THE REPUBLIC OF UGANDA

Mukono District

Hazard, Risk, and Vulnerability Profile

2016

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 Kirungi Raymond - 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 Mukono District Team;

1. Mr.Nivlume George-Chief Administrative Officer
2. Jonathan Hosea Mukose-Deputy Chief Administative Officer
3. Dr. Elly. K. Tusushabe

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

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 Nama Nagojje Mpatta and Nkokonjeru 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 in Kampala City as a central place within the region. This involved key district DDMC focal persons for the purpose of creating local/district ownership of the profiles.

Multi-hazards experienced in Mukono 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 Mukono 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. Soil erosion and human diseases were identified as most serious problems in Mukono District with almost all Sub-counties being vulnerable to the hazards. This is because the area is generally hilly hence very prone to soil erosion 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 Office 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.

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ARI	Acute Respiratory Infections
BBW	Banana Bacterial Wilt
BOQs	Bills of Quantities
CBOs	Community Based Organizations
CSOs	Civil Society Organizations
DEAP	District Environment Action Plan
DPTC	District Technical Planning Committee
DTT	District Technical Team
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
ENR	Environment and Natural Resources
ENSO	El Niño Southern Oscillation
FGD	Focus Group Discussion
GIS	Geographical Information Systems
HRV	Hazard Risk Vulnerability
KII	Key Interview Informant
LEC	Local Environment Committee
MAAIF	Ministry of Agriculture Animal Industry and Fisheries
MWE	Ministry of Water and Environment
NARO	National Agricultural Research Organisation
NBSAP	National Biodiversity Strategy and Action Plan
NEMA	National Environment Management Authority
NGOs	Non-Governmental Organizations
NCCP	National Climate Change Policy
OPM	Office of the Prime Minister
PGIS	Participatory GIS
SMCA	Spatial Multi-criteria Analysis
STRM	Shuttle Radar Topography Mission
STIs	Sexually Transmitted Infections
UBOS	Uganda Bureau of Statistics
UNCCD	United Nations Convention on Climate Change and Desertification
UNCCD	United Nations Convention on Combating Desertification
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UBOS	Uganda Bureau of Statistics
UNDP	United Nations Development Programme
UNRA	Uganda National Roads Authority
UTM	Universal Transverse Mercator
WGS	World Geodetic System

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).

INTRODUCTION

1.1 Background

Uganda has over the past years experienced frequent disasters that range from prolonged dry spells, 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 towards 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 report details methodological approach for HRV profiling and mapping for Mukono 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 Mukono District, Central Uganda.

1.2.2 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 Mukono 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 five sections: Section 1 provides Introduction on the assignment. Section 2 elaborates on the overview of Mukono District. Section 3 focuses on the methodology employed. Section 4 elaborates the Multi-hazard, Risks and Vulnerability profile and Coping strategies for Mukono district. Section 5 describes Conclusions and policy related recommendations.

OVERVIEW OF MUKONO DISTRICT

2.1 Location

Mukono District lies in the Central region of Uganda, sharing borders with the District of Buikwe in the East, Kayunga along river Sezibwa in the North, Luwero in the North West, Kampala and Wakiso in South West, Tanzania, Lake Victoria in the South with the Islands of Buvuma District.

The District Headquarters is in Central Division-Mukono Municipality, located along Kampala-Jinja road (21km East of Kampala City). Mukono central division serves as an Administrative and commercial centre. Other urban centers include Seeta trading centre and the four town boards namely Katosi, Kasawo, Namataba and Nakifuma town boards (Figure 1).

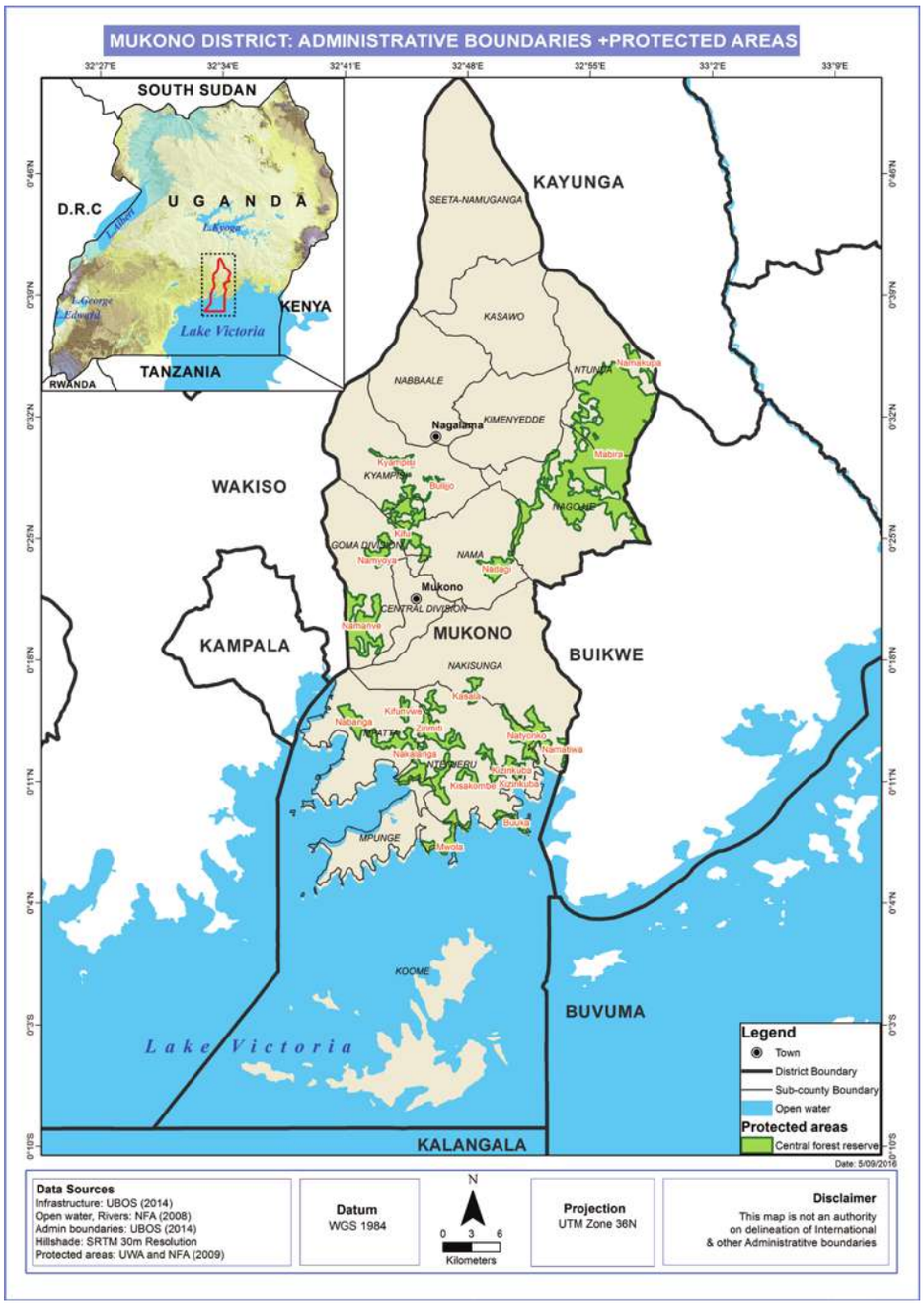


Figure 1: Administrative Boundaries and Gazetted areas, Mukono District

2.1.1 Geomorphology

The Northern part of the District is flat but the Southern region consists of sloping land with great many undulations; 75% of the land is less than 60^{o} in slope. Most of Mukono District lies on a high plateau (1000-1300 m.a.s.l) with some areas along Sezibwa River below 760m above sea level, drained by rivers of Sezibwa and Musamya.

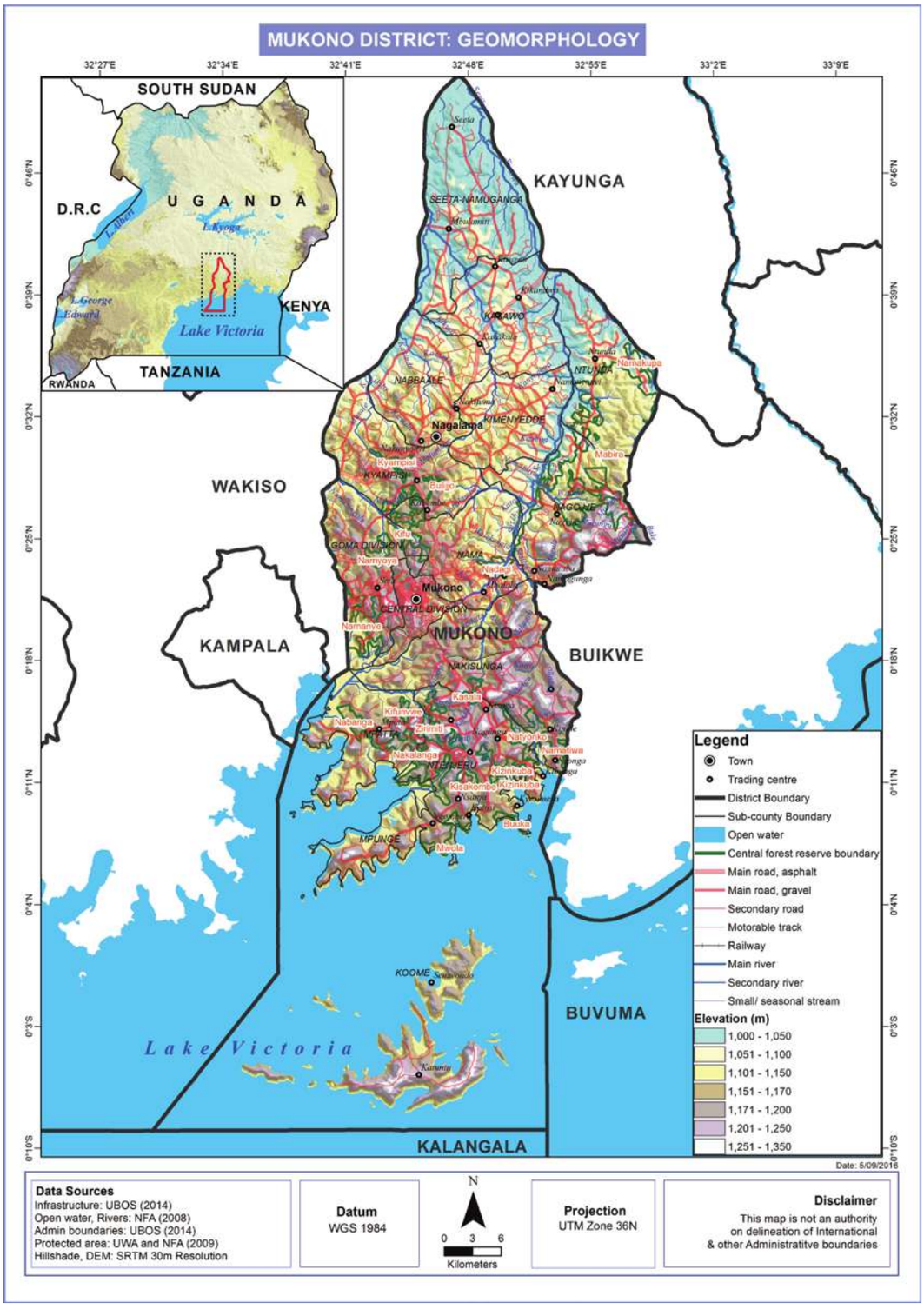


Figure 2: Geomorphology, Mukono District

2.1.2 Soils and Geology

There are two main categories of soils namely; Ferralitic soils and Ferrisols.

Table 1: Types of soils found in Mukono District

Soil types	Location by sub-county,
Mirambi catena	Ntunda
Lwampanga series	Along Sezibwa river
Sesse series	Koome island
Nakabango catena	Dominant in the district

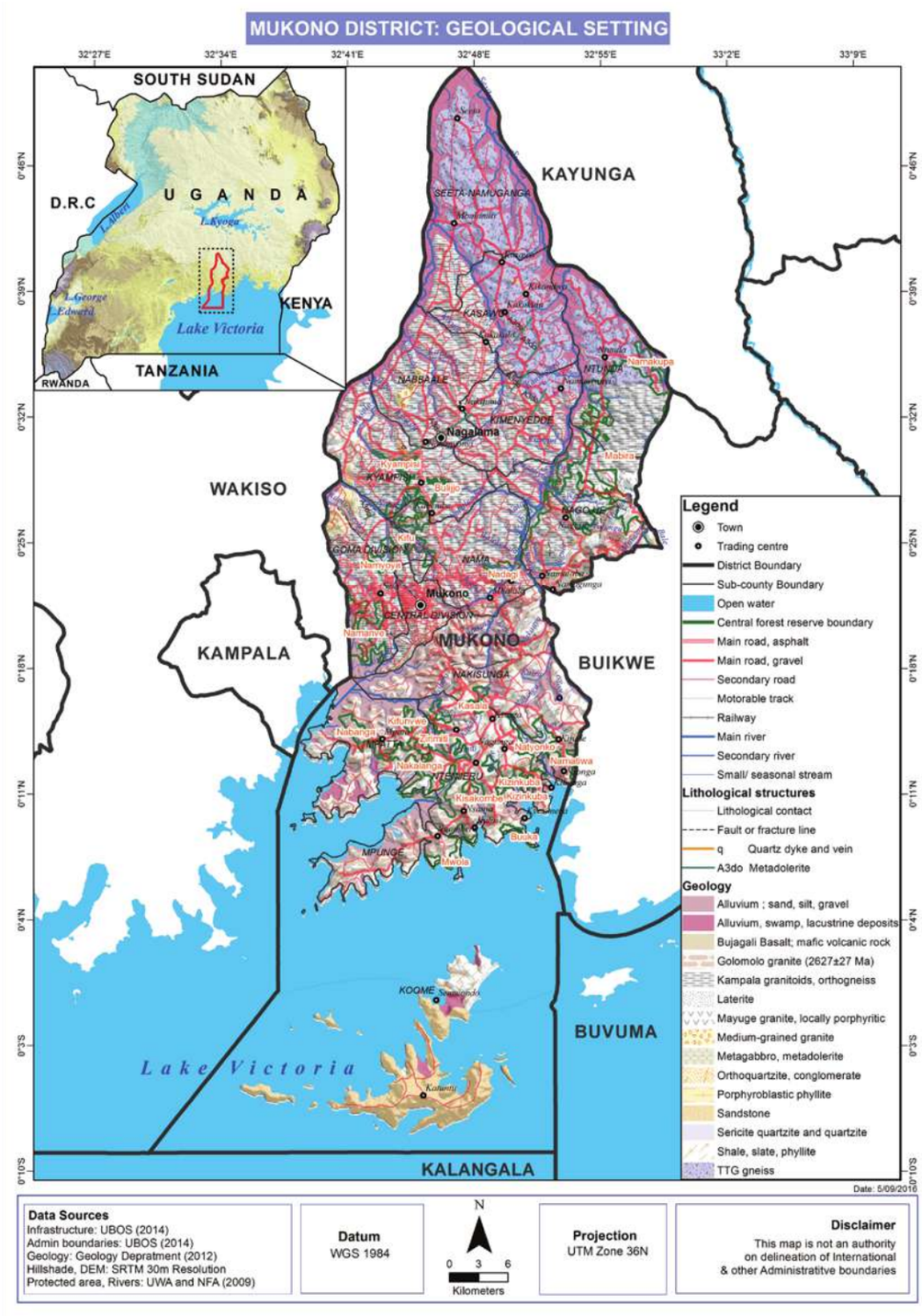


Figure 3: Geology and Lithological Structures, Mukono District

2.1.3 Vegetation and Land use Stratification

Generally, the vegetation cover is of the forest/savannah mosaic characterized by patches of dense forest in the South and scattered trees, shrubs and grassland in the Northern parts of the district. Natural forests on private land and government-controlled forests are a characteristic of this region.

The wetland vegetation comprise of typha, miscanthus, hyparrhenia species, some cyperaceous and creepers, mostly convolvulaceae. Swamp forest tree species such as pseudospondias microcarpa, mitrogyra species, tarbementana, ficus spp and bridelia micrautha and phoenix reclinata shrub vegetation include some edible plants such as psidium guava and afromonium augustifolium. Several species found here are utilized by the local community for food, fuel, building materials, medicines and raw materials for crafts.

The forest/tree resources under the district management consist of Local Forest Reserves and forests/ trees under private ownership. They also experience tremendous pressure for the exploitation of resources like fuel wood, charcoal, building poles, timber cutting and agricultural encroachment leading to either forest/tree loss or forest degradation.

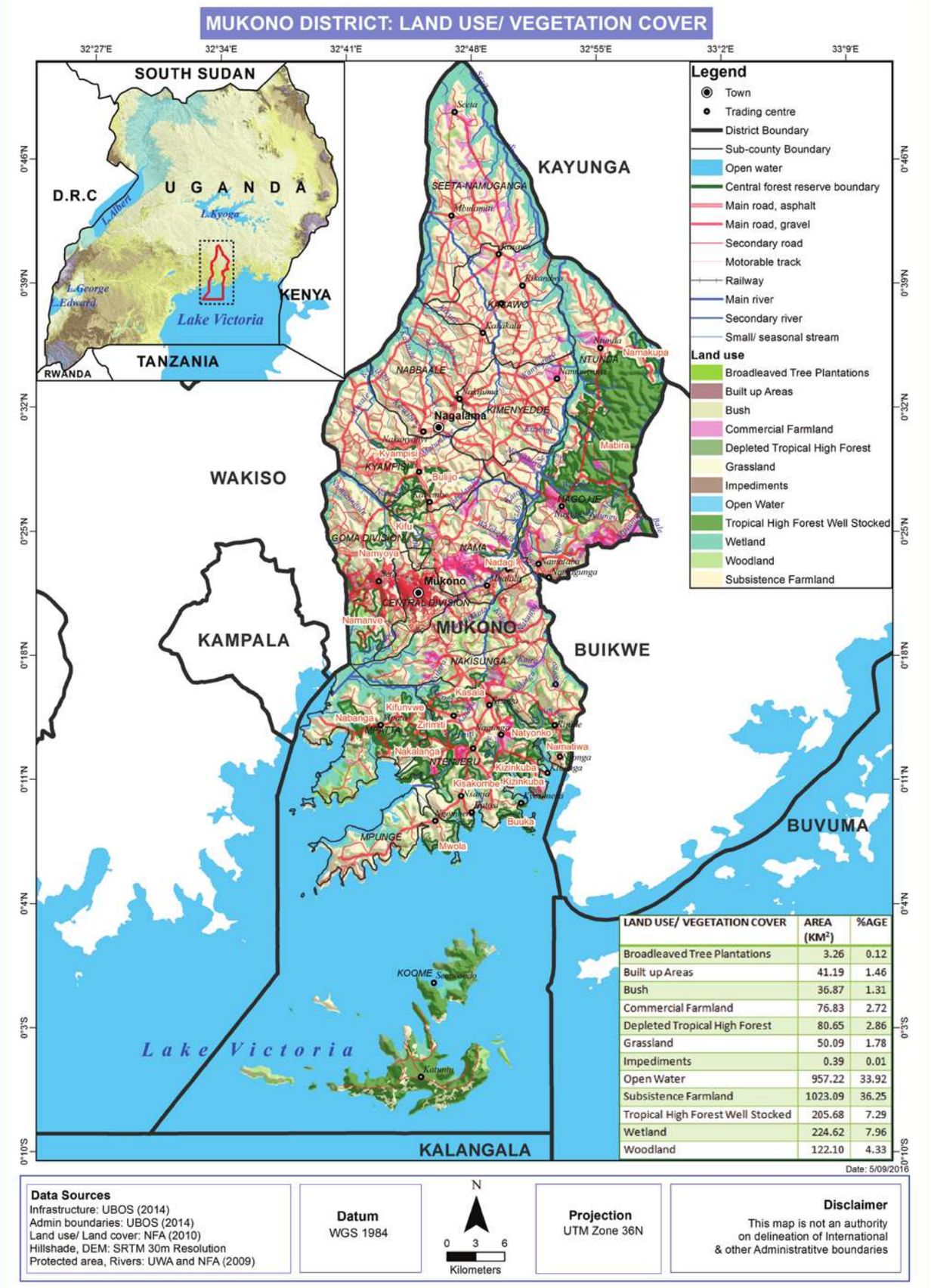


Figure 4: Land use Stratification, Mukono District

2.1.4 Temperature and Humidity

Temperatures range between 16^{o}C and 28^{o}C throughout the year.

2.1.5 Rainfall

The mean annual rainfall is 1,100mm distributed over 106 rain days, with a bimodal pattern with peaks in March – May and September – November.

Both relief and the climate provide a good potential for investment in cash and food crop, horticulture and floriculture on a commercial basis. Existing commercial farms in the District also provide a good background for experience sharing for those investors who want to venture in such areas (Figure 5)

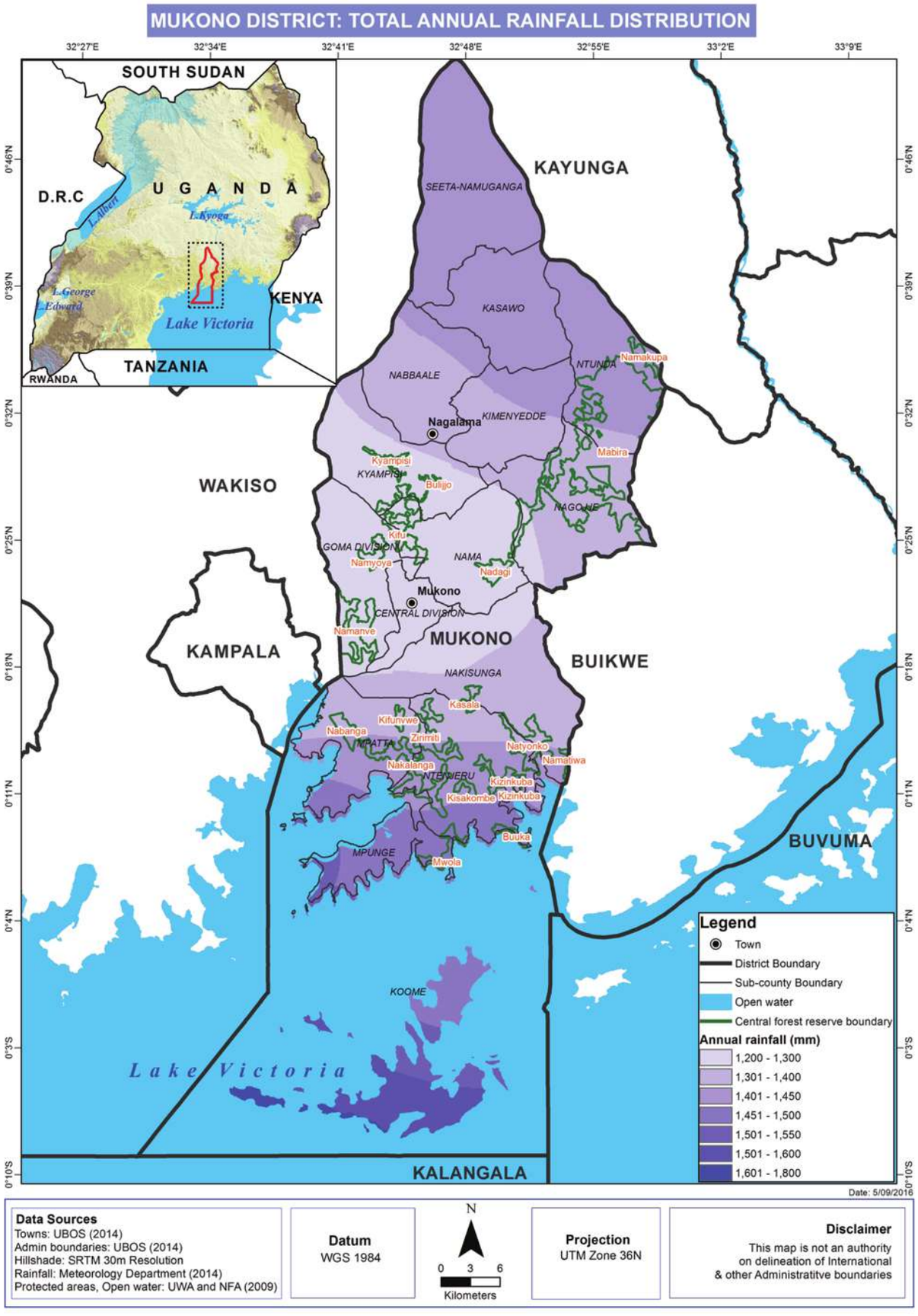


Figure 5: Total Annual Rainfall Distribution, Mukono District

2.1.6 Hydrology

Water bodies cover a total area of 1,181.73Km^2, out of which open water bodies cover 396.3Km^2 (rivers and the lakes) and wetlands/swamps cover 151Km^2. Hence, water bodies constitute 40% of the total area of the District. Figure 3 indicates drainage system in Mukono District.

The district is richly endowed with natural resources ranging from land, wetlands, fisheries, minerals, forest/trees, wildlife (biodiversity), rivers and lakes. Tremendous pressure is currently exerted on these resources in an increasing way and the main drivers include high population growth, unsustainable agricultural practices, increasing demand for forest products, development processes, increasing dependence for economic returns, reducing settlement and arable land among others.

Wetlands consist of a system of wetlands of major and small ecosystems that all eventually drain into L. Victoria and other rivers. They provide a range of goods/products and ecological services that include fish, fuel wood, water, food, medicines, pasture, sand, clay, thatch, building poles, water quality, water flow, water storage, water purification, micro climate regulation, shore stabilization, nutrient retention, ecotourism, cultural/heritage values among others. Some of these wetlands range in attributes from very important, vital, critical and a combination of the latter. Most of them are threatened with degradation and others with conversion into other land uses hence total loss from settlements, farming, drainage, pollution, industrial developments, to mention but a few. Some of these need restoration while others require different levels of protection and regulated use.

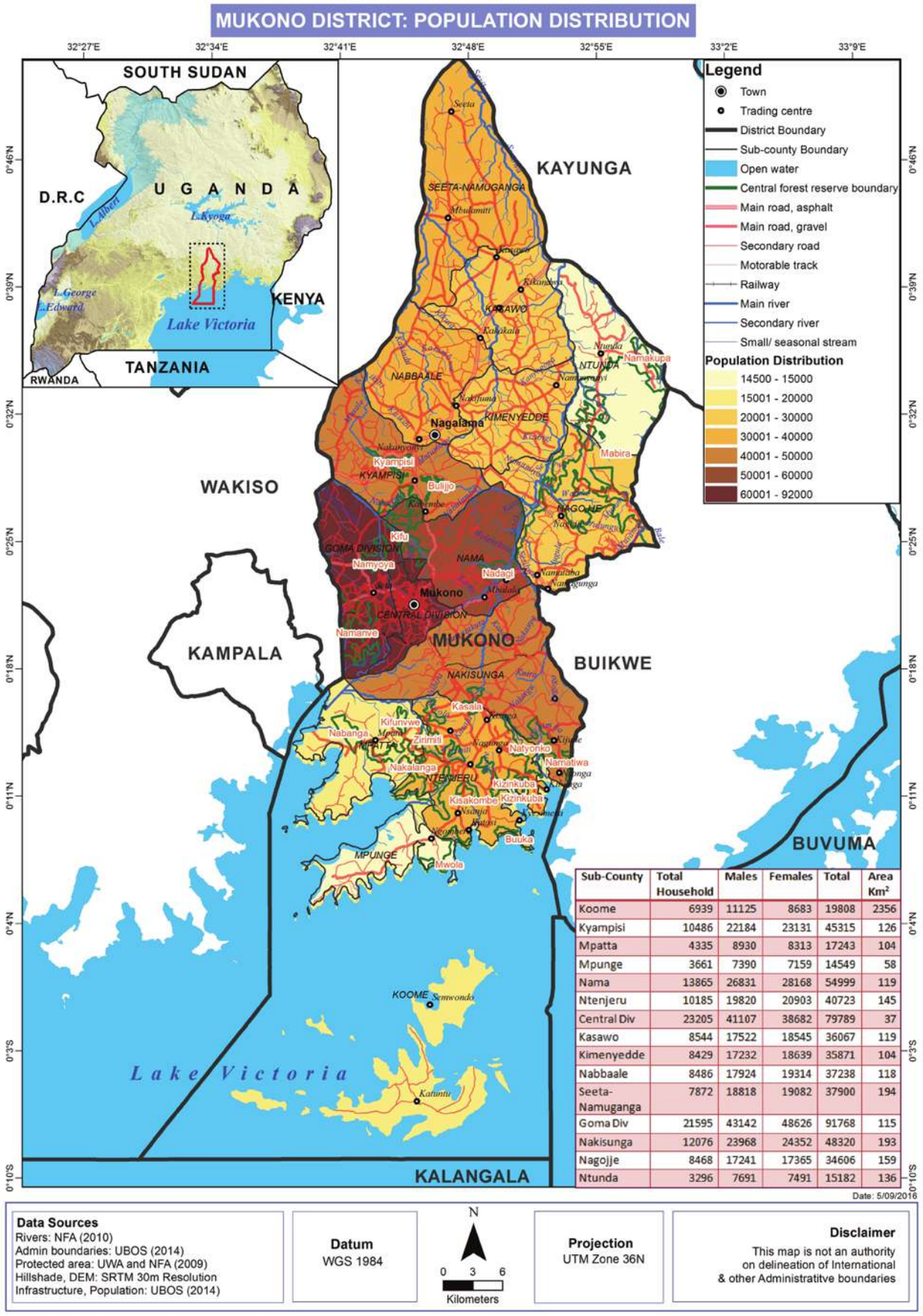
2.1.7 Population

According to the National Population and Housing Census (2014) results, Mukono District had a total population 599,817 people. Results also showed that most of the people in Mukono District reside in urban areas (437,821 (73%) compared to (161,996 (27%) who reside in rural areas. The gender distribution was reported to be males: 119,068 (48%) and females: 126,805 (52%). About 98% (585,683) of the population form the household population and only 2% (13,954) is Non-household. Goma Division had the highest population of 91,768 people while Mpunge Sub-county had the least population of 14,549 people (Figure 6). Table 1 shows the population distribution per sub-county for the different gender.

Table 1: Population Distribution in Mukono District

SUB-COUNTY	HOUSEHOLDS		POPULATION			
	Average	*Number*	*Female*	*Male*	*Total*	*% of total population*
Koome	2.7	6,939	8,683	11,125	19,808	3
Kyampisi	4.2	10,486	23,131	22,184	45,315	8
Mpatta	3.9	4,335	8,313	8,930	17,243	3
Mpunge	3.9	3,661	7,159	7,390	14,549	2
Nakisunga	4.0	12,076	24,352	23,968	47,936	8
Nama	3.9	13,865	28,168	26,831	54,999	9
Ntenjeru	4.0	10,185	20,903	19,820	40,723	7
Central Division	3.9	17,338	38,156	32,072	70,228	12
SUB-COUNTY	**HOUSEHOLDS**		**POPULTAION**			
Goma Division	4.1	21,595	48,626	43,142	91,768	15
Kasawo	4.2	8,544	18,545	17,522	36,067	6
Kimenyedde	4.2	8,429	18,639	17,232	35,871	6
Nabbaale	4.3	8,486	19,314	17,924	37,238	6
Nagojje	4.0	8,468	17,365	17,241	34,606	6
Ntunda	4.6	3,296	7,491	7,691	15,182	3
Seeta Namuganga	4.7	7,872	19,082	18,818	37,900	6
Total		**145,575**	**307,927**	**291,890**	**599,817**	**100**

Source: UBOS Census 2014



Sub-County	Total Household	Males	Females	Total	Area Km²
Koome	6939	11125	8683	19808	2356
Kyampisi	10486	22184	23131	45315	126
Mpatta	4335	8930	8313	17243	104
Mpunge	3661	7390	7159	14549	58
Nama	13865	26831	28168	54999	119
Ntenjeru	10185	19820	20903	40723	145
Central Div	23205	41107	38682	79789	37
Kasawo	8544	17522	18545	36067	119
Kimenyedde	8429	17232	18639	35871	104
Nabbaale	8486	17924	19314	37238	118
Seeta-Namuganga	7872	18818	19082	37900	194
Goma Div	21595	43142	48626	91768	115
Nakisunga	12076	23968	24352	48320	193
Nagojje	8468	17241	17365	34606	159
Ntunda	3296	7691	7491	15182	136

Figure 6: Population Distribution, Mukono District

District Specific Characteristics

- The sex ratio was 94.8 males per 100 females
- The literacy rate at 79 % (of the population aged 10 years and above)
- Three (3) percent are disabled
- The mean household size is 4.0 persons
- Access to clean water is at 73 % of the household
- 8% have no access to a toilet facilitate
- 10.3% of the household have access to electricity
- 49% of the households depend on subsistence farming
- 96% of the households use firewood and charcoal for cooking
- 33 percent of the dwelling units are constructed with permanent materials
- 59% of the households owned a radio
- 27% of the household own a bicycle
- 26 % are female headed households

The above Demographic characteristics indicate that the District;

- Has a higher density, which implies the increased need to provide social services per unit area of the District.
- Has a high rate of urbanization. Implies that spatial physical planning is imperative.
- And most of its people live in households. Household poverty alleviation programmes therefore needs emphasis.

Table 2: Demographic Comparatives

Factor	Mukono District	Central Region	National
Population density	332 persons per km^2	175.7 people per km^2	174 persons per km^2
Annual Growth Rate	2.6 %	2.6 %	3.03%
Urbanization level	27%	25 %	18%
Institutional population	2113	5051	29949
Infant population below1 year	15493		1470800
Population under 5 years	64180	1133633	3746800
Children of primary school age (6 to 12yrs)	138558	1421189	8088200
Adolescents (10 – 24 years)	187143	2378914	11984300
Population under 18 years	340096	3596929	19974000
Adults above 18 years	0	2978496	0
Youth (18-30 years)	110366	1598825	6437400
Elderly (60+ years)	25192	291799	1481800
Orphans (Less than 18 years)			
PWDs	24120	205165	844841

The demographic structure of the district is not different from other Districts that is the triangular structure that depicts a big population in the 0 – 18 years of age and small population in the productive population bracket.

Such a trend if not controlled contributes to poverty since household incomes are spent on consumable services for the young generation as compared to household saving on the other hand. Given their age this group contributes little if any to the national income.

This kind of structure depicts the following implication.

- The high level of service consumption in relation to overall input in the productive sectors, (i.e.) high Per capita consumption.
- Low Per capita production of the youth and general contribution to the District GDP,
- High level of dependence of the underage on the working class.
- In cases of HIV/AIDS scourge, so many families become child headed families when their parents die. Therefore the kind of intervention required in this plan is the emphasis on family planning through use of acceptable methods by the communities.

Table 3: Population and Age distribution

Sub-county	Under 1 year	1-5 years	6-12 years	13-18	19-30	60+	Total
Koome island	634	2548	1380	796	14118	324	19808
Kyampisi	1212	6287	9141	5432	21055	2189	45315
Nakisunga	1297	6604	9245	5506	23366	2303	48320
Nama	1391	7290	10013	6315	27557	2432	54999
Ntenjeru	1199	5914	6705	4126	4066	18711	40721
Mpunge	389	1918	2175	1338	1319	6068	13208
Mpatta	559	2759	3128	1924	1897	8727	18993
Kasawo	987	5112	7324	4189	16721	1733	36067
Kimenyedde	1125	5304	7124	3915	16732	1670	35871
Nabaale	1013	5358	7326	4591	17166	1784	37238
Nagojje	987	4702	6125	3660	17410	1694	34606
Ntunda	423	2287	2868	1714	7129	761	15182
Seeta-Namuganga	1208	5961	7377	3980	17515	1861	37900
Total	**12,434**	**62,044**	**79,958**	**47,484**	**186,052**	**50,257**	**438,228**

Source: Estimated using 2002 percentages on 2014 census results.

Area coverage

Table 4 below indicates that Mukono District has a total area of 2,986.47Km^2 of which land occupies 1,804.68 Km^2 and the remaining is open water.

Table 4: Land and Water coverage

No.	Sub-county	Total Area [sq km]	Land Area[sq km]
1	Koome	773.26	105.82
2	Kyampisi	134.40	134.40
3	Nama	124.33	122.04
4	Central Division	31.35	29.35
5	Goma	118.08	109.87
6	Nakisunga	193.79	180.55
7	Ntenjeru*	379	165.6
8	Mpunge *	145.06	56.1
9	Mpatta *	152	91.2
9	Kasawo	207.05	189.59
10	Nabbale	122.86	117.63
11	Nagojje	168.78	164.61
12	Kimenyedde	108.70	108.70
13	Ntunda	130.22	108.46
14	Seeta-Namuganga	197.59	140.39
	Total	**2,986.41**	**1,804.68**

*Source: District statistical abstract 1994 * **estimated sub county land area, 2015**.*

2.1.8 Administrative Units

Table 5 indicates the Local Governments and Administrative Units in Mukono District. The Town Boards include Kasawo, Nagojje and Nakifuma in Nakifuma County and Katosi in Mukono County.

Table 5: Mukono District Administrative Units

Counties	Local Governments		Administrative Units	
	Sub-counties	Town Councils	Parishes/ Wards	Village/Zones
Nakifuma	6	3 Town boards	31	235
Mukono	9	1Municipal Council with Two Divisions & 1 Town board	49 [40 are rural]	357
Total	15	5	80	592

***Source**: Planning Unit*

2.1.9 Migration trends

Migrants in the District are those that come to invest and to seek for employment, Investors are both local and foreign. Mukono District is grateful to those who have invested in the District employee seekers mainly target Tea and Sugar plantations industries. Of these, west

Nile has a big proportion. Others especially from the East like Samia, Japadholla,Basoga and Bagishu have come to be employed in the fishing industry. This mixture could be good for enriching the social cultural strata. On the other hand, certain cultures and people are volatile and a threat to the District Security.

2.1.10 Religion and Culture

Table 6: Population distributions by Religion

Religion	**Catholic**	**Anglican**	**SDA**	**Pentecostal**	**Moslem**	**Other None**	**Total**
Percentages	37	33	2	6	21	1	**100**
Population	221,932	197,940	11,996	35,989	125,962	5,998	**599,817**

Source: Population census 2002 percentages on 2014 population census

Analysis of Urban Development Issues

The rate of urbanization in Mukono District is high because of the Kampala urban spill and the Kampala – Jinja high way, The 2014 Population Census puts Mukono at an urbanization level of 26.6%. At this level, Mukono is the second in Central region to Wakiso District. It's worth noting that with this high rate of urbanization, there is less effort in terms of physical planning for these urban centers to the extent that many of them may develop into slums.

Table 7: Urban developments in Mukono District

Sub-county	**Town Boards**	**Trading Centres**	**Total**
Mukono Municipality	2 Town Divisions		
Koome island			
Kyampisi	-	4	4
Nakisunga	-	6	6
Nama	-	6	6
Ntenjeru	1	2	3
Mpunge	-	3	3
Mpatta			
Kasawo	1	4	5
Kimenyedde	1	4	5
Nabaale	-	3	3
Nagojje	1	1	2
Ntunda	-	2	2
Seeta-Namuganga	-	3	3
	4	38	42

With the one Municipal Council (MC), 4 town boards and 38 trading centres the District has issues in relation to the urbanization which is 26.6%. These are:

- Most of the town boards have no physical plan.
- The trading centre has no guidance to the developer when developing in these centres.
- Waste management in all the urban centres is a problem.
- Unemployment of the youth who are looking for jobs in towns.

2.1.11 Economic activities

Industrialization:

The District is one of the major industrial Districts in the country base with major industries concentrated in the following areas;

Mukono Central Division: Is in the neighbourhood of Lwanyonyi – Industrial park, Kyetume abattoir and railway. This Division is as well blessed with the following Hotels/facilities: Colline Hotel, Ankrah Foundation, Patron Hotel, Mukono Resort, Jobiah, Festino cite,Leisure centre (summer gardens) and other guest houses. The establishment of Christian University of Uganda has as well increased institutional and private sector activities in Mukono Central Division.

Seeta – Goma Division and Nama Sub-county: Hosts Namanve Industrial zone in Goma, Mbalala and Lwanyonyi industrial parks in Nama, with the industries shown below:-

Name of industry	***Products produced***
Namanve Industrial Park	
Coca cola century bottling campany	Soda, water
African poly bags	Polythene bags
Biyinzika poultry farmers	Day old chicks, poultry feeds, eggs, oil
Rwenzori mineral water	Drinking water
Vero	Drinking water
Hima cement	Cement
Red pepper	News papers
Mbalala and Lwanyonyi Industrial Parks	
Riley packaging	Packaging material
Tiang tang	Construction metal
Global paper	Toilet paper
Abacus pharmaceuticals	Drugs
Body investment and landy industries	Gumboots

Source: Commercial office

All the above investments indicate that Mukono District is a suitable place for investment because;

- The extended piped water system to Mukono and surrounding areas from Ggaba water plant has provided adequate water supplies for industrial, institutional and domestic purposes,
- The existing industries in those mentioned areas provides infrastructure which facilitates benefit of Economies of scale,
- The ability to access skilled labour which has historically developed from old industries,
- Cheap and easy means of transport to markets due to good roads like the Mukono-Kampala highway, Mukono – Kayunga road and the Kalagi – Gayaza tarmacking yet to be completed.
- The Industrial park at Mbalala and Lwanyonyi, has in place infrastructure which requires an investor little initial capital.

Agriculture:

Over 80% of Mukono is agricultural based, characterized as subsistence production. Partial commercial agriculture exists with farmers like SCOUL sugarcane plantations, Tea estates, in Nama and Nagojje Sub-counties. Commercial farming is characterized by use of migrant labour from West Nile living in labour camps characterized by poor housing, sanitation and with little pay, and etc. To date high value crops like vanilla, flowers, have boosted and replaced the declining volumes of coffee. However, more farmers who have lost coffee needs to be encouraged to take on such crops as a replacement. Subsistence agriculture is characterized by low acreage due to increasing family sizes and slicing of land, low productivity per unit acre arising from deteriorating soil fertility over cultivation and soil erosion. The females provide most labour and yet the men take most of the biggest share of farm proceeds.

Economic shocks, like price slump of our cash crops (coffee) on world market has affected the eventual incomes of the farmer in two ways. Output per acre is low and the price is low, the eventual revenue is low. On top of this, natural shocks, like the coffee wilt, banana wilt have destroyed thousands of coffee and banana acres District wide. This has affected yields per acre.

Fishing: This is the third largest economic activity in the District. Given that almost three quarters of Mukono's surface area is under water, this provides an adequate fish catchment area. To date a big number of fish processing industries in Kampala are fed by fish from Mukono. The distribution of landing and available facilities is provided in the District situation analysis.

Tourism: The District has a big potential of tourism activities, with the following important sites; Ngamba islands in Koome Sub-county, having many chimpanzees, several attractive birds, and a special breed of monkeys on the main land of Koome and others, Sezibwa falls in Ngojje Sub-county, several cultural sites in different parts of the District.

Disguised employment:

This looms large especially among the youths whose access to paying jobs is limited by their lack of skills. This coupled with poor attitude or culture to work, has led many of the youth using their productive labour and time in non-paying jobs.

Table 8: Economic activities by Gender in Mukono District

Category of People	Economic Activity
Youth	- Boda-boda services - Brick laying - Fishing and fish metering - Petty trading - Hair salon services - Formal employment - Gambling
Women	- Substance farming craft making - Rearing poultry - Petty trading - House keeping - Animal husbandry - Vanilla growing
Men	- Farming both subsistence and commercial - Trading - Poultry keeping - Small scale industries - Formal employment - Brick laying - Vanilla growing - Fishing/fish mongering
People with disability	- Shoe repair - Craft making - Tailoring - Petty trading
People living with HIV/AIDs	- Craft making - Poultry rearing - Petty trading
Elderly	- Subsistence farming - Craft making

2.1.12 Infrastructure development

Because of the Kampala urban spill and the Kampala – Jinja high way, the rate of urbanization is high. The 2014 Population Census put Mukono at an urbanization level of 26.6%. At this level, Mukono is the second in central region to Kampala and fourth after Kampala, Jinja and Arua nationally. As already mentioned there is one Municipal Council with a high rate of growth. However surprisingly is number of trading centres spring up to towns, there is less effort in terms of physical planning for these towns to the extent that many of them may develop into slums. Such towns are Nakifuna, Kasawo, Kisoga, Katosi and Namataba Town Boards.

Infrastructure development include: schools, health units, water sources, and economic infrastructure like roads, industries. Mukono District is proud to have a total motorable feeder road network of about 759kms, and 700kms of Bulungi Bwansi road. The challenge is that about 70% of the Bulungi Bwansi roads are in poor status. This therefore prohibits easy access of produce, fish and other commercial goods to markets. It is therefore important to urge our communities and local leaders to rise up for this cause. Good access and feeder road network will stimulate attitude to work and hence employment especially in agriculture.

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 three respondents (District Environment Officer, District Production Officer and District Agricultural Officer) was held at Mukono 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 Nama Sub-county, Nagojje Sub-county, Mpatta Sub-county and Nkokonjeru Sub-county. 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. 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 Mbale Municipality as a central place within 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 Mukono 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 pests and diseases, human epidemic diseases, vermin attacks and wildlife animal attacks,
iv. Human induced or Technological hazards including bush fires, road accidents land conflicts.

4.1 Geomorphological and Geological Hazards

4.1.1 Landslides, Rockfall and soil erosion

Results from the participatory assessments indicated that there were no incidences of landslides in Mukono District. Rock falls were reported around stone quarry in Ddundu village, Ddundu Parish in Kyampisi Sub-county, Namubiru stone quarry in Namubiru Village, Namubiru Parish in Nama Sub-county, Nakagere in Goma Division, Mbalala (Sterling) in Nakisunga and Nama Sub-counties, due to stone blasting using explosives instead of the recommended wet crashing. Incidences of flying stones in Nakisunga, Nama, Goma division and Kyampisi Sub-counties damage houses and crops. High cases of soil erosion reported around murram extraction sites in Kimenyedde and Kasawo sub-county causing small gulleys. Small scale artisanal mining, digging up rocks and causing incidences of debris collapse and burrying of people especially in Mbalala village, Kasenge parish, Nama Sub-county. 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 (Figure 7).

Soil erosion causes silting of rivers and streams such as Sezibwa and Musamya, washing away crops and causing soil fertility loss and consequently poor crop yield. The most affected crops by soil erosion include maize, beans and cassava. It was indicated that livestock are also affected by soil erosion by washing away pasture and silting water source points. Some of the interventions on rock fall: warning before blasting, carrying out EIA and environmental monitoring and compliance; recommend compensation (minimum distance 500m from stone quarry), introducing wet crashing, adopting better technology of blasting (covering)

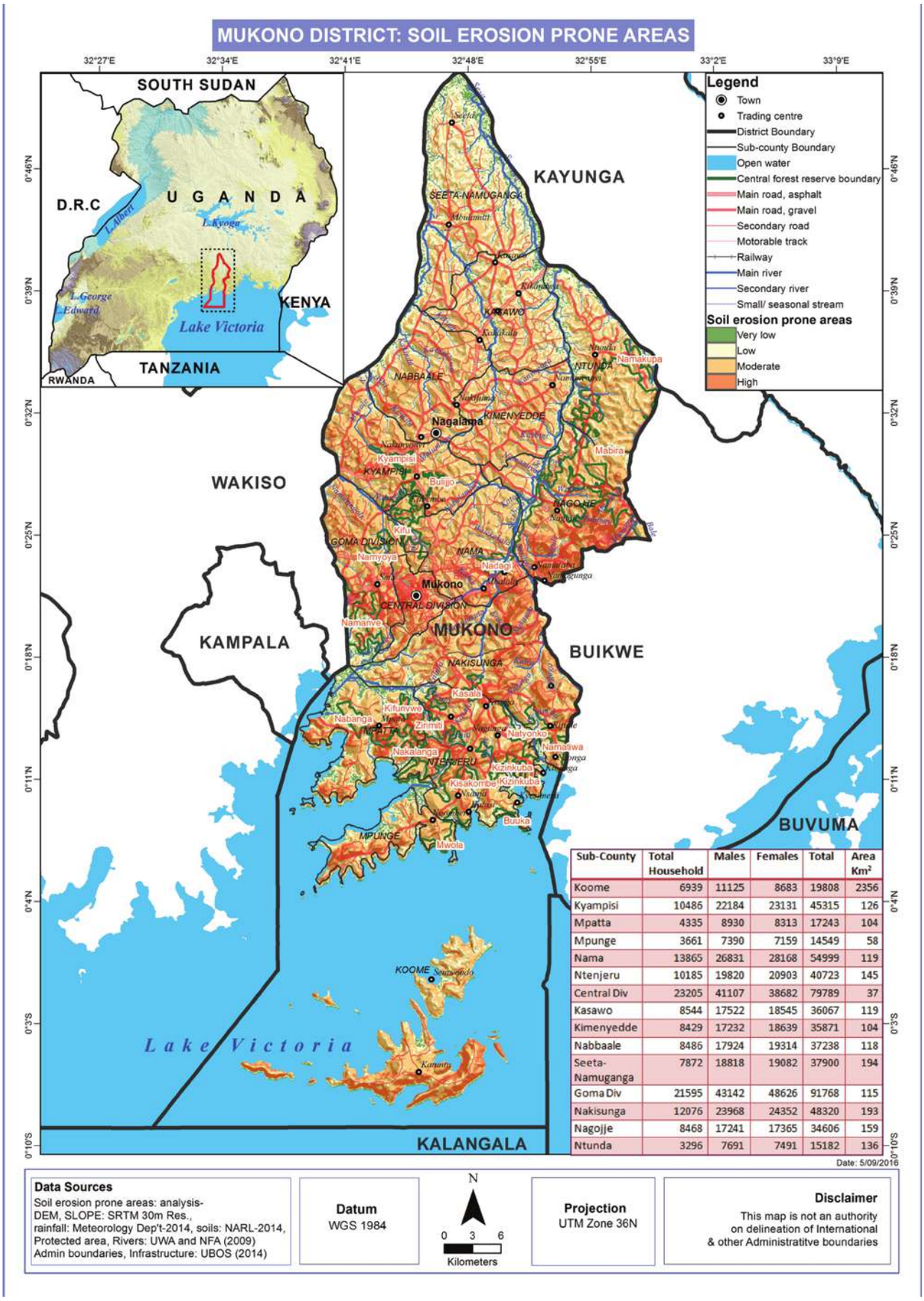
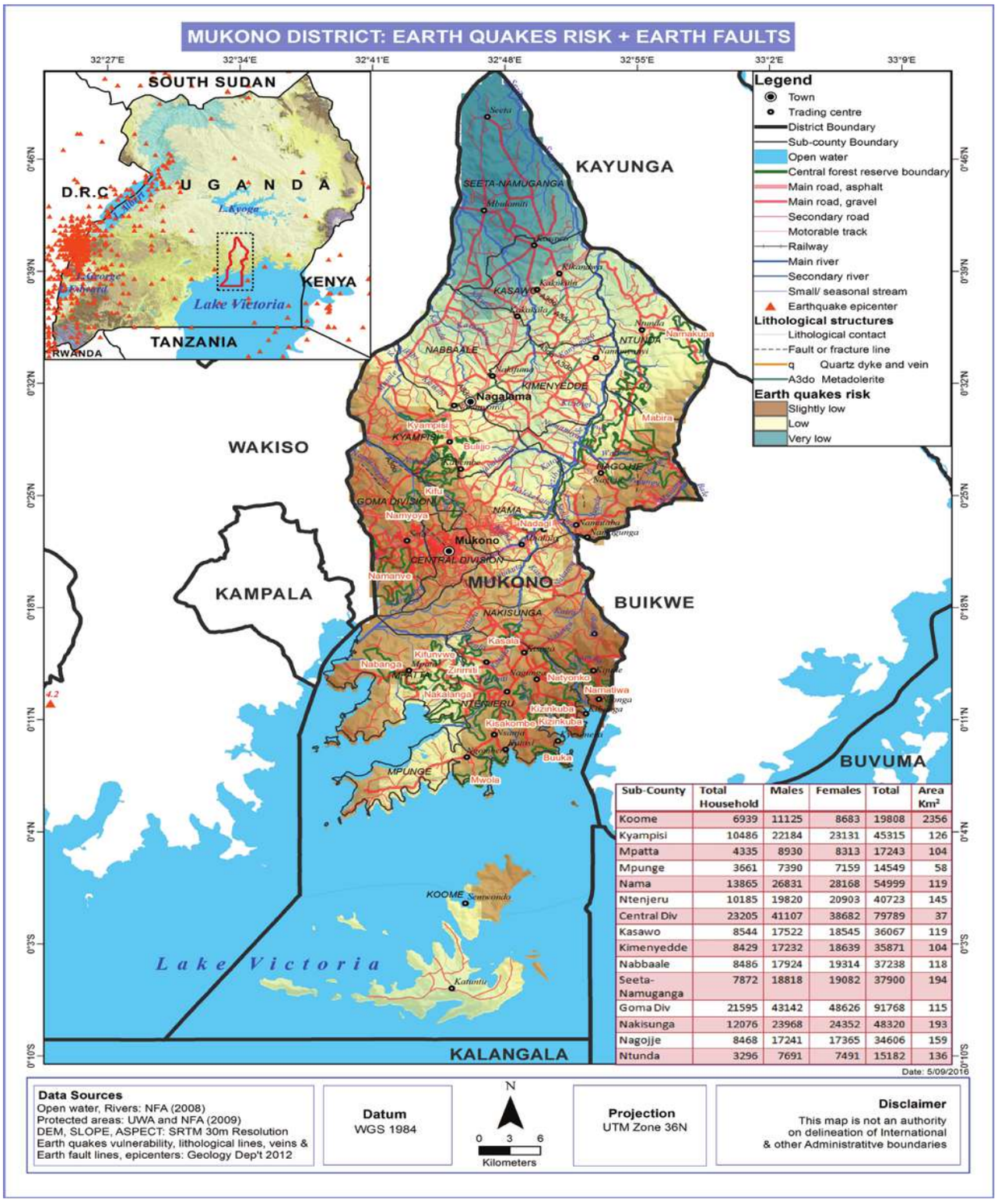


Figure 7: Flying stones and Soil erosion prone areas, Mukono District

4.1.2 Earthquakes and faults

Participants of the focus group discussion indicated that earthquakes weren't a serious problem in Mukono District. However, it was observed that the entire district only experiences minor tremors. Figure 8 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.



Sub-County	Total Household	Males	Females	Total	Area Km²
Koome	6939	11125	8683	19808	2356
Kyampisi	10486	22184	23131	45315	126
Mpatta	4335	8930	8313	17243	104
Mpunge	3661	7390	7159	14549	58
Nama	13865	26831	28168	54999	119
Ntenjeru	10185	19820	20903	40723	145
Central Div	23205	41107	38682	79789	37
Kasawo	8544	17522	18545	36067	119
Kimenyedde	8429	17232	18639	35871	104
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Goma Div	21595	43142	48626	91768	115
Nakisunga	12076	23968	24352	48320	193
Nagojje	8468	17241	17365	34606	159
Ntunda	3296	7691	7491	15182	136

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

4.2 Climatological and Meteorological Hazards

4.2.1 Floods

Results from the focus group discussions revealed that floods are one of the biggest challenges especially during the rainy seasons along Sezibwa in Ntunda Sub-county. Participants observed that floods wash away and at times submerge especially horticultural crops and others such as, tomatoes, cabbages, rice, yams, sweet potatoes and maize thus causing food insecurity and considerable economic losses. It was also reported that flooding of 2010 along Sezibwa River in Ntunda Sub-county caused destruction of many horticultural crops. The most affected Sub-counties are; Ntunda, Seeta-Namuganga, Nabbale and Kimenyedde. Other incidences of flooding are experienced along Lake Victoria shoreline due to rise in water levels such as areas along Lake Victoria in Mpunge, Mpatta and Ntenjeru. Mbalala wetland reported as flood prone (Industrial park) particularly Kasaala stream in Namawojolo Parish and Kasenge Parish, Nama Sub-county. 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) (Figure 9).

Some of the interventions on floods include: shifting to upland areas, constructing bigger heaps for potatoes, trenches. Government through MAAIF is implementing conservation agriculture program handling maize, beans and banana in Nabbale Sub-county.

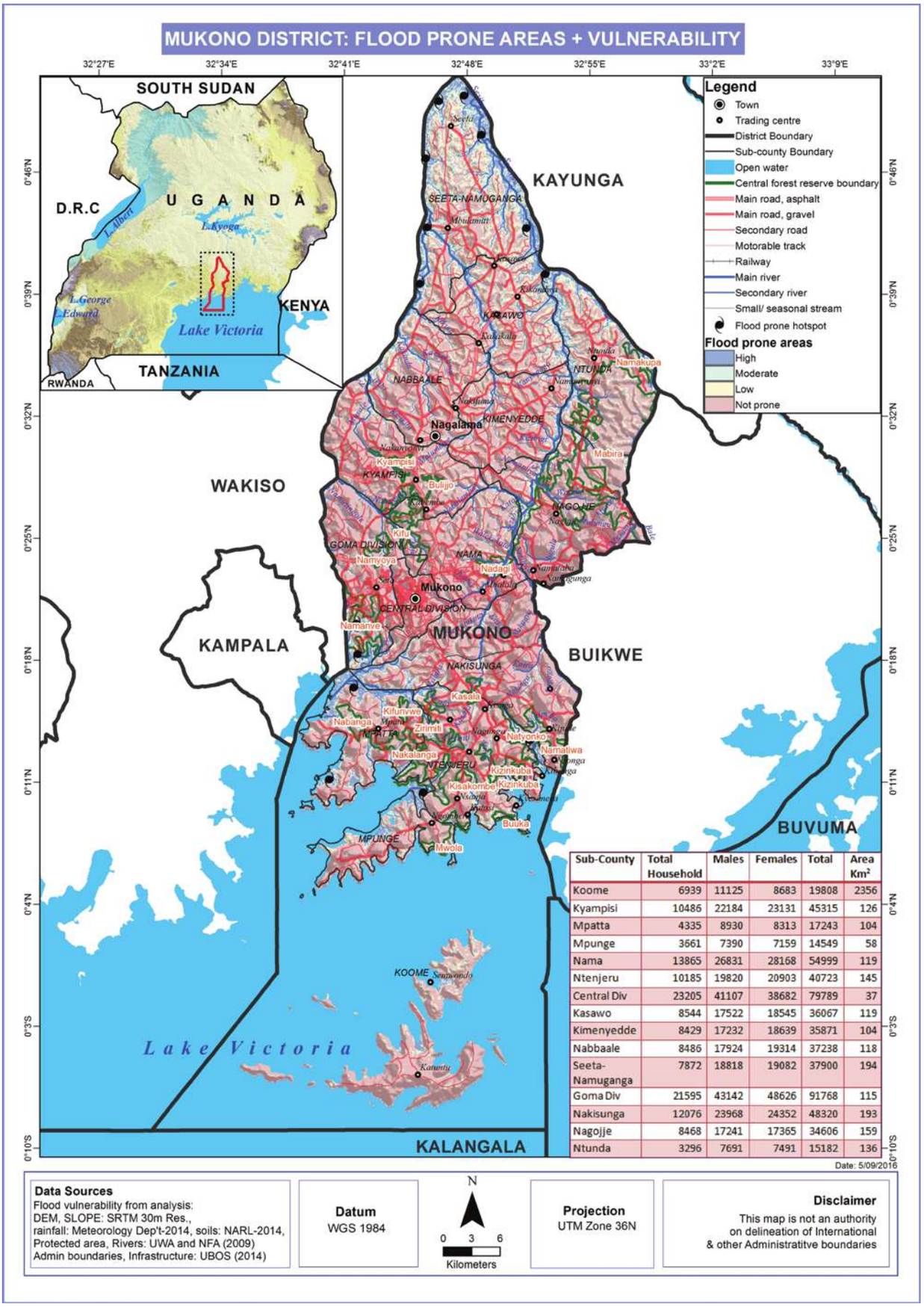

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Figure 9: Flood prone areas and Ranking, Mukono District

4.2.2 Prolonged Dry spells

Participatory assessments through focus group discussions indicated that prolonged dry spells is not serious problem in Mukono District, however areas north of the District in Seeta-Namuganga and Kasawo are prone to prolonged dry spells causing dry up of the water sources. Participants observed that prolonged dry spells have caused scarcity of water and pastures, low milk and crop production and increased incidences of pests and diseases. The participants also mentioned that termite infestation on pastures is always high in the dry season.

Some of the interventions on prolonged dry spells include: water harvesting especially at schools, health centers, markets, early planting, growing early maturing crops, irrigation in Seeta-Namuganga using motorized pump provided by Mukono District Local Government and implemented by Production Department. Other irrigation equipment particularly motorized pumps were provided in 2016 to 3 farmer groups neighboring swamps in Kasawo, Seeta-Namuganga and Kimenyedde Sub-counties.

Dry spell vulnerability map generated from Rainfall and Temperature (Uganda National Meteorological Authority, 2014) using spatial modeling using socio-ecological spatial data using the Standardized Precipitation Index (Figure 10).

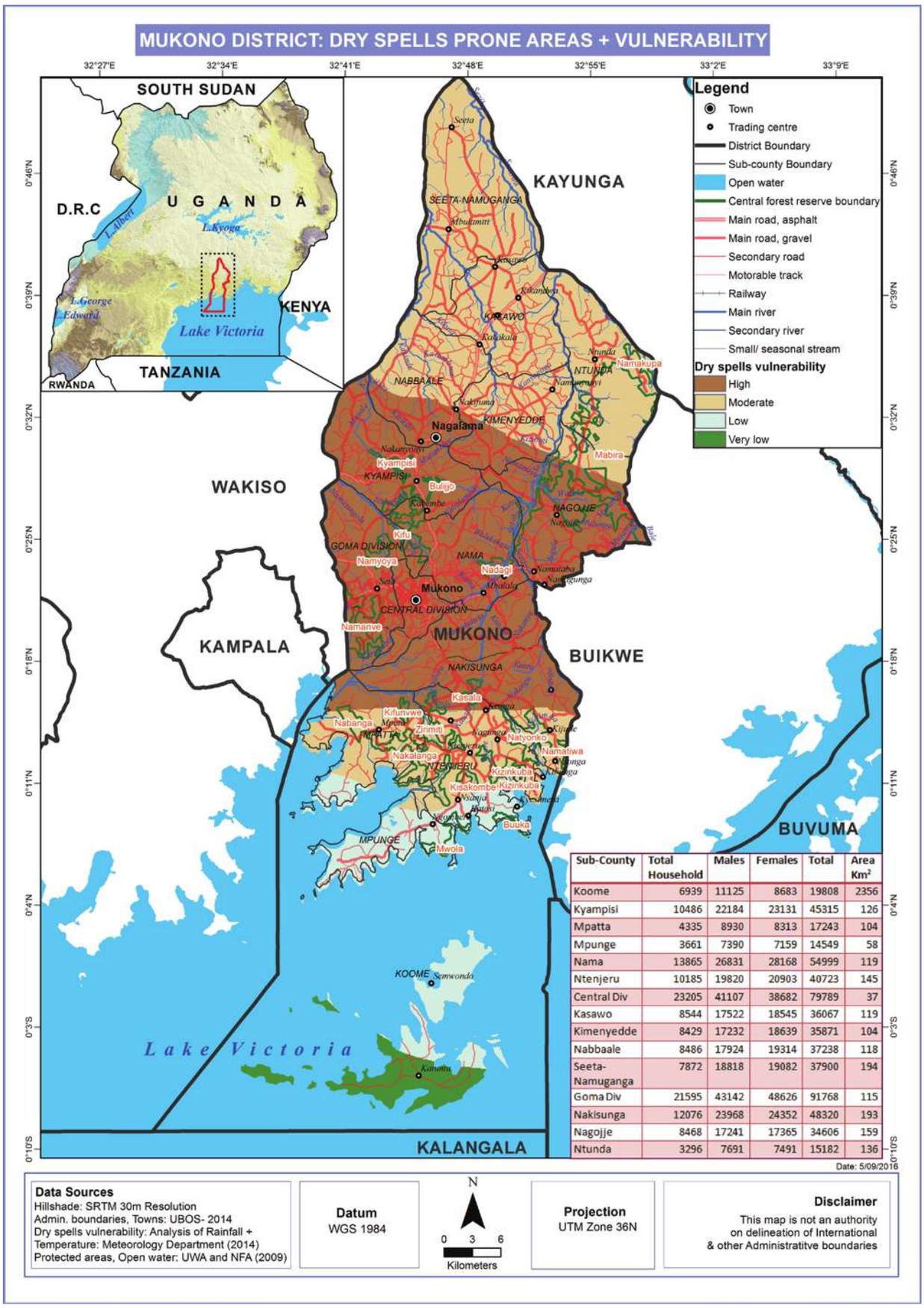

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Figure 10: Dry spells prone areas and Vulnerability Ranking, Mukono District

4.2.3 Hailstorms

Results from the participatory assessments indicate that hailstorms are common occurrence at beginning of rainy seasons affecting almost the entire District. Participants observed that hailstorms come along with strong winds that destroy crops especially maize, cassava, beans and banana plantations thus causing food insecurity and farmers have to replant in case of destroyed crops. The recently affected Sub-counties include Nakisunga and Ntenjeru (Figure 11).

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. Like Hailstorms, strong winds also affect the entire District. Windstorm (typhoon) reported in Mpunge and Ntenjeru Sub-counties blowing classrooms (Mpunge Primary School and Mpunge Sec. School) and destroyed crops in early 2016.

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 Mukono District. Participants reported that in 2013, lightning hit a school in Nagojje Sub-county. Most of the schools in Mukono District do not have lightning conductors and risk being struck by lightning.

The recent interventions on lightning from Government include: the lightning arrestors' policy in the BOQ - every newly constructed public facilities must have a lightning arrestor, and also the old public facilities are expected to have lightning arrestor. The case of Mpunge Primary School that was destroyed, the school was temporarily relocated to Mpunge Seed Secondary School

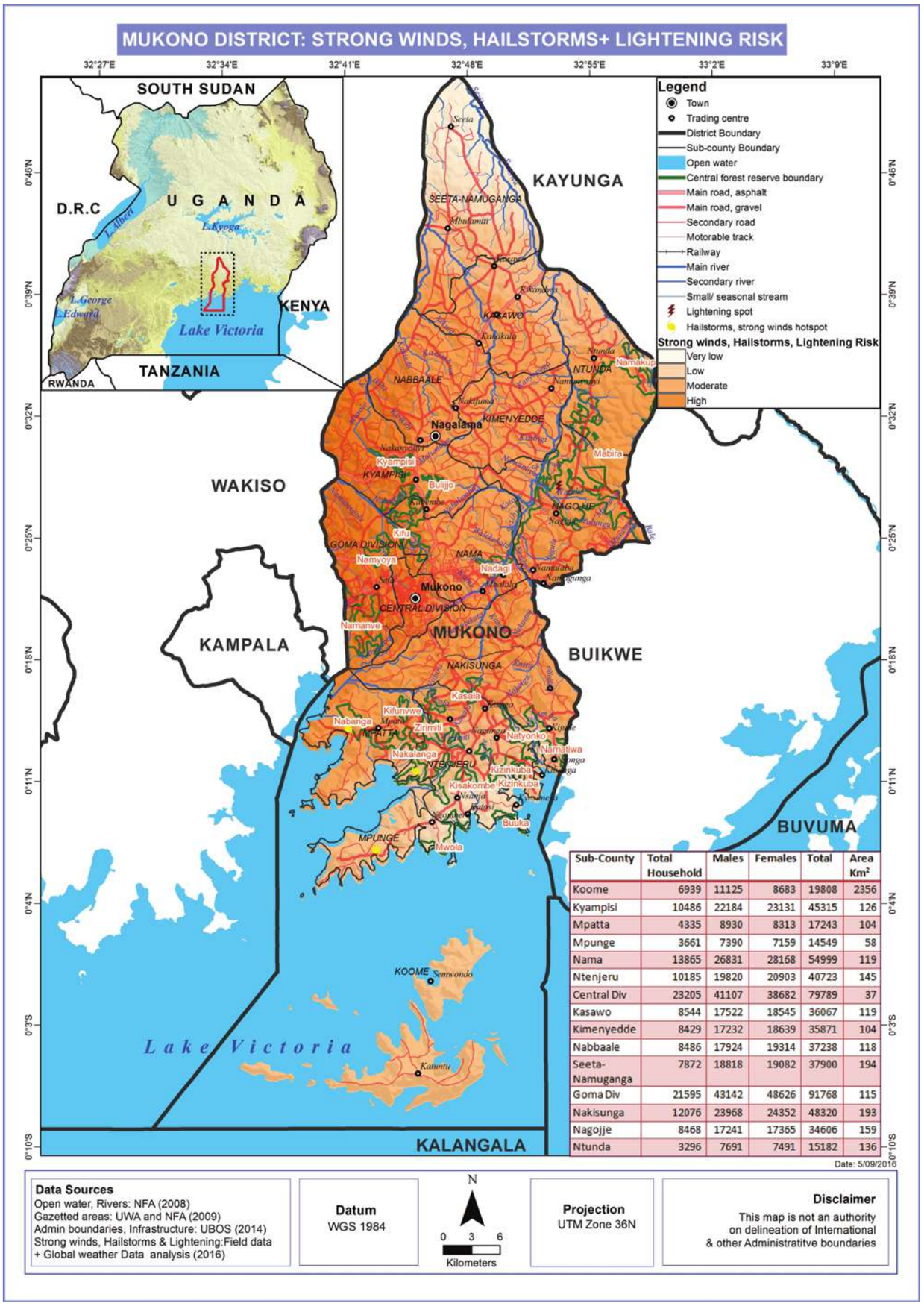


Figure 11: Strong winds, Hailstorms and Lightning Hotspots and Vulnerability, Mukono District

4.3 Ecological and Biological Hazards

4.3.1 Crop Pests and Diseases

Participatory assessments through focus group discussions indicated that the entire Mukono District was vulnerable to crop pests and diseases. Banana and coffee plantations were the most affected by crop pests and diseases. The most prominent crop diseases are Banana Bacteria Wilt (BBW), coffee wilt disease, Cassava Brown Streak virus Disease (CBSD) Cassava Mosaic Disease and Blights. One of the notorious coffee pests is coffee twig borer affecting water uptake by plant up the stem and branches dry and no photosynthesis and low yield. Other crop pests include: Nematodes, Banana weevils, fruit flies, mealy bugs and Aphids. Areas along forests have been hit by giant loppers three times in the recent 10 years destroying trees and crop gardens. It was reported that almost entire District is affected by crop pests and diseases (Figure 12).

Some of the interventions on crop pests and diseases include: use of manure to make soils fertile and boost crop vigor and planting of disease resistant varieties particularly coffee wilt resistant varieties have been introduced from research by NARO and distributed under Operation Wealth Creation Program, and also used as a measure to control the wilt disease. Banana bacterial wilt has been reduced by early removal of the male bud and cutting and destruction of the affected banana plants. Spraying with Confidol, for control of coffee twig borer, though very expensive. The Government through MAAIF provides pesticides to control giant loppers. While training of farmers has been done by the agriculture extension officers, especially BBW control measures. Some intervention has been done in collaboration with NARO, UCDA (Uganda coffee development Authority), MAAIF, Plantwise (CABI) and café Africa to train farmers on crop pests and diseases control measures

Table 9: Common Crop diseases and pests

CROP	DISEASES	PESTS
Banana	Fusarium wilt and Banana Bacterial Wilt	Banana weevils and Nematodes
Coffee	Coffee wilt, Coffee berry disease	Coffee twig borer, mealy bugs, caterpillars
Maize	Maize streak virus, Maize smuts	Maize stalk borer, Weevils
Beans	Bean root rot, Anthracnose	Maruca caterpillars, Weevils, aphids
Vegetables	Blights, wilts and leaf spots	Cut worms, Boll borers, Aphids, thrips, fruit fly, caterpillars, leaf miner
G. nuts	Rosette disease	Aphids, thrips
Cassava	Cassava mosaic, Cassava Brown Streak Disease	White fly, Mites
Rice	Rice blast	weaver birds
Sweet potatoes	Sweet potato Virus disease(SPVD)	Weevils and caterpillars
Mangoes	Anthracnose, powdery mildews	Fruit flies, caterpillars

Source: *Department of Agriculture 2015*

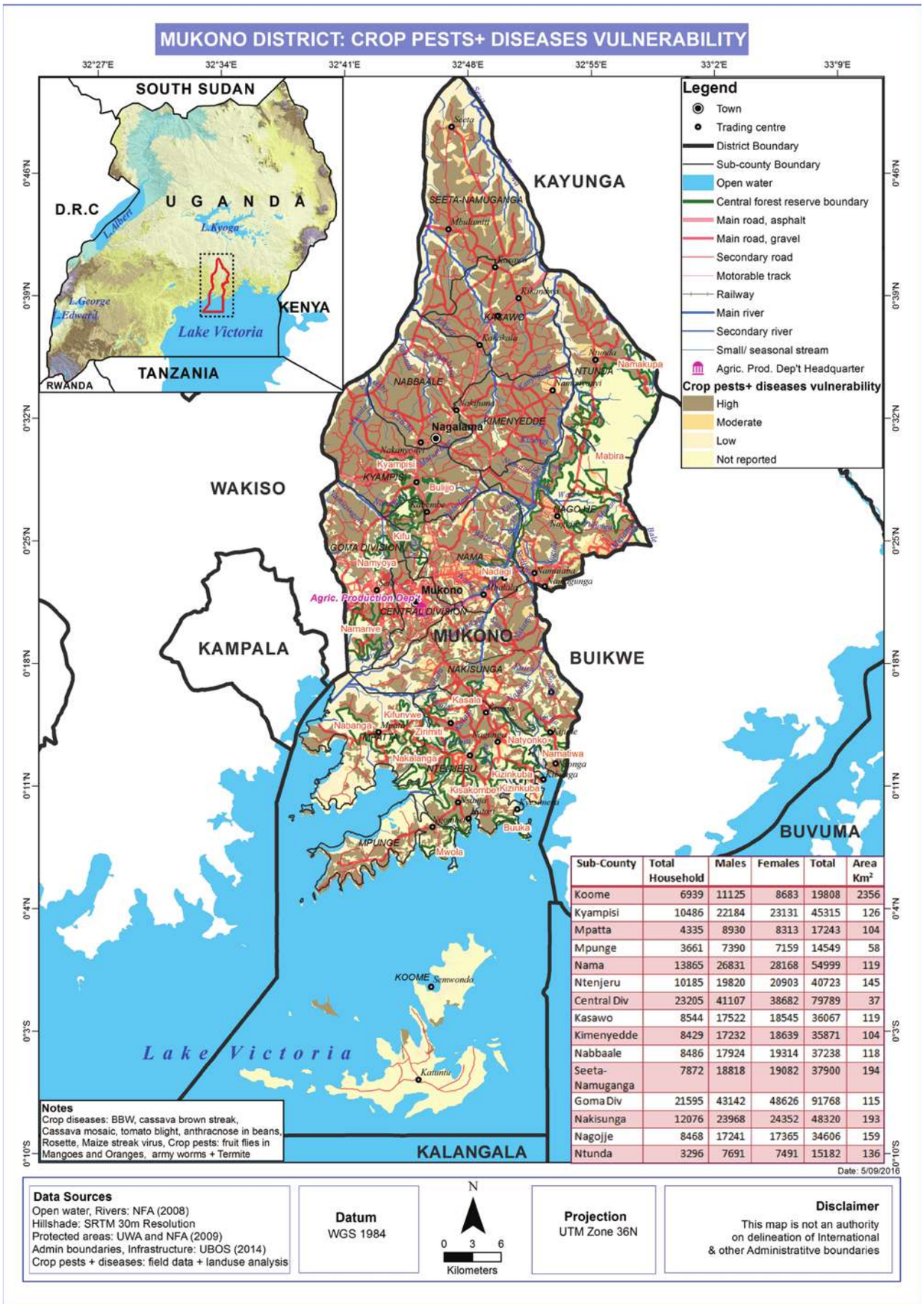


Figure 12: Crop Pests and Diseases Vulnerability, Mukono District

4.3.2 Livestock Parasites, Vectors and Diseases

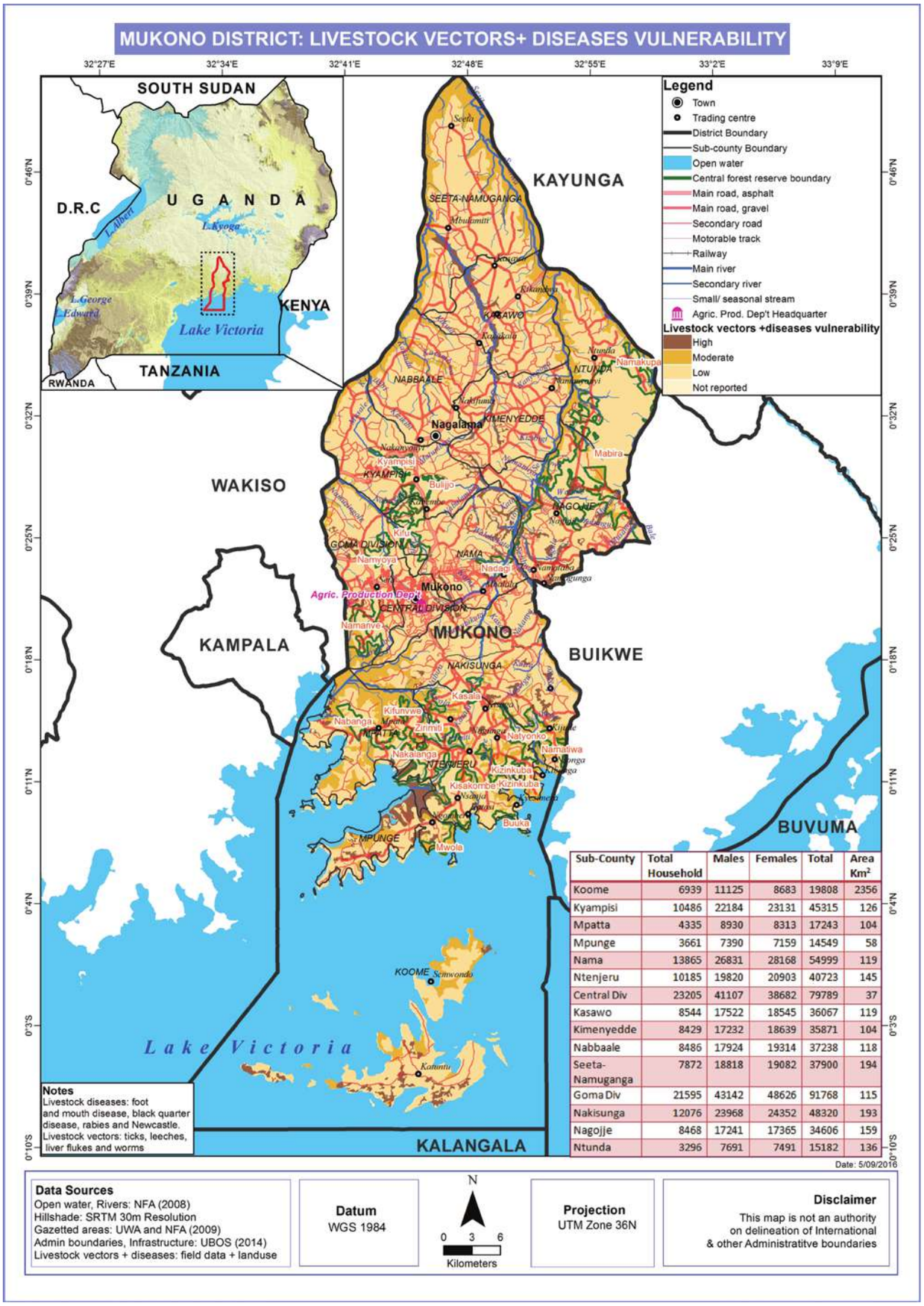
Results from the focus group discussions indicated that livestock parasites and diseases are a serious problem in Mukono District especially during rainy seasons. Table 10 indicates the common Livestock Parasites, Vectors and Diseases and Sub-counties where they have been reported including Seeta-Namuganga, Nabbale, Kasawo, Kimenyedde, Nakisunga, Ntenjeru, Nama and Koome. Figure 13 indicates the Livestock Parasites, Vectors and Diseases Vulnerability of Mukono District.

Some of the interventions on Livestock parasites and diseases include: massive vaccination organized by District Veterinary Department, environment management and quarantine.

Table 10: Common Livestock Diseases and Pests

LIVESTOCK	DISEASE	PARASITES, VECTORS	Location
Cattle, goats, sheep, Pigs	Foot and mouth disease, Lumpy skin disease, African swine fever, Anthrax, Trypanosomiasis	Tsetse flies, ticks intestinal worms and flukes	Ntenjeru, Seeta-Namuganga, Nabbale Nakisunga, Kasawo, Kimenyedde, Nama, Koome.
Poultry	Newcastle	mites	

Source: Department of Production 2015



Sub-County	Total Household	Males	Females	Total	Area Km²
Koome	6939	11125	8683	19808	2356
Kyampisi	10486	22184	23131	45315	126
Mpatta	4335	8930	8313	17243	104
Mpunge	3661	7390	7159	14549	58
Nama	13865	26831	28168	54999	119
Ntenjeru	10185	19820	20903	40723	145
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Nakisunga	12076	23968	24352	48320	193
Nagojje	8468	17241	17365	34606	159
Ntunda	3296	7691	7491	15182	136

Figure 13: Livestock Pests and Diseases Vulnerability, Mukono District

4.3.3 Human Diseases outbreaks

This study has indicated the most recent human diseases outbreak in Mukono District as bilharzia. Cases of bilharzia were reported in Koome, Mpunge, Mpatta, Nakisunga and Ntenjeru and Ntunda Sub-counties with the highest prevalence recorded in Sub-counties along Lake Victoria such as Koome, Mpunge, Mpatta, Nakisunga Sub-counties. The most common human diseases in Mukono District area malaria, diarrhea, respiratory tract infections (RTI) and HIV/ AIDS. Malaria was indicated as the leading cause of mortality in the district. HIV/ AIDS prevalence was indicated highest in Koome Islands up to 18%. Figure 14 indicates the Human Disease Outbreaks Vulnerability. HIV/ AIDS was highest in commercial sex workers along Mukono-Jinja highway in bars and hotels in towns and trading centers, track drivers along Mukono-Jinja highway, fishermen in landing sites, were mapped as hotspots.

Some of the Government interventions on Human diseases include: massive immunization for immunisable diseases, distribution of mosquito nets, case management for malaria, mass drug administration, mapping out the affected spot for HIV/ AIDS, determining affected population and procurement of drugs. Health services provision is done through the established 51 Health centres. The 51 health centres include: 1 Hospital (NGO), 3 Health centre IVs, 15 Health centre IIIs and 32 Health centre IIs. It was reported that health centres occasionally organize health talks especially encouraging testing for HIV/AIDS, counseling, distribution of preventive condoms and enrolment on ARVs palliative treatment.

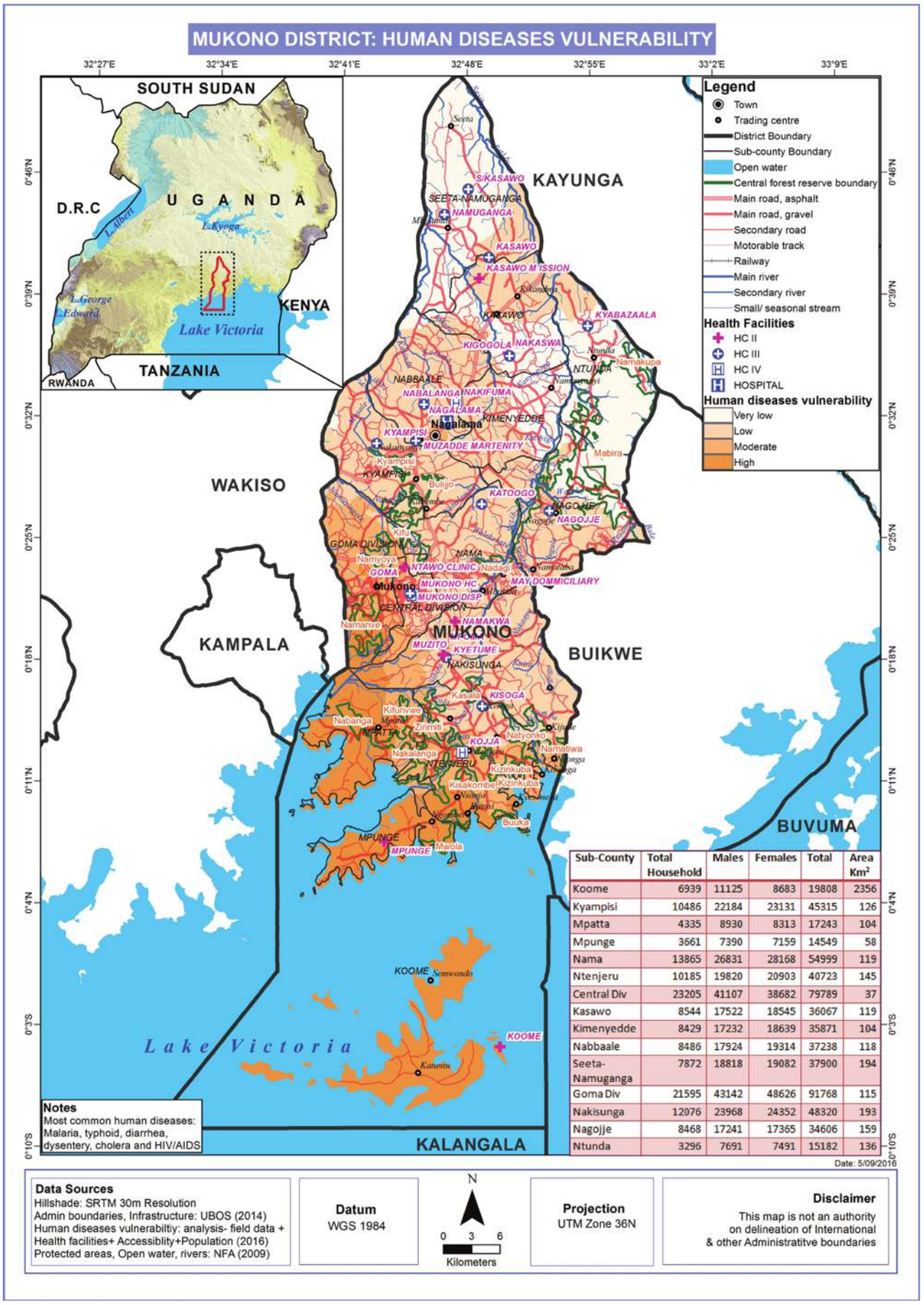

Figure 14: Human diseases outbreaks vulnerability, Mukono District

Accessibility of Health services

The health unit structure is summarized in the table below:

Table 11: Health Units by Ownership in Mukono District

Category	Government	NGO	Private	*Total*
1. Hospital	0	1	0	*1*
2. Health Center IV	2	1	0	*3*
3. Health Center III	13	2	0	*15*
4. Health Center II	24	8	0	*32*
TOTAL	39	12	0	51

The private health units comprise of 320 licensed and registered drug shops, 25 maternity units and 183 private clinics**.** The district also has 2186 VHT members. Most of the private clinics and drug shops are located in towns and Peri-urban areas

Table 12: Distribution of Health Units

County	Sub-county	Government				NGO			Total		
		Hospital	II	III	IV	II	III	IV	II	III	IV
Mukono North	Mukono c Division		1		1	4		1	5	0	2
	Goma		2	1		1			3	1	
	kyampisi		3	1		1	1		4	2	
	Nama		2	1					2	1	
	Total		20								
Mukono South	Ntenjeru		1	1	1	1			2	1	1
	Koome		2	1						1	
	Nakisunga		3	1		2	1		5	2	
	Total		16								
Nakifuma	Nabbale	1		1		1			1	1	
	Nagojje		1	1					1	1	
	Kimenyedde		1	1					1	1	
	Seeta-Namuganga		1	1					1	1	
	Kasawo		2	1		1			2	1	
	Ntunda		1	1					1	1	
Total		**1**									

Source: *Health Department 2015*

However the Health department faces the following challenges:

- The health department faces the challenge of health workers required for key services in some levels of health care e.g. lack of Public Health Dental Officers and mental health nurses and Health centre III level. These services are currently provided at Health centre IV and Hospital levels as per ministry of Health guidelines on staff establishment.

- The current policy on health staffing is guided by a level of the facility and not the catchment population, making some health facilities serve bigger workloads because of bigger catchment population. A model of Health worker: Population ratio would be able to address this challenge.

4.3.4 Vermin and Wild-life Animal Attacks

Participatory assessments through focus group discussions indicated cases of vermin and wildlife animal attacks in Mukono District. Wildlife attacks of primates and crocodiles were reported in Seeta-Namuganga. Crocodile attack killed 1 person in Kaweeri village in June 2014 along Sezibwa. Other crocodile attacks were reported in Koome Islands, Nakisunga and Ntenjeru Sub-counties. Primates were reported destroying crops for areas along the forest reserves especially in Koome Islands, and other Sub-counties. Some of the vermin reported include squirrels and mole rats also common along the forest reserves strewn all through the District. District game guard and UWA are occasionally called upon to chase the wild animals in case of an attack. Figure 15 indicates Vermin, Wildlife animal attacks vulnerability.

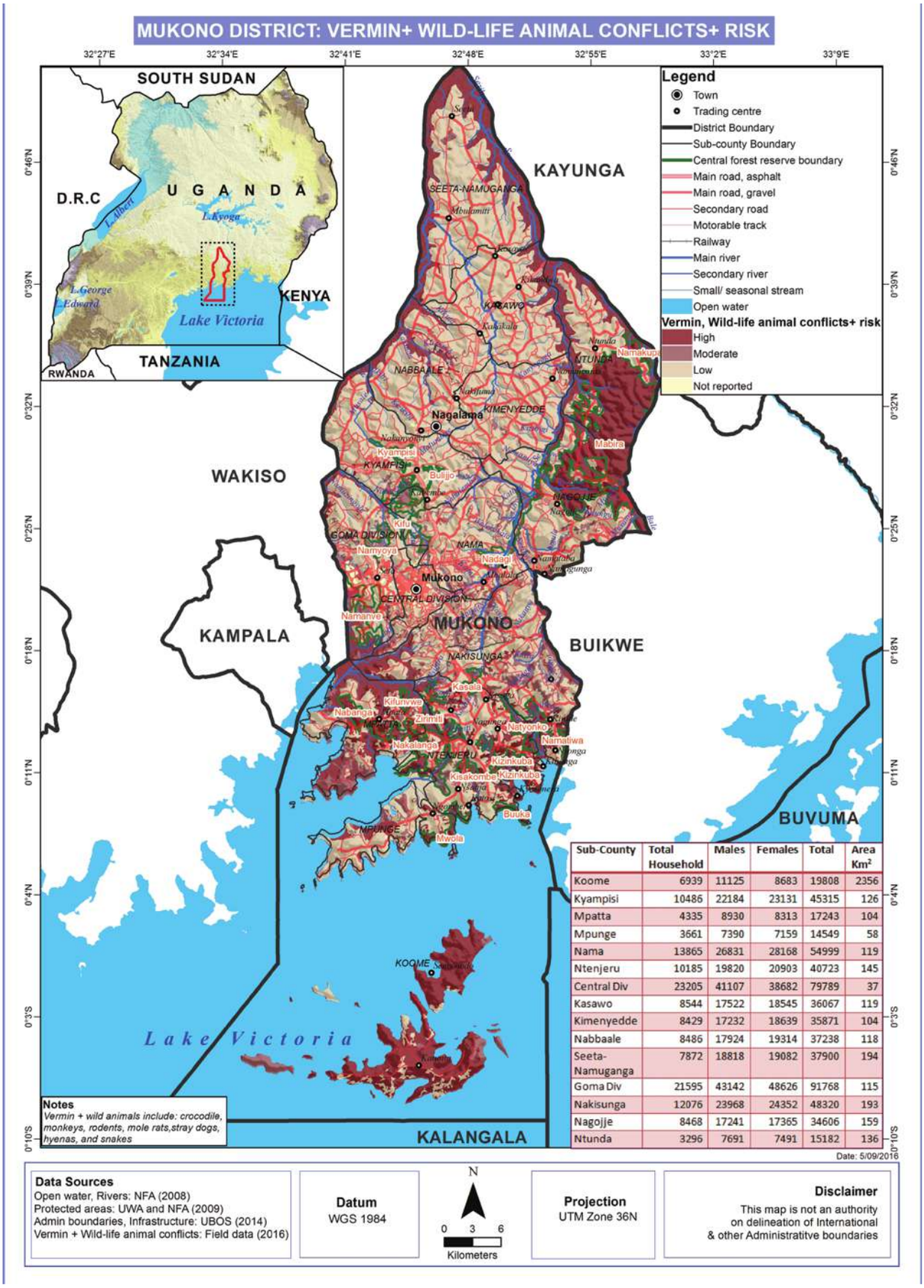

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Figure 15: Vermin, Wildlife animal attacks vulnerability, Mukono District

4.3.5 Invasive species

Results from the discussions indicated that *Paper mulberry*, *Lantana camara* and *water hyacinth,* are the most common invasive species in Mukono District. Paper mulberry was reportedly introduced in Mabira Central Forest Reserve specifically for commercial purposes as raw material for paper manufacture; however it has become a colonizer, excluding all other plants especially evident in Mabira Central Forest Reserve. Some of the intervention by NFA on Paper mulberry is the current campaign of cutting the Paper mulberry for fire wood. The most affected Sub-counties by Paper mulberry include those surrounded by Mabira Central Forest Reserve i.e. Ntunda, Nagojje, and Nama. Participants mentioned that *Lantana camara* invasive species normally dominate grazing lands and thus destroy pastures that would have been palatable for animals especially in Seeta-Namuganga, Nabbale and Kimenyedde. W*ater hyacinth* wide spread along the Lake Victoria covering the open waters and affecting fish in the waters. The most affected Sub-counties are along Lake Victoria such as Koome, Mpunge, Mpatta, Nakisunga Sub-counties. Figure 16 indicates Invasive Species Ranking in Mukono District.

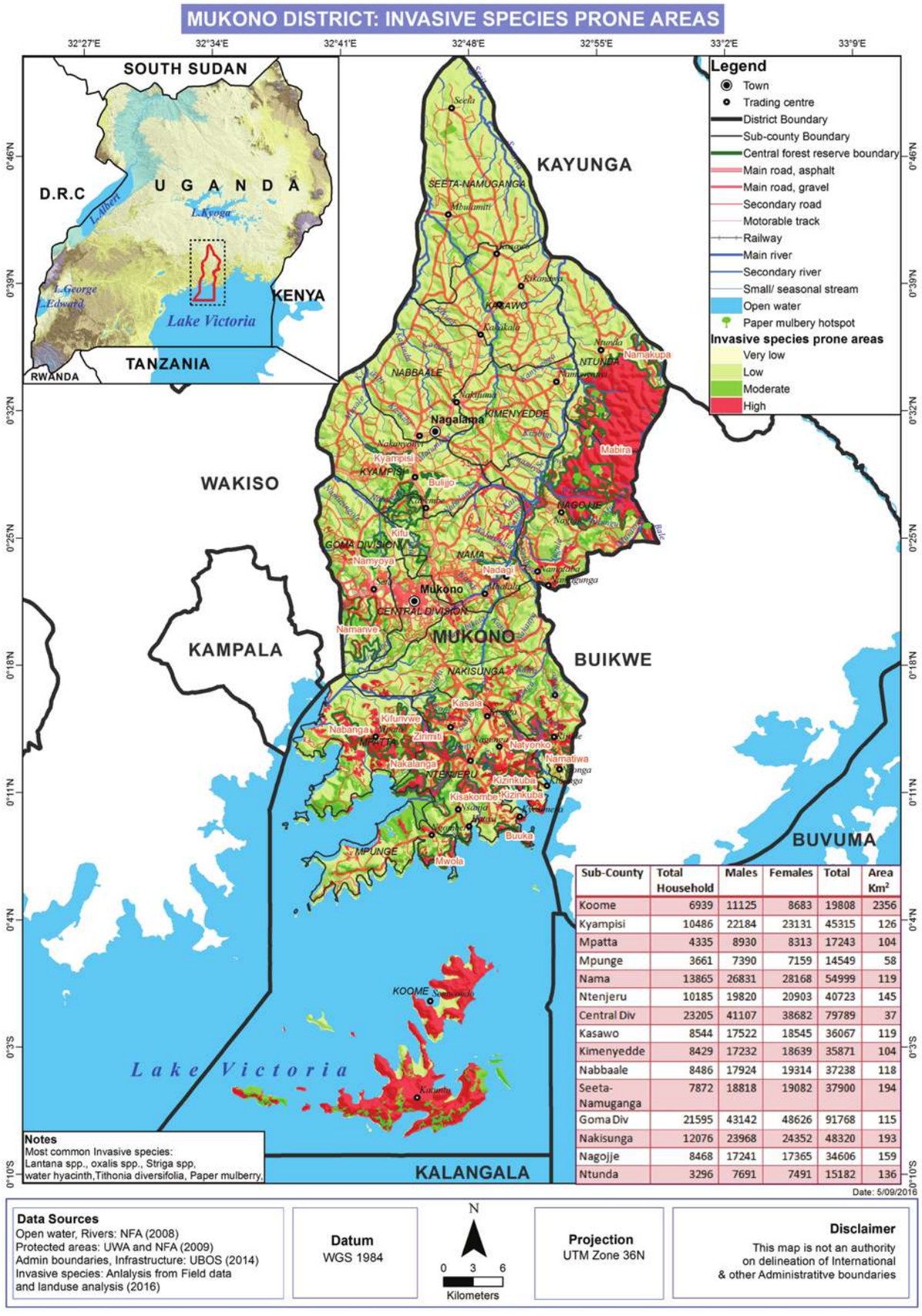

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Figure 16: Invasive Species Ranking, Mukono District

4.4 Human Induced and Technological Hazards

4.4.1 Fires

Results from participatory assessments indicated fires are not serious problem in Mukono District; however a few isolated cases of forest and bush fires. Some of the isolated dry season cases in planted forests, fires result from hunting activities and agricultural practice of preparing land for crop farming. Figure 17 indicates fire risk areas and ranking in Mukono District.

Some of the Government interventions on fires include: sensitization and awareness on dangers of fires, purchase of fire extinguishers for public institutions especially health centres and fire bye-laws enforcement through Police.

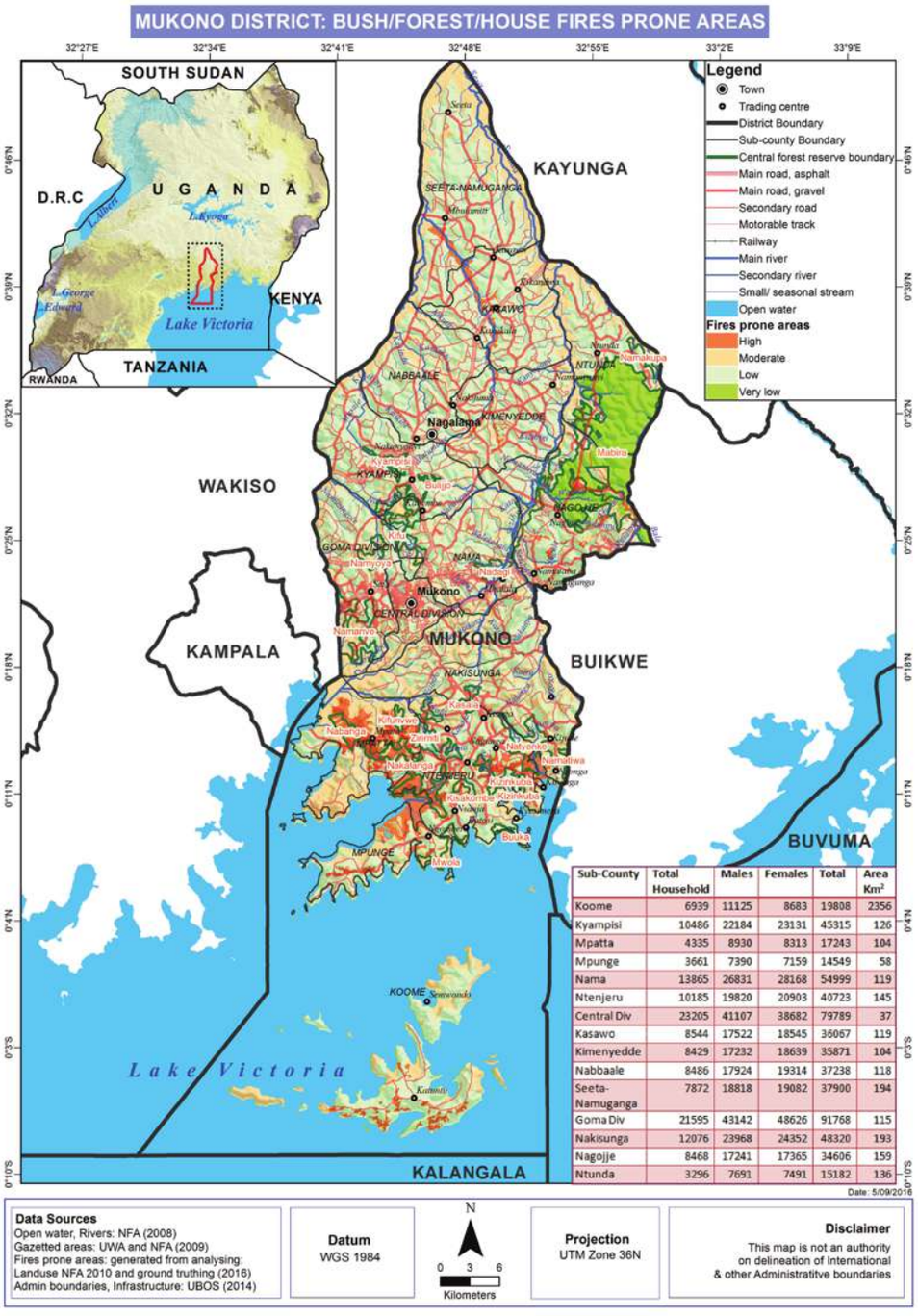

Figure 17: Bush fires, Hot spot areas and Vulnerability Ranking, Mukono District

4.4.2 Land conflicts

The land resources are mostly privately owned under the Mailo land tenure system, although there is dual ownership by Land Lords and Bonafide occupants (Tenants). Participants indicated that land disputes were a serious problem in the entire Mukono District. Most of the land conflicts in Mukono District are between land lords and squatters (Tenants).

Other land conflicts include inter-border conflicts between Wakiso and Mukono Districts in Namanve (Kira Town Council) along the District boundary souring the relationship between Districts and causing loss of revenue. In addition sub-county boundary conflicts were reported for Nama and Nakisunga Sub-counties. Land disputes amongst community members were also reported in form of land grabbing attributed to ignorance of the land user rights and the fact that some occupants do not have land titles.

The other form of land conflicts is on former public land leased to private individuals for a period of time on payment of premiums and regular ground rent (Leasehold) but is currently being converted into Freehold tenure system. Generally land disputes were reported for the entire district. Figure 18 indicates land conflicts ranking in Mukono District.

Some of the Government interventions on land disputes include: iniatating inter-district dialogues especially for inter-border conflicts, strengthening of security organs, courts of law, community dialogues and Ministry of Lands and surveys for boundary opening using the original coordinates for the boundaries.

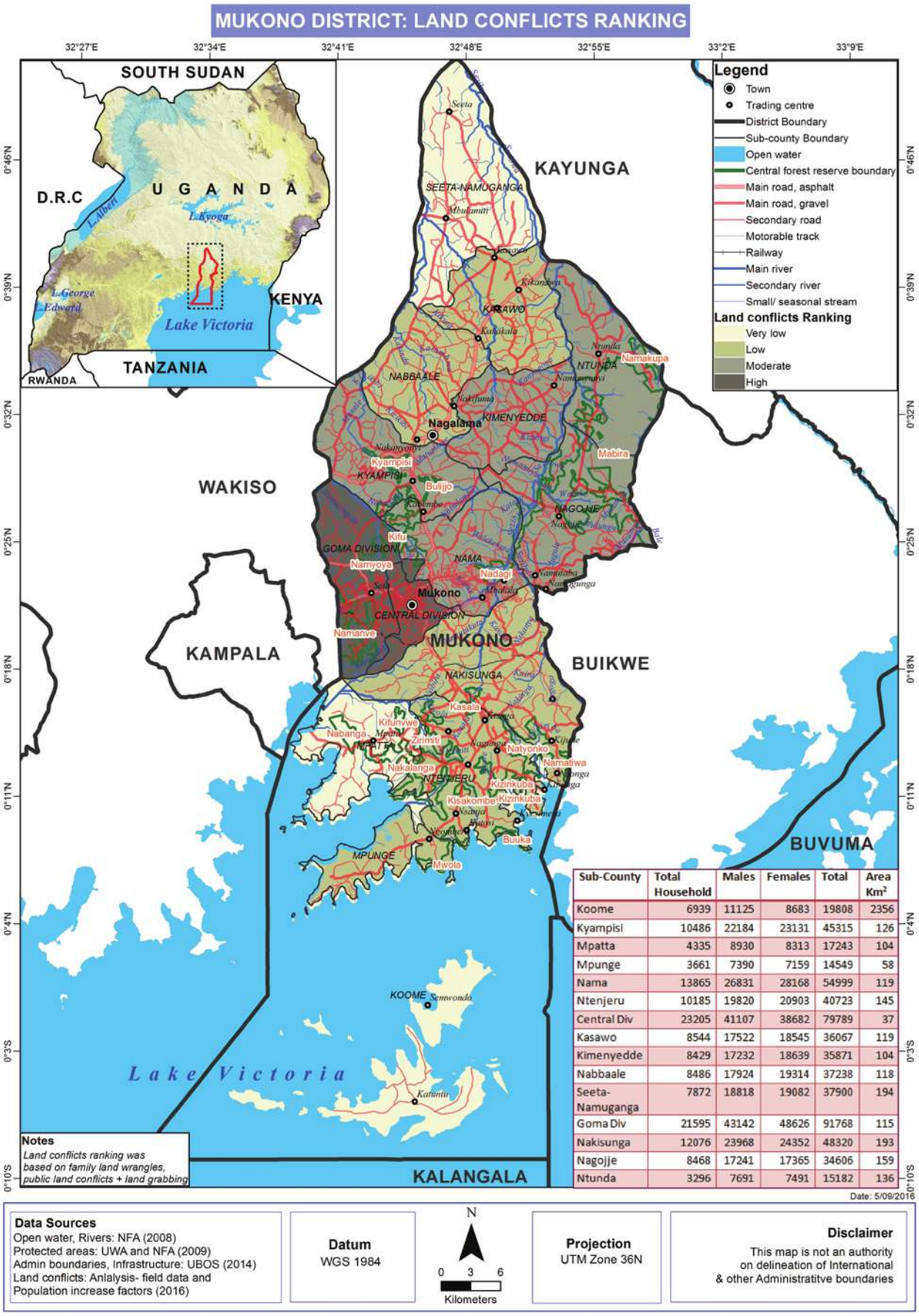

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Figure 18: Land Conflicts Ranking, Mukono District

4.4.3 Environmental Degradation

Over 90% of the District's population depends directly on natural resources for their livelihood and everyone in the District indirectly depend on the same. The District is richly endowed with natural resources ranging from land, wetlands, fisheries, minerals, forest/ trees, wildlife (biodiversity), rivers and lakes. Tremendous pressure is currently exerted on these resources in an increasing way and the main drivers include high population growth, unsustainable agricultural practices, increasing demand for forest products, development processes, increasing dependence for economic returns, reducing settlement and arable land among others.

The most reported forms of environmental degradation in Mukono District included: wetland reclamation and conversion for agriculture and industrial development, deforestation, brick making and sand mining. Most of the wetlands are threatened with degradation and others with conversion into other land uses hence total loss from settlements, farming, drainage, pollution, industrial developments, to mention but a few. Wetland degradation originates from industrialization (conversion of wetlands for industrialization), pollution from effluents, untreated waste discharge, air pollution, noise pollution and general environmental degradation. Some of these need restoration while others require different levels of protection and regulated use. The most affected Sub-counties include: Nakisunga and Nama where massive wetland conversion for industrialization is evident.

Cases of brick making in wetlands, massive tree felling as source of wood fuel for brick burning, issues of sand mining in wetlands and local brewing associated with use of wetland water for cooling but also discharge of effluents from the brewing. It is important to note that there is increased sugar cane growing in the District claiming wetland areas it is deemed fertile and suitable for the cane growing.

The forest/tree resources under the District management consist of Local Forest Reserves and forests/ trees under private ownership. They also experience tremendous pressure for the exploitation of resources like fuelwood, charcoal, building poles, timber cutting and agricultural encroachment leading to either forest/tree loss or forest degradation and extinction of species such as muvule, mahogany etc in the main forests such as Mabira CFR.

The land resources are mostly privately owned under the Mailo land tenure system, although there is dual ownership by Land Lords and Bonafide occupants. This contributes to unsustainable land management practices currently being observed as either party is not in total agreement on the level of rights to this same piece of land. The other part is former public land which was leased to private individuals for a period of time on payment of premiums and regular ground rent (Leasehold) but is currently being converted into Free hold tenure system. Land degradation issues include shifting cultivation and consequent encroachment on protected areas for more land. Figure 19 indicates environmental degradation ranking in Mukono District.

Some of the Government interventions on environmental degradation include: sensitization campaigns against wetland encroachment. However, there is need for prudent and responsible management of these resources as they lay foundation for other district development activities. This calls for effective implementation of the policies there in and regular monitoring to address emerging issues.

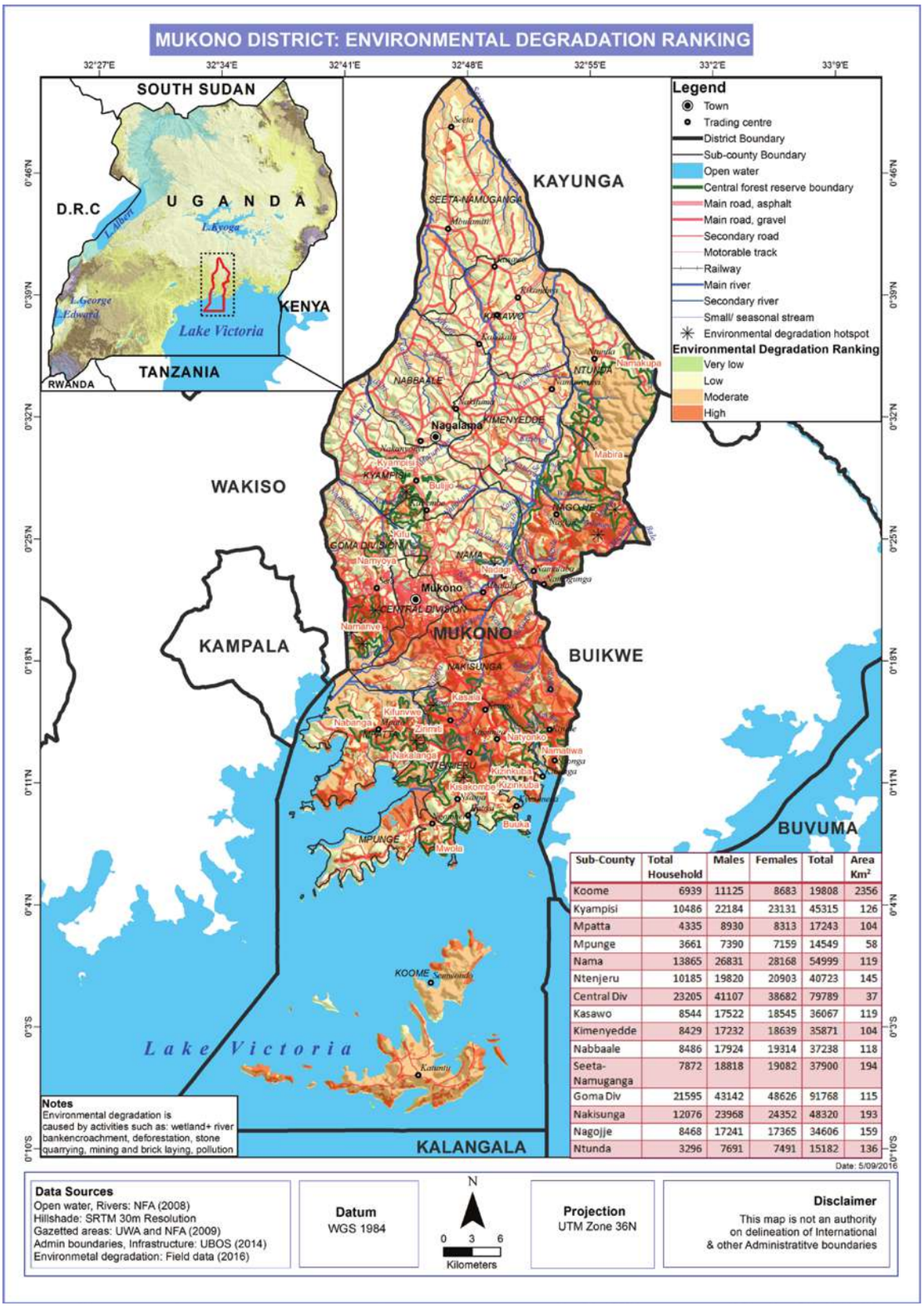

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Figure 19: Environmental Degradation Ranking, Mukono District

4.4.4 Accidents (Road, Water)

It was reported that road accidents such as head on collisions and vehicles overturning are common along Kampala – Mukono – Jinja road and Namawojjolo – walusubi – Namataba stretch along Mukono-Jinja highway and Kigunga T/C and Ntawo junction, and at black spots along Mukono-kayunga road. Boda-boda and vehicle accidents reported as biggest form of road accidents in Mukono District. Some of the black spots reported along Mukono-Jinja highway and Kigunga Trading Centre - Ntawo junction. The road surface is not even with potholes, and drivers usually come in free-wheeling making hard to break and consequent accident.

Water accidents have also been reported on the increase especially during dry seasons where strong winds become common on Lake Victoria causing engine failures and boat capsizes and drowns, the recent water accident happened on 9th June, 2016(the boat was moving from Mpatta to Ggaba, 7 people drowned). The most prone areas are the open waters where waves gather momentum and getting stronger causing boat capsize. Some other incidences were also reported early 2016, boat capsizing killed people in Koome Sub-county. Figure 20 indicates accident hotspots and risk areas in Mukono District. Water collecting in dug pits also water accidents prone.

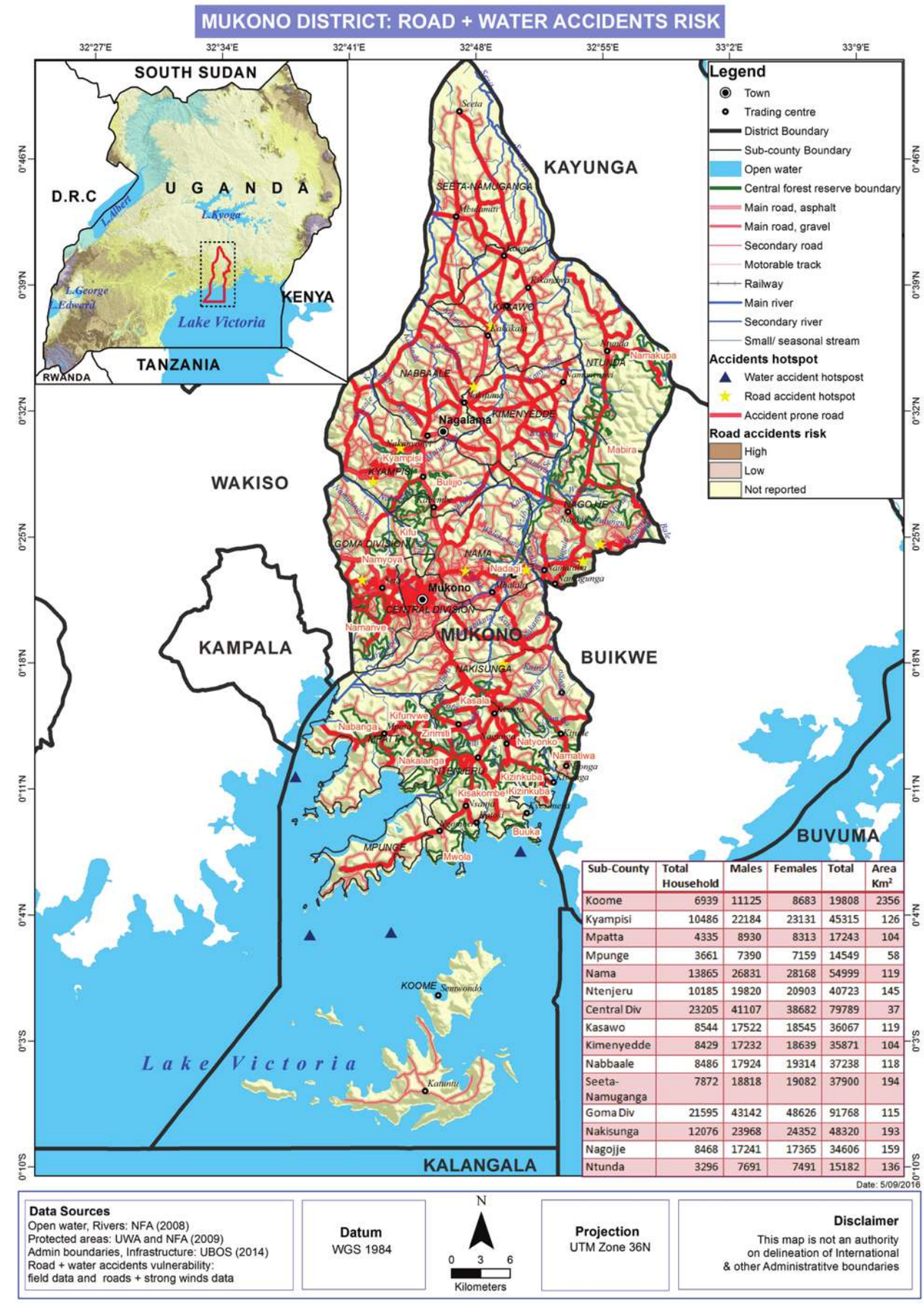

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Figure 20: Road Accidents Hotspots and Vulnerability, Mukono District

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 Mukono 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 13).

Table 14 (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 pests and diseases and lightning, also create a moderate vulnerability profile in the community (Table 14). Table 4 shows Hazard assessment for Mukono District.

Table 13: Components of Vulnerability in Mukono District

Vulnerability	Exposure			Susceptibility			Resilience
	Hazards	Elements at Risk	Geographical Scale	Susceptibility	Geographical Scale	Coping strategies	Geographical Scale
Socio-economic component	Flying stones 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 - crop damage -Loss of production in layer bird -Miscarriages - Destruction of infrastructure e.g. homes,	Parish	-Migration -Sensitization by both government and non-governmental agencies	Parish
	Earth quakes	- Infrastructure e.g. houses, schools	District	- Destruction of Infrastructure e.g. houses, schools	District	-No much measure so far	District
	Floods	- Livestock adjacent to flood plain - Crops on flood plain - Infrastructure e.g. roads adjacent to flood plain	Parish	- Livestock loss - Foot rot - Destruction of crops - Destruction of infrastructure e.g. roads adjacent to flood plain	Parish	-Migration -Sensitization on wetland conservation -Dig trenches	Parish
	Prolonged dry spells	- Livestock - Crops - Human population	Village	- Hunger & poverty - Crop failure - Shortage of pasture - Shortage of water - Livestock mortalities	Village	-Migration -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,	Parish		Parish
	Crop Pests and Diseases	-Crops	District	-Reduced crop yields - crop production losses -Reduced quality of produce	District	- Spraying - Cut and burry affected crops -Sensitization on crop disease management	District
	Livestock and poultry Parasites, vectors and Diseases	-Livestock (cattle, goats,pigs, etc) birds	District	- Loss of livestock - Reduced livestock and poultry Productivity - Reduced incomes	District	- Vaccination - Burry and burn animals that have died from infection - Quarantine	District
	Human Disease outbreaks	- Human Population	District	- Loss of lives -Reduced labour productivity -Loss of incomes	District	- Mass Immunization - Use of mosquito nets	District

Socio-economic component	Invasive species	-indigenous species -Animals	District	- Outcompete the indigenous spp., suppress growth of indigenous spp - Loss of indigenous spp. - Reduced crop productivity - suppress growth of pasture -some are poisonous to livestock	District	- Cut and burn -Sensitization on Invasive species management - Spray with herbicides e.g 2,4 D Amine	District
	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 -Loss of lives	Sub-county	-Sensitization - Fire control measures: firebreaks, fire lines and fire fighting equipments	Sub-county
	Road accidents	- Human population - Infrastructure adjacent to accident black spots e.g. houses, schools , vehicles 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	Sub-county
	Land conflicts	- Human population -Assets	Village	-Loss of lives -Loss of assets -Family violence and break outs -retards development	Village	- Community dialogue - District court in charge of land issues	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	Village
	Environmental degradation	- Human and livestock populations - Crops - Natural vegetation	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 bi-laws	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	

Environmental component	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
	Dry spells	- Livestock - Crops - Human population	Village	- Livestock loss - Crop failure - Shortage of pasture - Shortage of water -Hunger and poverty	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	- Reduced crop productivity and production	District	- Spraying - Cut and burry affected crops -Sensitization on crop disease management
	Livestock Parasites, vectors 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 -Reduced labour productivity	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. - crop Failure - suppress growth of pasture	District	- Cut and burn -Sensitization on Invasive species management
	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

Environmental component	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 bi-laws

Table 14: Vulnerability Profile for Mukono 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	3	2	6	*Ntunda, Nama,seta-namuganga,Mpunge*
Prolonged dry spells	3	2	6	*Seeta-namuganga,Kasawo*
Soil erosion and flying stones	3	2	6	*Flying stones in Nama, Nakisunga, Kyampisi and Goma division and mild soil erosion crosscutting in the district*
Hail storms, lightning and strong winds	3	2	6	*Mpunge, Nakisunga, Nagojje,Ntunda*
Bush fires	2	1	2	Seeta-namuganga
Crop pests and diseases	5	3	15	*Crosscutting all Sub-counties.*
Livestock pests and diseases	4	3	12	*Crosscutting all Sub-counties.*
Human Diseases outbreaks	4	3	12	*Crosscutting all Sub-counties.*
Land conflicts	4	3	12	*Crosscutting all Sub-counties.*
Vermin and Wild-life animal attacks	3	2	6	*Nagojje,Ntunda, seeta-namuganga,Mpunge, Mpatta, Nakisunga,Ntenjeru*
Earth tremors	2	2	4	Not specific
Road and water accidents	4	3	12	*Nama, Goma, Mukono central, Koome*
Environmental degradation	5	4	20	*Crosscutting all Sub-counties*
Invasive species	3	3	9	*Nagojje, Ntunda, Koome, Mpatta, Ntenjeru, Mpunge*

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 15: Hazard Risk Assessment

Hazard	Koome	Kyampisi	Mpatta	Mpunge	Nakisunga	Nama	Ntenjeru	Mukono Central Division	Goma Division	Kasawo	Kimenyedde	Nagojje	Ntunda	Nabbale	Seeta-Namuganga
Floods	M		M	M	L	L	L			L	L	L	M	L	M
Dry spells	L	L	L	L	L	L	L	L	L	H	L			L	H
Rock falls and Erosion	L	M	L	L	M	M	L	L	M	L	L	L	L	L	L
Strong winds, Hailstorms and Lightning	H	L	M	H	M	L	M			L	L	L	L	L	L
Crop pests and Diseases	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Livestock Parasites, Vectors and Diseases	M	M	M	M	H	M	H	M	M	H	M	M	M	M	H
Human disease outbreaks	H	M	M	M	M	H	M	H	H	M	M	M	M	M	M
Vermin and Wildlife animal attacks	M	L	L	L	L	L	M	L	L	L	L	M	M	L	M
Land conflicts	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Fires	L	L	L	L	L	L	L	L	L	M	L	L	L	L	M
Environmental degradation	H	M	M	M	M	H	M	H	H	M	M	H	H	M	M
Earthquakes and faults	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Accidents (Road + Water)	H	L	M	M	L	H	M	H	H	L	L	L	L	L	L
Invasive species	M	L	L	L	L	L	L	L	L	L	L	H	H	L	L

Key

	High		Medium		Low		Not reported/ Not prone

4.5.1 Gender and Age groups mostly affected by Hazards

Table 16: Gender and age groups mostly affected by hazards

Hazard	Gender and Age mostly affected
Dry spells	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	All gender and age groups
Lightning	Children in schools are mostly affected
Crop pests and Diseases	All gender and age groups
Livestock parasites, vectors 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
Fires	All gender and age groups
Environmental degradation	All gender and age groups
Accidents (Road, Water)	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 17).

Table 17: Coping strategies to the Multi-hazards in Mukono District

No	Multi-Hazards		Coping strategies
1	Geomorphological or Geological	Rock falls and Soil erosion	• Plant trees to control water movement on hill slopes • Mulching in banana plantations • Plant grass in banana plantations on hill slopes
2		Earthquakes and faults	• Designs of houses (pillars) • Early warning system • Vigilance • Sensitization • Emergency response mechanisms
3	Climatological or Meteorological	Floods	• Digging up of trenches in the flood plains • Planting trees to control water movement to flood plains • Migration to safer areas • Seek for government food aid • Soil and water conservation measures
4		Prolonged Dry spells	• Leave wetlands as water catchments • Plant trees as climate modifiers • Buy food elsewhere in case of shortage • Pay for cost of water distribution • Food Storage especially dry grains • Plant drought resistant crops • Recommend water harvesting
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 • 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
6	Ecological or Biological	Crop pests and Diseases	• Spraying pests • Cutting and burying BBW affected crops • Burning of affected crops • Vigilance • Clean plant materials • Plant disease and pest resistant varieties
7		Livestock Parasites and Diseases	• Spraying parasites • Vaccinations • Burying animals that have died from infection • Quarantine

8	Ecological or Biological	Human epidemic Diseases	• Mass immunisation • Visiting health centres • Use of mosquito nets
9		Vermin and Wild-life animal attacks	• Guarding the gardens • Poisoning • Hunt and kill • Recommend vermin guards
10		Invasive species	• Uproot • Spray with herbicides (e.g 2-4-D for broad-leaved plants) • Cut and burn • Sensitization on Invasive species management
11	Human induced or technological	Land conflicts	• Community dialogues • Report to court • Migration • Resettlement • Surveying and titling • Strengthen Land management structures • Sensitization on land ownership • Proper demarcation (live fencing)
12		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 • Bye-laws and ordinances and enforcement • Sensitization on dangers of fires • Recommend controlled burning
13		Accidents (Road and Water)	• Construction of humps • Road Signage including speed limits • Separate lanes on sharp corners • Sensitisation • Widen narrow roads • Plant trees on road reserve, as road guards • Deployment of Traffic officers • Vigilance for water accidents
14		Environmental degradation	• Leave wetlands as water catchments • Plant appropriate tree species as climate modifiers • Get Approval of the physical planning committee before construction • Sensitization • Bye-laws • Enforcement • Gazatte and demarcate wetlands • Restore wetlands and other fragile ecosystems • EIA for new developments • No land titles for wetland areas • Cancellation of existing wetland land titles • Developing land use plans and enforce them

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 Mukono District has over the past two decades increasingly experienced hazards including flying stones, soil erosion, floods, dry spells, hailstorms, strong winds, lightning, crop pests and diseases, livestock parasites, vectors and diseases, human disease outbreaks, vermin, wildlife animal attacks, invasive species, fires and land conflicts putting livelihoods at increased risk. Generally prolonged dry spells and pests and diseases were identified as most serious problem in Mukono 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 Mukono District increase their vulnerability to hazard exposure necessitating urgent external support.

Hazards experienced in Mukono District can be classified as:

i. Geomorphological or Geological hazards including flying stones and soil erosion.

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, vectors and diseases, human disease outbreaks, vermin and wildlife animal attacks and invasive species.

iv. Human induced or Technological hazards including, fires, water and road accidents land conflicts.

However, counteracting 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, 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 and the District Production should promote drought and disease resistant crop seeds and irrigation technologies.

viii. The Government through OPM and Meteorology Authority should increase importation of lightning conductors and also reduce taxes on their importation.

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.

References

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

Mukono 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.

Mukono District development Plan 2015/2015 – 2019/2020

APPENDIX I: DATA COLLECTION TOOLS

FOCUS GROUP DISCUSSION GUIDE FOR DISTRICT DISASTER RISK MANAGEMENT FOCAL PERSONS

Interviewer Team Name(s)	District: Mukono Sub- county: Parish: Village:	GPS Coordinates	
		X:	471100
		Y:	39967
		Altitude	1234

No.	Name of Participants	Designation	Contact	Signature
1	Nivlume George	CAO	0772426293	
2	Jonathan Hosea Mukose	DCAO	0772969029	
3	Dr. Elly. K. Tumushabe	DHO	0772414189	
4	Mujuni Willian	DIVRO	0772414509	
5	Mukasa. S. Mabira	PAO/DAO	0772460235	
6	Mugisa John S.A	D/E	0772476459	

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

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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?

LIST OF CONTRIBUTORS

SPATIAL DATA COLLECTION SHEET FOR HAZARD VULNERABILITY AND RISK MAPPING

Observer Name: Date:	District: Sub- county: Parish: Village:	Coordinates	
		X:	
		Y:	
		Altitude	

Slope characterization		**Bio-physical characterization**		**Vegetation characterization**		
Slope degree (e.g 10, 20, …)		Soil Texture		Veg. cover (%)		**Land use type (tick)** Bush Grassland Wetland Tree plantation Natural forest Cropland Built-up area Grazing land Others
Slope length (m) (e.g 5, 10, …)		Soil Moisture		Tree cover (%)		
Aspect (e.g N, NE…)		Rainfall		Shrubs cover (%)		
Elevation (e.g high, low…)		Drainage		Grass / Herbs cover (%)		
Slope curvature (e.g concave, covex…)		Temperature		Bare land cover		
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)						

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