

**FROM SQUATTER FARMERS TO TENANT FARMERS: APPLICATION OF LOW COST
GEO-SPATIAL TECHNOLOGIES IN KALANGALA**

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ABSTRACT

Kalangala district in Uganda was largely comprised of subsistence farmers and fisher folk, before the it was curved out of the greater Masaka district in 1989. The UNDP Human Development Index for Uganda, showed that in 2000, Kalangala district was ranked the 71st poorest district in Uganda, out of 76 districts, The district was known for high levels of poverty, depletion of forests and dependence on capture fisheries.

The Government of Uganda through a Public Private Private partnership has supported 1,801 smallholder farmers (34% female) to grow oil palm in Kalangala. So far, 1,200 farmers on 2,500 hectares are harvesting. Farmers have now planted 4,424 hectares of oil palm.

Majority of the farmers lacked security of tenure when they planted their oil palm. Most of the land owners do not live on the island and had no interest in the island at the time it had a few economic activities. As the land values increased, conflicts with the land owners and neighbors started. The use of the Q-GIS based Social Tenure Domain model has allowed farmers to document their interests on their land and engage the land owners with evidence. This has helped them register as tenants to the landlords.

Key Words:

LAND TENURE, GIS TECHNOLOGIES, SMALLHOLDER FARMERS, SOCIAL TENURE DOMAIN MODEL



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INTRODUCTION

Land is fundamental to the lives of poor rural people. It is a source of food, shelter, income and social identity. Secure access to land reduces vulnerability to hunger and poverty. But for many of the world's poor rural people in developing countries, access is becoming more tenuous than ever (IFAD 2015).

Land tenure is the relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to land. (For convenience, "land" is used here to include other natural resources such as water and trees.) Land tenure is an institution, i.e., rules invented by societies to regulate behaviour. Rules of tenure define how property rights to land are to be allocated within societies. They define how access is granted to rights to use, control, and transfer land, as well as associated responsibilities and restraints. In simple terms, land tenure systems determine who can use what resources for how long, and under what conditions (FAO 2002).

Land tenure is an important part of social, political and economic structures. It is multi-dimensional, bringing into play social, technical, economic, institutional, legal and political aspects that are often ignored but must be taken into account. Land tenure relationships may be well-defined and enforceable in a formal court of law or through customary structures in a community. Alternatively, they may be relatively poorly defined with ambiguities open to exploitation (FAO 2002).

BACKGROUND

Kalangala district in Southern Uganda was largely comprised of subsistence farmers and fisher folk, before it was carved out of the greater Masaka district in 1989. It was the high level of poverty in the district that influenced the people of Kalangala to request Government of Uganda (GOU) to be granted district status. GOU however did not have evidence of economic viability of the district. Most of the residents of the main island, Bugala, were not born of the island, and therefore had no tenure rights on the land. The UNDP Human Development Index for Uganda, showed that in 2000, Kalangala district was ranked the 71st poorest district in Uganda, out of 76 districts (Uganda Poverty Status Report, 2014). The district was known for high levels of poverty, depletion of forests and dependence on capture fisheries.



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LAND TENURE CONTEXT IN THE CENTRAL PART OF UGANDA

The colonial state in Uganda was built on the official philosophy of protectorate and indirect rule rather than colony, territory or direct rule. The Colonial state didn't introduce radical changes in the system of customary tenure in Uganda. The dominant economic structure chosen for Uganda was one of small peasant agriculture under the prevailing customary tenure. However, other land policies which could accommodate customary tenure were introduced to appease the local chiefs and get local political allies in the effective administration of the country. The colonial administration thus introduced policies which could accommodate customary tenure (

In 1900, Sir Harry Johnston, as Her Majesty's Special Commissioner in Uganda, entered into a historic agreement with the Kabaka's regents (Stanislaus Mugwanya, Zakaria Kisingiri and Apollo Kaggwa, and Chiefs of Buganda). This agreement was to establish clearly the powers of the Kabaka's government vis-à-vis the protecting power and the limits of those powers and, paramount of all, to effect a land settlement which, by giving security of tenure, would lay the foundation for the economic growth of the Kingdom.

This was the Uganda Agreement of 1900. It was later changed to read: 'Buganda Agreement' by legal notice of 1908. The agreement granted square miles of land to Chiefs and private land owners hence the term 'mailo' deriving from the English length-unit (mile) which was the basis of measurement in land allocations. The agreement divided the land among the crown (Queen's government), the Uganda Protectorate Administration, the Kabaka, his Chiefs and missionary societies. The total land under the Protectorate Government was 10,550 sq. Miles and came to be known as 'Crown land'.

There were two categories of Mailo which were divided thus:

(a) Official Mailo

These were grants of land attached to specific offices in the Buganda Local Government. They could neither be sub-divided or sold and instead passed intact from the original land holder to his successor. This official mailo was defined in sec. 6 (a)&(c) of the Buganda Possession of Land law:

Section 6 "*Every man who has land for his chieftainship shall hold it as follows –*

(a) For all the time that he holds his chieftainship he will be allowed to take all the profits from the land which he has, except as written in the words below. . . .



(c) To hold land in this manner will be called to hold “official Mailo” and shall be governed as directed above . . .”

The holder of an official estate could not sell that estate but he was capable of leasing the same in accordance with the Official Estates Ordinance/Act of 1918 (Cap. 203 of the 1964 ed. Laws of Uganda). This applied also to the grounds of official estates of Toro and Ankole Agreements. So here, one held land by virtue of his chieftainship (office), thus it was not private property. Under the agreement, it was clear that the 350 square miles given to the Kabaka was to be Kabaka-ship mailo, i.e it was not private property. Official Mailo was abolished in 1967 and these estates became public land.

(b) Private Mailo

In such estates, some 1000 chiefs and private land owners were allocated 8,000 square miles of land under the 1900 Buganda Agreement. The Mailo land owner held rights in his land akin to those of free hold. He was free to sell all or part of his holding and to pass it to his successors either under customary inheritance procedures or through a will. Approximately half of Buganda (more than 8,000 square miles) became formally privatized, despite the fact that these mailo estates were already settled by small holders under customary tenure, whose usufruct (land use) rights were not legally recognized.

Under sub sec. (a) of section 2 (Buganda Possession of Land law), there was a prohibition from owning more than 30 square miles of mailo land, whether by one self directly or by others for someone, except with the approval in writing of the Governor and the Lukiiko (Buganda Parliament). Therefore individual holdings of mailo were not to exceed 30 square miles. The Buganda Possession of Land law 1908 prohibited a mailo owner from transferring land to a person who was not of Ugandan origin without prior consent of the Governor and the Lukiiko.

Clauses 15 to 18 of the 1900 Buganda Agreement dealt with the issue of land. The essence of this settlement was that approximately one half of Buganda became crown land and was vested in the Protectorate government. This is what was referred to as Public Land. The other half was widely distributed in the form of freehold estates (‘mailo’) to the Kabaka, his relatives, Senior chiefs, one thousand other chiefs and private land owners. These people got square miles of land among themselves. Historical records show that the first mailo title was issued on the 2nd of January 1909 although by 1964, the total number of titles issued was 48,519 (forty eight thousand five hundred nineteen). These grants under the Buganda Possession of land law, 1908, were in the nature of freehold. The new system thus cemented individual title ownership.



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The 1900 Agreement, however, did not define the nature of the estate (tenure) that had been granted to the Kabaka, Chiefs, etc. It was not mentioned in the agreement as to what was the character of the grant. The agreement was pre-occupied with the question of acreage. It was not until 1908 that Mailo tenure was actually defined in the Buganda Possession of Land law, 1908. Under Section 2 thereof, for the first time the word 'mailo' which is derived from the English word 'mile' was coined (out of a corruption of the English word) to refer to land which the government had surveyed and recognised as belonging to someone.

In further criticism, allocation of the original mailo holdings in the early part of the century was made without regard to pre-existing rights of occupancy and ignored the presence of peasant cultivators whose tenancy rights were recognised under customary system of land tenure. These people, who had been occupying the land in different capacities, i.e as bibanja holders at the King's pleasure; as Chiefs (Butongole); as part of Butaka (clan) land, now had to adapt to a new system where they had a land lord directly over them and possessing title to the land. They therefore could no longer hold their land as they traditionally did but under the dictates of the new Mailo system.

Other persons who wanted to settle on mailo land had to approach the mailo owner and get permission to occupy a specific piece of land on terms agreed with the land lord. Initially, most tenants paid little or no rent and labour services, particularly on large estates. Mailo owners were considered lords of their area and their tenants were their servants. Even though mailo owners permitted peasants to retain possession of the land (called kibanja) they were occupying, this effectively converted them from customary land users into legal tenants on private property. This fact alone laid the ground for the genesis of multiple rights on the same piece of land, which is a defining characteristic of land disputes and relations as evidenced by evictions and a land use impasse between land lords and tenants in contemporary Uganda.

Kalangala is part of Buganda Kingdom and the actions resulting from the Buganda Agreement rendered all the subsequent generations in Buganda who did not belong to these families to be squatters. The mailo land particularly comprised of the most fertile land in Buganda. This further provided incentives to the beneficiaries to hold onto the land making them the most-wealthy as the value of land increased.



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VEGETABLE OIL DEVELOPMENT PROJECT

In 1998, GOU started implementing the Vegetable Oil Development Project and introduced oil palm, a new crop in Uganda, to Kalangala district. Oil palm is the world's most productive and efficient oil crop, with an average refined oil yield of about 4.2 mt/ha/year compared with about 0.4-0.6 mt/ha for sunflower and soybean. Oil palm needs adequate water (usually in areas of more than 1 800 mm/annum rainfall or in some cases using irrigation) and relatively warm temperatures. Bugala island on Kalangala district met the rainfall and temperature requirements of oil palm.

The overall goal of the project is to contribute to sustainable poverty reduction in the project area. The development objective is to increase the domestic production of vegetable oil and it's by products, thus raising rural incomes for smallholder producers and ensuring the supply of affordable vegetable oil products to Ugandan consumers and neighboring regional markets. This is being achieved by supporting farmers to increase production of crushing material (both oil palm and oilseeds) and helping them to establish commercial relations by linking them to processors. The project is implemented through a Public Private Partnership and private sector partner has established 6,500 hectares of oil palm while GOU and IFAD have supported 1,801 smallholder farmers (34% female) to establish 4,424 hectares. The project also provides value chain support to smallholder farmers growing sunflower, soybean, ground nuts and sesame in 51 districts spread across the Northern and Eastern parts of Uganda.

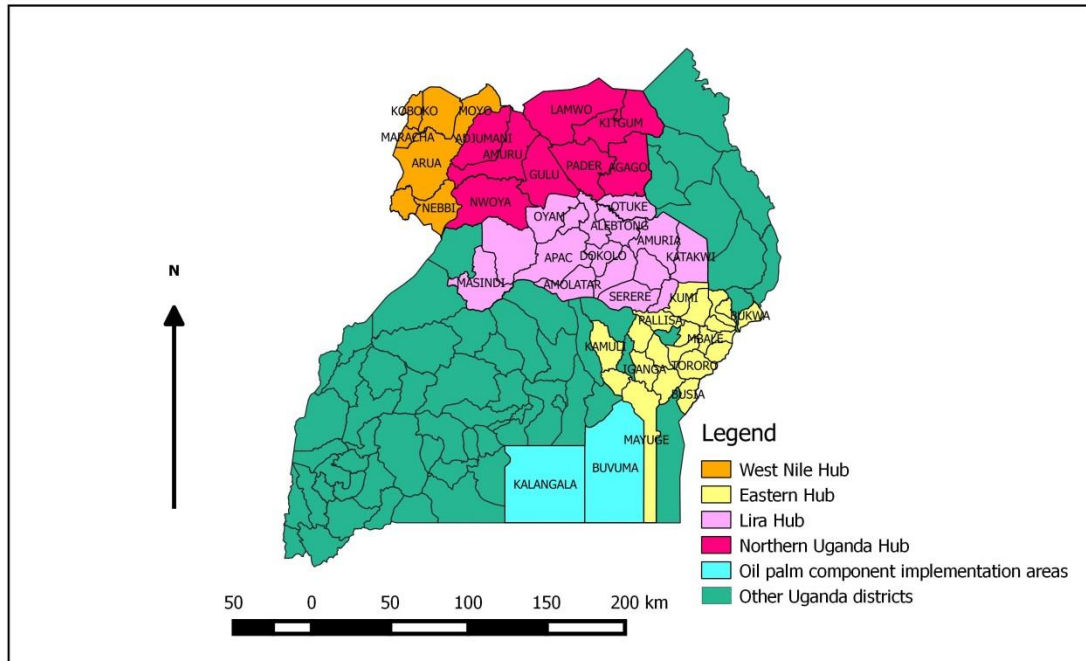


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MAP OF UGANDA SHOWING THE PROJECT AREA



PREPARED BY VODP2 M&E OFFICE

Figure 1: Map of Uganda showing the project area

Establishment of the smallholder oil palm scheme started in Kalangala in 2005 with first priority given to the smallholder farmers who had evidence of ownership of land. This however resulted in a delayed implementation of the smallholder scheme as majority of the residents in Kalangala did not have any evidence of security of tenure on the land on which they lived and carried out their subsistence agriculture.

OIL PALM SMALLHOLDER SCHEME IN KALANGALA

The smallholder scheme in Kalangala is organized in 7 blocks which are geographical units in which farmers are organized for ease of access to services for example roads, extension services, fruit excavation among others. The blocks are Kayunga, Kalangala, Bbeta East, Bbeta West, Bujumba, Kagulube and the Outlying islands block. Table 1 below shows the number of oil palm farmers registered in each oil palm block and the area planted with oil palm.



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Table 1: Farmers registered and area planted with oil palm in Kalangala

Oil palm block	Registered farmers	Area planted
1.Bbeta East	416	672
2.Bbeta West	295	770
3. Bujumba	243	623
4. Kagulube	213	734
5. Kalangala	155	478
6. Kayunga	289	673
7. Outlying islands	190	474
Total	1,801	4,424

In Kalangala, most of the land owners did not live on the island. The high levels of poverty had made them disinterested in the goings-on of the island, and in many cases the same land owners owned big chunks of land in other and in many cases more economically developed districts. The seeming lack of interest by the landowners to develop the land in Kalangala, combined with a decline in fish stocks in Lake Victoria resulted in to the landless, mainly those who had moved to the island to benefit from the fishing and related activities, to settle and start tilling the land for mainly their food needs.

When the oil palm development activities were introduced to the island in 2005, these farmers were initially not able to benefit as they had no documentation giving them a right to use the land. Eventually, the project opened up to them as they sought to get more smallholder beneficiaries. The farmers were then tasked with opening as much land as they would using mainly their own and family labour, as there were minimal services of hired labour. The project offered loans for land clearing, seedlings, fertilizer and maintenance of the gardens which enabled the poor rural farmers to establish their oil palm enterprises. Relaxing of the condition of evidence of tenure rights on land to be planted enabled the project to meet its smallholder targets, and enabled the project to achieve its focus of reaching the poorest in the community. By 2005, an acre of land in Kalangala was valued at USD 18. An acre of land in currently valued at USD 2,000.

When the first commercial oil palm harvests were delivered to the palm oil mill in 2010, the value of land started increasing. The project was paying farmers straight to their accounts and the preliminary impact of the project was realised as incomes increased. This attracted people to get more interest in the island which further contributed to an increase in land values and then the “absentee landlords” also gained interest in the land. The raising interest and related land values then started resulting in conflicts as the



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benefactors of the land redistribution who also had the old land titles returned to make claim for their land on the islands. The conflicts forced some smallholder oil palm farmers to quickly sell off their land and leave the island, while others choose share cropping where they agreed to pay a percentage of all their incomes to the holders of the land title. Table 2 below shows the change in value of production of the oil palm smallholder farmers' enterprise between 2010 and 2016.

Table 2: Value of production for oil palm farmers between 2010 and 2016 (USD)

Month	2010	2011	2012	2013	2014	2015	2016
January	89	9,076	60,909	58,116	104,958	123,009	120,419
February	542	14,304	73,040	71,626	78,832	148,346	105,563
March	971	33,836	71,112	100,809	95,827	154,964	244,500
April	2,726	28,919	101,844	119,762	108,439	190,236	412,651
May	3,911	35,636	101,766	118,161	103,209	188,933	399,457
June	3,459	33,988	72,364	106,728	85,935	149,250	368,203
July	3,191	39,239	53,810	87,741	78,243	131,859	218,595
August	4,059	33,475	68,523	78,297	85,919	130,045	188,761
September	6,673	37,213	75,580	93,276	79,077	133,400	210,450
October	6,974	40,853	69,475	111,883	105,546	152,131	277,336
November	8,638	54,605	68,853	119,366	112,490	170,184	357,734
December	10,534	64,136	47,595	109,558	103,315	133,067	298,898
Total	51,767	425,282	864,871	1,175,324	1,141,790	1,805,424	3,202,567



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GLOBAL LAND TOOL NETWORK (GLTN) AND THE TENURE LEARNING INITIATIVE FOR EASTERN AND SOUTHERN AFRICA

The Land and Natural Resources Tenure Learning Initiative for Eastern and Southern Africa (TSLI-ESA⁴) is a collaborative regional initiative of the Global Land Tool Network (GLTN) and the International Fund for Agricultural Development (IFAD). The initiative aims at building knowledge, awareness, and capacity of staff and partners of IFAD on integration of pro-poor and gender appropriate land tools for strengthening of access to land and security of tenure for communities targeted by IFAD supported investment projects and programs in Eastern and Southern Africa (ESA) region.

TSLI-ESA Phase 1 reviewed and identified a list of 22 on-going IFAD supported investment projects and programmes with lessons for the development of tools and approaches on five thematic areas: (i) Land and water rights, in the context of watershed management and irrigation schemes; ii) Recognizing and documenting group rights to land and related natural resources; iii) Supporting women's access to land and related natural resources; iv) Using approaches and technologies for mapping land and natural resource use and rights; and v) Securing and valuing land and natural resource rights as part of establishing business ventures between rural communities and investors). In addition, to continuing with the knowledge management, TSLI-ESA Phase 2 selected 4 focus countries, Uganda, Kenya, Malawi and Mozambique for country-level engagement on capacity development for land tenure tool implementation.

At country level, the process of land tenure tool integration in the IFAD supported projects and programmes followed six stages:

- i. *Country Scoping* - consultations with the IFAD supported projects and partners to identify land tenure issues and areas of collaboration with TSLI-ESA Project;
- ii. *Orientation Workshop* – platform to showcase GLTN tools, initiate plan of engagement with IFAD country office, IFAD supported project/programmes, and in-country GLTN partners;
- iii. *Action planning* – a joint meeting for putting in place a strategy and plan for tool pilot implementation;
- iv. *Tool implementation of selected tools* – on a pilot basis to assess appropriateness and efficacy of the tool;
- v. *Up-scaling* – adopting the tool for implementation at large scale within the project area; and
- vi. *Out-scaling* – adapting the tool to another context or geographical area.

⁴ TSLI-ESA initiative has two phases, Phase 1 was a small grant agreement (October 2011 – June 2013) and TSLI-ESA Phase 2 (October 2013 – December 2017) is a large grant agreement.



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Figure 2: Stages for land tenure tool integration in the IFAD supported projects and programmes

LAND TENURE CHALLENGE IN KALANGALA

The main challenge to tenure security in Kalangala has been the economic interest. The class customary system was set in a simple society which produces basically for consumption and not evolving around exchange relations (i.e Barter or monetary system). However, with the introduction of oil palm, a monetary system based on cash crop economy was introduced to enable the households to earn higher incomes, but also to improve the local economy and raise revenue for Government.

Land is now a commodity on the island and with its increasing value as more smallholders harvest more and therefore earn more, those with no legal documentation providing a guarantee of security of tenure face the risk of losing the land on which they earn a livelihood.

THE SOCIAL TENURE DOMAIN MODEL

The oil palm farmers did not have defined boundaries. When harvesting started, conflicts arose about the garden boundaries and all this started posing a risk to the success and sustainability of the project. In 2014, the project partnered with the Global Land Tool Network of the UN Habitat to document the



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tenure, social and economic characteristics of the smallholder oil palm farmers through the use of a poor land recordation tool: the Social Tenure Domain Model (STDM).

The tool captures data, facilitates the data management analysis and data validation and allows updating. The tool creates map based documents, reports and maps. The main objectives of the project are: to document the farmers' tenure rights and conflict mapping; to capture the impact of oil palm growing; and, to assess the productivity of the oil palms in relation to socio-economic factors. The tool allows is simple to lean and apply and smallholder farmers learnt how to use the simple technologies such as the Global Positioning System (GPS). The tool allows for adjustment of its fields and commands and is generally user friendly.

The tool transformed the smallholder farming Kalangala, as it availed farmers the opportunity to properly document the land on which they had grown their oil palms and on which they had built their homes. This improved the interaction with land owners as the farmers were able to provide evidence of the land on which they had planted their gardens. This avoided the scenarios where because no survey of the land, the land owners were not willing to negotiate with the squatters. The tool therefore greatly facilitated the farmers to engage the land lords and resulted in many landlords accepting the squatters to become registered tenants on the land on which they had grown their oil palm. The rate of sale of gardens by smallholder farmers scared of losing all their investment reduced and more engagements are now ongoing between many tenants and land lords. The tool is Quantum GIS based and was customized to meet the needs of the oil palm farmers.

So far, about 80% of the data on the smallholder oil palm farmers in Kalangala has been collected and is currently being analyzed. Discussions are being done to assess whether a certificate that is generated from the tool for the smallholders can be authentic and used to access credit facilities and access other services. The project has now customized the tools to capture data on the beneficiaries of the oil seeds component focused on sunflower, soybeans, grounds nuts and sesame.

IMPLEMENTATION OF THE STDM

The STDM automatically generated garden IDs as a unique identifier for each farmer's garden. The farmers are organized in blocks and units which fall under the counties and sub-counties. The team found it relevant to have the garden as the unique identifier as it was permanent (25 years). Each section of the



questionnaire formed a table in the STDM. These included Household data, farmer details, Enumerators details, the garden information,

Matching the questionnaire and GPX File Match

1. During the data collection, it is important that all the questionnaires have a corresponding .gpx file. This involves checking the farmers specified in the questionnaires have a gpx file with their name written.
2. Where for one reason or another no corresponding .gpx file was found for a given farmer name in questionnaire or the vis versa, the missing .gpx file or questionnaire needs to be listed in list containing missing information. Then, the missing information can be obtained through a field data collection.

Questionnaire Answer Coding

Once we have a matching GPX files for the questionnaires, we can start the coding process. This refers to the creation of summarized lists for all open ended or semi-open ended questions (with “Other (Specify...)” option.

Coding is done through:

1. Going through each questionnaire for each open or semi-open ended question. List and summarize the open ended response for each question.

For instance, if Question 1 is an open/semi-open ended question, this step involves Opening Questionnaire 1, for question 1, Questionnaire 2 for question 1, etc. Once all questionnaires are checked for question 1, go to the next question and carry out the same steps. They create a summery list of your own with the following format.

Q1 – description of the question

5. Answer 1

6. Answer 2



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- i. Once everyone in the team has created his/her own summery list for all responses on open-ended and Semi-open ended questions, start a group discussion and create a common summery/list for the response using the format as indicated in Table 2 in the annex.
- ii. Once you have a complete summarized values for all open ended responses, go back to each questionnaire. If they have an extra, manually written answer for example for question 1, find a value in the value list, with a similar meaning with the one on the questionnaire. Then with a pen, write the code (eg. 5 or 6) that matches the value.
- iii. Once you write the code for questionnaires with open ended questions responses, you can proceed to the next step for data entry.
- iv. Provide this list to the system administrator, so that he enters these lists as a lookup value in STDm.

Once the whole questionnaire is entered, for new responses, during data entry, try to categorize all the responses

Data Entry into STDm

To do a data entry, you need to always have the list containing the question number and the list of values with a code 1, 2, 3, etc. so that you can easily find which value the code written manually on the Questionnaire refers to.

The whole administrative units, the lookups with their values should be entered before proceeding into data entry.

Things to consider when doing the data entry.

- i. Do not follow the question order in the questionnaire but rather the order of questions in STDm.
- ii. For all questions in STDm that have year and month but no corresponding year or month in the questionnaires, use the enumeration month and year.
- iii. If some questions have missing information, they should be left empty in STDm.
- iv. If there is there is any major issue other than missing information, track the problem of the questionnaires using Table 3 in the annex.



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Conduct your data entry from the Questionnaire into STDM using the following order of entry on STDM *Entities*.

1. Household
 - a. Household income
2. Farmer – also upload the supporting documents if available.
3. Witness
4. Garden – import .gpx file and add the additional information from the questionnaire.
 - a. Priority
 - b. Food crop
 - c. Garden productivity
 - d. Impact
5. Enumerator
6. Survey
7. Social Tenure Relationship

Future Data Collection and Data Entry

For the future, data collection will be done after updating the existing Questionnaire. The questionnaires will depend on the frequency of data collection required for each question.

1. The project will create three types of questionnaire namely:
 - a. Initial Questionnaire - This questionnaire should be similar to the one already used for this survey. This will hold all the information required from a newly registered garden and farmer.
 - b. Monthly Questionnaire – This questionnaire will keep track of monthly changing data such as Field Crop, Garden Productivity, and Household Income data.



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- c. Yearly Changing Data – This questionnaire will keep track of annually changing data such as Impact and Priority.
2. In creating the above questionnaires:
 - a. We shall use the same questions used in STDm
 - b. For all questions, make them close ended questions as it is easier for data entry, standardization, and analysis. In doing so, use the STDm lookup values (drop down items) used in the questions.
 - c. For each close ended question use answer a number such as 1, 2, 3, etc. to denote each answer, rather than the existing box for check mark.
 - d. categorize the questionnaire based on STDm entities.
 - e. order the question categories based on the order of data entry in STDm.
 - f. If needed, add more questions and categories, that also involves doing the same on STDm.
 - g. For new questions with open ended or semi-open ended questions, we shall follow the same step as discussed **Questionnaire Answer** Coding topic. For existing open ended questions we shall share the new manually written values with the System administrator so that he/she can check if there is an existing matching value in the STDm lookup. If there is no similar lookup value, the system administrator will add the new value in the configuration wizard.

Generation of certificates:

First a template was designed with both static items and dynamic items. Static items such as the logo, the description terms and conditions while the dynamic items will include the certificate number, farmer picture, farmer name, the map of the garden, and any other variable information. To design a certificate, the location of the static and dynamic items will have to be determined. Information that populates the certificate is from the data entered.



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The certificate has the certificate number, the date on which the certificate is issued, the picture of the farmer, the information on the farmer, the map of the farmers garden (including the legend and campus direction).

Data entry

When data is entered on different computers, it is possible to merge all the data into one system/ server. This can easily be done through ensuring all the computers with the data are connected to the LAN. If there is no LAN, the computers will need to have a static IP address to enable them to connect. The data will then be merged and STDM reports and reports produced for all the data.

The STDM also provides for restriction of user rights. Under content authorization, the STDM administrator will determine what rights a particular user will have.

Observations and Recommendations in the implementation of the STDM

- Use STDM when connected to the LAN network.
- Even though, the trainees grasped the process of data entry, the training time is very short. As a result, if there is a delay in implementation, they might forget what they were taught. Thus, we recommend the implementation to start soon.



STDM interfaces

Below are some of the interfaces on the STDM.

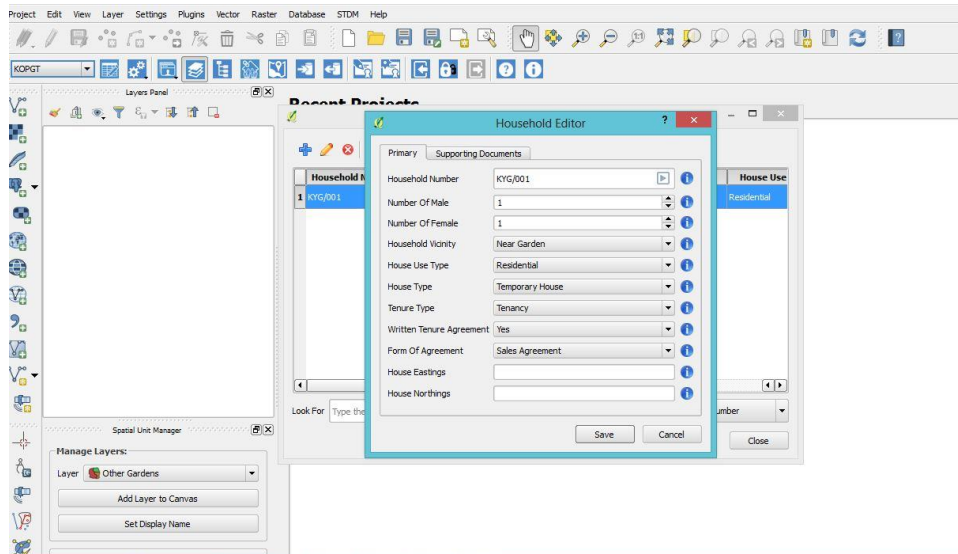


Figure 3: The STDM interface



The figure displays four distinct software interfaces for data entry, each with a title bar and standard window controls (minimize, maximize, close). Each interface includes a 'Supporting Documents' tab and a 'Save' button, along with 'Save and New' and 'Cancel' options.

- Farmer Editor:** Features a 'Primary' tab and a 'Supporting Documents' tab. Fields include Farmer Number, First Name, Last Name, National ID, Gender, Date Of Birth (09/03/2017), Marital Status, Contact Number, Address, Respondent Role, and Household.
- Garden Productivity Editor:** Fields include Garden, Year (1900), Month, Year Of Planting (1950), Average Harvest (0.00), Earning (0), Labor Spending (0), Garden Area (0.00), Fertilizer Type, and Fertilizer Quantity (0).
- Household Income Editor:** Fields include Year (0), Month, Income Generating Activity, Amount Of Income (0), and Household.
- Impact Editor:** Fields include Garden, Year (1900), Impact Factor, and Rank (1).

Figure 4: Different STDM entry interfaces

STDM OUTPUTS

The project has started producing some outputs of the STDM. So far, the project has produced a map showing some of the gardens whose boundaries have been captured and sample certificates which will be finalized after holding consultations with the smallholder farmers and the farmer leaders. The process of validation of the information collected is on-going as more data is collected and verified by the Project Management Unit and Kalangala Oil Palm Growers Trust so the map shown below shows a sample of the map output.

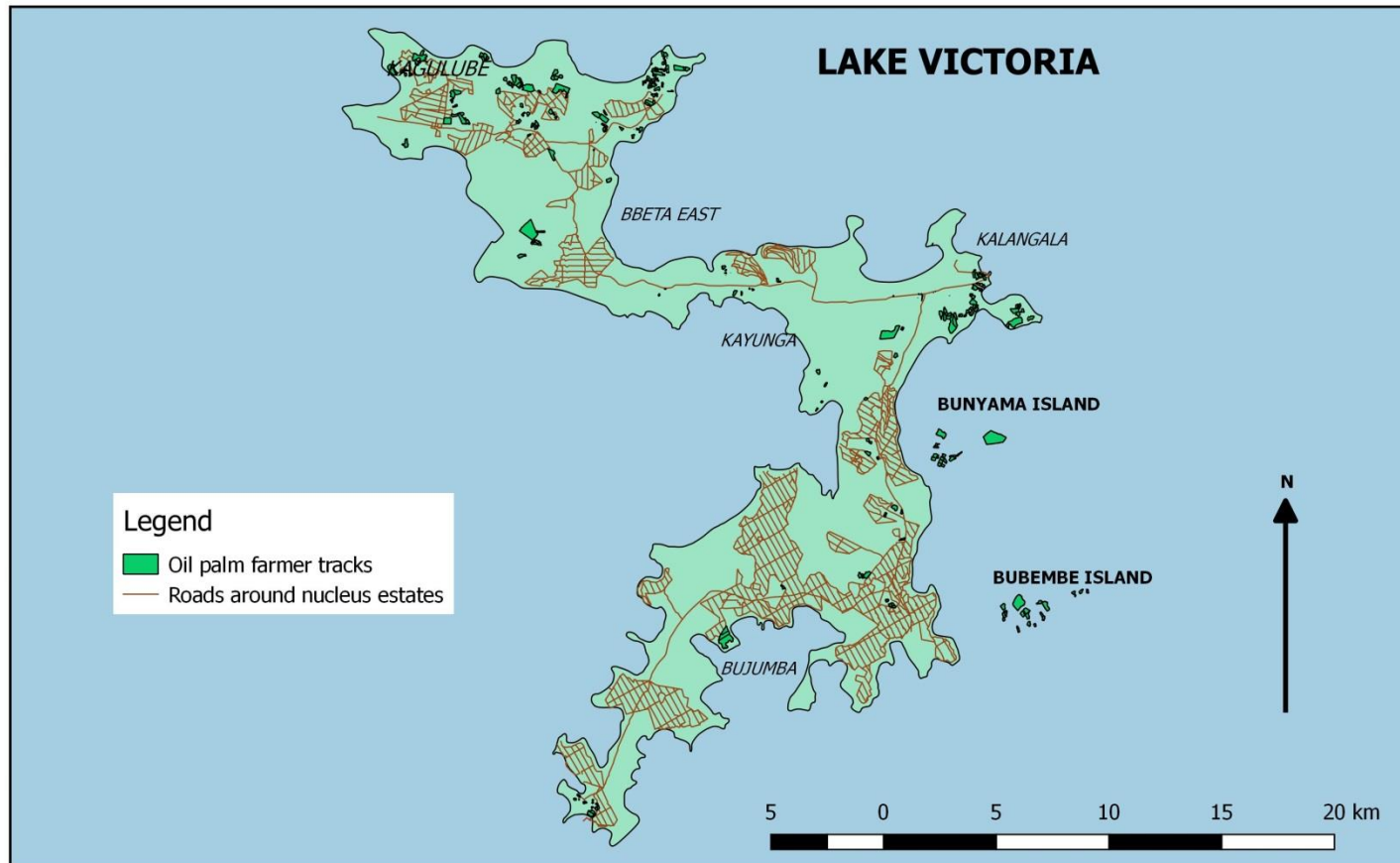


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MAP OF BUGALA ISLAND SHOWING OIL PALM SMALLHOLDER FARMERS GARDEN TRACKS



PREPARED BY THE M&E OFFICE VODP 2 AND GLTN


Figure 5: Map of Bugala island showing some of the oil palm farmers' tracks



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Certificate Number: 2082
Date of Issue: 10/03/2017

THE REGISTERED TRUSTEES OF KALANGALA OIL PALM GROWERS
Trust Secretariat, P.O. Box 39, Kalangala Tel: 0392946714

FARMER GARDEN CERTIFICATE



Farmer No	First Name	Last Name	National ID	Gender	Date of Birth	Tenure Type
A001	Amos	Peter	4654646	Male	1981-03-31	Family Ownership

Garden ID:
KL/BJ/BB/012

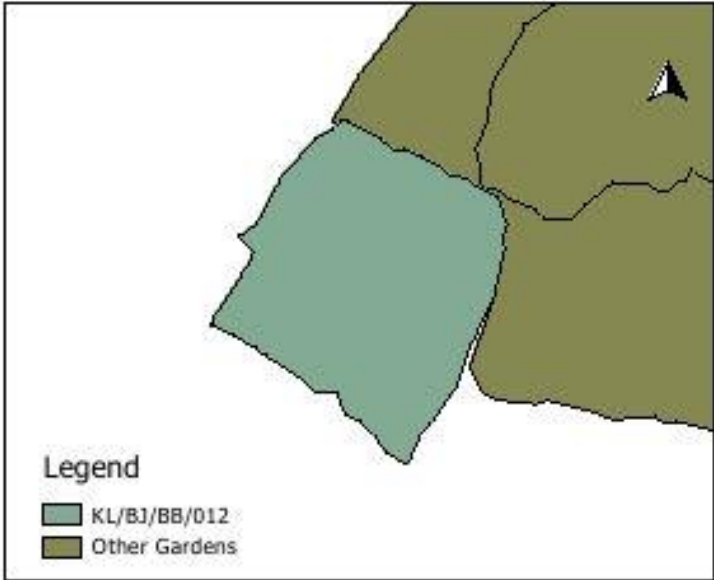
Garden Area:
1.872236 Acres

District:
Kalangala

Sub-County:
Bubeke

Parish:
Kayunga

Block:
Bubembe



Legend

- KL/BJ/BB/012
- Other Gardens

ISSUING OFFICER

BLOCK CHAIRPERSON

Disclaimer: This document is not a title deed. The rights cannot be transferred from the persons listed in this document. In case of any changes, this document will be rendered null and void, and a new certificate will need to be issued in consultation with the Kalangala Oil Palm Growers Trust Secretariate.

Figure 6: A sample of a smallholder oil palm farmers certificate from the STDM



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STDM AND THE PROJECT MANAGEMENT INFORMATION SYSTEM

The project has an operational MIS focused on tracking the implementation of project activities. The project after discussion with GLTN is now merging the project MIS with the STDM through making sync the two databases. This is being done through scripting and linking (php script or python script) the two databases to enable the STDM database to be automatically updated. Another option being pursued is change the database of the MIS from MySQL to Postgress due to the weakness of MySQL on spatial data. The important part of the merging is clearly defining which tables would like to be seen.

CONCLUSION

The use of geo-spatial technologies in Kalangala has proved that it is possible for low cost and affordable technologies to be introduced to rural areas, to be adopted by farmers and to be scaled up to enable smallholder farmers to document their land use interests and rights, and thereby enable them to negotiate better for tenure security especially for their commercial enterprises.

Land tenure security should however not be pursued independently. Steven Lawry (2015) notes that programs to secure land rights are best treated as one element in comprehensive agrarian reform programs. Effective reform is not about providing secure land rights to people. It's also about providing affordable access to farming inputs and markets, and investment in roads, cooperatives, farming training, and so on; investments that enable farmers to capitalize on their secure land rights.

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International Fund for Agriculture Development (2015): Land Tenure Security and Poverty Reduction

Ministry of Finance, Planning and Economic Development, Uganda (2014): Uganda Poverty Status Report

Steven Lawry (2015): The impact of land property rights interventions.