THE REPUBLIC OF UGANDA

Kyankwanzi District
Hazard, Risk and Vulnerability Profile

2016

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES

ACRONYMS

BBW	Banana Bacterial Wilt
DDMC	District Disaster Management Committee
DEM	Digital Elevation Model
DLG	District Local Government
DRM	Disaster Risk Management
DWD	Directorate of Water Development
DWRM	Directorate of Water Resources Management
ENSO	El Niño Southern Oscillation
FGD	Focus Group Discussion
GIS	Geographical Information Systems
HRV	Hazard Risk Vulnerability
KII	Key Interview Informant
MAAIF	Ministry of Agriculture Animal Industry and Fisheries
MWE	Ministry of Water and Environment
NCCP	National Climate Change Policy
OPM	Office of the Prime Minister
PGIS	Participatory GIS
SMCA	Spatial Multi-criteria Analysis
STRM	Shuttle Radar Topography Mission
UBOS	Uganda Bureau of Statistics
UNDP	United Nations Development Program
UNRA	Uganda National Roads Authority
UTM	Universal Transverse Mercator
WGS	World Geodetic System

ACKNOWLEDGMENT

On behalf of Office of the Prime Minister, I wish to express my sincere appreciation to all of the key stakeholders who provided their valuable inputs and support to this Multi-Hazard, Risk and Vulnerability mapping exercise that led to the production of comprehensive district Hazard, Risk and Vulnerability (HRV) profiles.

I extend my sincere thanks to the Department of Relief, Disaster Preparedness and Management, under the leadership of the Commissioner, Mr. Martin Owor, for the oversight and management of the entire exercise.

The HRV assessment team was led by Ms. Ahimbisibwe Catherine, Senior Disaster Preparedness Officer supported by Ogwang Jimmy, Disaster Preparedness Officer and the team of consultants (GIS/DRR specialists); Dr. Bernard Barasa, and Mr. Nsiimire Peter, who provided technical support.

Our gratitude goes to UNDP for providing funds to support the Hazard, Risk and Vulnerability Mapping. The team comprised of Mr. Steven Goldfinch – Disaster Risk Management Advisor, Mr. Gilbert Anguyo - Disaster Risk Reduction Analyst, and Mr. Ongom Alfred-Early Warning system Programmer.

My appreciation also goes to Kyankwazi District Team.

The entire body of stakeholders who in one way or another yielded valuable ideas and time to support the completion of this exercise.

Hon. Hilary O. Onek
Minister for Relief, Disaster Preparedness and Refugees

DEFINITION OF KEY TERMS

Climate change: Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer).

Drought: The phenomenon that exists when precipitation has been significantly below normal recorded levels, causing serious hydrological imbalances that adversely affect land resource production systems.

El Niño: El Niño, in its original sense, is warm water current that periodically flows along the coast of Ecuador and Peru, disrupting the local fishery. This oceanic event is associated with a fluctuation of the inter-tropical surface pressure pattern and circulation in the Indian and Pacific Oceans, called the Southern Oscillation. This coupled atmosphere-ocean phenomenon is collectively known as El Niño Southern Oscillation, or ENSO. During an El Niño event, the prevailing trade winds weaken and the equatorial countercurrent strengthens, causing warm surface waters in the Indonesian area to flow eastward to overlie the cold waters of the Peru Current. This event has great impact on the wind, sea surface temperature, and precipitation patterns in the tropical Pacific. It has climatic effects throughout the Pacific region and in many other parts of the world. The opposite of an El Niño event is called La Niña.

Flood: An overflowing of a large amount of water beyond its normal confines.

Food insecurity: A situation that exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life. It may be caused by the unavailability of food, insufficient purchasing power, inappropriate distribution, or inadequate use of food at the household level. Food insecurity may be chronic, seasonal, or transitory.

Impact: Consequences of climate change on natural and human systems.

Risk: The result of the interaction of physically defined hazards with the properties of the exposed systems i.e., their sensitivity or vulnerability.

Susceptibility: The degree to which a system is vulnerable to, or unable to cope with, adverse effects of climate change, including climate variability and extremes.

Semi-arid: Ecosystems that have more than 250 mm precipitation per year but are not highly productive; usually classified as rangelands.

Vulnerability: The degree of loss to a given element at risk or set of elements at risk resulting from the occurrence of a natural phenomenon of a given magnitude and expressed on a scale from 0 (no damage) to 1 (total damage)" (UNDRO, 1991) or it can be understood as the conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of community to the impact of hazards "(UN-ISDR 2009.)

Also Vulnerability can be referred to as the potential to suffer harm or loss, related to the capacity to anticipate a hazard, cope with it, resist it and recover from its impact. Both vulnerability and its antithesis, resilience, are determined by physical, environmental, social, economic, political, cultural and institutional factors" (J.Birkmann, 2006)

Hazard: A physically defined source of potential harm, or a situation with a potential for causing harm, in terms of human injury; damage to health, property, the environment, and other things of value; or some combination of these (UNISDR, 2009).

EXECUTIVE SUMMARY

The multi-hazard vulnerability profile outputs from this assessment was a combination of spatial modeling using socio-ecological spatial layers (i.e. DEM, Slope, Aspect, Flow Accumulation, Land use, vegetation cover, hydrology, soil types and soil moisture content, population, socio-economic, health facilities, accessibility, and meteorological data) and information captured from District Key Informant interviews and sub-county FGDs using a participatory approach. The level of vulnerability was assessed at sub-county participatory engagements and integrated with the spatial modeling in the GIS environment. The methodology included five main procedures i.e.

Preliminary spatial analysis
Hazard prone areas base maps were generated using Spatial Multi-Criteria Analysis (SMCA) was done in a GIS environment (ArcGIS 10.1).

Stakeholder engagements
Stakeholder engagements were carried out in close collaboration with OPM's DRM team and the district disaster management focal persons with the aim of identifying the various hazards ranging from drought, to floods, landslides, human and animal disease, pests, animal attacks, earthquakes, fires, conflicts etc. Stakeholder engagements were done through Focus Group Discussions (FGDs) and key informant interviews guided by checklist tools (Appendix I). At district level Key Informants included: District Agricultural Officer, District Natural Resources Officer, District Health Inspector and District Planner while at sub-county level Key informants included: Sub-county and parish chiefs, community Development mobilisers and health workers.

FGDs were carried out in five purposively selected sub-counties that were ranked with highest vulnerability. FGDs comprising of an average of 12 respondents (crop farmers, local leaders, nursing officers, police officers and cattle keepers) were conducted at Nyankwazi, Butemba, Ntetwe and Nsambya Sub-counties. Each Parish of the selected Sub-counties was represented by at least one participant and the selection of participants was engendered. FGDs were conducted with utmost consideration to the various gender categories (women, men) with respect to age groups since hazards affect both men and women though in different perspectives irrespective of age.

Participatory GIS
Using Participatory GIS (PGIS), local communities were involved in identifying specific hazard prone areas on the Hazard base maps. This was done during the FGDs and participants were requested through a participatory process to develop a community hazard profile map.

Geo-referencing and ground-truthing
The identified hazard hotspots in the community profile maps were ground-truthed and geo-referenced using a handheld Spectra precision Global Positioning System (GPS) unit, model: Mobile Mapper 20 set in WGS 1984 Datum. The entities captured included: hazard location, (Sub-county and parish), extent of the hazard, height above sea level, slope position, topography, neighboring land use among others. Hazard hot spots, potential

and susceptible areas will be classified using a participatory approach on a scale of “not reported/ not prone”, “low”, “medium” and “high”.

Data analysis and integration
Data analysis and spatial modeling was done by integrating spatial layers and non-spatial attribute captured from FGDs and KIIs to generate final HRV maps at Sub-county level.

Data verification and validation
In collaboration with OPM, a five-day regional data verification and validation workshop was organized by UNDP for the region. This involved key district DDMC focal persons for the purpose of creating local/district ownership of the profiles.

Multi-hazards experienced in Kyankwazi District were classified as:

- Geomorphological or Geological hazards including; landslides, rock falls, soil erosion and earth quakes.
- Climatological or Meteorological hazards including; floods, drought, hailstorms, strong winds and lightning
- Ecological or Biological hazards including; crop pests and diseases, livestock pests and diseases, human disease outbreaks, vermin and wildlife animal attacks and invasive species.
- Human induced or Technological hazards including; bush fires, road accidents land conflicts.

General findings from the participatory assessment indicated that Kyankwazi district has over the past two decades increasingly experienced hazards including rock falls, soil erosion, floods, drought, hailstorms, strong winds, lightning, crop pests and diseases, livestock pests and diseases, human disease outbreaks, vermin, wildlife animal attacks, invasive species, bush fires, road accidents and land conflicts putting livelihoods at increased risk. Drought and floods were identified as most serious problems in Kyankwazi district with almost all sub-counties being vulnerable to the hazards. This is because the area is generally flat hence very prone to flooding in case of heavy rains.

The limited adaptive capacity (and or/resilience) and high sensitivity of households and communities in the district increase their vulnerability to hazard exposure necessitating urgent external support. To reduce vulnerability at community, local government and national levels should be a threefold effort hinged on:

- Reducing the impact of the hazard where possible through; mitigation, prediction, early warning and preparedness;
- Building capacities to withstand and cope with the hazards and risks;
- Tackling the root causes of the vulnerability such as poverty, poor governance, discrimination, inequality and inadequate access to resources and livelihood opportunities.

The following were recommended policy actions targeting vulnerability reduction:

- The government should improve enforcement of policies aimed at enhancing sustainable environmental health.
- The government through MAAIF should review the animal diseases control act because of low penalties given to defaulters.
- The government should establish systems to motivate support of political leaders toward government initiatives and programmes aimed at disaster risk reduction.
- The government should increase awareness campaigns aimed at sensitizing farmers/ communities on disaster risk reduction initiatives and practices.
- The government should revive disaster committees at district level and ensure funding of disaster and environmental related activities.
- The government through UNRA and the District Authority should fund periodic maintenance of feeder roads to reduce on traffic accidents.
- The government through MAAIF and the District Production should promote drought and disease resistant crop seeds.
- The government through OPM and Meteorology Authority should increase importation of lightning conductors and also reduce taxes on their importation.
- The government through OPM and Meteorology Authority should support establishment of disaster early warning systems.
- The government through MWE increase funding and staff to monitor wetland degradation and non-genuine agro-inputs.
- The government through OPM should improve communication between the disaster department and local communities.
- The government through MWE should promote Tree planting along road reserves.
- The government through MAAIF should fund and recruit extension workers at sub-county level and also facilitate them.

INTRODUCTION

1.1 Background

Uganda has over the past years experienced frequent disasters that range from drought, to floods, landslides, human and animal diseases, pests, animal attacks, earthquakes, fires, conflicts and other hazards which in many instances resulted in deaths, property damage and losses of livelihood. With the increasing negative effects of hazards that accompany population growth, development and climate change, public awareness and pro-active engagement of the whole spectrum of stakeholders in disaster risk reduction, are becoming critical.

The Government of Uganda is shifting the disaster management paradigm from the traditional emergency response focus toward one of prevention and preparedness. Contributing to the evidence base for Disaster and Climate Risk Reduction action, the Government of Uganda is compiling a National risk Atlas of hazard, risk and vulnerability conditions in the Country to encourage mainstreaming of disaster and climate risk management in development planning and contingency planning at National and local levels.

Since 2013, UNDP has been supporting the Office of the Prime Minister to develop District Hazard Risk and Vulnerability profiles in the sub-regions of Rwenzori, Karamoja, Teso, Lango, Acholi and West Nile covering 42 districts. During the above exercise, local government officials and community members have actively participated in data collection and analysis. The data collected was used to generate hazard risk and vulnerability maps and profiles. Validation workshops were held in close collaboration with Ministries, District Local Government (DLG), Development Partners, Agencies and academic/research institutions. The developed maps show the geographical distribution of hazards and vulnerabilities up to sub-county level of each district. The analytical approach to identify risk and vulnerability to hazards in the pilot sub-regions visited of Rwenzori and Teso was improved in subsequent sub-regions.

This final draft report details methodological approach for HRV profiling and mapping for Kyankwanzi District in Central Uganda.

1.2 Objectives of the study

The following main and specific objectives of the study were indicated:

1.2.1 Main objective

The main objective of the study was to develop Multi-hazard, Risk and Vulnerability Profile for Kyankwanzi District, Central Uganda.

1.2.3 Specific Objectives

In fulfilling the above mentioned main objective the following are specific objectives as expected:

i. Collect and analyze field data generated using GIS in close collaboration and coordination with OPM.

ii. Develop District specific multi-hazard risk and Vulnerability profile using a standard methodology.

iii. Preserve the spatial data to enable use of the maps for future information.

iv. Produce age and sex disaggregated data in the HRV maps.

1.3 Scope of Work

Through UNDP's Project: *"Strengthening Capacities for Disaster Risk Management and Resilience Building"* the scope of work entailed following:

i. Collection of field data using GIS in close collaboration and coordination with OPM in Kyankwanzi district and quantify them through a participatory approach on a scale of "not reported/ not prone", "low", "medium" and "high".

ii. Analysis of field data and review the quality of each hazard map which should be accompanied by a narrative that lists relevant events of their occurrence. Implications of hazards in terms of their effects on stakeholders with the vulnerability analysis summarizing the distribution of hazards in the district and exposure to multi-hazards in sub-counties.

iii. Compilation of the entire district multi-hazard, risk and vulnerability HRV Profiles in the time frame provided.

iv. Generating complete HRV profiles and maps and developing a database for all the GIS data showing disaggregated hazard risk and vulnerability profiles to OPM and UNDP.

1.4 Justification

The government recognizes climate change as a big problem in Uganda. The draft National Climate Change Policy (NCCP) notes that the average temperature in semi-arid climates is rising and that there has been an average temperature increase of 0.28°C per decade in the country between 1960 and 2010. It also notes that rainfall patterns are changing with floods and landslides on the rise and are increasing in intensity, while droughts are increasing, and now significantly affect water resources, and agriculture (MWE, 2012). The National Policy for Disaster Preparedness and Management (Section 4.1.1) requires the Office of the Prime Minister to "Carry out vulnerability assessment, hazard and risk mapping of the whole country and update the data annually". UNDP's DRM project 2015 Annual Work Plan; Activity 4.1 is "Conduct national hazard, risk and vulnerability (HRV) assessment including sex and age disaggregated data and preparation of district profiles."

1.5 Structure of the Report

This Report is organized into four sections: Section 1 provides Introduction on the assignment. Section 2 elaborates on the overview of Kyankwanzi district. Section 3 focuses on the methodology employed. Section 4 elaborates the Multi-hazard, Risks and Vulnerability profile and Coping strategies for Kyankwanzi district. Section 5 describes Conclusions and policy related recommendations.

OVERVIEW OF KYANKWANZI DISTRICT

2.1 Location

Kyankwanzi District was carved out of Kiboga District in July 2010. It is located between coordinates 1° 12' 0"N and 31° 48' 0"E in the Central region of Uganda. The District borders with Nakaseke to the east across River Mayanja, Kiboga to the southeast, Mubende and Kibaale to the southwest across River Mpongo and Hoima and Masindi to the north across River Kafu. The district has 10 sub-counties and 2 town councils. These include; Bananywa, Butemba, Gayaza, Kyankwanzi, Mulagi, Nkandwa, Nsambya, Ntwetwe, Byerima and Wattuba sub-counties and Butemba and Ntwetwe Town Councils. Kyankwanzi lies in the cattle corridor of Uganda and the main road from Kampala to Hoima divides the district into two main parts, the predominantly cattle rearing community commonly referred to as Balaalo in the East and the crop growing area on the western side of the road.

Kyankwanzi District is a cosmopolitan district consisting mainly of Baganda, Banyoro, Banyakole, Banyarwanda, Alur, Basoga, Lugabara, Bagishu, Bafumbira and some other smaller tribes scattered all over. Baganda has the highest population compared to others.

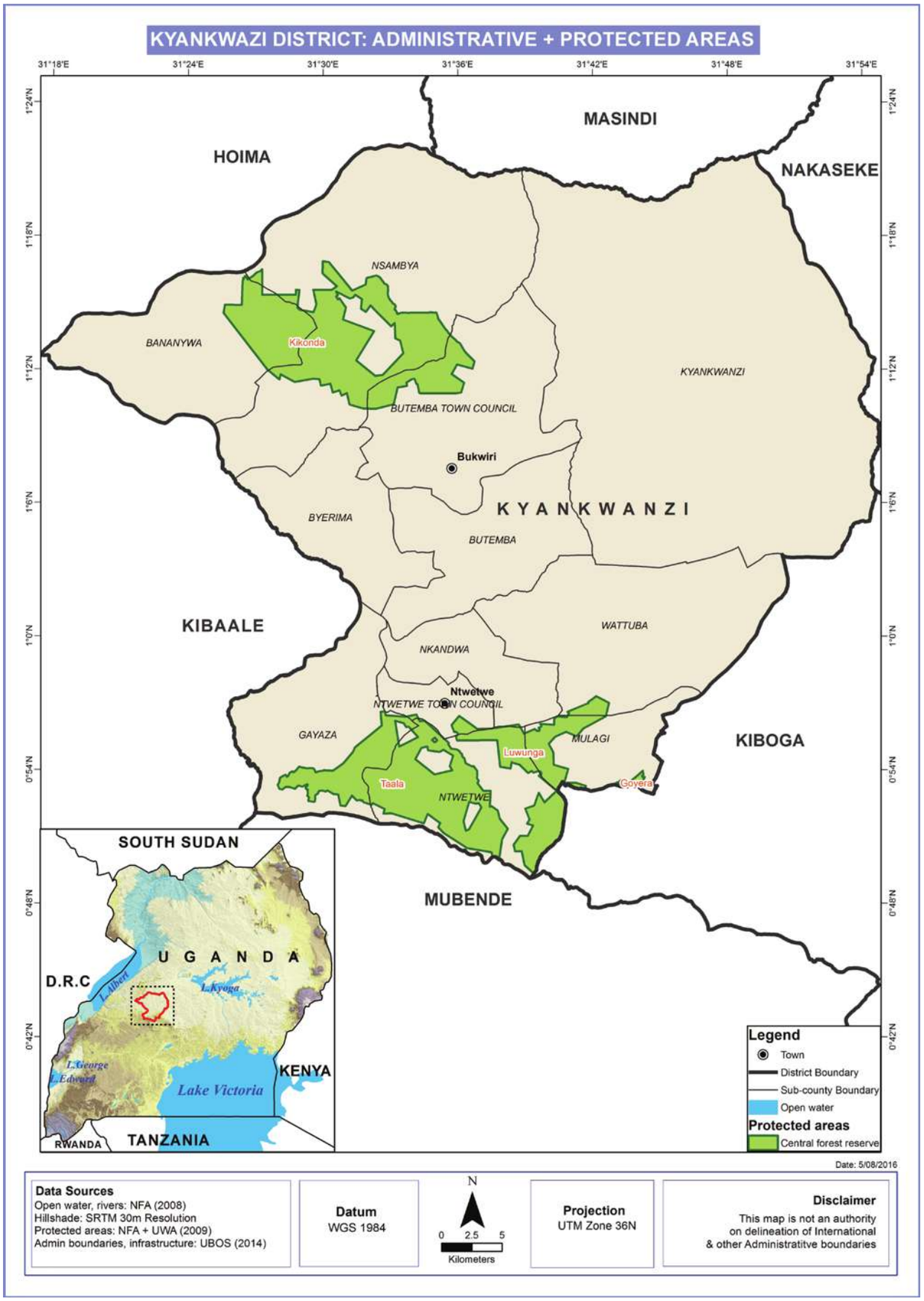


Figure 1: Administrative Boundaries and Gazetted areas, Kyankwanzi District

2.1.1 Geomorphology

The relief is generally low and flat characterized by shallow seasonal wetlands and flat-topped hills. Its altitude ranges from 1,000 – 1,200m above sea level. In most cases the interfluves are broad flat or rounded and murram covered, and the valleys are wide.

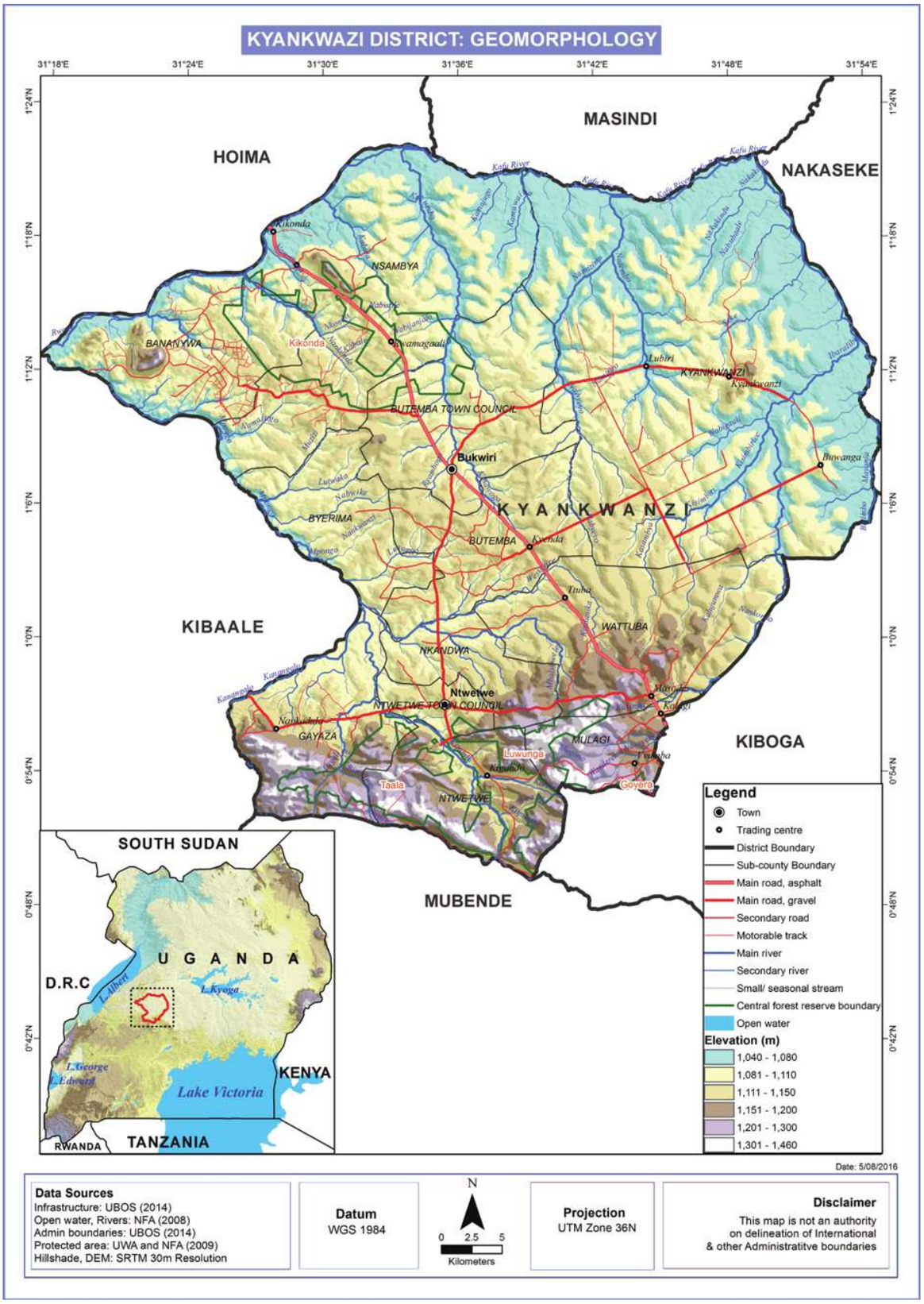


Figure 2: Geomorphological , Kyankwanzi District

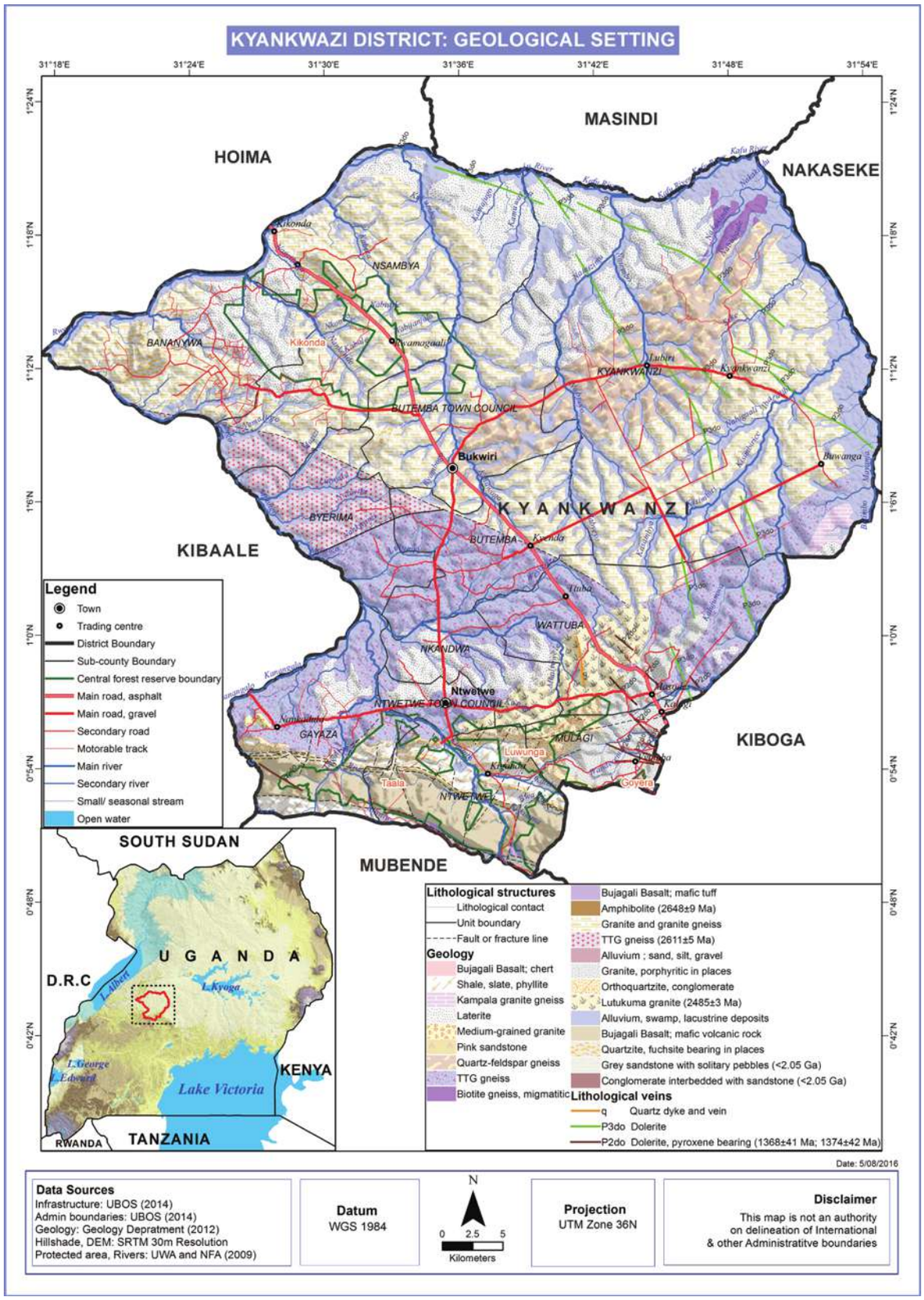


Figure 3: Geology, Kyankwanzi District

2.1.2 Vegetation and Land use stratification

The vegetation is covered with savannah associated with hyparhenia. The district has forests with exotic and local tree species and largely savannah reserves with scattered trees mainly Mutuba, Mukoola, Nongo, Muvule, Musizi , Mugavu etc..

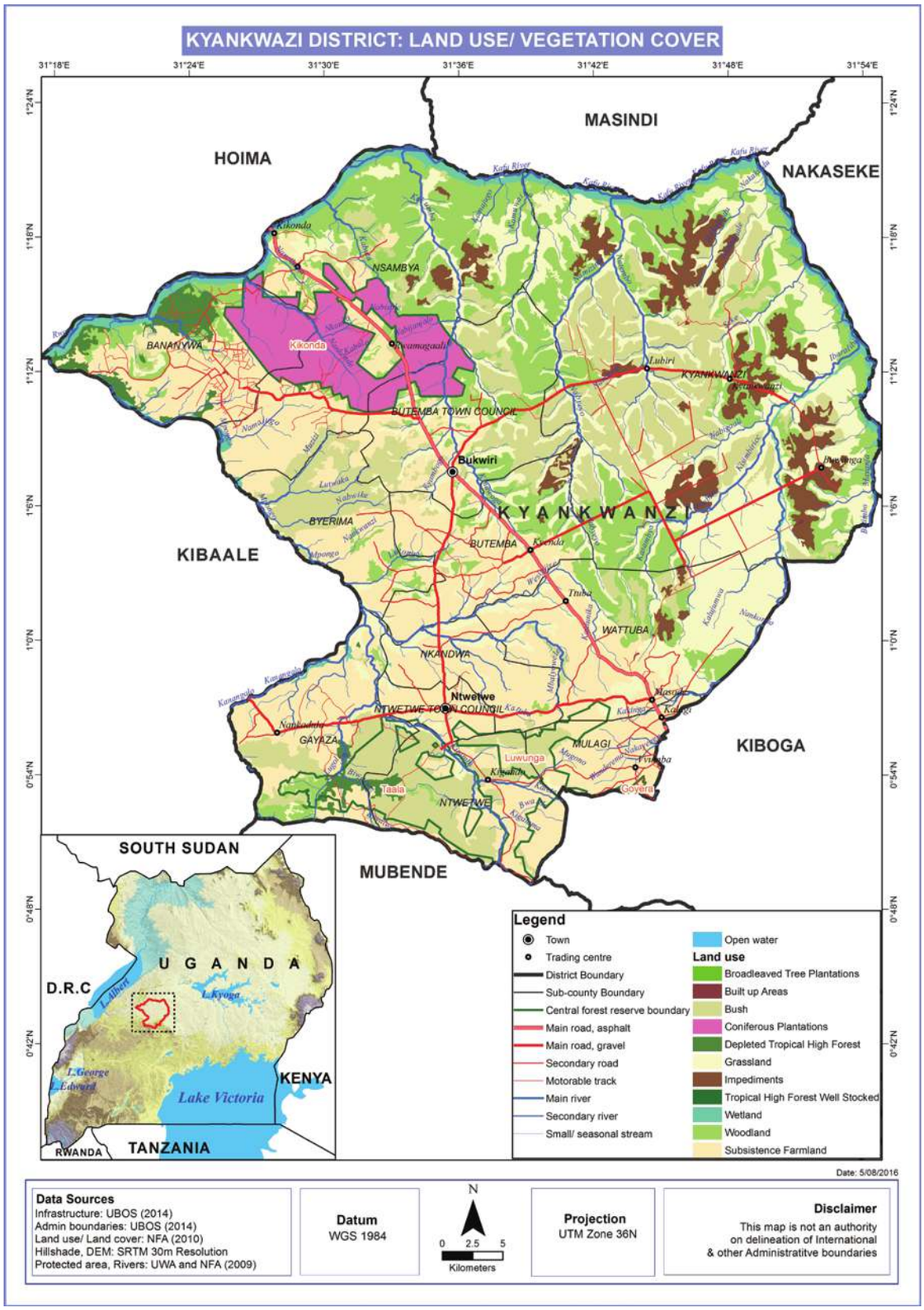


Figure 4: Land use/vegetation cover, Kyankwazi District

2.1.3 Temperature and Humidity

The high altitude ensures favorable climate with medium annual temperatures ranging from 17.2° C to 29°C.

2.1.4 Rainfall

Kyankwanzi district has two rainfall Seasons, with the peak one from March to June and the second one from August to November. The rainfall is fairly distributed throughout the year, average is 1,300 mm and the mean annual rainfall is between 1,450 mm to1500 mm. However in some instances the rainfall pattern described may become irregular causing farmers' failure to plan accordingly. The variations in temperatures are not significant.

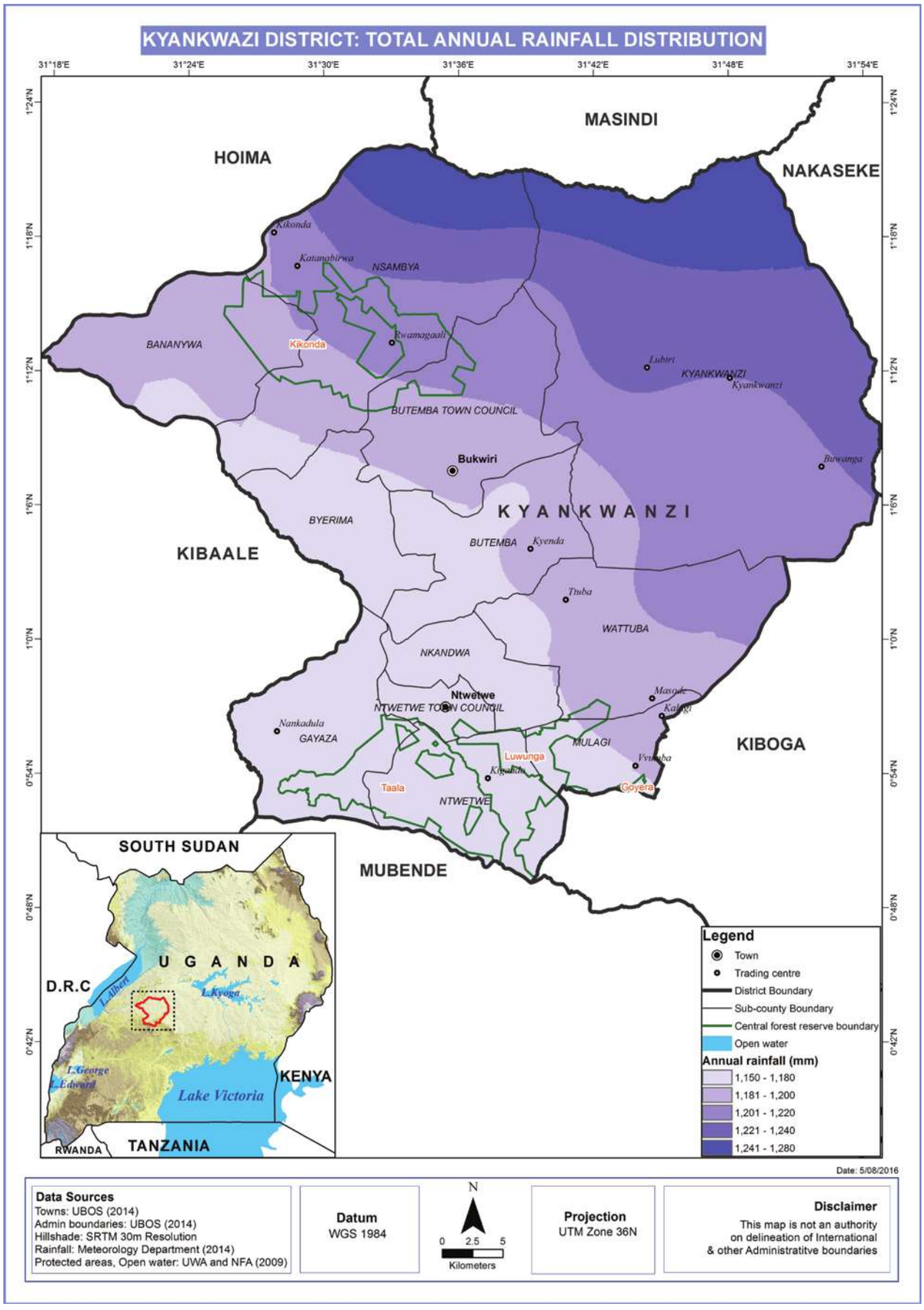


Figure 5: Total Annual Rainfall Distribution, Kyankwazi District

2.1.5 Hydrology

The main rivers are R.Kitumbi. R. Lugolima, R. Kanangalo, R. Mpongo, R. Kafu and R. Mayanja all draining into L.Kyoga. In water stressed sub counties of Kyankwanzi, Nsambya, Wattuba and Butemba are valley dams/tanks and boreholes. In some sub counties like Kyankwanzi,Nsambya and Butemba where the water table is assumed to be low, boreholes, ponds, valley dams and tanks are constructed. Wetlands have been severely encroached for crop farming and eucalyptus growing.

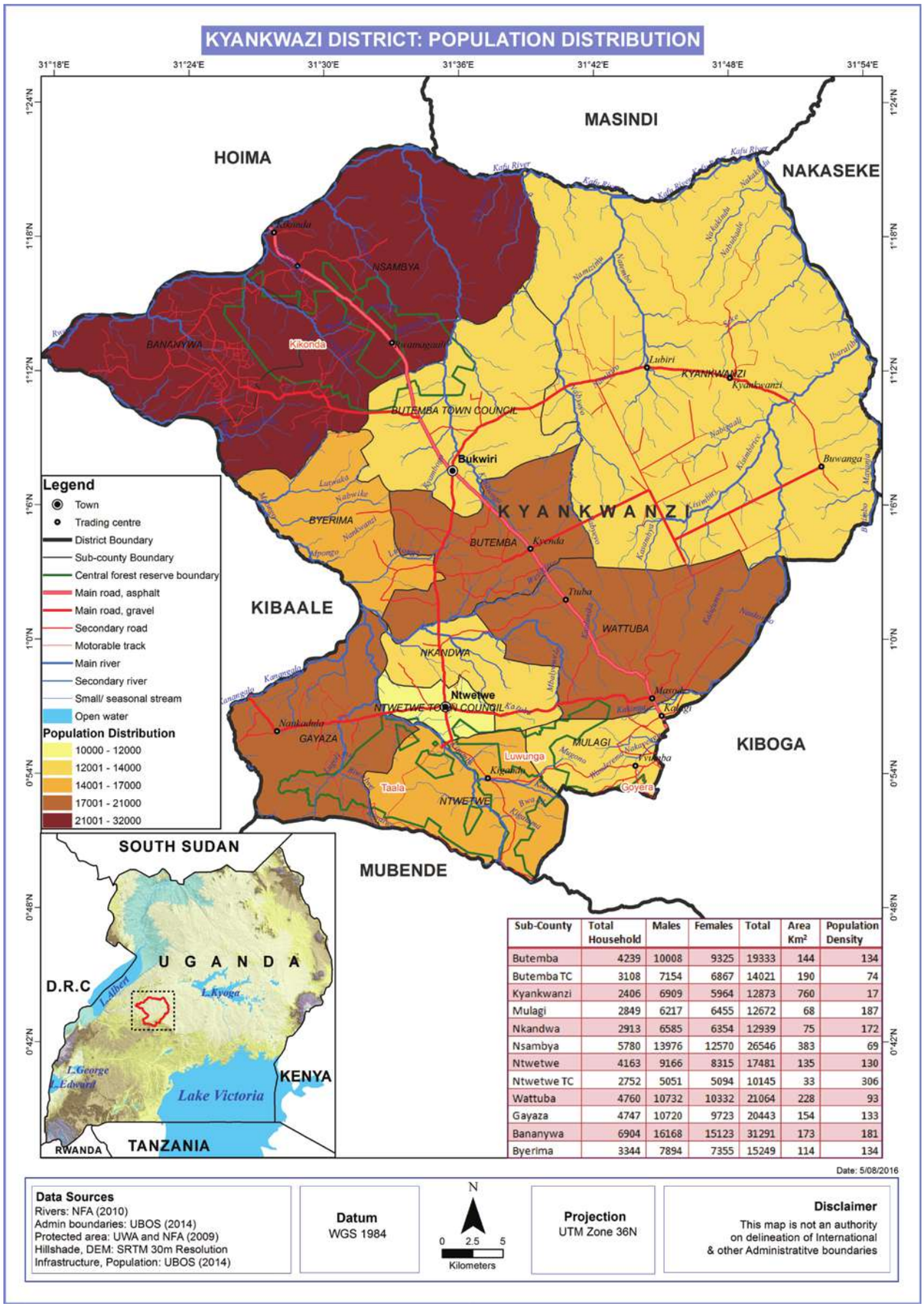
2.1.6 Population

According to the National Population and Housing Census (2014) results, Kyankwanzi District had a total population 214,057 people. Results also showed that most of the people in Kyankwanzi District reside in rural areas (189,891 (88.7%) compared to (24,166 (11.3%) who reside in urban centers. The gender distribution was reported to be males: 110,580 (51.7%) and females: 103,477 (48.3%). About 99.2% (212,295) of the population form the household population and only 0.8% (1,762) is Non-household. Butemba sub-county had the highest population of 34,582 people while Ntwetwe town council had the least population of 10,145 people (Figure 6). Table 1 shows the population distribution per sub-county for the different gender.

Table 1: Population Distribution in Kyankwanzi District

SUB-COUNTY	HOUSEHOLDS		POPULATION DISTRIBUTION				
	Number	Av. Size	Males	Females	Total	Area	Population Density
Butemba	4239	4.6	10008	9325	19333	144	134
Butemba Town Council	3108	4.5	7154	6867	14021	190	74
Kyankwanzi	2406	5.2	6909	5964	12873	760	17
Mulagi	2849	4.3	6217	6455	12672	68	187
Nkandwa	2913	4.4	6585	6354	12939	75	172
Nsambya	5780	4.5	13976	12570	26546	383	69
Ntwetwe	4163	4.2	9166	8315	17481	135	130
Ntwetwe Town Council	2752	3.6	5051	5094	10145	33	306
Wattuba	4760	4.4	10732	10332	21064	228	93
Gayaza	4747	4.3	10720	9723	20443	154	133
Bananywa	6904	4.5	16168	15123	31291	173	181
Byerima	3344	4.6	7894	7355	15249	114	134
TOTAL	47965		110580	103477	214057	2455	87

Source: UBOS Census 2014



Sub-County	Total Household	Males	Females	Total	Area Km²	Population Density
Butemba	4239	10008	9325	19333	144	134
Butemba TC	3108	7154	6867	14021	190	74
Kyankwanzi	2406	6909	5964	12873	760	17
Mulagi	2849	6217	6455	12672	68	187
Nkandwa	2913	6585	6354	12939	75	172
Nsambya	5780	13976	12570	26546	383	69
Ntwetwe	4163	9166	8315	17481	135	130
Ntwetwe TC	2752	5051	5094	10145	33	306
Wattuba	4760	10732	10332	21064	228	93
Gayaza	4747	10720	9723	20443	154	133
Bananywa	6904	16168	15123	31291	173	181
Byerima	3344	7894	7355	15249	114	134

Date: 5/08/2016

Data Sources
Rivers: NFA (2010)
Admin boundaries: UBOS (2014)
Protected area: UWA and NFA (2009)
Hillshade, DEM: SRTM 30m Resolution
Infrastructure, Population: UBOS (2014)

Datum
WGS 1984

N
0 2.5 5
Kilometers

Projection
UTM Zone 36N

Disclaimer
This map is not an authority on delineation of International & other Administratitve boundaries

Figure 6: Population Distribution, Kyankwanzi District

2.1.7 Economic activities

Majority of the population in Kyankwanzi district engages in subsistence and commercial agriculture where cultivation of maize, cassava, beans, bananas, sweet potatoes and coffee is dominant. A considerable number of the population is also involved in livestock production especially rearing cattle, goats, poultry and pigs.

There are four vibrant livestock markets (Lubiri in Kyankwanzi Sub County, Mbali in Nsambya Sub County, Katanabirwa in Butemba Town Council and Lwanyetta in Wattuba Sub County. Of recent, the milk industry has picked up and most farmers are now up grading their herds for better economic income. Kyankwanzi district is also among the major maize producing districts in Uganda. Youths are mainly employed in Boda-Boda industry. Betwee 2014-2015, the district was severely affected by quarantine imposed by MAAIF, due to an outbreak of Foot and Mouth disease (FMD) which affected the livelihood of very many people and the district local revenue base. FMD was later controlled by massive vaccination through support from MAAIF by livestock movement control and provision of vaccine, veterinary equipment and personnel.

METHODOLOGY

3.1 Collection and analysis of field data using GIS

3.1.1 Preliminary spatial analysis

Hazard prone areas base maps were generated using Spatial Multi-Criteria Analysis (SMCA) basing on numerical models and guidelines using existing environmental and socio-ecological spatial layers (i.e. DEM, Slope, Aspect, Flow Accumulation, Land use, vegetation cover, hydrology, soil types and soil moisture content, population, socio-economic, health facilities, accessibility, and meteorological data) in a GIS environment (ArcGIS 10.1).

3.1.2 Stakeholder engagements

Stakeholder engagements were carried out in close collaboration with OPM's DRM team and the District Disaster Management focal persons with the aim of identifying the various hazards ranging from drought, floods, landslides, human, animal and crop diseases, pests, wildlife animal attacks, earthquakes, fires and conflicts among others. Stakeholder engagements were done through Focus Group Discussions (FGDs) and Key Informant Interviews guided by checklist tools (Appendix I). At District level, one Key Informant Interview comprising of four respondents (Assistant Chief Administrative Officer, District Planner, District Natural Resources Officer and District Agricultural Officer) was held at Kyankwanzi District Headquarters (). At Sub-county level key informants included: Sub-county and parish chiefs and Community Development Officers.

FGDs were carried out in four purposively selected sub-counties that were ranked with the highest vulnerability. FGDs comprising of an average of 12 respondents (crop farmers, local leaders and cattle keepers) were conducted at Butemba Sub-county, Wattuba Sub-county, Kitabona Sub-county, Kyankwanzi Sub County, Nsambya Sub County and Butemba Town council and Ntwetwe Town Council. Each Parish of the selected Sub-counties was represented by at least one participant and a list of selected participants was engendered. FGDs were conducted with utmost consideration to the various gender categories (women, men) with respect to age groups since hazards affect both men and women though in different perspectives irrespective of age. This allowed for comprehensive representation as well as provision of detailed and verifiable information.

Focus Group discussions and Key Informant Interviews were transcribed in the field for purposes of input into the NVIVO software for qualitative data analysis. Case stories and photographs were documented and captured respectfully. In order to produce age and sex disaggregated data, results from FGDs and KIIs were integrated with the district population census data. This was also input in the multi-hazard, risk and vulnerability profile maps.

3.1.3 Participatory GIS

Using Participatory GIS (PGIS), local communities were involved in identifying specific hazards prone areas on the Hazard base maps. This was done during the FGDs and participants were requested through a participatory process to develop a community hazard profile map.

3.1.4 Geo-referencing and ground-truthing

The identified hazard hotspots in the community profile maps were ground-truthed and geo-referenced using a handheld Spectra precision Global Positioning System (GPS) unit, model: Mobile Mapper 20 set in WGS 1984 Datum. The entities captured included: hazard location, (Sub-county and parish), extent of the hazard, height above sea level, slope position, topography, neighboring land use among others (Appendix I). Hazard hot spots, potential and susceptible areas will be classified using a participatory approach on a scale of “not reported/ not prone”, “low”, “medium” and “high”. This information generated through a participatory and transect approach was used to validate modelled hazard, risk and vulnerability status of the district. The spatial extent of a hazard event was established through modelling and a participatory validation undertaken.

3.2 Develop District Specific Multi-hazard Risk and Vulnerability Profiles

3.2.1 Data analysis and integration

Data analysis and spatial modeling was done by integrating spatial layers and non-spatial attribute captured from FGDs and KIIs to generate final HRV maps at Sub-county level. Spatial analysis was done using ArcGIS 10.1 to generate specific hazard, risk and vulnerability profile for the district.

3.2.2 Data verification and validation

In collaboration with OPM, a five-day regional data verification and validation workshop was organized by UNDP in for the region. This involved key district DDMC focal persons for the purpose of creating local/district ownership of the profiles.

3.3 Preserve the Spatial data to enable future use of the maps

HRV profiles report and maps have been verified and validated, final HRV profiles inventory and geo-database have been prepared containing all GIS data in various file formats to enable future use of the maps.

RESULTS FROM MULTI-HAZARD RISK, VULNERABILITY MAPPING

4. Multi-hazards

A hazard, and the resultant disaster can have different origins: natural (geological, Hydro-meteorological and biological) or induced by human processes (environmental degradation and technological hazards). Hazards can be single, sequential or combined in their origin and effects. Each hazard is characterized by its location, intensity, frequency, probability, duration, area of extent, speed of onset, spatial dispersion and temporal spacing (Cees, 2009).

In the case of Kyankwanzi district, hazards were classified following main controlling factors:

i. Geomorphological or Geological hazards including landslides, rock falls and soil erosion
ii. Climatological or Meteorological hazards including floods, drought, hailstorms, strong winds and lightning
iii. Ecological or Biological hazards including crop pests and diseases, livestock parasites and diseases, human epidemic diseases, vermin attacks and wildlife animal attacks,
iv. Human induced or Technological hazards including bush fires, road accidents land conflicts and crop destruction by livestock.

4.1 Geomorphological and Geological Hazards

4.1.1 Landslides, rock falls and soil erosion

Results from the participatory assessments indicated that there weren't any incidences of rock falls in Kyankwanzi district. However, participants reported cases of soil erosion especially along Kitumbi River in Kitabona, Kitwala, Sirimula, Muwangi, Kayindiyindi villages and in the cattle corridor especially in the sub counties of Kyankwanzi, Nsambya, part of Butemba and Wattuba. Minor cases of rock falls were reported in gold artisanal mining areas of Ntwetwe-Kitabona and Bananywa Sub counties. This information was integrated with the spatial modelling using socio-ecological spatial data i.e. Soil texture (data for National Agricultural Research Laboratories – Kawanda (NARL) 2014, Rainfall (Meteorology Department 2014), Digital Elevation Model (DEM), SLOPE, ASPECT (30m resolution data from SRTM Shuttle Radar Topography Mission (SRTM) to generate Land slide, rock falls and soil erosion vulnerability map.

Plate 1: Soil erosion spot in Ntwentwe quarrying site.

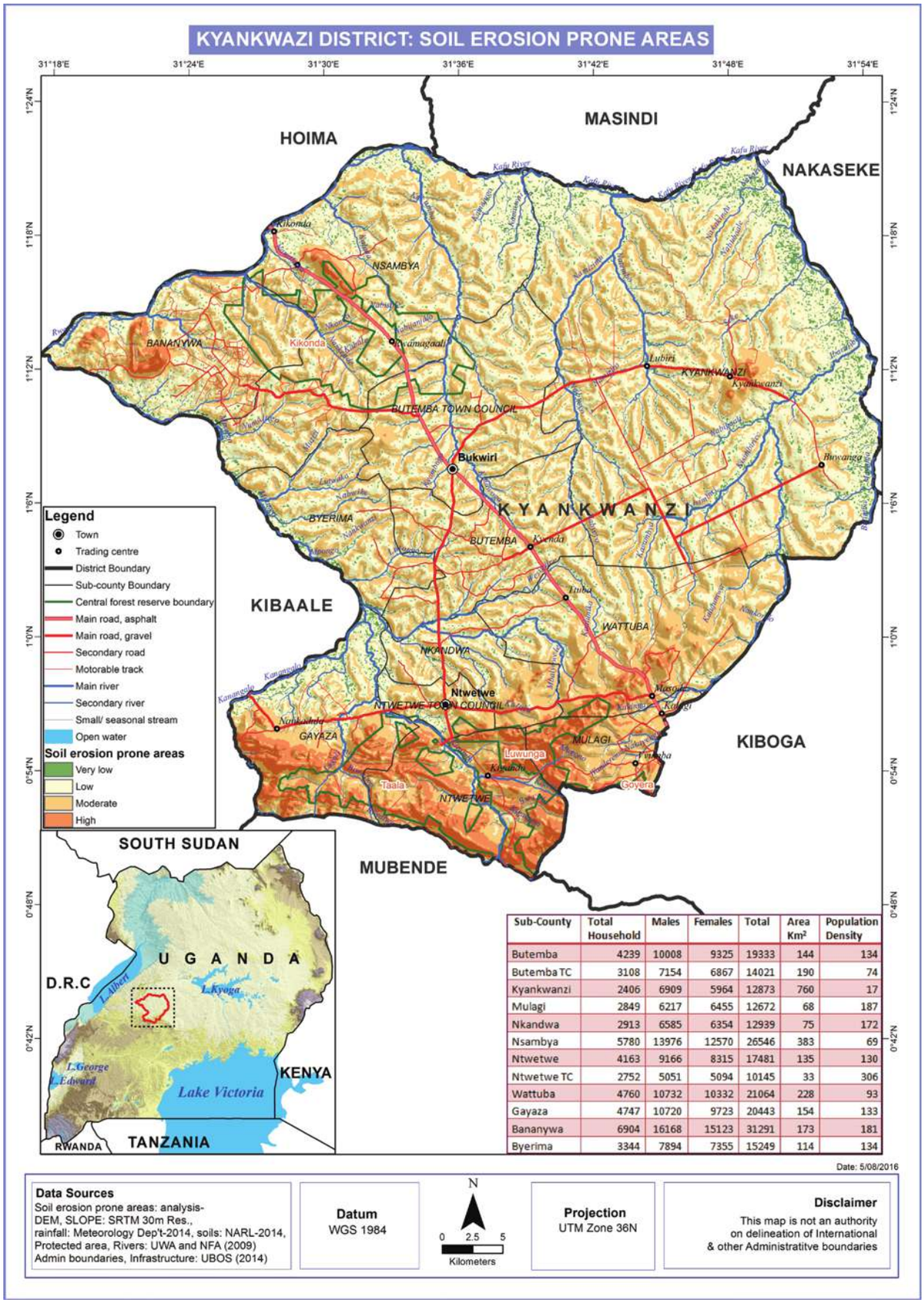


Figure 7: Rock fall, Soil erosion prone areas, Kyankwanzi District

4.1.2 Earthquakes and faults

Participants of the focus group discussion indicated that earthquakes weren't a serious problem in Kyankwanzi district. However, it was observed that the entire district only experiences minor tremors. Figure indicates areas where faults exist as vulnerable areas where earthquakes have more impact and the ranking is dependent on the distance from the faults and lithological veins.

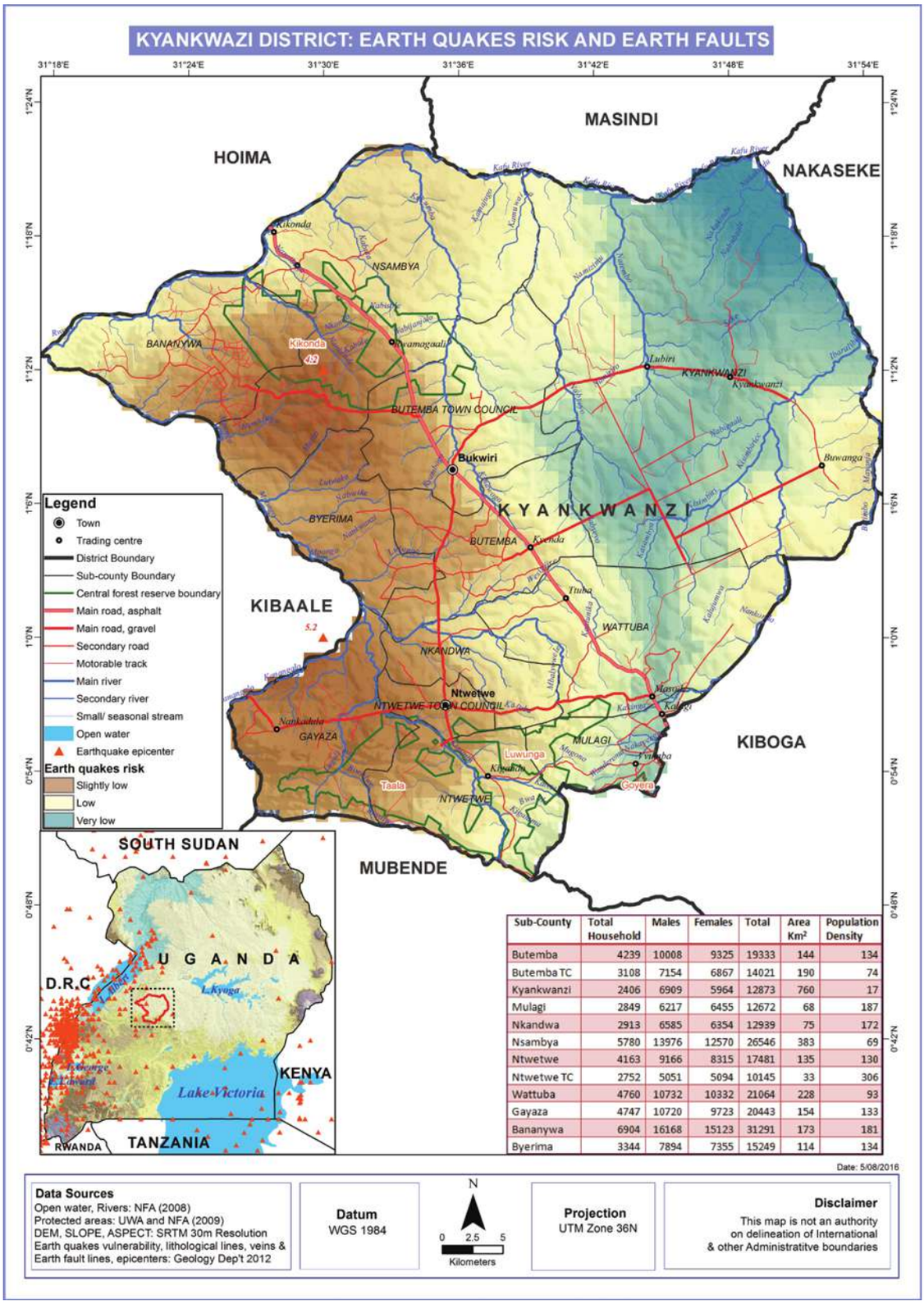


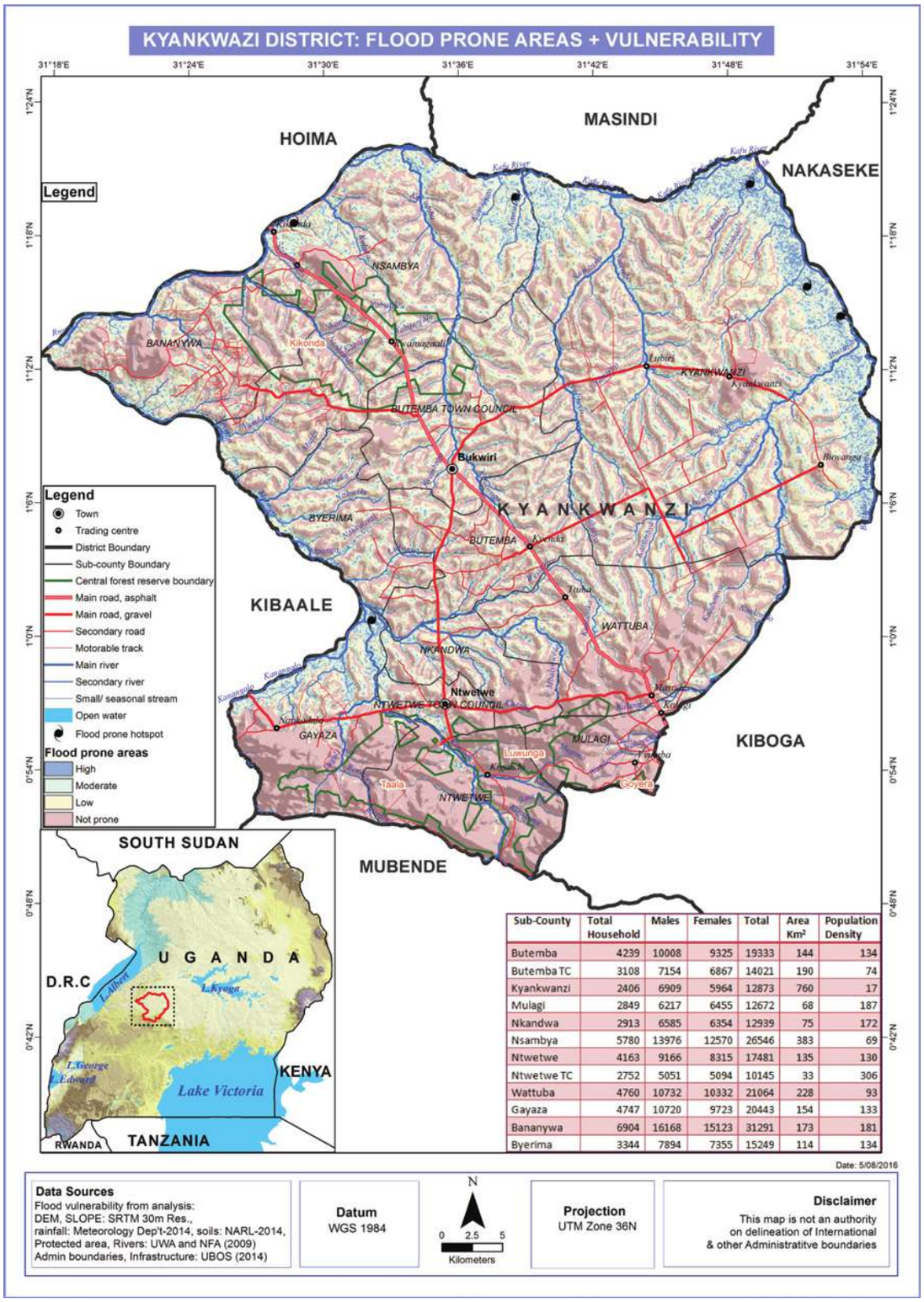
Figure 8: Earth quakes Vulnerability, Fault lines, Kyankwanzi District

4.2 Climatological and Meteorological Hazards

4.2.1 Floods

Results from the focus group discussions revealed that floods usually occur in the low lying areas especially during the rainy seasons. Participants observed that floods wash away and at times submerge crops such as beans, sweet potatoes and maize thus causing food insecurity and considerable economic losses. Participants reported that in 2014, River Kitumbi flooded and washed away bridges (Kayindiyindi, Bambaala, Kabinduula and Butambuka) and along R. Kafu banks in Nsambya and Bananywa sub counties thus rendering some roads impassable. This information was integrated with the spatial modelling using socio-ecological spatial data i.e. generated from Soil texture (data for National Agricultural Research Laboratories – Kawanda (NARL) 2014, Rainfall (Meteorology Department 2014), Digital Elevation Model (DEM), SLOPE, ASPECT (30m resolution data from SRTM Shuttle Radar Topography Mission (SRTM).

Plate 2: Flood prone area along R. Kafu banks in Nsambya Sub-County



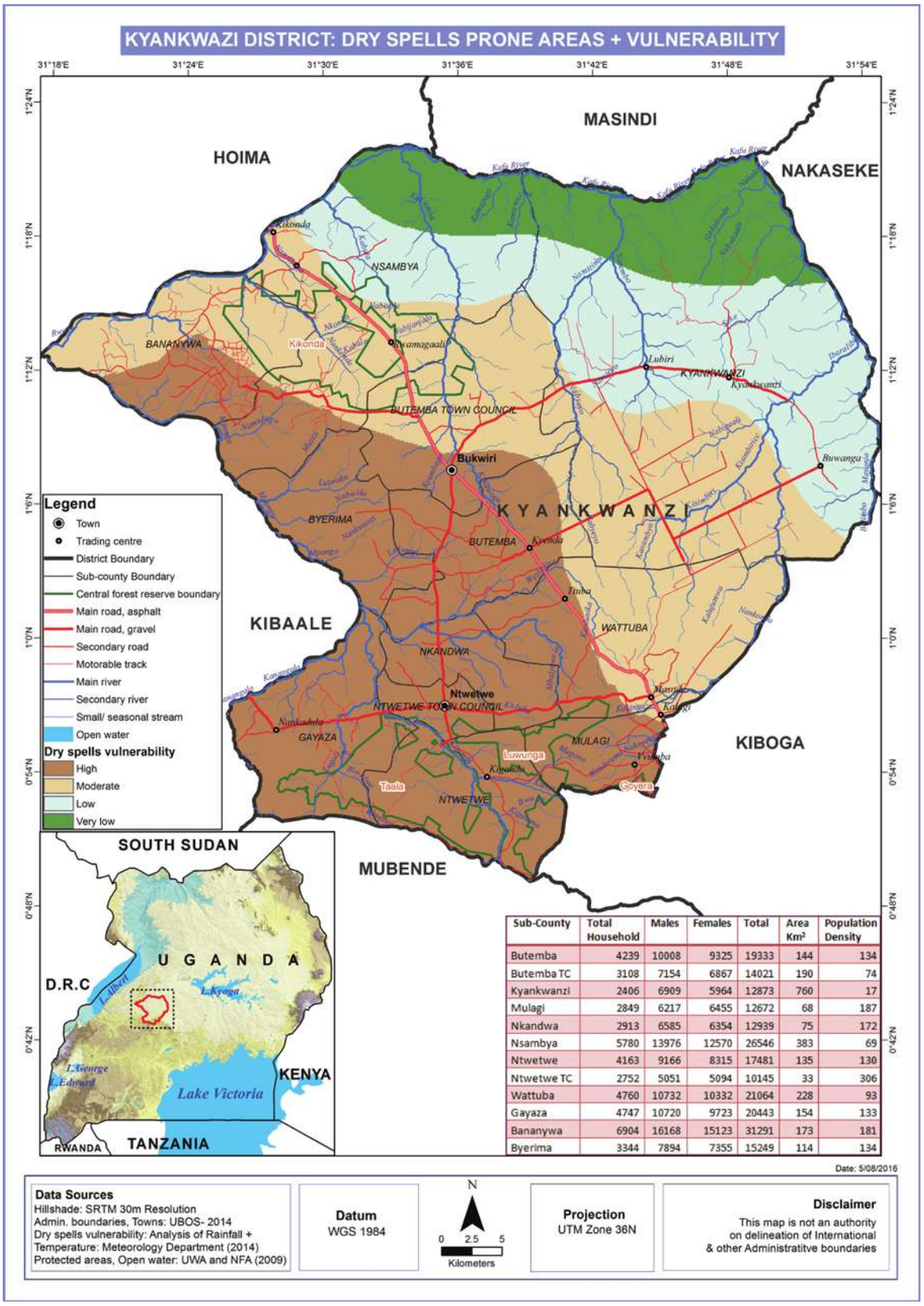
Sub-County	Total Household	Males	Females	Total	Area Km²	Population Density
Butemba	4239	10008	9325	19333	144	134
Butemba TC	3108	7154	6867	14021	190	74
Kyankwanzi	2406	6909	5964	12873	760	17
Mulagi	2849	6217	6455	12672	68	187
Nkandwa	2913	6585	6354	12939	75	172
Nsambya	5780	13976	12570	26546	383	69
Ntwetwe	4163	9166	8315	17481	135	130
Ntwetwe TC	2752	5051	5094	10145	33	306
Wattuba	4760	10732	10332	21064	228	93
Gayaza	4747	10720	9723	20443	154	133
Bananywa	6904	16168	15123	31291	173	181
Byerima	3344	7894	7355	15249	114	134

Figure 9: Flood prone areas and Ranking, Kyankwanzi District

4.2.2 Prolonged dry spells

Participatory assessments through focus group discussions indicated that prolonged dry spells were a serious problem in the cattle corridor sub-counties of Kyankwanzi district such as Wattuba, Kyankwanzi, Butemba T/C and Nsambya. Participants observed that prolonged dry spells have caused scarcity of water and pastures, low milk and poor crop production and increased incidences of pests, parasites and diseases.

The participants also mentioned that termite infestation on pastures is always high in the dry season. It was reported that some households migrate to River Mayanja, Mpongo and R. Kafu in search of water for their animals during dry seasons. This information was integrated with the spatial modeling using socio-ecological spatial data i.e. generated from Rainfall and Temperature (Uganda National Meteorological Authority, 2014) using the Standardized Precipitation Index.



Sub-County	Total Household	Males	Females	Total	Area Km²	Population Density
Butemba	4239	10008	9325	19333	144	134
Butemba TC	3108	7154	6867	14021	190	74
Kyankwanzi	2406	6909	5964	12873	760	17
Mulagi	2849	6217	6455	12672	68	187
Nkandwa	2913	6585	6354	12939	75	172
Nsambya	5780	13976	12570	26546	383	69
Ntwetwe	4163	9166	8315	17481	135	130
Ntwetwe TC	2752	5051	5094	10145	33	306
Wattuba	4760	10732	10332	21064	228	93
Gayaza	4747	10720	9723	20443	154	133
Bananywa	6904	16168	15123	31291	173	181
Byerima	3344	7894	7355	15249	114	134

Figure 10: Drought Prone areas and Vulnerability Ranking, Kyankwanzi District

4.2.3 Hailstorms

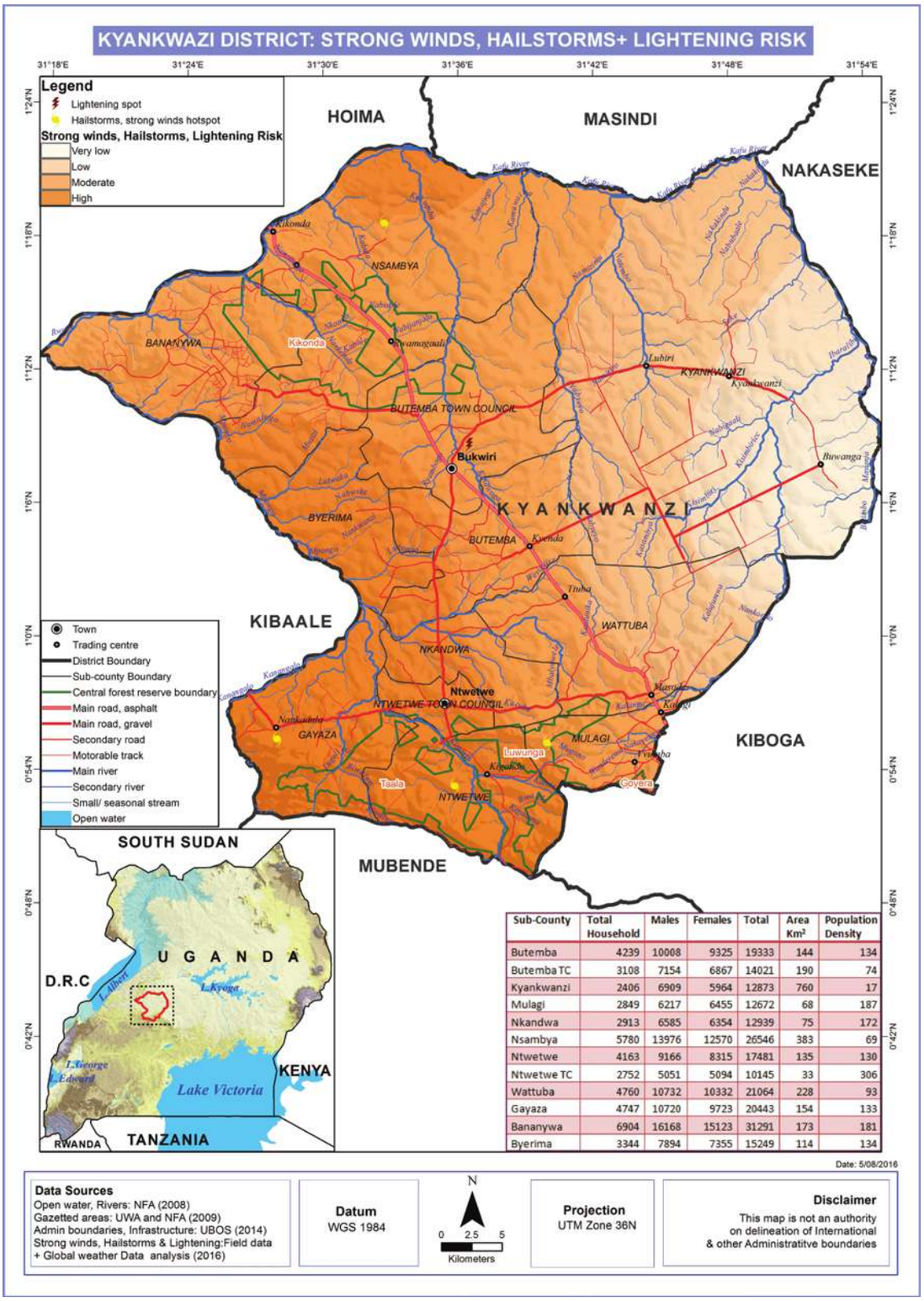
Results from the participatory assessments showed that Wattuba, Butemba Town Council, Kyankwanzi, Ntwetwe, Butemba and Nsambya sub-counties were the most affected by hailstorms in Kyankwanzi district. Participants observed that hailstorms come along with strong winds that destroy crops especially maize, cassava and banana plantations thus causing food insecurity. In October 2010, the sub-counties of Mulagi, Gayaza, Ntwetwe, Butemba and Wattuba were hit by hailstorm which destroyed beans, maize, coffee, bananas, sweet potatoes and cassava.

4.2.4 Strong winds

The participants of the focus group discussions reported that strong winds are experienced at the onset of the rainy seasons. It was observed that strong winds blow off roof tops of houses and schools and also uproot trees and banana plantations. Butemba Town Council (Kamirambazzi cell), Ntwetwe, Kyankwanzi and Nsambya sub-counties are the most affected.

4.2.5 Lightning

Lightning is a sudden high-voltage discharge of electricity that occurs within a cloud, between clouds, or between a cloud and the ground. The distribution of lightning on Earth is far from uniform. The ideal conditions for producing lightning and associated thunderstorms occur where warm, moist air rises and mixes with cold air above. Results from the participatory assessments indicated that there have been increased incidences of lightning occurrences in Kyankwanzi district. Participants reported that in 2013, lightning struck the District headquarters. Most of the schools in Kyankwanzi district do not have lightning conductors/ arresters and risk being struck by lightning. The most affected are Butemba Town Council and Kyankwanzi Sub County.



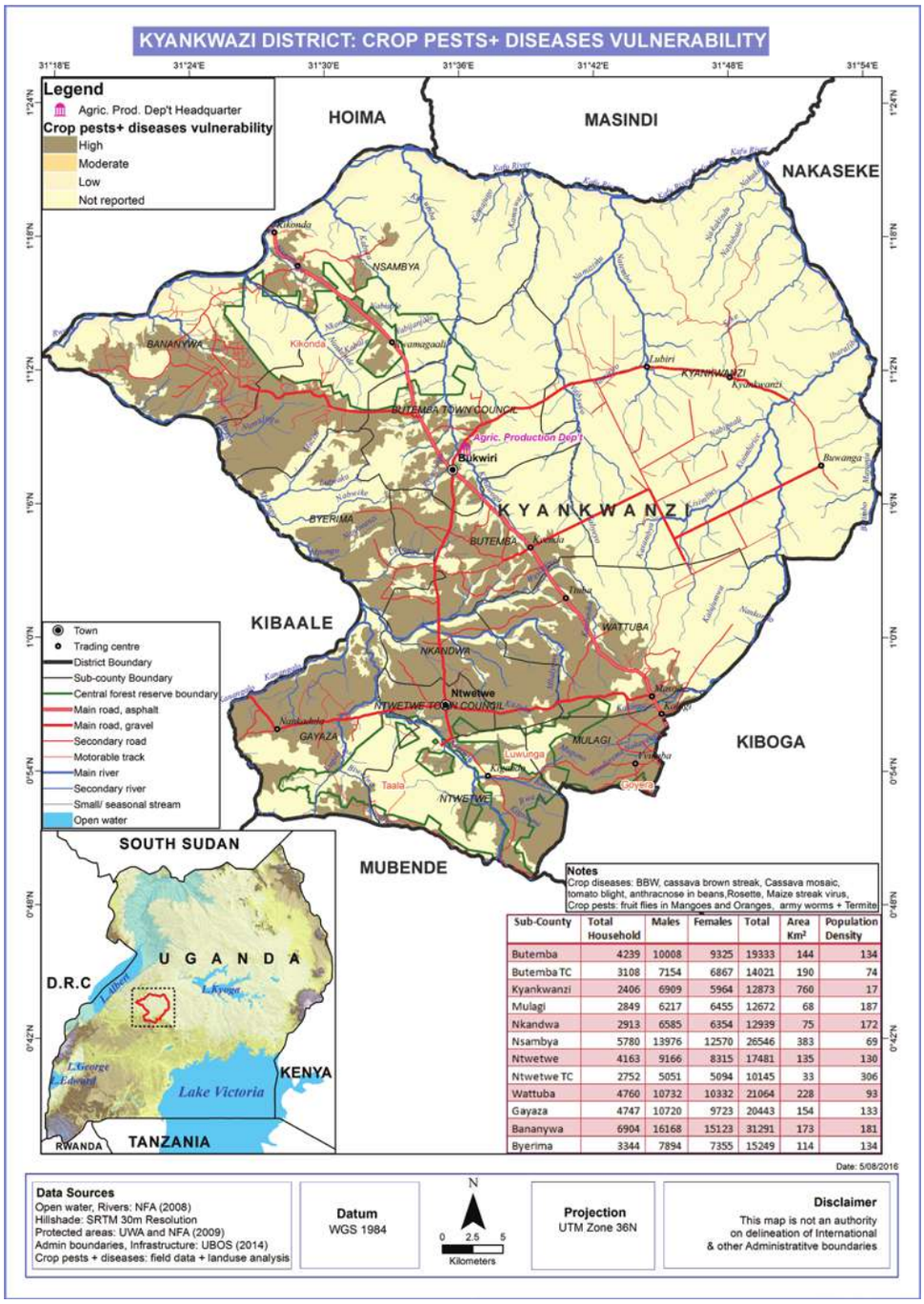
Sub-County	Total Household	Males	Females	Total	Area Km²	Population Density
Butemba	4239	10008	9325	19333	144	134
Butemba TC	3108	7154	6867	14021	190	74
Kyankwanzi	2406	6909	5964	12873	760	17
Mulagi	2849	6217	6455	12672	68	187
Nkandwa	2913	6585	6354	12939	75	172
Nsambya	5780	13976	12570	26546	383	69
Ntwetwe	4163	9166	8315	17481	135	130
Ntwetwe TC	2752	5051	5094	10145	33	306
Wattuba	4760	10732	10332	21064	228	93
Gayaza	4747	10720	9723	20443	154	133
Bananywa	6904	16168	15123	31291	173	181
Byerima	3344	7894	7355	15249	114	134

Figure 11: Strong winds, Hailstorms and Lightning Hotspots and Vulnerability, Kyankwanzi District

4.3 Ecological and Biological Hazards

4.3.1 Crop Pests and Diseases

Participatory assessments through focus group discussions indicated that the entire Kyankwanzi district was vulnerable to crop pests and diseases. Banana, cassava, maize and coffee plantations were the most affected by crop pests and diseases. The most prominent crop diseases were Fusarium wilt, banana bacterial wilt, sigatoka, scab, coffee wilt disease, Cassava Brown Streak and cassava mosaic. Participants attributed the massive increases in pests such as the banana weevils, nematodes, black coffee twig borer, bean weevils, fruit flies and aphids to the Climate change. The Sub-Counties of Nsambya, Gayaza, Butemba, Mulagi and Ntwetwe were the most affected by crop pests and diseases.



Sub-County	Total Household	Males	Females	Total	Area Km²	Population Density
Butemba	4239	10008	9325	19333	144	134
Butemba TC	3108	7154	6867	14021	190	74
Kyankwanzi	2406	6909	5964	12873	760	17
Mulagi	2849	6217	6455	12672	68	187
Nkandwa	2913	6585	6354	12939	75	172
Nsambya	5780	13976	12570	26546	383	69
Ntwetwe	4163	9166	8315	17481	135	130
Ntwetwe TC	2752	5051	5094	10145	33	306
Wattuba	4760	10732	10332	21064	228	93
Gayaza	4747	10720	9723	20443	154	133
Bananywa	6904	16168	15123	31291	173	181
Byerima	3344	7894	7355	15249	114	134

Figure 12: Crop Pests and Diseases Vulnerability, Kyankwanzi District

4.3.2 Livestock parasites and Diseases

Results from the focus group discussions indicated that livestock parasites and diseases were a serious problem because part of Kyankwanzi district is located in the cattle corridor. The sub-counties of Kyankwanzi, Butemba, Nsambya, Ntwetwe, Mulagi, Wattuba, Gayaza and Nkandwa are prone to livestock diseases including foot and mouth disease, Newcastle, African swine fever, Brucellosis, mange, Ephermral fever, worm infestations and rabies, Black Quarter and Trypanosomiasis especially along River Kafu and Mayanja. It was observed that diseases such as foot rot, lumpy skin disease and tick borne diseases like East coast fever, Anaplasmosis, Babeiosis (Red Urine), tick paralysis increase during the rainy seasons. Participants revealed that there are high incidences of rabies in Butemba and Gayaza sub-counties.

It was observed that diseases such as foot rot, lumpy skin disease and tick borne diseases like East coast fever increase during the rainy seasons. Participants revealed that there are high incidences of rabies in Butemba and Gayaza sub-counties.

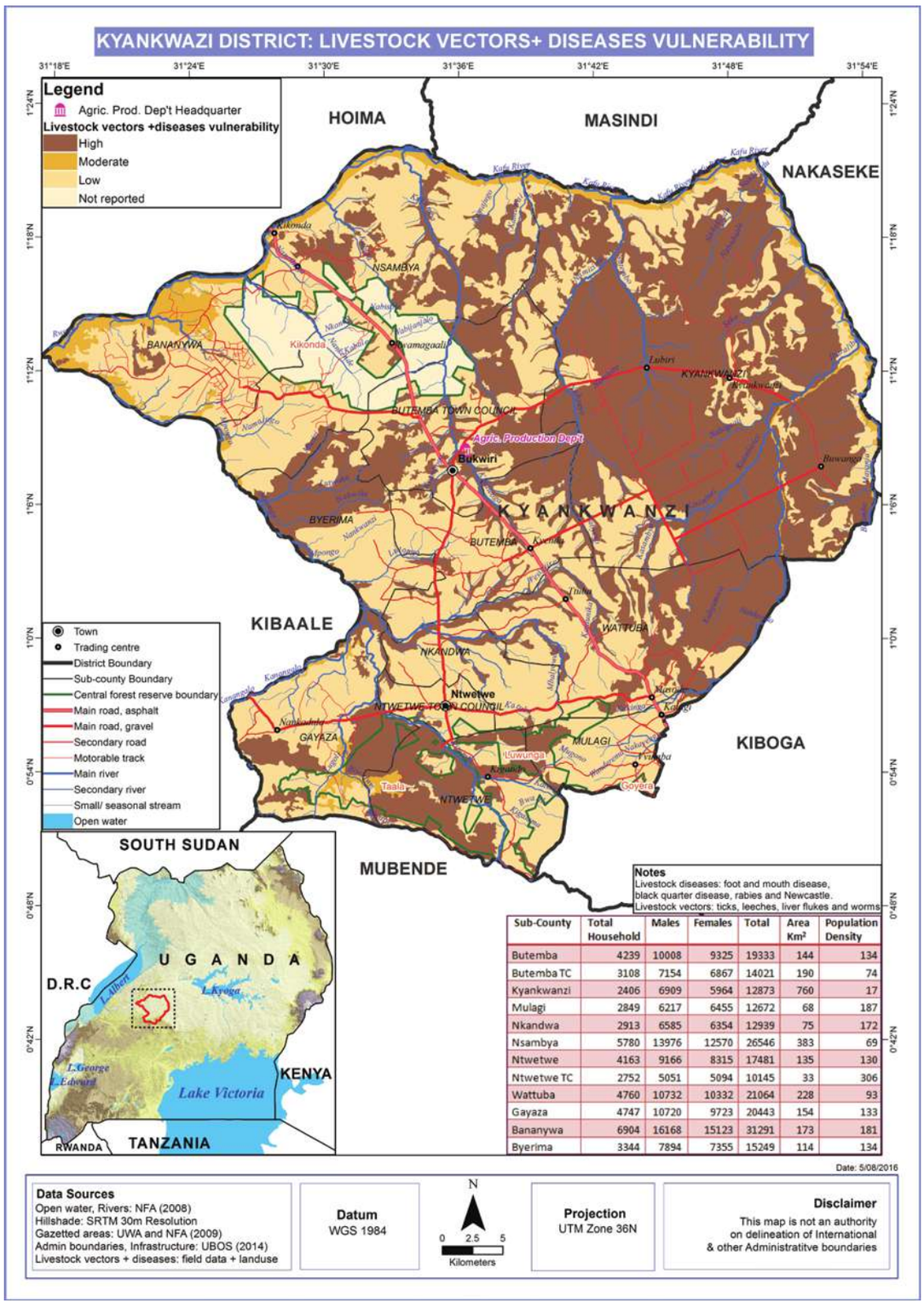
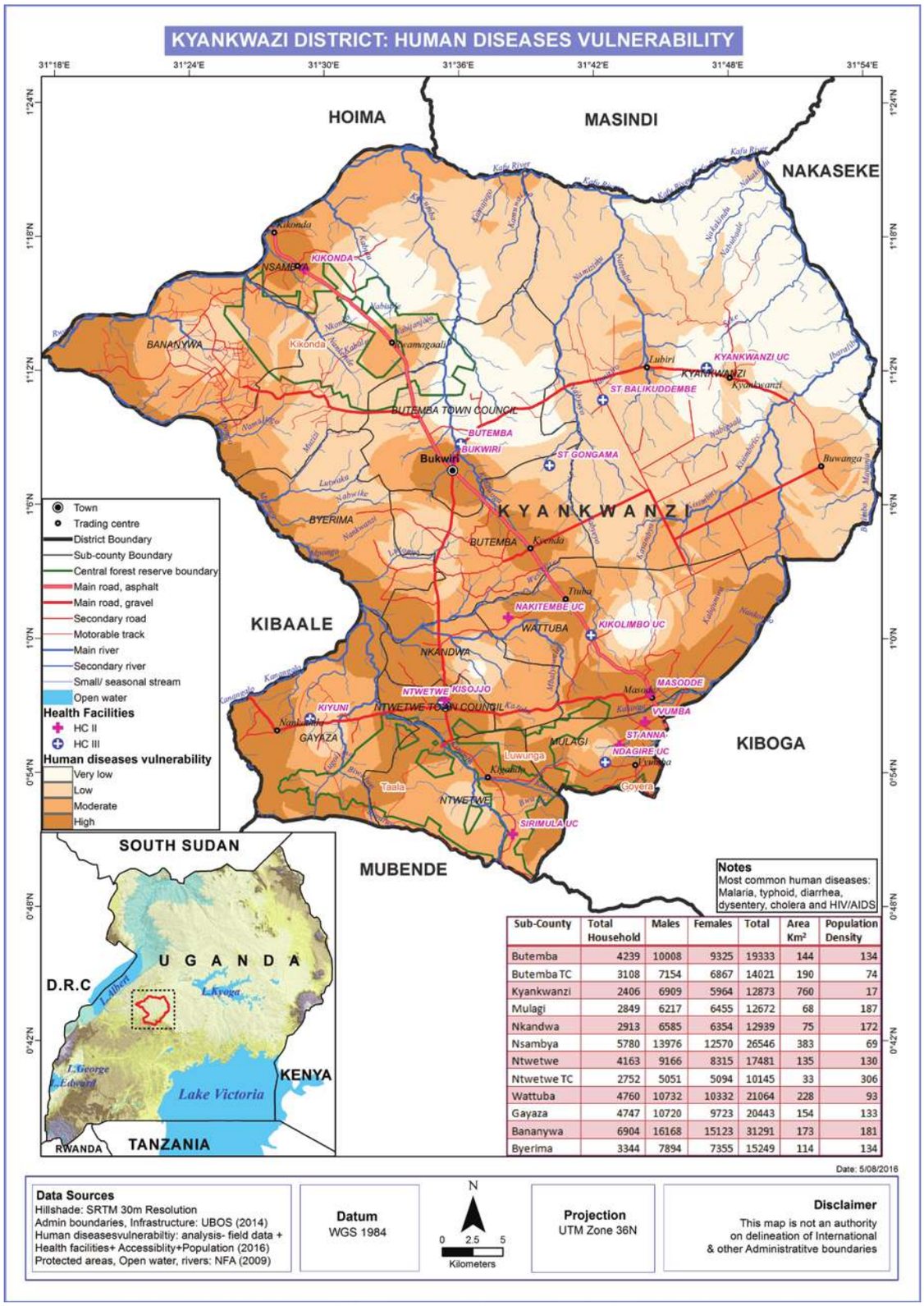


Figure 13: Livestock Parasites and Diseases Vulnerability, Kyankwanzi District

4.3.3 Human Diseases outbreaks

Participants in the series of focus group discussions held indicated that the most prevalent human diseases in Kyankwanzi district were malaria, brucellosis, typhoid, diarrhea, pneumonia and HIV/AIDS. It was reported that brucellosis is transmitted from cattle through milk and meat and is common in Kyankwanzi, Wattuba, Butemba, Nsambya and Ntwetwe sub-counties.

Reports indicated that HIV/AIDS prevalence rates were high in Wattuba trading centre, Butemba Town council and in Rwenzori cell in Ntwetwe town council. Results showed that the entire district was affected by malaria.

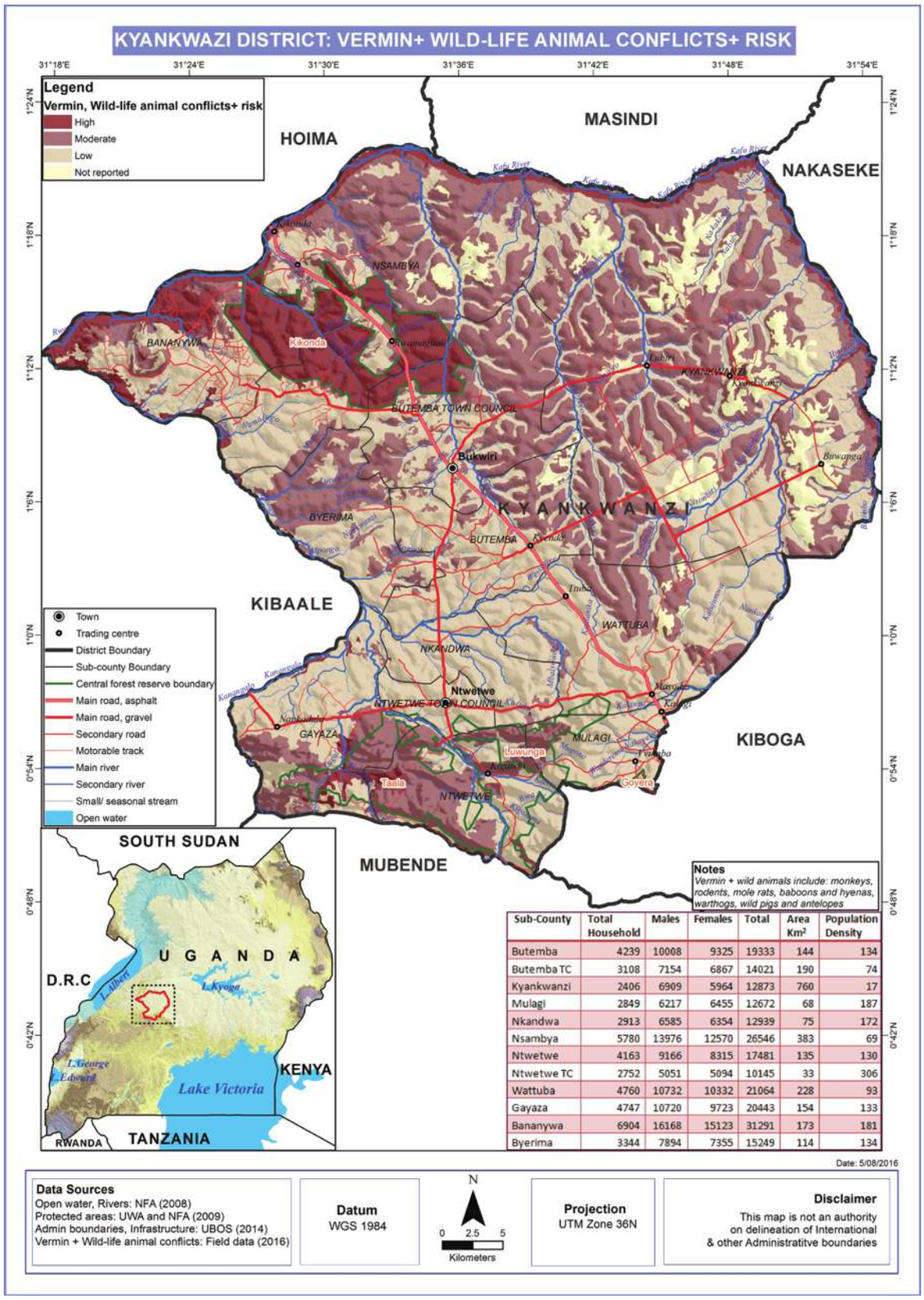


Sub-County	Total Household	Males	Females	Total	Area Km²	Population Density
Butemba	4239	10008	9325	19333	144	134
Butemba TC	3108	7154	6867	14021	190	74
Kyankwanzi	2406	6909	5964	12873	760	17
Mulagi	2849	6217	6455	12672	68	187
Nkandwa	2913	6585	6354	12939	75	172
Nsambya	5780	13976	12570	26546	383	69
Ntwetwe	4163	9166	8315	17481	135	130
Ntwetwe TC	2752	5051	5094	10145	33	306
Wattuba	4760	10732	10332	21064	228	93
Gayaza	4747	10720	9723	20443	154	133
Bananywa	6904	16168	15123	31291	173	181
Byerima	3344	7894	7355	15249	114	134

Figure 14: Human Disease Outbreaks Vulnerability, Kyankwanzi District

4.3.4 Vermin and Wild-life Animal Attacks

Participatory assessments through focus group discussions revealed that vermin, domestic animals (cattle, goats) and wildlife animal attacks are a serious problem in Kyankwanzi district. Cases of monkeys, baboons, wild pigs and antelopes destroying crops were reported in Wattuba, Butemba, Nsambya and Kyankwanzi sub-counties.



Sub-County	Total Household	Males	Females	Total	Area Km²	Population Density
Butemba	4239	10008	9325	19333	144	134
Butemba TC	3108	7154	6867	14021	190	74
Kyankwanzi	2406	6909	5964	12873	760	17
Mulagi	2849	6217	6455	12672	68	187
Nkandwa	2913	6585	6354	12939	75	172
Nsambya	5780	13976	12570	26546	383	69
Ntwetwe	4163	9166	8315	17481	135	130
Ntwetwe TC	2752	5051	5094	10145	33	306
Wattuba	4760	10732	10332	21064	228	93
Gayaza	4747	10720	9723	20443	154	133
Bananywa	6904	16168	15123	31291	173	181
Byerima	3344	7894	7355	15249	114	134

Figure 15: Vermin, Wildlife animal attacks vulnerability, Kyankwanzi District

4.3.5 Invasive species

Results from the discussions indicated that *Lantana camara, solanum spp* and *Amaranthus spp* were the most reported invasive species in Kyankwanzi district. Participants mentioned that these invasive species normally dominate grazing lands and thus destroy pastures pasture for animals. *Lantana camara* was dominant in Kyankwanzi, Wattuba, Butemba and Nsambya sub-counties.

Plate 3: A section of Lantana camara an invasive species in Wattuba, sub-county

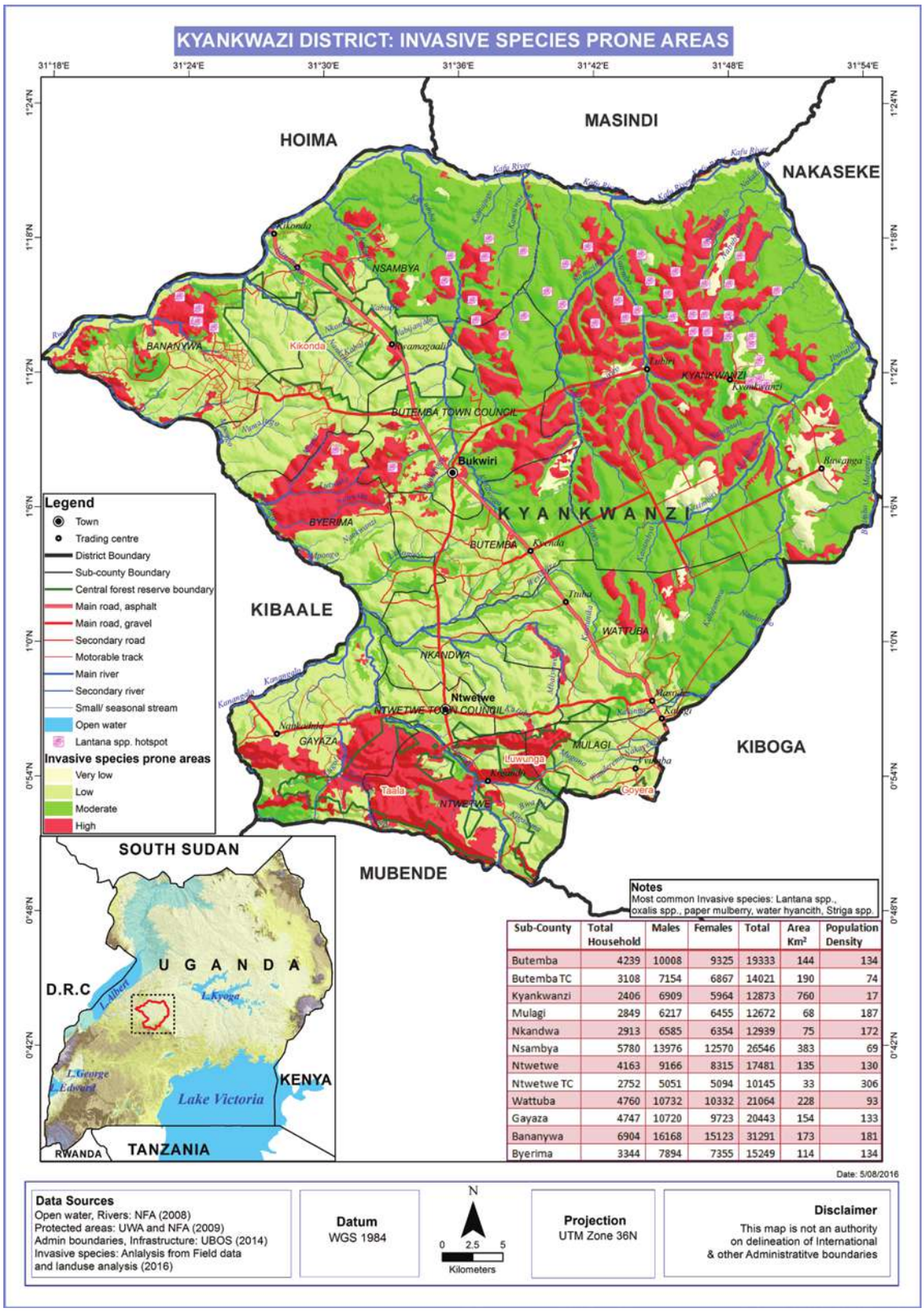


Figure 16: Invasive Species Ranking, Kyankwanzi District

4.4 Human Induced and Technological Hazards

4.4.1 Bush fires

Results from participatory assessments showed that bush burning was a very serious problem in Kyankwanzi district. Participants indicated that cattle keepers particularly in the cattle corridor sub-counties of Kyankwanzi, Wattuba, Butemba and Nsambya practice bush

burning at the end of the dry seasons for regeneration of fresh pastures at the onset of the rainy season. Hunters and farmers also set bushes on fire in search for meat and opening of land for crop production especially in Kyankwanzi, Wattuba, Butemba and Nsambya sub counties. It was reported that some parts of Luwunga and Kikonda Central Forest Reserves are burnt almost every year during the dry seasons.

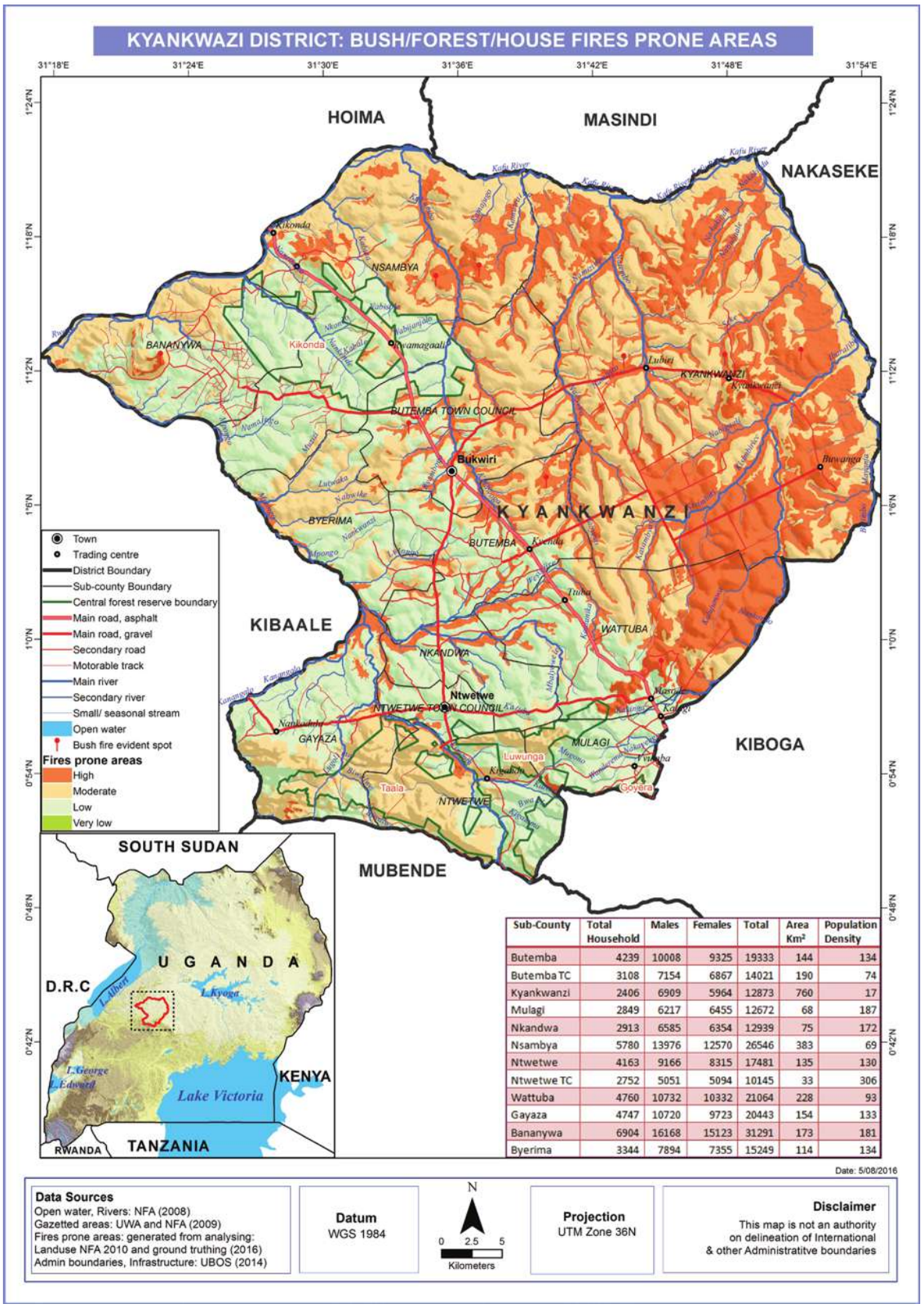


Figure 17: Bush fires Hotspot areas and Vulnerability Ranking, Kyankwanzi District

4.4.2 Land conflicts

Participants indicated that land disputes were a serious problem in the entire Kyankwanzi district. Most of the registered land conflicts are between immigrants from Kisoro, Kabale, Busoga and Sembabule and the local communities. It was reported that these conflicts are usually settled in the RDCs office and magistrates court.

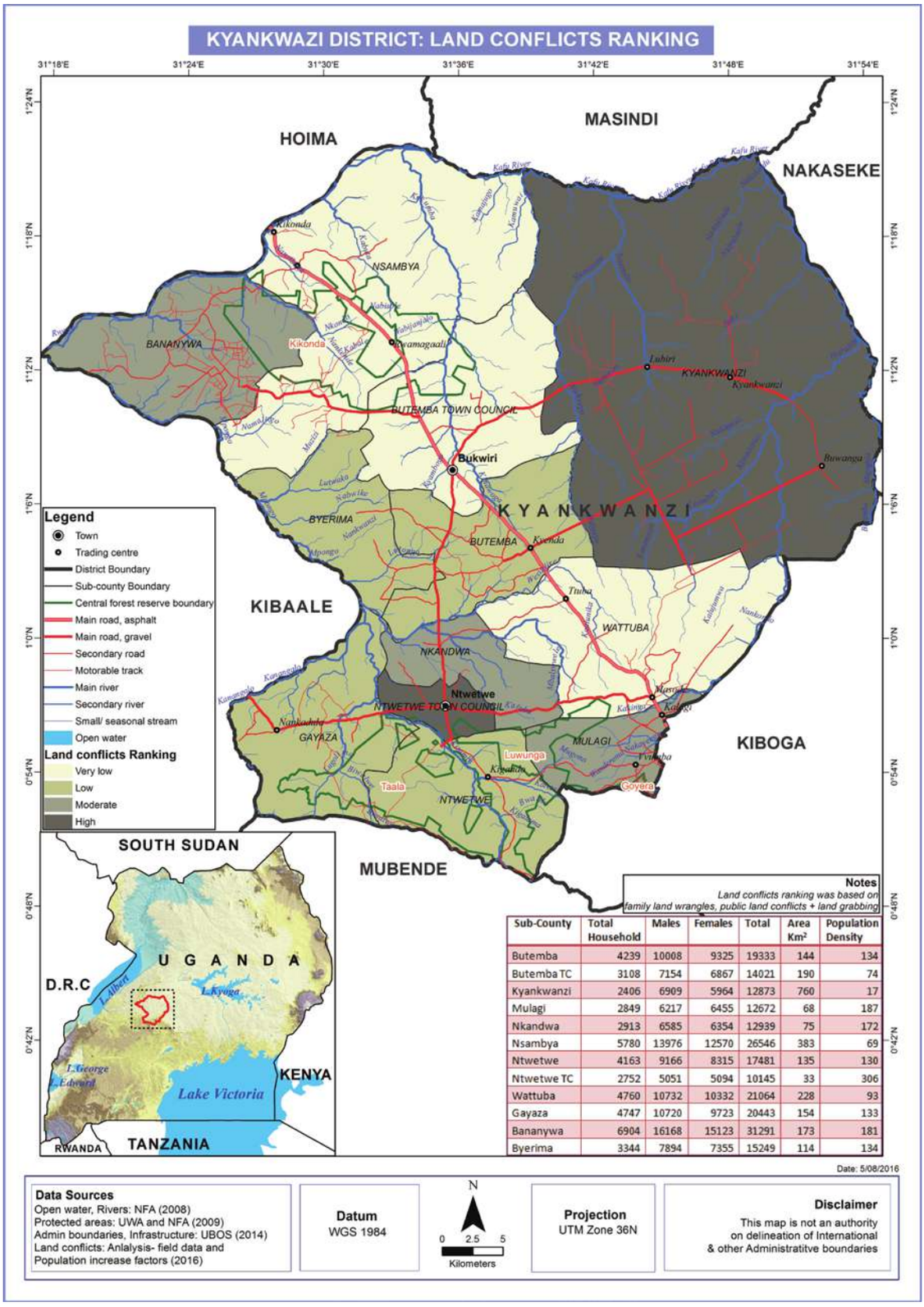


Figure 18: Land Conflicts Ranking, Kyankwanzi District

4.4.3 Environmental Degradation

The most reported forms of environmental degradation in Kyankwanzi district included; sand mining, stone quarrying, artisanal mining of gold, wetland reclamation, brick making, deforestation, charcoal burning, and overgrazing. Kyankwanzi, Butemba Bananywa and Nsambya were the most affected by these kinds of environmental degradation.

Plate 4: Charcoal business along Kampala-Hoima road an evidence of charcoal burning.

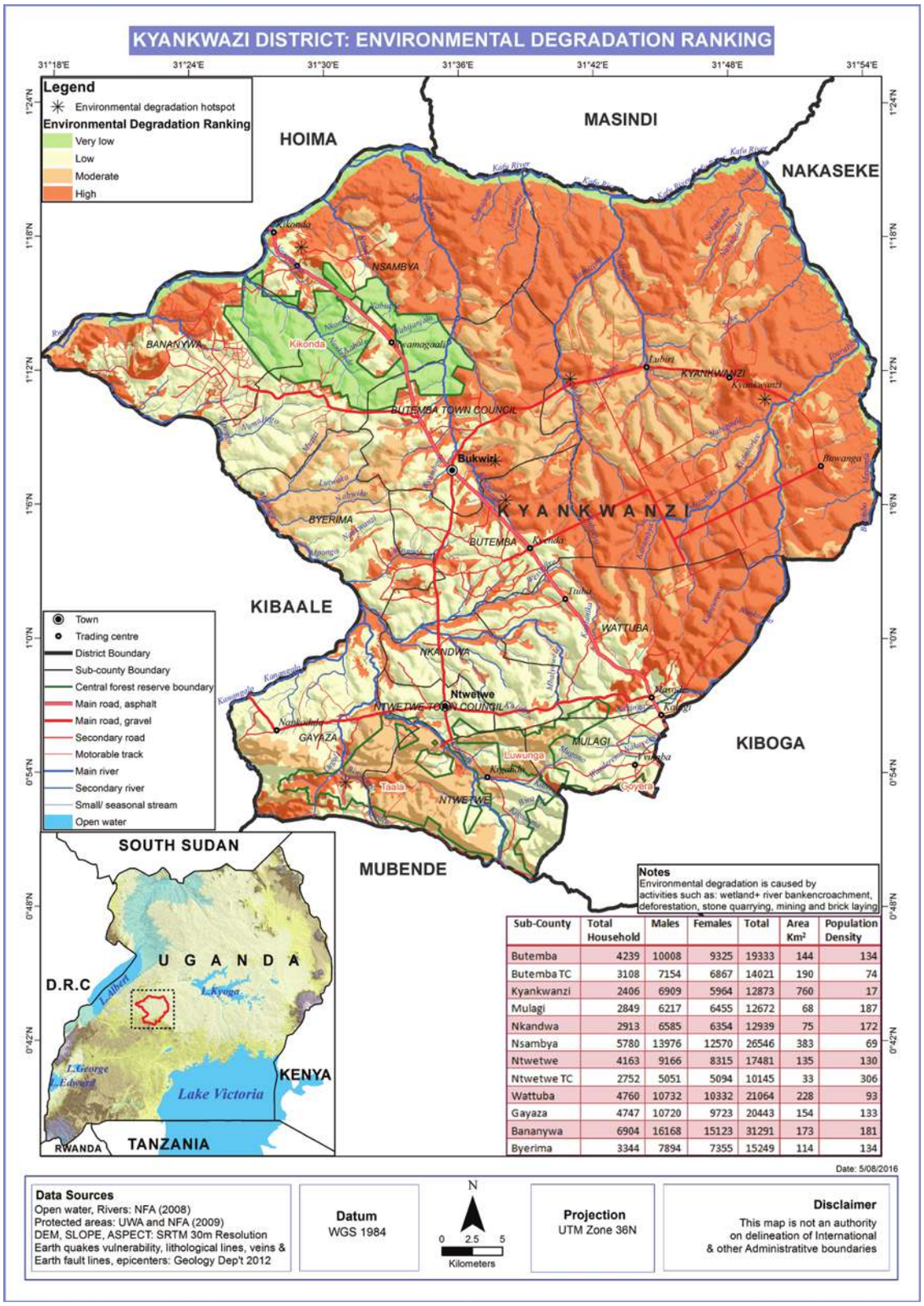
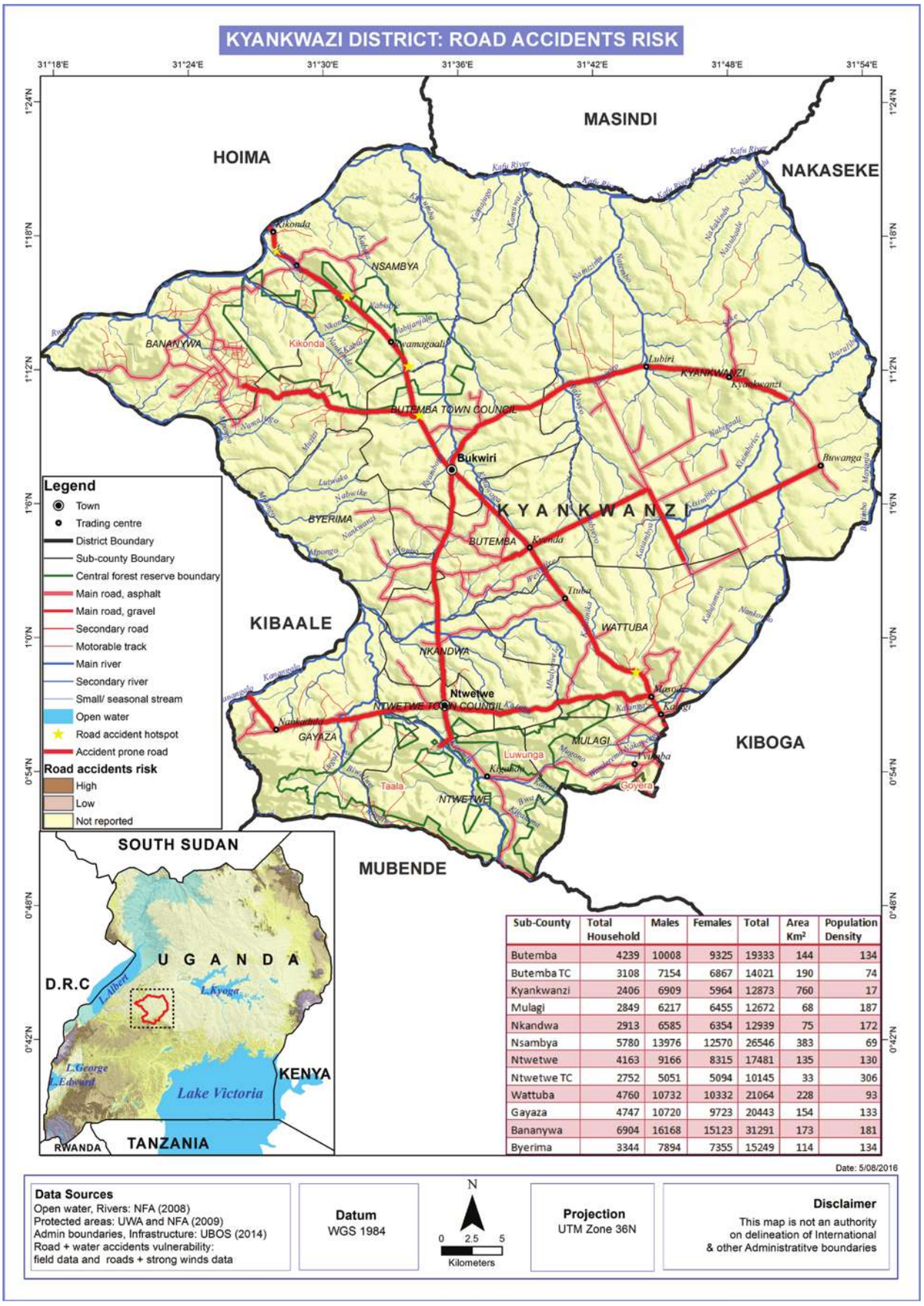


Figure 19: Environmental Degradation Ranking, Kyankwanzi District

4.4.4 Road Accidents

It was reported that road accidents such as head on collisions and vehicles overturning were common along the Kampala - Hoima highway. The most notable black spot along on this highway is at Masodde trading centre and Kikonda (a corner) towards R. Kafu. A number of bodaboda accidents were also reported along Masodde- Ntwetwe- Nkooko road and in Ntwetwe Town Council.



Sub-County	Total Household	Males	Females	Total	Area Km²	Population Density
Butemba	4239	10008	9325	19333	144	134
Butemba TC	3108	7154	6867	14021	190	74
Kyankwanzi	2406	6909	5964	12873	760	17
Mulagi	2849	6217	6455	12672	68	187
Nkandwa	2913	6585	6354	12939	75	172
Nsambya	5780	13976	12570	26546	383	69
Ntwetwe	4163	9166	8315	17481	135	130
Ntwetwe TC	2752	5051	5094	10145	33	306
Wattuba	4760	10732	10332	21064	228	93
Gayaza	4747	10720	9723	20443	154	133
Bananywa	6904	16168	15123	31291	173	181
Byerima	3344	7894	7355	15249	114	134

Figure 20: Road Accidents Hotspots and Vulnerability, Kyankwanzi District

4.5 Vulnerability Profile

Vulnerability depends on low capacity to anticipate, cope with and/or recover from a disaster and is unequally distributed in a society. The vulnerability profile of Kyankwanzi district were assessed based on exposure, susceptibility and adaptive capacity at community (village), parish, sub-county and district levels highlighting their sensitivity to a certain risk or phenomena. Indeed, vulnerability was divided into biophysical (or natural including environmental and physical components) and social (including social and economic components) vulnerability. Whereas the biophysical vulnerability is dependent upon the characteristics of the natural system itself, the socio-economic vulnerability is affected by economic resources, power relationships, institutions or cultural aspects of a social system. Differences in socio-economic vulnerability can often be linked to differences in socio-economic status, where a low status generally means that you are more vulnerable.

Vulnerability was assessed basing on two broad criteria i.e. socio-economic and environmental components of vulnerability. Participatory approach was employed to assess these vulnerability components by characterizing the exposure agents, including hazards, elements at risk and their spatial dimension. Participants also characterized the susceptibility of the district including identification of the potential impacts, the spatial disposition and the coping mechanisms. Participants also identified the resilience dimension at different spatial scales (Table 2).

Table 3 (Vulnerability Profile) shows the relation between hazard intensity (probability) and degree of damage (magnitude of impacts) depicted in the form of hazard intensity classes, and for each class the corresponding degree of damage (severity of impact) is given. It reveals that climatological and meteorological hazards in form of drought and hailstorms predispose the community to high vulnerability state. The occurrence of parasites and diseases and lightning also create a moderate vulnerability profile in the community (Table 3). Table 4 shows Hazard assessment for Kyankwanzi District.

Table 2: Components of Vulnerability in Kyankwanzi District

Vulnerability	Exposure		Susceptibility		Resilience		
	Hazards	Elements at Risk	Geographical Scale	Susceptibility	Geographical Scale	Coping strategies	Geographical Scale
Socio-economic component	Rock falls and Soil erosion	- Human and livestock adjacent to hill slopes - Crops on hill slopes - Infrastructure e.g. houses, schools, roads adjacent to hill slopes - Water bodies	Parish	- Loss of lives - Complete crop failure - Destruction of infrastructure e.g. homes, and schools - Silting of rivers & flooding - Poor water quality - Loss of some fish species	Parish	- Sensitization by both government and non-governmental agencies on control measures - Soil & water conservation measures -Contour planting - Intercropping - Agroforestry	Parish
	Earth quakes	- Infrastructure e.g. houses, schools	District	- Loss of lives - Destruction of Infrastructure e.g. houses, schools	District	-No much measure so far	District
	Floods	- Livestock adjacent to flood plain/river banks - Crops along river banks, flood plains - Infrastructure e.g. houses, schools, roads/bridges adjacent to flood plain	Parish	- Livestock loss - Foot rot - Destruction of crops - Destruction of infrastructure e.g. houses, springs, boreholes, schools, roads adjacent to flood plain	Parish	-Migration -Sensitization on wetland conservation -Temporary wooden bridges	Parish

	Prolonged dry spells	- Livestock - Crops - Human population	Village	- Hunger & poverty - Livestock loss - Crop failure - Shortage of pasture - Shortage of water - Spread of livestock epidemics - Livestock mortalities & emaciation	Village	- Migration to river banks - Construction of dams/valley tanks - Timely planting - Use of improved, early maturing &drought tolerant varieties - Sensitization on tree planting - Buy food from elsewhere	Village
	Hailstorms, strong winds and Lightning	- Human and livestock populations - Crops - Infrastructure e.g. houses, schools, health centres	Parish	- Loss of lives - Destruction of crops - Destruction of infrastructure e.g. houses, schools, roads adjacent to flood plain	Parish	- Lightning arresters - Tree planting as wind breaks	Parish
	Crop Pests and Diseases	-Crops	District	- Complete crop failure - Poor yields (food insecurity& low income - Poverty	District	- Spraying - Cut and burry affected crops - Sensitization on crop disease management - Intercropping - Tolerant varieties - Timely /early planting	District

	Livestock Parasites and Diseases	- Livestock (cattle, goats, pigs, poultry etc.)	District	- Loss of livestock - Reduced livestock productivity - Reduced incomes	District	- Vaccination - Burry and burn animals that have died from infection - Treatment - Quarantine	District
	Human Disease outbreaks	- Human Population	District	- Loss of lives - Unproductive humans - Poverty	District	- Mass Immunization - Use of mosquito nets	District
	Invasive species	- Indigenous plant species - Animals	District	- Outcompete and suppress growth of indigenous plant spp. - Loss of indigenous spp and biodiversity - Reduced crop failure - Suppress growth of pastures - Some are poisonous to livestock	District	- Cut and burn - Sensitization on Invasive species management - Spray with herbicides e.g 2,4 D	District
	Bush fires	- Livestock - Crops - Infrastructure e.g. houses, granaries/ cribs	Sub-county	- Loss of livestock - Shortage of pasture - Destruction of crops - Destruction of infrastructure e.g. houses, granaries/cribs - Loss of lives	Sub-county	- Sensitization - Fire control measures: firebreaks, fire lines and fire fighting equipments	Sub-county
	Road accidents	- Human population - Livestock and wild animals - Infrastructure adjacent to accident black spots e.g. houses, schools etc.	Sub-county	- Loss of lives - Destruction of vehicles - Destruction of Infrastructure adjacent to accident black spots e.g. houses, schools etc.	Sub-county	-Humps on roads (hot spots) -Signage on speed limits -Sensitization on traffic rules Traffic police	Sub-county

	Land conflicts	- Human population	Village	- Loss of lives - Family violence and break outs - Retards development - Failure to plant perennial crops	Village	- Community dialogue - District court in charge of land issues - Area land committees	Village
	Vermin and Wildlife animal attacks	- Human population - Livestock - Crops	Parish	- Loss of lives - Livestock loss - Crop destruction	Parish	- Report to UWA and Vermin Officer - Guard gardens - Poison - Hunt and kill - Fence water collection points with Wildlife animals - Hunting	Village
	Environmental degradation	- Human and livestock populations - Crops - Natural vegetation - Wetlands	Sub-county	- Crop failure - Shortage of pasture - Shortage of water - Decline of water quality - Increased incidences of env't related diseases	Sub-county	- Sensitization on wetland conservation - Sensitization on tree plating - Setting Bye-laws/ Ordinances	Sub-county
Environmental component	Landslides, Rock falls and Soil erosion	- Human and livestock adjacent to hill slopes - Crops on hill slopes - Infrastructure e.g. houses, schools, roads adjacent to hill slopes	Parish	- Loss of lives - Complete crop failure - Destruction of infrastructure e.g. homes, and schools	Parish	- Migration - Sensitization by both government and non-governmental agencies	
	Earth quakes	- Infrastructure e.g. houses, schools	District	- Loss of lives - Destruction of Infrastructure e.g. houses, schools	District	- No much measure so far	

	Floods	- Livestock adjacent to flood plain - Crops on flood plain - Infrastructure e.g. houses, schools, roads adjacent to flood plain	Parish	- Livestock loss - Destruction of crops - Destruction of infrastructure e.g. houses, schools, roads adjacent to flood plain	Parish	-Migration -Sensitization on wetland conservation -Dig trenches	
	Drought	- Livestock - Crops - Human population	Village	- Hunger & poverty - Livestock loss - Crop failure - Shortage of pasture - Shortage of water	Village	-Migration -Sensitization on tree planting -Buy food from elsewhere	
	Hailstorms, strong winds and Lightning	- Human and livestock populations - Crops - Infrastructure e.g. houses, schools, health centres	Parish	- Loss of lives - Destruction of crops - Destruction of infrastructure e.g. houses, schools, roads adjacent to flood plain	Parish		
	Crop Pests and Diseases	-Crops	District	- Complete crop Failure	District	- Spraying - Cut and burry affected crops -Sensitization on crop disease management	
	Livestock Pests and Diseases	-Livestock (cattle, goats etc.)	District	- Loss of livestock - Reduced livestock productivity	District	- Vaccination - Burry and burn animals that have died from infection - Quarantine	
	Human Disease outbreaks	- Human Population	District	- Loss of lives	District	- Mass Immunization - Use of mosquito nets	

	Invasive species	- Indigenous species - Animals	District	- Outcompete the indigenous spp., suppress growth of indigenous spp - Loss of indigenous spp. - Complete crop Failure - suppress growth of pasture	District	- Cut and burn -Sensitization on Invasive species management	
	Bush fires	- Livestock - Crops - Infrastructure e.g. houses, schools	Sub-county	- Loss of livestock - Shortage of pasture - Destruction of crops - Destruction of infrastructure e.g. houses, schools	Sub-county	-Sensitization	
	Road accidents	- Human population - Infrastructure adjacent to accident black spots e.g. houses, schools etc.	Sub-county	- Loss of lives - Destruction of vehicles - Destruction of Infrastructure adjacent to accident black spots e.g. houses, schools etc.	Sub-county	-Humps on roads -Signage on speed limits -Sensitization on traffic rules	
	Land conflicts	- Human population	Village	- Loss of lives - Family violence and break outs	Village	- Community dialogue - District court in charge of land issues	

	Vermin and Wildlife animal attacks	- Human population - Livestock - Crops	Parish	- Loss of lives - Livestock loss - Crop destruction	Parish	- Report to UWA - Guard gardens - Poison - Hunt and kill - Fence water collection points with Wildlife animals	
	Environmental degradation	- Human and livestock populations - Crops - Natural vegetation	Sub-county	- Crop failure - Shortage of pasture - Shortage of water - Decline of water quality	Sub-county	- Sensitization on wetland conservation - Sensitization on tree plating - Setting bye-laws	

Table 3: Vulnerability Profile for Kyankwanzi District

	PROBABILITY	SEVERITY OF IMPACTS	RELATIVE RISK	VULNERABLE SUB COUNTIES
	Relative likelihood this will occur	Overall Impact (Average)	Probability x Impact Severity	
Hazards	1 = Not occur 2 = Doubtful 3 = Possible 4 = Probable 5 = Inevitable	1 = No impact 2= Low 3=medium 4 = High	0-1= Not Occur 2-10= Low 11-15=Medium 16-20= High	
Floods	4	3	12	Kitabona, Gayaza, Ntwetwe Town Council, Bananywa, Nsambya
Prolonged dry spells	5	4	20	Entire district
Soil erosion, rock falls and landslides	5	3	15	Kitabona, Mulagi, Wattuba, Gayaza, Nsambya, Bananywa, Butemba S/C, Nkandwa, Byerima
Hail storms, lightning and strong winds	5	4	20	Wattuba, Butemba Town Council, Nsambya, Kyankwanzi, Nkandwa
Bush fires	4	3	12	Nsambya, Kyankwanzi, Butemba S/C, Wattuba
Crop pests and diseases	5	4	20	Entire district
Livestock parasites and diseases	5	4	20	Kyankwanzi, Nsambya, Butemba S/C, Ntwetwe T/C, Wattuba
Human Diseases outbreaks	5	3	15	Entire district
Land conflicts	5	2	10	Nsambya, Bananywa, Kyankwanzi, Wattuba, Kitabona, Gayaza
Vermin and Wild-life animal attacks	3	2	6	Kyankwanzi, Nsambya, Wattuba, Butemba S/C
Earthquakes and faults	2	1	2	Entire district
Road accidents	5	3	15	Wattuba, Ntwetwe T/C, Butemba S/C, Nsambya

Environmental degradation	4	4	16	Kitabona, Wattuba, Gayaza, Bananywa, Nsambya, Ntwetwe
Invasive species	5	3	15	Kyankwanzi, Wattuba, Butemba S/C, Nsambya

Note: This table presents relative risk for hazards to which the community was able to attach probability and severity scores.

Key for Relative Risk

	High
	Medium
	Low
	Not reported/ Not prone

Table 4: Hazard Risk Assessment

Hazard	Mulagi	Wattuba	Kitabona	Ntwetwe T/C	Gayaza	Nkandwa	Byerima	Butemba S/C	Butemba T/C	Kyankwanzi	Bananywa	Nsambya
Floods	L	L	H	H	H	L	L	L	M	L	M	M
Prolonged dry spells	M	M	M	M	M	M	M	H	M	H	M	H
Rock falls and Soil erosion	M	M	H	M	M	M	M	H	H	H	M	H
Strong winds, Hailstorms and Lightning	L	H	M	M	M	H	H	H	M	H	M	H
Crop pests and Diseases	H	H	H	M	H	H	H	H	M	L	H	H
Livestock parasites and Diseases	M	H	M	VH	M	L	M	H	H	VH	M	VH
Human disease outbreaks	M	H	M	H	M	M	M	M	M	M	M	M
Vermin and Wildlife animal attacks	L	H	L	L	M	L	L	H	H	H	L	H
Land conflicts	L	L	L	L	L	H	H	L	L	L	H	L
Bush fires	L	H	H	L	H	M	M	M	L	H	H	H
Environmental degradation	M	H	H	M	M	M	M	H	H	VH	M	H
Earthquakes and faults	L	L	L	L	L	L	L	L	L	L	L	L
Road accidents	L	H	L	H	L	L	L	M	H	L	L	H
Invasive species	M	H	L	L	L	L	M	H	H	VH	L	H

Key

VH	Very high
H	High
M	Medium
L	Low
	Not reported/ Not prone

4.5.1 Gender and Age groups mostly affected by Hazards

Table 5: Gender and age groups mostly affected by hazards

Hazard	Gender and Age mostly affected
Drought	Affects mostly women and children since most water wells dry up increasing distance for fetching water
Erosion	All age groups and gender are affected
Hailstorms Lightning	All gender and age groups Children in schools are mostly affected
Crop pests and Diseases	All gender and age groups
Livestock parasites and Diseases	All gender and age groups
Human disease outbreaks	All gender and age groups
Vermin and Wildlife animal attacks	All gender and age groups
Land conflicts	All gender and age groups
Bush fires	All gender and age groups
Environmental degradation	All gender and age groups
Road accidents	All gender and age groups

4.5.2 Coping Strategies

In response to the various hazards, participants identified a range of coping strategies that the community employs to adjust to, and build resilience towards the challenges. The range of coping strategies are broad and interactive often tackling more than one hazard at a time and the focus of the communities leans towards adaptation actions and processes including social and economic frameworks within which livelihood and mitigation strategies take place; ensuring extremes are buffered irrespective of the direction of climate change and better positioning themselves to better face the adverse impacts and associated effects of climate induced and technological hazards (Table 2).

Table 6: Coping strategies to the Multi-hazards in Kyankwanzi District

No	Multi-Hazards		Coping strategies
1	Geomorphological or Geological	Rock falls and Soil erosion	• Migration to safe areas • Terracing/ contour farming • Plant trees to control water movement on hill slopes • Mulching in banana plantations • Plant grass in banana plantations on hill slopes • Removal of stones from banana farmlands
2		Earthquakes and faults	• No action, communities think the tremors are minor
3	Climatological or Meteorological	Floods	• Digging up of trenches in the flood plains/ gardens • Planting trees to control water movement to flood plains • Temporary migration to other areas • Seek for government food aid
4		Prolonged dry spells	• Leave wetlands as water catchments • Tree planting as climate modifiers • Buy food elsewhere in case of shortage • Buy water from the nearby areas • Food Storage especially dry grains • Construction of ponds, Dams and Valley tanks • Adoption of climate smart agriculture
5		Strong winds, Hailstorms and Lightning	• Plant trees as wind breakers • Use of stakes against wind in banana plantations • Use of ropes to tire banana against wind • Installation of lightning conductors • Stay indoors during rains • Changing building designs and roof types • Removal of destroyed crops • Request for aid from the Office of the Prime Minister • Installation of lightning conductors on newly constructed schools /health centres

6	Ecological or Biological	Crop pests and Diseases	• Spraying crops to combat pests & diseases • Cutting and roguing BBW affected crops • BBW task forces • Burning of affected crops • Vigilance (community sensitization on regular monitoring of the farms & report anything strange to extension staff). • Sensitization of farmers
7		Livestock pests and Diseases	• Spraying parasites • Deworming • Clinical treatment • Vaccinations • Burying animals that have died from infection • Quarantine • Sensitization of farmers
8		Human epidemic Diseases	• Mass immunisation • Visiting health centres for treatment • Use of mosquito nets • Routine sensitizations
9		Vermin and Wild-life animal attacks	• Guarding the gardens • Poisoning • Trapping • Hunt and kill • Report to UWA and Vermin Officer • Plant red pepper • Dig trenches around garden
10		Invasive species	• Uproot • Cut and burn • Spraying with herbicides • Sensitization on Invasive species management • Spray with herbicides

11	Human induced or technological	Land conflicts	• Community dialogues • Report to court • Migration
12		Bush fires	• Stop the fires in case of fire outbreak • Fire lines (may be constructed, cleared grass) • Fire breaks planted along gardens e.g. euphorbia spp. • Vigilance especially in dry seasons where most burning is done • Popularise the use of fire beaters • Set up bye- laws
13		Road accidents	• Construction of humps • New road have Signage posts including speed limits • Sensitisation
14		Environmental degradation	• Leave wetlands as water catchments • Plant trees and fruit trees (mangoes, citrus)as climate modifiers • Sensitization on sustainable wetland utilization and management

GENERAL CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The multi-hazard vulnerability profile output from this assessment was a combination of spatial modeling using socio-ecological spatial layers (i.e. DEM, Slope, Aspect, Flow Accumulation, Land use, vegetation cover, hydrology, soil types and soil moisture content, population, socio-economic, health facilities, accessibility, and meteorological data) and information captured from District Key Informant interviews and sub-county FGDs using a participatory approach. The level of vulnerability was assessed at sub-county participatory engagements and integrated with the spatial modeling in the GIS environment.

Results from the participatory assessment indicated that Kyankwanzi district has over the past two decades increasingly experienced hazards including rock falls, soil erosion, floods, prolonged dry spells, hailstorms, strong winds, lightning, crop pests and diseases, livestock parasites and diseases, human disease outbreaks, vermin, wildlife animal attacks, invasive species, bush fires and land conflicts putting livelihoods at increased risk. Generally prolonged dry spells and flooding were identified as most serious problem in Kyankwanzi district with almost all sub-counties being vulnerable to the hazards. The limited adaptive capacity (and or/resilience) and high sensitivity of households and communities in Kyankwanzi district increase their vulnerability to hazard exposure necessitating urgent external support.

Hazards experienced in Kyankwanzi district can be classified as:

i. Geomorphological or Geological hazards including rock falls, soil erosion and earth quakes.

ii. Climatological or Meteorological hazards including floods, dry spells, hailstorms, strong winds and lightning.

iii. Ecological or Biological hazards including crop pests and diseases, livestock parasites and diseases, human disease outbreaks, vermin and wildlife animal attacks and invasive species.

iv. Human induced or Technological hazards including bush fires, road accidents land conflicts and crop destruction.

However, reducing vulnerability at community, local government and national levels should be a threefold effort hinged on:

i. Reducing the impact of the hazard where possible through mitigation, prediction, early warning and preparedness.

ii. Building capacities to withstand and cope with the hazards and risks.

iii. Tackling the root causes of the vulnerability such as poverty, poor governance, discrimination, inequality and inadequate access to resources and livelihood opportunities.

5.2 Policy-related Recommendations

The following recommended policy actions targeting vulnerability reduction include:

i. The government should improve enforcement of policies aimed at enhancing sustainable environmental health.

ii. The government through MAAIF should review the animal diseases control act because of low penalties given to defaulters.

iii. The government should establish systems to motivate support of political leaders toward government initiatives and programmes aimed at disaster risk reduction.

iv. The government should increase awareness campaigns aimed at sensitizing farmers/ communities on disaster risk reduction initiatives and practices.

v. The government should revive disaster committees at district level and ensure funding of disaster and environmental related activities.

vi. The government through UNRA and the District Authority should fund periodic maintenance of feeder roads to reduce on traffic accidents.

vii. The government through MAAIF (NARO) and the District Production Office should promote drought and disease tolerant/resistant crop seeds.

viii. The government through OPM and Meteorology Authority should increase importation of lightning conductors at subsidized prices.

ix. The government through OPM and Meteorology Authority should support establishment of disaster early warning systems.

x. The government through MWE increase funding and staff to monitor wetland degradation and non-genuine agro-inputs.

xi. The government through OPM should improve communication between the disaster department and local communities.

xii. The government through MWE should promote Tree planting along road reserves.

xiii. The government through MAAIF should fund and recruit extension (facilitate them) works at sub-county level.

xiv. Rural electrification should be strengthened and electric tariffs subsidized to reduce deforestation for fuel (charcoal and firewood).

REFERENCES

Jorn Birkmann (2006). Measuring Vulnerability to promote Disaster-Resilient Societies: Conceptual Frameworks and Definitions.

Kyankwanzi District Local Government (2012). Five Year District Development Plan (2010/11 – 2014/15).

MWE (2013). *Water and Environment Sector Performance Report*: Ministry of Water and Environment, Kampala

MWE (2012). *Uganda National Climate Change Policy*, Ministry of Water and Environment, Kamapla, Final version for approval, 18 July 2012, p.2

UBOS (2014). National Housing Population Census 2014; Uganda Bureau of Statics, Kampala

UNDP-UNDRO (1991). Mitigation Strategies in Disaster Mitigation UN Disaster Management Training Program

UNISDR (2009). UNISDR Terminology on Disaster Risk Reduction.

APPENDIX I: DATA COLLECTION TOOLS

FOCUS GROUP DISCUSSION GUIDE FOR DISTRICT DISASTER RISK MANAGEMENT FOCAL PERSONS

Interviewer Team Name(s)	District: Sub- county: Parish: Village:	GPS Coordinates	
		X:	
		Y:	
		Altitude	

No.	Name of Participants	Designation	Contact	Signature

Introduction

i. You have all been requested to this session because we are interested in learning from you. We appreciate your rich experiences and hope to use them to strengthen service delivery across the district and the country as whole in a bid to improve access to information on Hazards and early warning.

ii. There is no “right” or “wrong” answers to any of the questions. As a Focus Group Discussion leader, I will try to ask all people here today to take turns speaking. If you have already spoken several times, I may call upon someone who has not said as much. I will also ask people to share their remarks with the group and not just with the person beside them, as we anxious to hear what you have to say.

iii. This session will be tape recorded so we can keep track of what is said, write it up later for our report. We are not attaching names to what you have to what is said, so whatever you say here will be anonymous and we will not quote you by name.

iv. I would not like to keep you here long; at most we should be here for 30 minutes- 1 hour.

Section A: Geomorphological or Geological Hazards (Landslides, rock falls, soil erosion and earth quakes)

1. Which crops are majorly grown in your area of jurisdiction?

2. Which domestic animals are dominant in your area of jurisdiction?

3. What challenges are faced by farmers in your area of jurisdiction?

4. Have you experienced landslides and rock falls in the past 10 years in your area of jurisdiction?

5. Which villages, parishes or sub-counties have been most affected by landslide and rock falls?

6. As a way of ranking from Low, Medium, High and Very high, rank the villages, parishes or sub-counties that have been most affected?

7. Which crops are majorly affected by landslides and rock falls in your area of jurisdiction?

8. In which way are the crops affected by landslides and rock falls?

9. Which domestic animals are majorly affected by landslides and rock falls in your area of jurisdiction?

10. In which way are the domestic animals affected by landslides and rock falls?

11. Which agricultural practices are being adopted by farmers in a bid to mitigate the above challenges?

12. What are the relevant government's interventions focusing at helping farmers mitigate the challenges mentioned?

13. Do you have any earth faults or earth cracks as lines of weakness in your area of jurisdiction?

14. Have you experienced any earth quakes in the past 10 years in your area of jurisdiction?

15. Which particular villages, parishes or sub-counties have been majorly affected by earth quakes in your area of jurisdiction?

16. As a way of ranking from Low, Medium, High and Very high, rank the villages, parishes or sub-counties that have been most affected?

17. What impacts have been caused by earth quakes?

18. To what extent have the earth quakes affected livelihoods of the local communities in your area of jurisdiction?

19. Which mitigation measures have been adopted local communities in a bid to mitigate the above challenges?

20. What are the relevant government's interventions focusing at helping local communities mitigate the challenges mentioned?

Section B: Meteorological or climatological hazards (Floods, Droughts, Lightning, strong winds, hailstorms)

21. Have you experienced floods in the past 10 years in your area of jurisdiction?

22. Which villages, parishes or sub-counties have been most affected by floods?

23. As a way of ranking from Low, Medium, High and Very high, rank the villages, parishes or sub-counties that have been most affected?

24. Which crops are majorly affected by floods in your area of jurisdiction?

25. In which way are the crops affected by floods?

26. Which domestic animals are majorly affected by floods in your area of jurisdiction?

27. In which way are the domestic animals affected by floods?

28. Which agricultural practices are being adopted by farmers in a bid to mitigate the above challenges?

29. What are the relevant government's interventions focusing at helping farmers mitigate the challenges mentioned?

30. Have you experienced drought in the past 10 years in your area of jurisdiction?

31. Which villages, parishes or sub-counties have been most affected by drought?

32. As a way of ranking from Low, Medium, High and Very high, rank the villages, parishes or sub-counties that have been most affected?

33. Which crops are majorly affected by drought in your area of jurisdiction?

34. In which way are crops affected by drought?

35. Which domestic animals are majorly affected by drought in your area of jurisdiction?

36. In which way are the domestic animals affected by drought?

37. Which agricultural practices are being adopted by farmers in a bid to mitigate the above challenges?

38. What are the relevant government's interventions focusing at helping farmers mitigate the challenges mentioned?

39. Have you experienced hailstorms or lightning in the past 10 years in your area of jurisdiction?

40. Which villages, parishes or sub-counties have been most affected by hailstorms or lightning?

41. As a way of ranking from Low, Medium, High and Very high, rank the villages, parishes or sub-counties that have been most affected?

42. What impacts have been caused by hailstorms or lightning?

43. To what extent have the hailstorms or lightning affected livelihoods of the local communities in your area of jurisdiction?

44. Which mitigation measures have been adopted local communities in a bid to mitigate the above challenges?

45. What are the relevant government's interventions focusing at helping local communities mitigate the challenges mentioned?

Section C: Biological hazards (Crop pests and diseases, Livestock pests and Diseases, Invasive species, vermin and wild-life animal attacks)

46. Have you experienced any epidemic animal disease outbreaks in the past 10 years in your area of jurisdiction?

47. Which villages, parishes or sub-counties have been most affected by epidemic animal disease outbreaks?

48. As a way of ranking from Low, Medium, High and Very high, rank the villages, parishes or sub-counties that have been most affected?

49. Specify the epidemic animal disease outbreaks that have majorly affected animals in your area of jurisdiction?

50. Which domestic animals are majorly affected by epidemic animal disease outbreaks in your area of jurisdiction?

51. In which way are the domestic animals affected by epidemic animal disease outbreaks?

52. Which mitigation practices are being adopted by farmers in a bid to mitigate the above epidemic animal disease outbreaks?

53. What are the relevant government's interventions focusing at helping farmers mitigate the epidemic animal disease outbreaks mentioned?

54. Have you experienced any crop pests and disease outbreaks in the past 10 years in your area of jurisdiction?

55. Which villages, parishes or sub-counties have been most affected by epidemic animal disease outbreaks?

56. As a way of ranking from Low, Medium, High and Very high, rank the villages, parishes or sub-counties that have been most affected?

57. Specify the crop pests and disease outbreaks that have majorly affected animals in your area of jurisdiction?
58. Which crops are majorly affected by crop pests and disease outbreaks in your area of jurisdiction?

59. In which way are the crops affected by crop pests and disease outbreaks?

60. Which mitigation practices are being adopted by farmers in a bid to mitigate the above crop pests and disease outbreaks?

61. What are the relevant government's interventions focusing at helping farmers mitigate the crop pests and disease outbreaks mentioned?

62. Have you experienced any epidemic human disease outbreaks in the past 10 years in your area of jurisdiction?

63. Specify the epidemic human disease outbreaks that have majorly affected animals in your area of jurisdiction?

64. In which way are the humans affected by epidemic human disease outbreaks?

65. Which mitigation measures have been adopted by local communities in a bid to mitigate the above epidemic human disease outbreaks?

66. What are the relevant government's interventions focusing at helping local communities mitigate the epidemic human disease outbreaks mentioned?

67. Do you have any national park or wildlife reserve in your area of jurisdiction?

68. Have you experienced wildlife attacks in the past 10 years in your area of jurisdiction?

69. Which particular villages, parishes or sub-counties have been majorly affected by wildlife attacks in your area of jurisdiction?

70. As a way of ranking from Low, Medium, High and Very high, rank the villages, parishes or sub-counties that have been most affected?

71. What impacts have been caused by wildlife attacks?
72. To what extent have the wildlife attacks affected livelihoods of the local communities in your area of jurisdiction?

73. Which mitigation measures have been adopted local communities in a bid to mitigate the above challenges?

74. What are the relevant government's interventions focusing at helping local communities mitigate the challenges mentioned?

75. Are there invasive species in your area of jurisdiction?

76. Specify the invasive species in your area of jurisdiction?

77. Which villages, parishes or sub-counties have been most affected by invasive species in your area of jurisdiction?

78. As a way of ranking from Low, Medium, High and Very high, rank the villages, parishes or sub-counties that have been most affected?

79. Which crops or animals are majorly affected by invasive species in your area of jurisdiction?

80. In which way are the crops or animals affected by invasive species?

81. Which mitigation practices are being adopted by farmers in a bid to mitigate the above invasive species?

82. What are the relevant government's interventions focusing at helping farmers mitigate the invasive species mentioned?

Section D: Human induced or Technological hazards (Land conflicts, bush and forest fires, road accidents, water accidents and environmental degradation)

83. Have you experienced environmental degradation in your area of jurisdiction?

84. What forms of environmental degradation have been experienced in your area of jurisdiction?

85. Which villages, parishes or sub-counties have been most affected by environmental degradation?

86. As a way of ranking from Low, Medium, High and Very high, rank the villages, parishes or sub-counties that have been most affected?

87. What impacts have been caused by environmental degradation?
88. Which measures have been adopted by local communities in a bid to mitigate the above challenges?

89. What are the relevant government's interventions focusing at helping local communities mitigate the challenges mentioned?

90. Have you experienced land conflicts in the past 10 years in your area of jurisdiction?

91. Which particular villages, parishes or sub-counties have been majorly affected by land conflicts in your area of jurisdiction?

92. As a way of ranking from Low, Medium, High and Very high, rank the villages, parishes or sub-counties that have been most affected?

93. What impacts have been caused by land conflicts?

94. To what extent have the land conflicts affected livelihoods of the local communities in your area of jurisdiction?

95. Which conflict resolution measures have been adopted local communities in a bid to mitigate the above challenges?

96. What are the relevant government's interventions focusing at helping local communities mitigate the challenges mentioned?

97. Have you experienced Road accidents in the past 20 years in your area of jurisdiction?

98. Which roads have experienced Road accidents?

99. What impacts have been caused by Road accidents?

100. To what extent have the Road accidents affected livelihoods of the local communities in your area of jurisdiction?

101. Which conflict resolution measures have been adopted local communities in a bid to mitigate the above challenges?

102. What are the relevant government's interventions focusing at helping local communities mitigate the challenges mentioned?

103. Have you experienced any serious bush and or forest fires in the past 10 years in your area of jurisdiction?

104. Which particular villages, parishes or sub-counties have been majorly affected by bush and or forest fires in your area of jurisdiction?

105. As a way of ranking from Low, Medium, High and Very high, rank the villages, parishes or sub-counties that have been most affected?

106. What impacts have been caused by serious bush and or forest fires?

107. To what extent have the serious bush and or forest fires affected livelihoods of the local communities in your area of jurisdiction?

108. Which mitigation measures have been adopted local communities in a bid to mitigate the above challenges?

109. What are the relevant government's interventions focusing at helping local communities mitigate the challenges mentioned?

FOCUS GROUP DISCUSSION GUIDE FOR LOCAL COMMUNITIES

Interviewer Team Name(s)	District: Sub- county: Parish: Village:	GPS Coordinates	
		X:	
		Y:	
		Altitude	

No.	Name of Participants	Village/ Parish	Contact	Signature

Introduction

v. You have all been requested to this session because we are interested in learning from you. We appreciate your rich experiences and hope to use them to strengthen service delivery across the district and the country as whole in a bid to improve access information on Hazards and early warning.

vi. There is no “right” or “wrong” answers to any of the questions. As a Focus Group Discussion leader, I will try to ask all people here today to take turns speaking. If you have already spoken several times, I may call upon someone who has not said as much. I will also ask people to share their remarks with the group and not just with the person beside them, as we anxious to hear what you have to say.

vii. This session will be tape recorded so we can keep track of what is said, write it up later for our report. We are not attaching names to what you have to what is said, so whatever you say here will be anonymous and we will not quote you by name.

viii. I would not like to keep you here long; at most we should be here for 30 minutes- 1 hour.

Section A: Geomorphological or Geological Hazards (Landslides, rock falls, soil erosion and earth quakes)

1. Which crops are majorly grown in your community?

2. Which domestic animals are dominant in your community?

3. What challenges are faced by farmers in your community?

4. Have you experienced landslides and rock falls in the past 10 years in your community?
5. Which villages and parishes have been most affected by landslide and rock falls?

6. As a way of ranking from Low, Medium, High and Very high, rank the villages and parishes that have been most affected?

7. Which crops are majorly affected by landslides and rock falls in your community?

8. In which way are the crops affected by landslides and rock falls?

9. Which domestic animals are majorly affected by landslides and rock falls in your community?

10. In which way are the domestic animals affected by landslides and rock falls?

11. Which agricultural practices are being adopted by farmers in a bid to mitigate the above challenges?

12. What are the relevant government's interventions focusing at helping farmers mitigate the challenges mentioned?

13. Do you have any earth faults or earth cracks as lines of weakness in your community?

14. Have you experienced any earth quakes in the past 10 years in your community?

15. Which particular villages, parishes or sub-counties have been majorly affected by earth quakes in your community?

16. As a way of ranking from Low, Medium, High and Very high, rank the villages, parishes that have been most affected?

17. What impacts have been caused by earth quakes?

18. To what extent have the earth quakes affected livelihoods of the local communities in your community?

19. Which mitigation measures have been adopted local communities in a bid to mitigate the above challenges?
20. What are the relevant government's interventions focusing at helping local communities mitigate the challenges mentioned?

Section B: Meteorological or climatological hazards (Floods, Droughts, Lightning, strong winds, hailstorms)

21. Have you experienced floods in the past 10 years in your community?

22. Which villages and parishes have been most affected by floods?

23. As a way of ranking from Low, Medium, High and Very high, rank the villages and parishes that have been most affected?

24. Which crops are majorly affected by floods in your community?

25. In which way are the crops affected by floods?

26. Which domestic animals are majorly affected by floods in your community?

27. In which way are the domestic animals affected by floods?

28. Which agricultural practices are being adopted by farmers in a bid to mitigate the above challenges?

29. What are the relevant government's interventions focusing at helping farmers mitigate the challenges mentioned?

30. Have you experienced drought in the past 10 years in your community?

31. Which villages and parishes have been most affected by drought?

32. As a way of ranking from Low, Medium, High and Very high, rank the villages and parishes that have been most affected?

33. Which crops are majorly affected by drought in your community?

34. In which way are crops affected by drought?

35. Which domestic animals are majorly affected by drought in your community?

36. In which way are the domestic animals affected by drought?

37. Which agricultural practices are being adopted by farmers in a bid to mitigate the above challenges?

38. What are the relevant government's interventions focusing at helping farmers mitigate the challenges mentioned?

39. Have you experienced hailstorms or lightning in the past 10 years in your community?

40. Which villages and parishes have been most affected by hailstorms or lightning?

41. As a way of ranking from Low, Medium, High and Very high, rank the villages and parishes that have been most affected?

42. What impacts have been caused by hailstorms or lightning?

43. To what extent have the hailstorms or lightning affected livelihoods of the local communities in your community?

44. Which mitigation measures have been adopted local communities in a bid to mitigate the above challenges?

45. What are the relevant government's interventions focusing at helping local communities mitigate the challenges mentioned?

Section C: Biological hazards (Crop pests and diseases, Livestock pests and Diseases, Invasive species, vermin and wild-life animal attacks)

46. Have you experienced any epidemic animal disease outbreaks in the past 10 years in your community?

47. Which villages and parishes have been most affected by epidemic animal disease outbreaks?

48. As a way of ranking from Low, Medium, High and Very high, rank the villages and parishes that have been most affected?

49. Specify the epidemic animal disease outbreaks that have majorly affected animals in your community?

50. Which domestic animals are majorly affected by epidemic animal disease outbreaks in your community?

51. In which way are the domestic animals affected by epidemic animal disease outbreaks?

52. Which mitigation practices are being adopted by farmers in a bid to mitigate the above epidemic animal disease outbreaks?

53. What are the relevant government's interventions focusing at helping farmers mitigate the epidemic animal disease outbreaks mentioned?

54. Have you experienced any crop pests and disease outbreaks in the past 10 years in your community?

55. Which villages and parishes have been most affected by epidemic animal disease outbreaks?

56. As a way of ranking from Low, Medium, High and Very high, rank the villages and parishes that have been most affected?

57. Specify the crop pests and disease outbreaks that have majorly affected animals in your community?

58. Which crops are majorly affected by crop pests and disease outbreaks in your community?

59. In which way are the crops affected by crop pests and disease outbreaks?

60. Which mitigation practices are being adopted by farmers in a bid to mitigate the above crop pests and disease outbreaks?

61. What are the relevant government's interventions focusing at helping farmers mitigate the crop pests and disease outbreaks mentioned?

62. Have you experienced any epidemic human disease outbreaks in the past 10 years in your community?

63. Specify the epidemic human disease outbreaks that have majorly affected animals in your community?

64. In which way are the humans affected by epidemic human disease outbreaks?

65. Which mitigation measures have been adopted by local communities in a bid to mitigate the above epidemic human disease outbreaks?

66. What are the relevant government's interventions focusing at helping local communities mitigate the epidemic human disease outbreaks mentioned?

67. Do you have any national park or wildlife reserve in your area of jurisdiction?

68. Have you experienced wildlife attacks in the past 10 years in your community?

69. Which particular villages and parishes have been majorly affected by wildlife attacks in your community?

70. As a way of ranking from Low, Medium, High and Very high, rank the villages and parishes that have been most affected?

71. What impacts have been caused by wildlife attacks?

72. To what extent have the wildlife attacks affected livelihoods of the local communities in your community?

73. Which mitigation measures have been adopted local communities in a bid to mitigate the above challenges?

74. What are the relevant government's interventions focusing at helping local communities mitigate the challenges mentioned?

75. Are there invasive species in your community?

76. Specify the invasive species in your community?

77. Which villages and parishes have been most affected by invasive species in your community?

78. As a way of ranking from Low, Medium, High and Very high, rank the villages and parishes that have been most affected?

79. Which crops or animals are majorly affected by invasive species in your community?

80. In which way are the crops or animals affected by invasive species?

81. Which mitigation practices are being adopted by farmers in a bid to mitigate the above invasive species?

82. What are the relevant government's interventions focusing at helping farmers mitigate the invasive species mentioned?

Section D: Human induced or Technological hazards (Land conflicts, bush and forest fires, road accidents, water accidents and environmental degradation)

83. Have you experienced environmental degradation in your community?

84. What forms of environmental degradation have been experienced in your community?

85. Which villages and parishes have been most affected by environmental degradation?

86. As a way of ranking from Low, Medium, High and Very high, rank the villages and parishes that have been most affected?

87. What impacts have been caused by environmental degradation?

88. Which measures have been adopted by local communities in a bid to mitigate the above challenges?

89. What are the relevant government's interventions focusing at helping local communities mitigate the challenges mentioned?

90. Have you experienced land conflicts in the past 10 years in your community?

91. Which particular villages and parishes have been majorly affected by land conflicts in your community?

92. As a way of ranking from Low, Medium, High and Very high, rank the villages and parishes that have been most affected?

93. What impacts have been caused by land conflicts?

94. To what extent have the land conflicts affected livelihoods of the local communities in your community?

95. Which conflict resolution measures have been adopted local communities in a bid to mitigate the above challenges?

96. What are the relevant government's interventions focusing at helping local communities mitigate the challenges mentioned?

97. Have you experienced Road accidents in the past 20 years in your community?

98. Which roads have experienced Road accidents?

99. What impacts have been caused by Road accidents?

100. To what extent have the Road accidents affected livelihoods of the local communities in your community?

101. Which conflict resolution measures have been adopted local communities in a bid to mitigate the above challenges?

102. What are the relevant government's interventions focusing at helping local communities mitigate the challenges mentioned?

103. Have you experienced any serious bush and or forest fires in the past 10 years in your community?

104. As a way of ranking from Low, Medium, High and Very high, rank the villages, parishes or sub-counties that have been most affected?

105. What impacts have been caused by serious bush and or forest fires?

106. To what extent have the serious bush and or forest fires affected livelihoods of the local communities in your community?

107. Which mitigation measures have been adopted local communities in a bid to mitigate the above challenges?

108. What are the relevant government's interventions focusing at helping local communities mitigate the challenges mentioned?

ATTENDANCE LIST FOR DISTRICT DISASTER RISK MANAGEMENT FOCAL PERSONS

No.	Name of Participant	Designation	Contact
1	Kasumba Deogratious	A/CAO	0772394127
2	Okello Paul	DHI	0782485704
3	Ssebaggala William	D/DEP/ Planner	0772399095
4	Nankya Doroth	DNRO	077235568
5	Ssebulime Godfry	DAO	0772450892
6	Madoi Ayub	DHO	0776909823

SPATIAL DATA COLLECTION SHEET FOR HAZARD VULNERABILITY AND RISK MAPPING

<table>
<tr><td colspan="2" rowspan="4">Observer Name:

Date:</td><td colspan="2" rowspan="4">District:
Sub- county:
Parish:
Village:</td><td colspan="4">Coordinates</td></tr>
<tr><td>X:</td><td colspan="3"></td></tr>
<tr><td>Y:</td><td colspan="3"></td></tr>
<tr><td>Altitude</td><td colspan="3"></td></tr>
<tr><td colspan="2">Slope characterization</td><td colspan="2">Bio-physical characterization</td><td colspan="3">Vegetation characterization</td><td rowspan="7">Land use type (tick)
Bush
Grassland
Wetland
Tree plantation
Natural forest
Cropland
Built-up area
Grazing land
Others</td></tr>
<tr><td>Slope degree (e.g 10, 20, …)</td><td></td><td>Soil Texture</td><td></td><td>Veg. cover (%)</td><td colspan="2"></td></tr>
<tr><td>Slope length (m) (e.g 5, 10, …)</td><td></td><td>Soil Moisture</td><td></td><td>Tree cover (%)</td><td colspan="2"></td></tr>
<tr><td>Aspect (e.g N, NE…)</td><td></td><td>Rainfall</td><td></td><td>Shrubs cover (%)</td><td colspan="2"></td></tr>
<tr><td>Elevation (e.g high, low…)</td><td></td><td>Drainage</td><td></td><td>Grass / Herbs cover (%)</td><td colspan="2"></td></tr>
<tr><td>Slope curvature (e.g concave, covex…)</td><td></td><td>Temperature</td><td></td><td>Bare land cover</td><td colspan="2"></td></tr>
<tr><td colspan="8">Area Description (Susceptibility ranking: landslide, mudslide, erosion, flooding, drought, hailstorms, lightning, cattle disease outbreaks, human disease outbreaks, land conflicts, wildlife conflicts, bush fires, earthquakes, faults/ cracks, pictures, any other sensitive features)</td></tr>
</table>

Available online: http://www.necoc-opm.go.ug/

THE REPUBLIC OF UGANDA

Department of Relief, Disaster
Preparedness and Management
Office of the Prime Minister
P.O.Box 371, Kampala, Uganda

With support from:

United Nations Development Programme

Plot 11 Yusuf Lule, Road, Nakasero
P. O. Box 7184, Kampala, Uganda
Tel: (+256) 417 112 100
Fax: (+256) 414 344 801
www.undp.org

Empowered lives.
Resilient nations.