.1). SDG 1, Target 1.4 commits every country to ensure that all men and women have equal rights to economic resources as well as access to essential services, ownership and control over land and other forms of property. Reporting on success thus far, the achievement of these goals by 2030 is not promising, with no country on the track of success (Lieberman, 2018). Countries that are most affected by this are in Africa; the STDM is an essential pro-poor land tool that could assist in achieving this target, with the justification described in the following paragraphs. The STDM will further aid in achieving other SDGs, such as goal 2 on zero hunger and goal 5 on gender equality.

The adoption of an unconventional approach to the land registration system by using the STDM to record land rights will provide the land industry with robust land records and land management (Augustinus, 2010). Less than 3% of Nigerian land is in a formal land register (see section 1); this implies that over 90% are outside the land register, land management in this area is complicated. The majority of these lands are in the rural areas, where local government officials lack the required land tools to administer such land. The STDM could be used to provide the necessary data for providing essential amenities (schools, hospitals, water, electricity etc.). The STDM could be critical for traditional institutions to accomplish the proper management of customary land, especially mediation between two parties in dispute. The model could also provide local communities with a land information system and support with legal guidelines surrounding the land. This is critical because land information systems will provide the necessary data to make it easier for community negotiations about compensation payable for land acquired by the government, which can also be used for land readjustment and settlement upgrading *(ibid*).

The provision of an alternative approach to land administration by using the STDM will improve the livelihood of the poor by increasing tenure security, quality of life and governance and empowerment (Augustinus, 2010). The continuous recording of land in the customary and informal areas with the STDM will provide a pro-poor land information management system; this will be upgraded over time along the continuum of land rights. Documenting the land rights of the poor in a manner that is affordable and relevant to their needs will increase the security of tenure "in terms of

use rights and land rights" (*ibid*, p.10). *De facto*, as well as *de jure* land rights and use rights, are accommodated in the STDM database. The availability of this information in the STDM system will help in the provision of service delivery in the slums and informal settlements. The STDM data will also later contribute to the formal land registration process, making it cheaper, faster and more efficient. The services provided through the available data will improve the quality of life of slum dwellers. Having access to vital social amenities (water, electricity, school and market) contributes to sustainable livelihoods.

3. Area of the study

Nigeria has 36 states with six regions, comprising three regions in the north and three regions in the south. The case study area is in the south-western region in Ekiti State, which comprises sixteen local government areas. The population of Ekiti State is around 3 270 798 according to the forecast for 2016 based on the 2006 population census (National Population Commission and National Bureau of Statistics, ND). Itaji-Ekiti, the case study area, is located in Oye Local Government Area of the State, as shown in figures 1.

Itaji-Ekiti was selected for the case study for two reasons. The first is that the first author is a native of the area, so getting permission from the community head and people in the community, for a sensitisation and awareness programme, was easier to do. Second, the recent dispute between two communities of this area, as discussed in section 1.1, provided the impetus for the study.

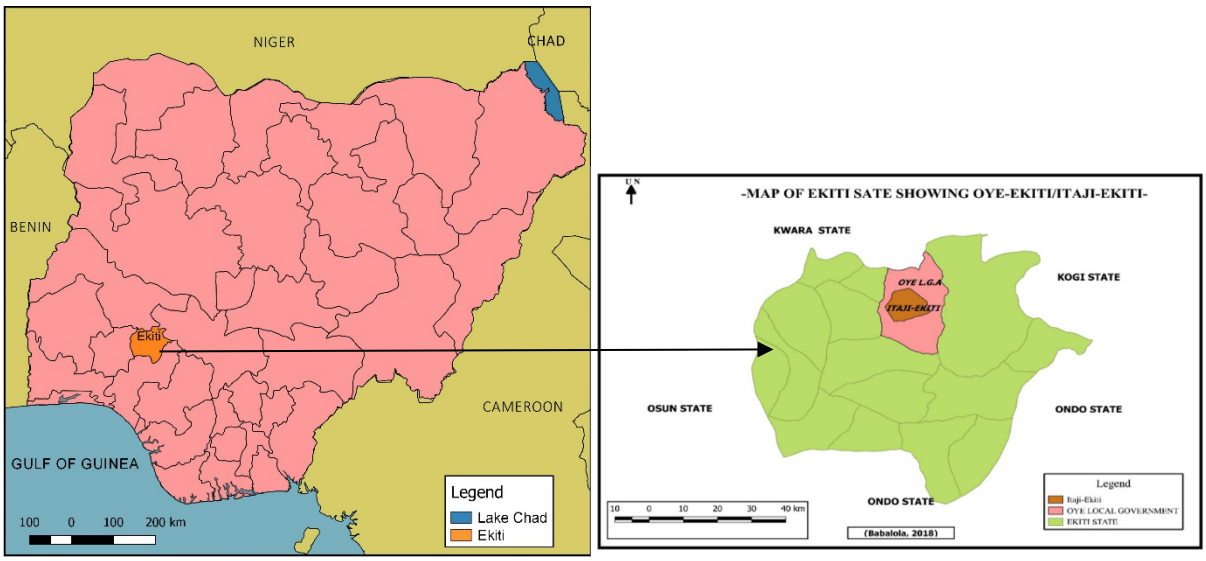

Figure 1. Map of Nigeria showing Ekiti State, map of Ekiti State showing Oye Local government (LG) area, and Oye LG showing Itaji-Ekiti

4. Methodology

A case study approach is adopted for this research because it enables a phenomenon to be investigated in its real-life context (Yin, 2009). Case study methodology is suitable to address problems that are 'unstructured' or 'soft' in nature (Yin, 1994) because it allows researchers to use their discretion (Zevenbergen, 2002), which provides room for flexibility in the application of the case study as a method of research. Unstructured and soft problems may include, but are not limited to, the situation of understanding and interpreting the environment, which revolves around unclear or contradictory goals or an instance in which multiple variables can be influenced over time (Barry and Fourie, 2002). These attributes can be observed in inefficient LAS and tenure insecurity, the problem to be addressed by this study. Hence the justification for adopting a case study approach for this research.

This paper is based on quantitative data that was collected in the rural area of Itaji-Ekiti. The data collected comprised of questionnaires administered to all land rights holders. To understand how STDM is being used to record land rights, some structured questionnaires were administered. A total of 472 questionnaires was distributed within the community. This research is based on both primary and secondary sources of data. Primary data was collected using questionnaires, participant observation, the handheld GPS receiver (Garmin Oregon 300) to collect spatial data, and a mobile application (Topographic Mapper) – see Section 4.5. The secondary source of data included reports, journal articles, published books and the Google Earth image data repository.

The STDM process is used to demonstrate how STDM can be used to record land rights in customary and informal land tenure systems. This process involved planning, sensitization, STDM design, mapping and structure numbering, data collection, data entry and analysis, and validation of data as shown in Figure 2. See section 4.1 to 4.7 for details of how data was acquired, analysed and validated.

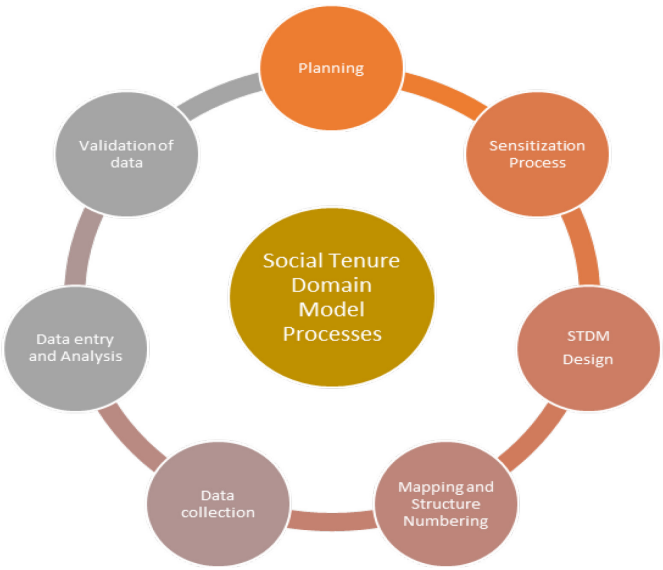

Figure 2: The STDM process used at Itaji-Ekiti

4.1. Planning

Thorough planning was conducted to achieve the best result possible. All tools, instruments and equipment to be used were prepared (i.e. questionnaire, interview sheets and stationery, camera, laptop, and the base map of the study area from satellite imagery).

4.2. Sensitization Process

Visits were made to the study area to inform the community, through the community head, about the intention to conduct research on land tenure and land administration. Two visits were made at this stage; the first visit was made on 18th of October 2017, and the second visit was made on 27th of October 2017. An awareness meeting was held to raise awareness and to inform the entire community of the purpose of the research. During one of the meetings, the researchers were invited to brief the community about the STDM. The community members welcomed the idea of the enumeration exercise, and they hoped it would impact positively on land administration in the area. The meeting was held at the palace of the community head on the 27th of October 2017. A total of 112 community members were in attendance, including the chiefs in charge of each of the streets within Itaji-Ekiti.

4.3. STDM design

After the sensitization exercise, based on the 472 questionnaires administered by the first author and his four team members, the design of the STDM system to fit the local context of the case study was carried out. This was achieved by setting up the STDM through its plug-in in Quantum GIS. The STDM plug-in provides data management which allows the design and storage of tables and acquired attribute data. Different parties and their corresponding relationships with the spatial unit type are defined. Customised tenure relationships with specific attributes, such as respondents' information (name, age and gender), street name, land use type, title ownership, duration of stay on land, tenure type and value ascribed to land, were defined.

The STDM conceptual model consists of the name of the party, their relationship with social tenure, the spatial unit and supporting documents. The party includes persons, groups, private and public lands that are involved in land transaction. The social tenure relationship may include rights, restrictions and responsibilities in the form of use rights, occupancy, customary tenure, tenancy, ownership, rent and leases, permits, etc. The spatial unit can be land, property, natural resources, objects, etc. The supporting documents are in the form of sketches, audio, video, scanned documents, and photographs. See Figure 3.

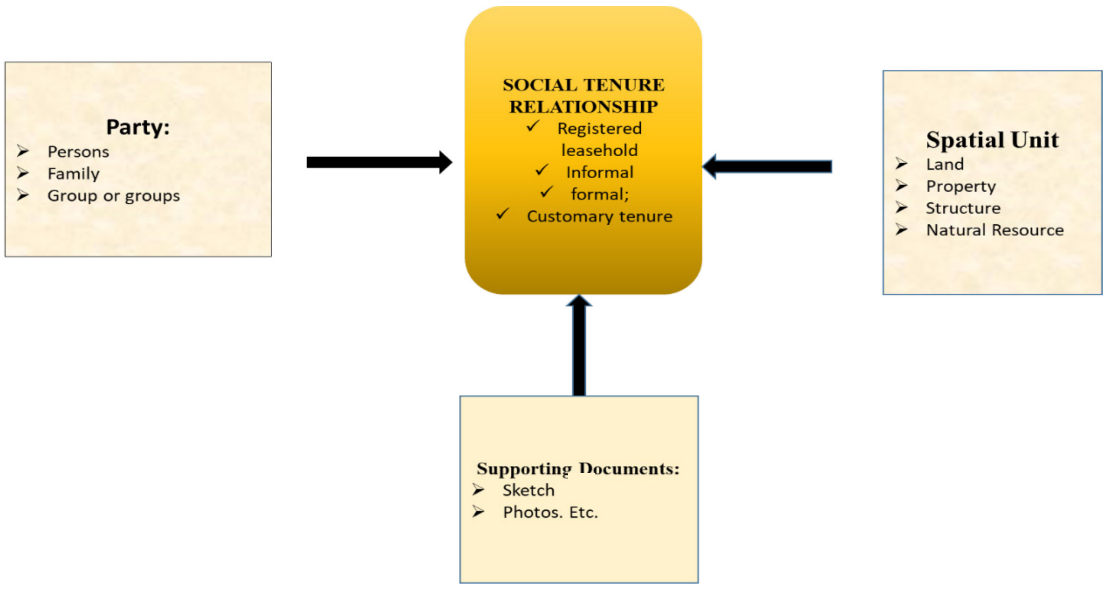

Figure 3: Defining the conceptual model at Itaji-Ekiti

4.4. Mapping and structure numbering

A Google Earth Pro satellite image was used for the base map (CES/Airbus, 2017). The spatial resolution of the image is 25 cm, which is sufficient for the identification of structures. The imagery of the study area was captured and printed. Structures were numbered on the images, and these numbers were used to identify structures in the field by painting them on the structures. After this, the individual parcel was digitized on Google Earth Pro and assigned a unique code for each structure. These activities spanned through October and November 2017.

4.5. Data collection

The researcher and other team members administered a questionnaire on a house-to-house basis. A total of 472 houses was enumerated between October 2017 and April 2018; this is because the residents were farmers and it was difficult to meet everyone at home in one visit. The questions were made simple and easy to answer. The questionnaires were administered based on the unique number assigned to structures on the base maps. This number was also assigned to each questionnaire to allow for easy identification when collating data. Supporting documents such as photographs were collected. During this stage, a handheld GPS and a mobile application (Mobile Topographer) were used. Mobile Topographer is an android application which records the coordinates of points on the satellite imagery. This free application works without internet access. Mobile Topographer was used on farmlands. Ten farmers were selected from Orisumibare Street in Itaji-Ekiti using snowball sampling methods. The ten farmers were paired in threes with the researcher and two team members, each team member following three farmers and the researcher following four farmers. Their farmlands were quickly mapped, which the farmers appreciated.

4.6. Data entry and analysis

The completed questionnaires and all supporting documentation obtained were entered into the Microsoft Excel spreadsheet after which it was imported to the STDM attribute database. This enables it to be linked with each parcel in the STDM module of QGIS. After the digitized parcel is uploaded into QGIS, the prepared Excel spreadsheet for the attribute data acquired during the enumeration is linked to the digitized parcel. This is done with the STDM plug-in enabled for spatial analysis. The STDM interface is customized to suit the attribute data collected. The STDM has a configuration wizard which allows a profile to be configured. It allows the supporting document's path to be specified, documents the output path and documents the template's path. Three profiles are embedded in STDM: informal settlements, local governments and Rural-Agriculture profiles. Any of the profiles can be selected depending on the context of enumeration. In the case of this study, the informal settlements' profile was used.

Supporting documents such as photos are scanned and imported into the system. The supporting documents are linked with the party owners and their individual tenure relationships. The STDM plug-in allows for report generation in which a certificate of customary rights is produced. A tool in STDM called 'report builder' generates a report and performs data analysis. Different tenure relationships of individual parcel owners are presented with the report generated. Two land-use types were used to generate the certificate of customary ownership in this case. These are residential and agricultural land use types. The Agricultural land-use type is shown in Figure 5.

4.7. Validation of data

The community members were allowed to validate the data entered into the Excel spreadsheet before uploading into the STDM module in QGIS. The entered data in the spreadsheet was printed out and pasted on the wall to aid reading and for corrections to be made. The process of data validation is essential as it adds credibility to the result obtained.

5. Results and discussion

The results of the descriptive analysis and the generated report of the STDM are hereby presented. The demographic analysis showed that the majority of the respondents are male with (91.7%) and female is (8.3%). In terms of the land use type, the majority of the landholders' land-use type is residential (90.40%), with less than 10.00% being commercial, agriculture and others. That more than 90% are residential means that the largest population examined were within the town with few farmers selected for the study. Another angle of argument is that title ownership is concentrated in the urban centre especially the state capitals (Ghebru & Okumo, 2017), this was confirmed by this study with 84% of land rights holders holding no title deeds to the land, and 15.89% having title to the land. Land rights are acquired mainly by inheritance (52.97%), followed by gifts (18.22%), purchase (17.58%), and in other ways (11.23%). This confirms that the inheritance practice is common in customary land, as can be shown in Itaji-Ekiti. Disputes are not common within the town,

but common on family and communal land. Of the respondents, 96.80% said there is no dispute about land, with 3.20% agreeing that there is a dispute about the land. In determining whether land can be alienated, it was discovered that (60.4%) said their interest in land cannot be transferred while (39.6%) agreed that their interest in land can be transferred. 50.4% of the respondents have stayed on their land for more than 20 years.

The purpose of using the STDM was to test its applicability in recording customary and informal land rights of the rural poor, which could aid the government decision of upgrading and provision of social amenities. This can be done with the available spatial and attribute data of the STDM implementation in Itaji-Ekiti, which is embedded in the STDM database. To achieve SDGs, land information of this type must be readily available for land administration purposes. The digitized spatial units of the study area were assigned a unique code and represented by it in the STDM database, for easy identification. This was linked with attribute information as shown in Figure 4. The certificate of customary rights of occupancy was generated from the STDM database using the spatial and attribute information (Figure 5).

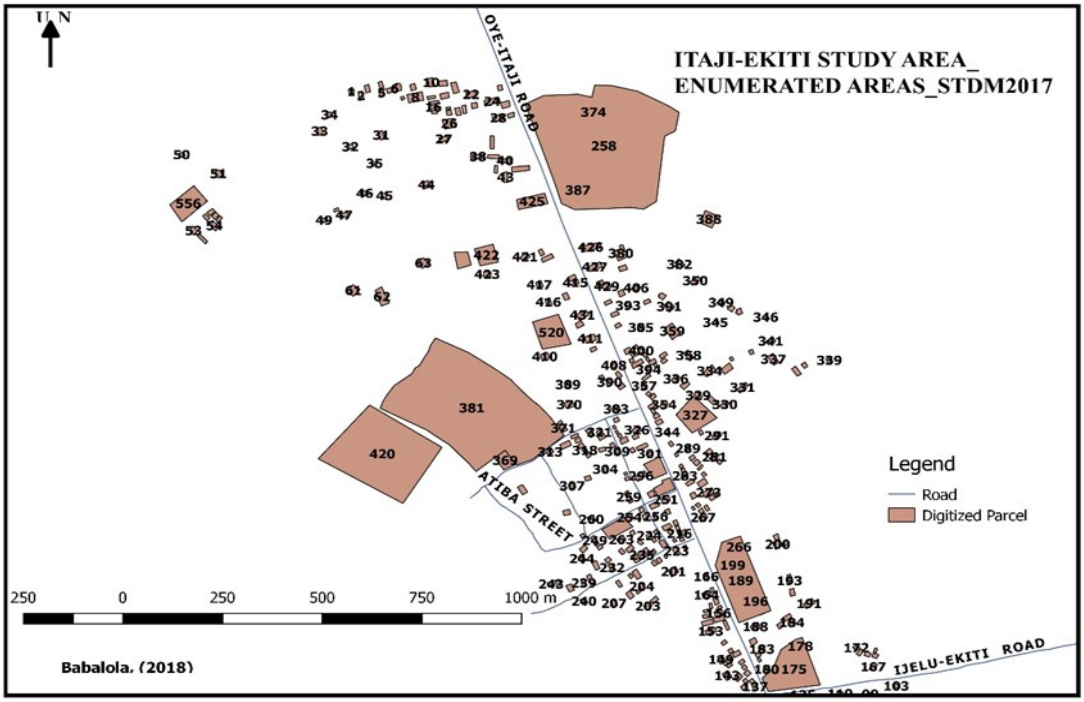

Figure 4: Digitized parcel with structure number in Itaji-Ekiti

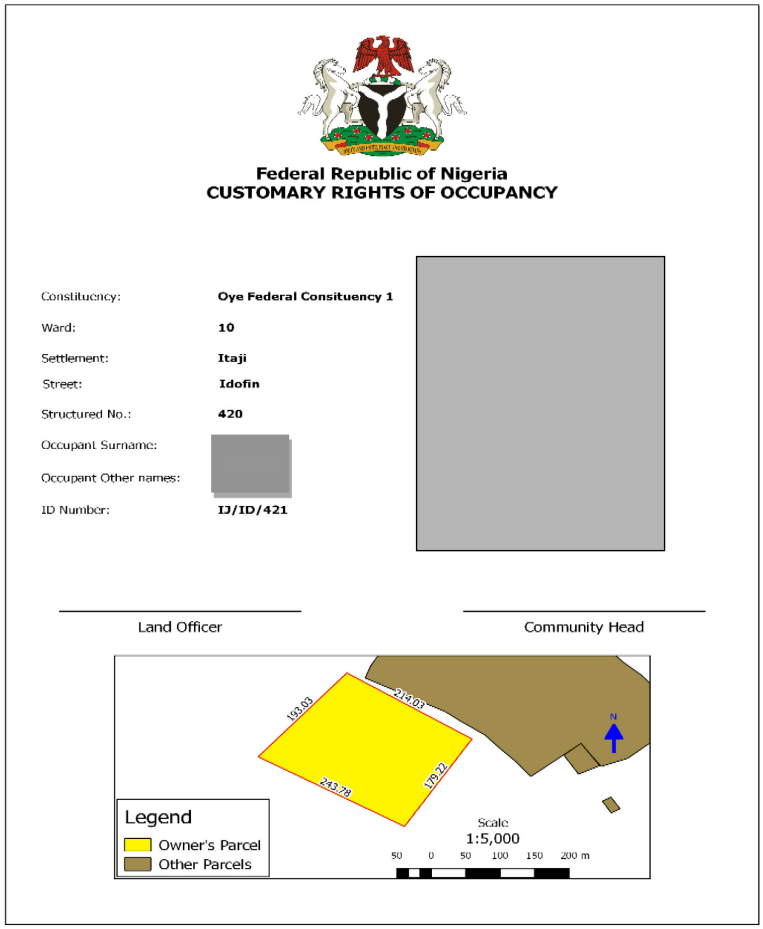

Figure 5: Generated customary rights of occupancy (agricultural land type)

6. Conclusion

The STDM was used to record land rights. It has been tested and found viable as a pro-poor land tool needed to record tenure relationship of the rural poor. The use of the model showed a participatory approach in which the community role is vital for a successful enumeration exercise. The use of the model showed the practical approach of the use of satellite / aerial imagery for recording land rights in a customary land tenure system. The use of pro-poor land tools had proved to be successful in modelling the tenure relationship of the rural poor. The pro-poor nature of the model satisfies the requirements of landowners in Itaji-Ekiti. This model is fit for the rural poor of Itaji-Ekiti to have their land documented in a pro-poor land management system.

The model as used in Itaji-Ekiti supports the development of pro-poor land legislation and land policy that considered the rural poor. Different country contexts can be incorporated when using the model. The availability of the model in an open-source software makes it acceptable to the rural poor of Itaji-Ekiti. This will reduce the cost of acquiring the software. The usage of the software is a great challenge for the rural poor. It requires training and retraining for the community members. Satellite imagery is readily available to identify the spatial unit of each landowner.

To achieve SDGs, the Nigerian government needs to reform the legal framework for administering land in Nigeria to recognise the use of STDM in land administration, especially in rural areas. There is a need to formulate an administrative structure that will assist in the management of the STDM database. This can be achieved by including the community members in the administrative structure. The adoption of STDM in land administration in Nigeria will be in the right direction of achieving sustainable land reform programme in Nigeria.

Overall, the research demonstrated the use of STDM to record land rights and provide tenure security by using alternative approaches to recording land rights. It has shown that the use of HRSI as a form of low-cost cadastral survey is achievable, and better satisfies the need of the rural poor than the accuracy requirements of the formal land registration system.

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