

# **LAND INFORMATION IN INFORMAL SETTLEMENT UPGRADING: THE SOCIAL TENURE DOMAIN MODEL AS AN EMPOWERMENT TOOL IN OKAHANDJA, NAMIBIA**

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**Key words:** Informal settlement upgrading, land information, participatory enumeration, Social Tenure Domain Model (STDM).

## **SUMMARY**

Managing informal settlements involves planning the settlements' growth and improving the living conditions of the people through provision of basic services and amenities as well as improving local livelihoods and economy. It also involves managing their complex and changing internal socio-economic arrangements. These require that socio-spatial data be collected and updated frequently. Therefore, accurate and complete information is indispensable for any effective intervention for improving tenure insecurity which is a major characteristic of informal settlements. Namibia's formal land registration system does not accommodate the wide range of land tenure claims in the country, including informal land rights, and its which is associated with informal land tenure system. This implies that most formal development projects implemented in local authorities usually do not include the needs of residents of informal settlements who live outside the boundaries of formal land tenure system. As a response to questions concerning what has to be done to manage informal settlements more securely, this paper presents the use of the Social Tenure Domain Model (STDM) for informal settlement upgrading in Okahandja, Namibia. The study also explores other emerging technologies for digital and analogue data collection. It is a reflection on the various modes of socio-spatial data collection process in Okahandja and how these data are captured into the STDM for informal settlement upgrading. It highlights the significance of adopting participatory enumeration as it empowers communities to lead their development path to tenure security through information management in STDM.

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Land Information in Informal Settlement Upgrading: the Social Tenure Domain Model as an Empowerment Tool in Okahandja, Namibia (12634)  
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## 1. INTRODUCTION

The land issue has been a topic of debate globally especially in Africa where land has been held and distributed unequally during the past colonial regimes. A global land administration concern is the development of informal settlements which is a feature of urbanisation and globalisation. Complex socio-cultural processes such as social inequalities are part of the factors that lead to the formation of informal settlements. They are commonly characterized as unsuitable environments and inadequate infrastructure; uncontrolled and unhealthy high population densities; inadequate housing; limited access to facilities for health, education, and employment. Sub-Saharan Africa has the fastest urbanisation and the highest urban population living in informal settlement which was recorded to be 56% in 2015 (Zerbo et al., 2020). Namibia is part of the countries that has been working endlessly on land reform programmes and legislation to address the unequal and skewed distribution of land. While Namibia has made some strides in land governance, key and critical challenges in land governance still exist today. The proliferating informal settlements that accompany urbanization in Namibia constitute a major challenge for land managers. Upgrading these informal settlements require accurate and detailed socioeconomic and spatial information. In 2018, 40% of Namibians lived in shacks (Karuaihe, 2019). Contributing factors, amongst others, are ill-designed land and housing policies, poor land governance, rural-urban migration and poor information systems (Tjia & Coetzee, 2022). Formal land registration systems fail to accommodate the wide range of land tenure claims which includes informal land tenure systems. Hence, the paradigm shift by the global land community to unconventional land administration approaches as appendage to conventional approaches (Archer, 2016). According to Salifu et al. (2019) less than 30% of developing countries are covered by a cadastre which implies 70% of the land in developing countries is not covered by any formal land registration systems. As a response, the Global Land Tool Network (GLTN) recognizes that security of tenure can be best improved through the provision of appropriate and practical land tools to solve land administration problems (UN-Habitat, 2012). The GLTN is a global network of partners with an agenda of ensuring the urban and rural poor have better access to land and security thereof through developing a set of land tools such as the participatory enumeration and the Social Tenure Domain Model (STDM) (UN-Habitat, 2013). The objective of the paper is to assess how to use STDM as an empowerment tool in informal settlement upgrading with key focus on digital and analogue data collection in participatory enumeration. This paper presents an experiential response to questions concerning what is being done to tackle land information related informal settlements challenges in Namibia. It presents the use of STDM for informal settlement upgrading. The experience presented in this paper is based on an ongoing city wide informal settlement upgrading project being co-implemented by the Namibian Housing Action Group/Shack Dwellers Federation of Namibia(NHAG/SDFN) and the Namibia University of Science and Technology (NUST), with the support of the Global Land Tool Network(GLTN) in the Municipality of Okahandja in Namibia. The scope of the paper outlines land governance in Namibia's informal settlements, presenting innovative solutions through the STDM and participatory enumeration land tools followed by detailed description of the participatory community-led informal settlement upgrading process in Okahandja. Further highlighting the local application of STDM and

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participatory enumeration using paper-based and digital data collection and concludes with an integration model for the optimal use of the land tools.

## **2. LAND GOVERNANCE IN NAMIBIA'S INFORMAL SETTLEMENTS**

### **2.1 Namibia's Land Administration System**

Namibia has established a multi-institutional, legislative and scale approach to land governance, which speaks to the diversities in the land sector which exists in terms of land tenure systems and which forms part of its land reform. Namibia has also registered successes in land governance under their respective tenure systems. Namibia's land tenure system comprises freehold (48%), communal (customary tenure) (35%), and state land (17%)-(Namibia Statistics Agency (NSA), 2018, p. 24). Formal land registration in urban areas is done via the Deed Registry System at the Deeds Office in Windhoek regulated by the Deeds Registries Act of 1937 as well as the Registration of Deeds in Rehoboth Act of 1976. This registration system does not record informal or customary land tenure, hence the development of new systems for land management. The latest form of land registration being the Flexible Land Tenure System (FLTS) that saw the first titles issued in 2021 by the Ministry of Agriculture, Water and Land Reform (Nembwaya, 2020). The current approach to registration does not correspond with the envisioned plan of flexibility and availability of land registration services for low-income communities and has been rolled out slowly (Delgado et al., 2020; Christensen, 2015). This means, there is still a growing need to record informal land rights in Namibia.

### **2.2 The growing urban challenge in Namibia**

At the Second National Land Conference held in 2018, Urban Land Reform was an identified thematic area. Part of the identified land issues under this theme was tenure insecurity in informal settlements and urban land/housing delivery. In 2018, 50% of the population lived in urban areas (de Sagte, 2021) and is predicted to be 70% urbanised in 2030 (Muller, 2018). The high demand for land accompanied by urbanization outweighs the supply by local authorities. Failure to produce sufficient housing and basic services commensurate with the demand triggers the formation of deprived informal areas. The conventional system of acquiring land is therefore costly to the low and ultra-low communities, and this leads to the development of informal settlements. Insecure tenure is one of the most prevailing indicators in informal settlements which means inhabitants do not have registered land rights leaving them prone to eviction and unrecognized. Insecure tenure leaves the poor communities vulnerable and disadvantaged from people who have access to formal land titles. Regardless of the challenges associated with informal settlements, informal settlements are also frequently identified by, strong social infrastructure, substantial personal housing investment seen through data collection, connections to the larger formally housed community. These reasons, together with the lack of space and funding needed to simply address the housing problem require that informal settlements be seen as places of possibility and vitality rather than as places that should be eliminated. Hence, the advocacy for community driven in-situ informal settlement upgrading.

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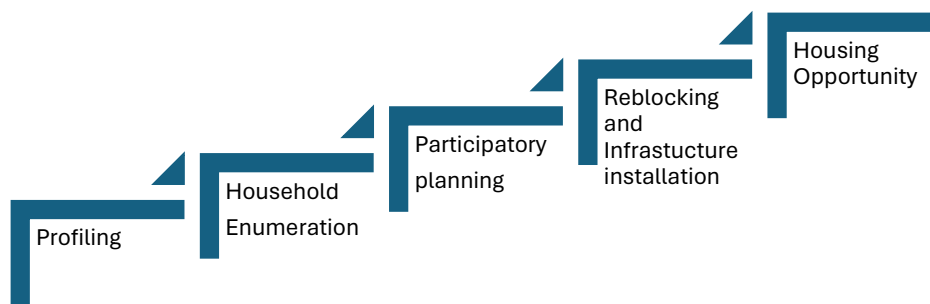
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## 2.3 Participatory community-led informal settlement upgrading in Namibia

The Sustainable Development Goal 1,3,6 and 11 are directly linked to informal settlement upgrading ((Tjia & Coetzee, 2022). Namibia's Second National Land Conference of 2018 resolution on urban land and housing delivery is to prioritise large scale community-based informal settlement upgrading for land delivery. SDFN/NHAG facilitates the Community Land Information Programme (CLIP) which was launched in Namibia to collect information on informal settlements through a participatory community-led upgrading process whereby communities are the drivers of the process in partnership with local authorities and other stakeholders (Shack Dwellers Federation of Namibia, 2009; Scharrenbroich & Shuunyuni, 2019/2020). The participatory community-led informal settlement upgrading is conducted in five incremental phases through community-to-community training and capacity building.

Figure 1. Phases of informal settlement upgrading (Authors' illustration)



During the first phase the settlement boundaries are mapped, and comprehensive key challenges of the settlement is captured, identifying community's comprehensive development needs. Subsequently, household enumeration activities are carried out inclusive of structure numbering, household mapping, household data collection, data analysis, data verification and capturing (Scharrenbroich & Shuunyuni, 2021/2022). SDFN/NHAG conduct enumeration across the country and the enumerators are local community members who are trained through learning exchanges with other community and SDFN members who have gone through the same upgrading data collection process. The objective of participatory planning via planning studios is to create concept layouts representing the community's vision for their settlement. Community identifies their developmental needs and desired amenities and map it onto the concept plan which is drafted into a layout. The approved layout is thereafter used for reblocking into the plots and infrastructure installation. A professional land surveyor pegs the boundaries and block of land with the help of the community (Scharrenbroich & Shuunyuni, 2021/2022). Community members are trained by technicians to service their areas for water and sewer. The last phase paves a way for housing construction through various housing programmes such as the SDFN housing programme, the Build Together programme or through their personal savings.

### **3. STDM AS AN EMPOWERMENT TOOL IN INFORMAL SETTLEMENTS**

The STDM is a land information tool that provides a standard for representing flexible people to land relationships and emphasizes the independent level of formalization and legality of those relationships (UN-Habitat, 2021). This is any form of relationship between a person or people and the land, be it formal, informal, or customary. Its database can store comprehensive socio-economic and spatial data on land. The land records generated from the participatory enumeration helps to strengthen security of tenure on the use and ownership of land through documentation (Chigbu et al., 2021). The development of STDM can be summarized in distinct tripartite perspectives as a concept, to bridge the gap to represent people to land relationships independent of the level of formality, legality and technical accuracy; as model as a specialization of the ISO-approved Land Administration Domain Model; and as an information tool providing the front-end interface for applying the STDM concept and model (Saers et al., 2015; Global Land Tool Network, 2013). Spatial information may be drawn on a paper, marked on a map or indicated on an aerial image photo or satellite image (Antonio et al., 2021). The positions may be surveyed with handheld Global Positioning system (GPS) equipment with traditional or modern surveying equipment or digitized from a pre-existing map (UN-Habitat, 2010). Each household's socioeconomic data is linked to the appropriate spatial unit. The software allows the data to be updated and it can be managed locally. It is used as an information dissemination method because the data is computerized, it is easy to analyse it and it makes the data widely available (Global Land Tool Network, 2013). The STDM has been applied in various informal settlement upgrading projects in Uganda, Kenya, Zambia (Antonio et al., 2021) and Namibia (Chigbu et al., 2021).

### **4. COLLECTING DATA THROUGH PARTICIPATORY ENUMERATION**

Participatory enumeration is a data-gathering process jointly designed and conducted by local communities and other stakeholders. The surveys are designed on paper or using computers. The enumerators may use existing, aerial or satellite photos and may use sophisticated global positioning equipment and geographical information software or it may be entirely paper based (Antonio et al., 2021). Furthermore, participatory enumerations are used to enable alternatives to eviction, for relocation and resettlement and recognition of informal rights and claims. Further uses include using it to assist in process of land administration, for land adjudication, local planning and development, to improve tax collection and for city-wide upgrading (UN-Habitat, 2021). Participatory enumeration has been used in successful cases in Nigeria, Uganda, Philippines, Thailand, Brazil, Somalia and Kenya (Antonio et al., 2021; UN-Habitat, 2012), Namibia (Delgado et al., 2020; Muller & Mbanga, 2012) and South Africa (Baptist & Bolnick, 2012). This is a useful flexible tool that can be adapted to different needs. Enumerations are participatory as it provides transparency and builds trust amongst the locals. This improves the data as communities are more willing to cooperate and can share knowledge on their own situation which can improve the quality of data obtained (Dobson et al., 2015). Data collection is a key activity through which capacity is built on a local level. It offers

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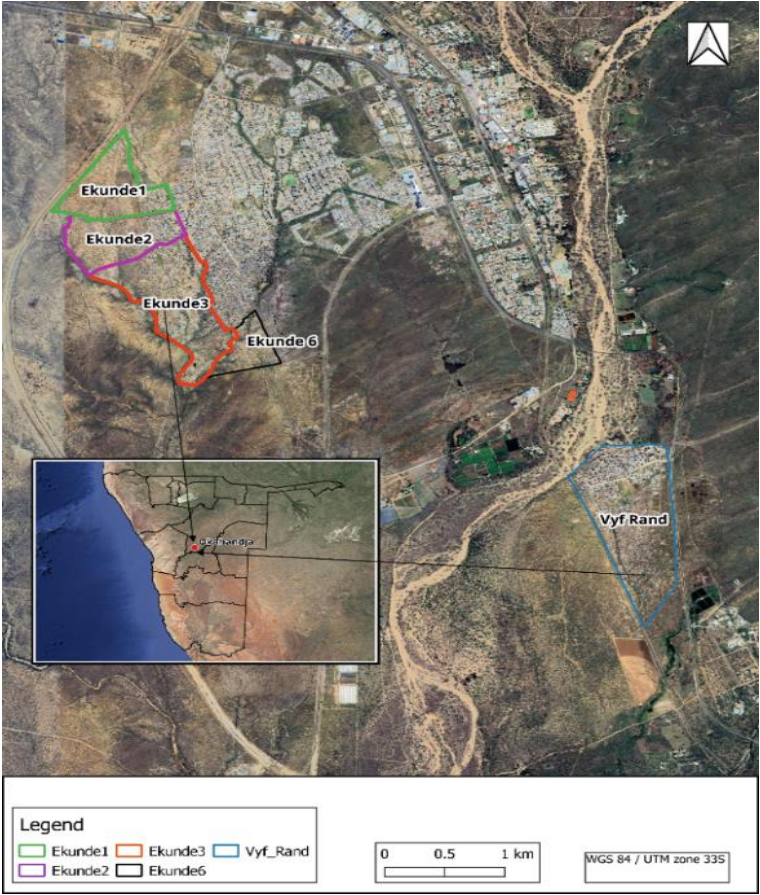
opportunities for self-empowerment as the locals take control of the process ensuring that it speaks directly to their needs and desires (Antonio et al., 2021)

## 5. METHODOLOGICAL APPROACH

### 5.1 Study area

This study focuses on Okahandja, a town 72 kilometers from Windhoek-the capital city of Namibia. Okahandja is the selected project town for informal settlement upgrading. A key part of this project is implementing the STDM through participatory enumeration, which sets the stage for this study. The five settlements selected Ekunde 1, Ekunde 2, Ekunde 3, Ekunde 6 and Vyf rand. While analogue data collection method was used at Ekunde 1,2,3, and 6, digital data collection method was used at Vyf Rand which is also known as Five Rand. This allows for the contrast and comparison of various data collection techniques and to synthesise the results by testing its integration with the STDM.

Figure 1: The selected informal settlements in Okahandja (Source: Hamunyela, 2023)



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## **5.2 Research Methodology**

A case study approach was adapted because it enables a phenomenon to be investigated in its real-life context (Harrison et al., 2017). A mixed research method was integrated using primary and secondary data to gather information. Focus group discussions were arranged with the participating community in the upgrading process to identify and review the data collection methods used in the respective settlements. Qualitative research included a desk top study which reviews existing literature on participatory enumerations and STDM. Finally, field research through participant observation entailed participating in the field testing of data collection tools, set up of the STDM and monitoring and facilitating communities' participation.

## **6. THE MUNICIPALITY OF OKAHANDJA AND ITS INFORMAL SETTLEMENTS**

Namibia has introduced the FLTS which aims to provide tenure security to people living in informal settlements offering two alternative forms of title, starter title and land hold title (Flexible Land Tenure Act, 2012). However, this new system has not yet been implemented in all the local authorities in the country, including Okahandja. This continues to leave many Namibians in informal areas without access to a pro-poor land registration system, thereby exacerbating tenure insecure. Okahandja is a fast-growing town, and its growth is associated with growth of informal settlements. The burgeoning nature of these settlements is a clear indication that policies and practice need further intervention. According to Shack Dwellers Federation Namibia (2022), Okahandja's informal settlements are deprived of basic services and infrastructure which impacts the livelihoods of communities. Communities lack access to safe and sufficient drinking water, adequate sanitation and are settled in hazardous areas such as dumping sites and riverbeds. Additionally, their rights to the land are not documented and secured. Due to continually changing internal social environments on these settlements and changes in the arrangements of shacks, social and spatial data need to be collected and updated frequently. The lack of data on these settlements and an inclusive land administration system hinders efforts to improve living conditions. Spatial and non-spatial information is not available in a well-designed and organized system at the Okahandja Municipality. This means that critical decisions and planning are made based on less comprehensive or little to no information. Hence, the combined intervention by the Okahandja Municipality, NHAG/SFDN, NUST, Trimble Inc., and the UN-Habitat/GLTN to upgrade the settlements and register the households.

## **7. EXPLORING DATA COLLECTION IN OKAHANDJA**

CLIP participatory enumerations are implemented in two phases: settlement profiling and household enumerations. This paper explores household enumerations. A local CLIP team is formed during community engagements. These are representatives from the community who are directly involved in the upgrading activities and that receive training from the SFDN/NHAG and other stakeholders such as NUST on implementing the activities with daily supervision by the municipal staff. It is a mixture of women, men, young people and the elderly. This meets the global agenda of youth and gender participation in land governance. A standard

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questionnaire developed by SDFN/NHAG for upgrading purposes was used which requires detailed information on household demographics, tenure and structure information, occupation and subsistence details, basic amenities, health, development needs, community organization and affordability levels.

Ekunde 1, Ekunde 2, Ekunde 3 and Ekunde 6 used the paper-based approach to collect data. Each settlement was divided into blocks with grouped teams responsible for collecting data in the blocks. There were two teams, one for numbering each structure with a unique code according to the settlement name and block number and the other team was responsible for conducting the interviews. A training workshop was arranged and facilitated by SDFN/NHAG and NUST with support from CLIP team members from other upgrading towns for a learning exchange. After the data was collected, the local team was trained to manually analyze the data. The output was summary findings on the data collected on a settlement level. These findings were presented to the community to know their data and to the Council of the Okahandja Municipality to know the data of its local inhabitants highlighting the deprivations of the settlement and the urgency to address their livelihood issues. Households were mapped during a separate community mapping exercise whereby the community go on the ground and map and verify the existing structures on an aerial image printed out and identify permanent structures and communal water points. The purpose is to digitize the points using QGIS and spatially link each household information to its structure. The structures not appearing on the map were captured using a handheld GPS. The results of the households surveyed are as follows: 786 households in Ekunde 1, 708 households in Ekunde 2, 1191 households in Ekunde 3 and 229 households in Ekunde 6.

### **7.1 Digital transformation in data collection**

Although analogue data collection has been explored in various settlement upgrading attempts in several towns in Namibia, digital data collection and the use of STDM is a first for Okahandja. With the support of GLTN, the paper-based questionnaire was customized and digitized into a mobile form and a form for STDM through an STDM system design exercise. The digitized form was restructured to ensure its compatibility with the STDM system. Vyf Rand applied the digital method. This team received training using tablets and they physically numbered the structures. The digitized form was imported into the KoboCollect application; however, you can also create a form in KoboCollect. KoboCollect is a free and widely used open-source system to collect, analyse and manage field data (Bokonda et al., 2020). KoboCollect features include capturing supporting documents, capturing the structure, and a built-in spatial feature to collect the coordinates for spatial mapping (Pandey et al., 2021). After the enumeration, the data was cleaned by the NHAG and municipality technicians via the application and verification was done by the CLIP team using the tablets. Additionally, KoboCollect has built-in analytical features which was used to automatically generate reports on the summary findings of the data collected which was then presented by the local CLIP team to the community and the Council. 1020 households were surveyed in Vyf Rand.



## 7.2 Analogue versus digital: Experiences of the local CLIP team

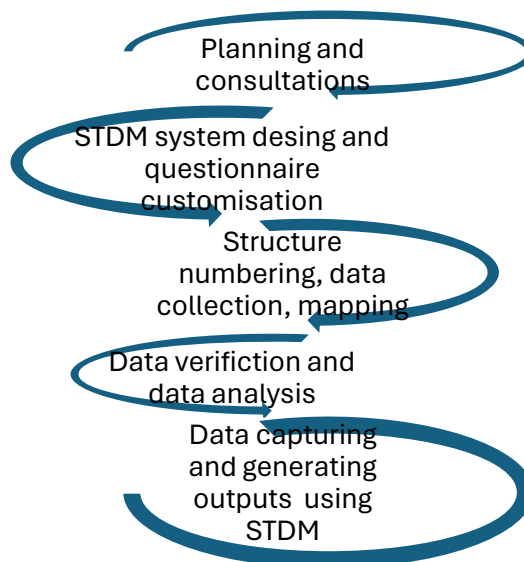
The initial reception of communities on the introduction of digital data collection was the fear of technology and the fear of losing the tablet. Digital data collection required detailed and more than one training session because not everyone is well familiar with technology. A challenge experienced was spelling, however the prediction settings on the tablets helped with accurate spelling. Different and wrong spellings added to the need for cleaning the data. Being grouped in teams also helped with translating questions as the digital form was not translated into local languages unlike the paper survey form. What worked well for the digital data collection was that it was fast to use, and it had the option to capture supporting documents. Households being interviewed found the use of tablets interesting and made the process look formal, making them more cooperative. The challenges encountered with digital data collection were once the forms were uploaded, you could not retrieve it. Data analysis was easier as KoboCollect automates reports however, this limited the team's participation in understanding the data they collected. Manual analysis required a certain level of literacy. Calculations were prone to errors and when the totals were not balanced, you had to reanalyze the forms which were a lot. Feedback from the CLIP team shows that digital data collection was faster, taking approximately 15-30 minutes to fill in a form contrary to analogue that takes about 30 minutes to an hour. Data management and storage turned out to be better in a digital format, in contrast to paper which becomes dirty easily, can tear and can easily get lost. The analogue CLIP team, however, also preferred training on digital data collection to enhance their knowledge.

The limited number of tablets also slowed the data collection process in Vyf Rand as compared to Ekunde that could have an unlimited number of participants working with the paper forms. However, the paper-based method required continuous printing of forms. The team using the paper-based method had flexible hours to collect data because they kept the forms compared to the digital team who could only use the tablet from 08h00-17h00 forms for safe keeping by the municipality. This also meant that communities relied on the municipal officials to charge the tablets as these settlements do not have electricity. The weak internet coverage in these areas meant the community had to gather at a place with stronger coverage to upload the digital forms to the server. The paper-based process included the community throughout the whole process which encouraged understanding and transparency, but the digital process excluded the community in cleaning and analysis of the data, slightly alienating them from their data; however, it provided fast and accurate analysed data. KoboCollect analysis provided a wider range of analysis information such as the mean, mode and average creating more realistic findings whereas paper-based only uses average. The digital application could pick up multiple entries of one person alerting the land issue of multiple owners. Data on the digital platform can be easily imported into STDM, whereas paper-based requires a time-consuming method of manually entering the data into STDM. An obstacle to the process was the levels of literacy. Some community members have a low level of education therefore not being able to read and write limits their participation in both methods, the same goes for people who are blind, deaf and disabled. Digitally, mapping can be done as an additional step in the survey form whereas analogue community mapping is a separate activity taking up more time for training and execution.

## 8. STDM APPLICATION IN PARTICIPATORY ENUMERATION

The STDM plays a crucial role in participatory enumeration and can be used in every step of the enumeration process. Likewise, participatory enumeration can be effectively incorporated into the STDM as a data-gathering and analytical process (UN-Habitat, 2021). Data processing and analysis is done within the open source QGIS software which will be imported into the STDM system. The STDM plugin will create the social tenure relationships between the spatial and party attributes to form the cadastral database within STDM (Mwanyungu et al., 2017). The attribute data linked to the structure numbers forms the social tenure relationship within the STDM domain. An STDM training workshop was organized with a GLTN technical exchange support in Namibia for the local CLIP team to familiarize themselves with the system. Thus far, the data collected has provided details for the layout plan on the number of plots needed to accommodate the households. The outcomes from the mapping depicted the number of permanent structures and key features which were taken into consideration during drafting of the layout plan. Community is now also able to identify their structures on the aerial image offering them some sense of recognition. As the project progresses in Okahandja, once the STDM workstation is fully operationalized at the Okahandja Municipality, it will be used to integrate all the relevant data into one and print certificates of recognition that will serve as a form of security recognizing the local people's occupation on municipal land until such a time when they can apply for more secure land rights under the Flexible Land Tenure System.

Figure 3: Model used for integrating participatory enumeration and STDM in Okahandja  
Source: Author (2023)



The model depicts integrated steps taken in the upgrading activities for household enumeration. This model links collection of data using the participatory enumeration approach with the STDM.

## CONCLUSION

A well-functional and developed land administration provides detailed land information, supporting proper planning and a spatially reference information system to aid in land registration. An improved land information system in Namibia will improve land delivery, service provision and housing provision and address all the urban and rural land development challenges it encounters. To address the gaps of the conventional system, the STDM integrates formal, informal and customary land rights. Moreso, it empowers informal settlement upgrading and communities. Data is a critical infrastructure. Informal settlement upgrading relies on reliable and up-to-date spatial and socio-economic data. Communities' involvement in participatory enumeration promotes capacity building and allows community to take ownership of their information to defend their land rights. Processes that allow communities to spearhead their own development also ensure needs-based solutions and sustainable development. Introducing two forms of data collection was an opportunity to improve the quality of the data for information management in STDM and it exposed stakeholders to emerging technologies. While digital data collection is faster in data collection and analysis, if the community enumerators have access to many devices and collect the data and have access to electricity points which is not always possible. The paper-based method allows for more community participation and community understanding and advocacy to be built. This means that one method is not effective alone, and a hybrid model is needed based on local cases where more than one approach can be used. Additionally, there is a need to improve each approach for its application in cases where only one method can be used. Where accuracy is concerned for mapping, it will be improved during reblocking by the professional land surveyor who adheres to the accuracy requirements. Penmap and Catalyst surveying equipment from Trimble Inc can also be explored as an emerging technology to improve accuracy. This process cannot be done in isolation; therefore, the commitment of stakeholders is crucial. Finally, integrating the land tools strengthens its optimal use and contributes to improving inclusive planning, community empowerment and tenure security.

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