THE REPUBLIC OF UGANDA

Dokolo District

Hazard, Risk and Vulnerability Profile

2016

CONTENTS

LIST FIGURES

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ACRONYMS

AU	African Union
CAO	Chief Administrative Officer
CDPC	City Disaster Policy Committee
CDMTC	City Disaster Management Technical Committee
CSOs	Civil Society Organisations
DDPMC	District Disaster Preparedness and Management Committee
DDPC	District Disaster Policy Committee
DECOC	District Emergency Coordination and Operations Centre
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
FGDs	Focus Group Discussions
GIS	Geographical Information Systems
GoU	Government of Uganda
GPS	Global Positioning System
HFA	Hyogo Framework for Action
IDPs	Internally Displaced Persons
IATC	Inter Agency Technical Committee
IGAD	Inter Governmental Authority on Development
IMPC	Inter Ministerial Policy Committee
IATC	Inter-Agency Technical Committee
IPCC	Inter-governmental Panel on Climate Change
LC	Local Council
MLHUD	Ministry of Lands, Housing and Urban Development
MGLSD	Ministry of Gender, Labour and Social Development
MoLG	Ministry of Local Government
MS	Microsoft
NARO	National Agricultural Research Organisation
NDPMC	National Disaster Preparedness Management Committee
NECOC	National Emergency Coordination and Operations Centre
NEMA	National Environment Management Authority
NFA	National Forest Authority
NGO	Non-Governmental Organisations

NIC	National Incident Commander
OPM	Office of the Prime Minister
OVC	Orphans and vulnerable children
PEAP	Poverty Eradication Action Plan
SCDMC	Sub County Disaster Preparedness and Management Committee
UCC	Uganda Communication Commission
UN	United Nations
UPDF	Uganda People's Defence Forces
URA	Uganda Revenue Authority
UWA	Uganda Wildlife Authority
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Developments Programme
UNOCHA	United Nations Office for Coordination of Humanitarian Affairs
UXO's	Unexploded Ordinances
VDPMC	Village Disaster Preparedness and Management Committees

ACKNOWLEDGEMENT

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

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

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

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

My appreciation also goes to Dokolo District Team.

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

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

EXECUTIVE SUMMARY

This Dokolo District Hazard, Risk and Vulnerability Profile integrates scientific information provided by GoU agencies and hazard and vulnerability knowledge provided by communities on the district base map to contribute to a Uganda National disaster risk atlas. It will support planning and decision making processes to manage disaster risk in the district.

The methodology provided for four phases of work:

Phase I:	Requirements analysis, work planning, team building, logistical arrangements
Phase II:	Stakeholder mapping, consultation, spatial data acquisition, secondary data assessment
Phase III:	Data cleaning, analysis and verification
Phase IV:	Dissemination workshop

The report characterises the district in terms of location, geography, gender demographics by sub-county and livelihoods. Dokolo District is located in Northern Uganda and is bordered by the districts of Lira to the North, Amolatar to the South, Kaberamaido to the East and Apac to the West. The district lies between Latitudes 1° 21° N; 2° 42° N Longitudes 32° 51° E; 34° 15° E. The district covers approximately a total area of 1,352 Km2.

The district is characterised by the equatorial/tropical climate with a dry and wet season in a year. There is also bimodal rainfall pattern with one peak in April–May and the other in September–October.

Dokolo District Local Government and the 11 Lower Local Governments are vulnerable to 11 hazards in order of decreasing risk: heavy storms, environmental degradation, prolonged dry spell, crop pests and diseases, human epidemics, invasive weed species, animal vectors and diseases, bush fires, internal conflicts, vermin and flooding. The most significant of which are environmental degradation, heavy storms, prolonged dry spell, internal conflict, crop pest and diseases, human epidemics, and flooding.

The discussion of the nature of each hazard and its geographic extent in terms of sub-counties provides a qualitative assessment of the situations that the communities face. Maps corresponding to each hazard show the areas where the hazard is significant, and also hotspots as reported points of incidence of the hazard.

The district has a medium level of cumulative vulnerability to hazards. Agwata is the most vulnerable sub-county in the district with a weighted vulnerability of 8, lying at the top (red) of the vulnerability scale. The rest of the sub counties displayed medium (yellow) with weighted vulnerabilities between 5 and 7.

The hazards mostly caused by natural events have and will continue to have devastating effects on various aspects of life, livelihoods, property and the environment due to lack of capacity to predict, guard against or contain the events when the hazards strike.

Timely early warning systems and other DRR interventions would be able to enhance the resilience of the people of Dokolo to the effects of climate change.

INTRODUCTION

Dokolo District is vulnerable to a number of hazards that easily result into disasters. These hazards include flooding, drought, crop pests and diseases, animal pests and diseases, environmental degradation, internal conflicts, hailstorms/heavy storms and lightning, and human epidemic. While these hazards and their occurrences have been reported, there has not been an attempt to consolidate and map this information in order to analyse the district's exposure and susceptibility to disaster risks.

The Dokolo District Local Government and the Department of Relief, Disaster Preparedness and Management in the Office of the Prime Minister (OPM), with the support of the United Nations Development Programme (UNDP), embarked on a process of mapping the different hazards and analysing the disaster risks and vulnerability of Dokolo district. The information contained in this District Hazard, Risk, and Vulnerability Profile will guide the adoption of disaster risk management (DRM) measures in the district as well as inform the development of the district's contingency and development plan.

Objectives

The objective of the hazard, risk, and vulnerability mapping exercise is to produce a district profile that will aid planning and decision making processes in addressing disaster threats/ risks in Dokolo District.

Methodology

The multi-hazard, risk and vulnerability mapping employed a people-centred, multi-sectoral, and multi-stakeholder approach. In generating the required information and production of the district profile, a mapping team led by the Office of the Prime Minister (OPM) and involving representatives from UNDP and district sector offices was deployed for a field mission to Lango region from May 11-30, 2014.

In collecting field data, the team employed a variety of methods including use of a mix-scale approach involving the integration of primary and secondary data. Secondary data was acquired through government sources (relevant Ministries, Departments and Agencies, the districts in Lango Sub regions) and data bases from other organisations/NGOS operating in these districts. The raw spatial data and satellite images were assembled from relevant sources and analysed with descriptive statistics and remote sensing technology.

The mapping exercise involved four (4) phases which are as follows;

Phase I: Preliminary Activities

Phase II: Field Data Collection &Mapping

Phase III: Data Analysis &Map Production and Report Writing

Phase IV: Refining and Final Map Production/Reporting

Phase I: Preliminary Activities

This phase involved the mapping team undertaking a series of planning and programming activities before start of field activity including but not limited to holding meetings with relevant teams, mobilising required resources, acquisition of required equipment and materials, review of relevant literature, establishing relevant contacts and a checklist of activities to be undertaken in Phase Two

.

The main objectives of Phase One is to allow the mapping team to prepare and undertake preliminary assessment of the quality and nature of the resources/materials, develop a quick understanding and appreciation within the mapping team and also with various actors towards the task of the multi-hazard, risk, and vulnerability mapping before any detailed physical field work is undertaken. This phase enabled the scoping and adoption of specific mapping content/legend for the thematic maps.

This phase was also useful in preparing the resource deployment plan, outlining procedure and field work plans, etc. It articulated, among others, utilisation of various stakeholders to ensure maximum participation in locating disaster prone locations and any other information relevant to the mapping exercise.

Phase II: Field Data Collection and Mapping

Stakeholder mapping and local meetings: A field entry meeting is held for each district that enabled the obtaining of key local issues that relate to disaster occurrence and changing trends. The meeting gave an opportunity for the mapping team and stakeholders to identify other key resource persons/support staff from within the local community to consult.

Stakeholder Participation Practices: Stakeholder participation is a key component of the mapping exercise. Consultations were conducted with district technical sector heads under the overall purview of the District Disaster Management Committee (DDMC) involved in on the ground exercises to ensure district leadership and ownership of the data and results. During exit meetings, stakeholders, particularly those at district level, were given the opportunity to validate, update and also yield any other relevant information vital to the mapping process.

Capture of spatial data: Spatial data was captured and complemented by base maps prepared at appropriate scales. The base maps contained relevant data including but not constrained to location of existing social infrastructure and services, district area boundaries, environmental elements, forest areas, utilities like roads, drainage and river course, contours and flood prone settlements.

Secondary data or desktop research: A desk review of relevant documents at the district and other umbrella organisations including policy and legal documents, previous maps/report and studies was conducted. A checklist was used to summarise the required information according to the different multi-disaster risk indicators being studied /mapped. Data from documents was analysed using various methods including content analysis.

Critical observation and ground truthing: This was used to critically assess the conditions, nature and location of disaster prone zones, "current human activity" and settlement patterns along disaster prone areas. Critical observation and ground truthing included inspection and observation of social infrastructure, major household economic activities being practiced, natural drainage lines/rivers etc. Non-mappable and non-physical situations were captured through remote sensing (e.g. satellite images) and physical observation.

Main instruments of data collection: The main instruments used for data collection are; manuals of instructions (guides to mapping assistants), use of key informant guides and notebooks, high resolution GPS receivers, digital camera for taking critical photographs, high resolution satellite images and base maps/topographic sheets of the mapping areas.

Exit/feedback meetings with stakeholders: After field activities and actual data collection, feedback and exit meeting with stakeholders were carried out in the district. This exit meeting provided additional information regarding the disaster mapping exercise validated the data generated, and provided clarity on the expected outputs and way forward under this exercise.

Phase III: Data Analysis and Verification

Analysis of collected data: The data collected was analysed by the mapping team together with district local government officials. GPS coordinates were overplayed on top of the base maps and high resolution satellite images in developing the different disaster thematic maps.

The main activities at this phase include;-

- Data entry, cleaning and coding
- Preparation of base maps and process maps
- Preparation of disaster risk and vulnerability maps

Methods used for data analysis; Data analysis methods used are the following:

- Geo-processing , data transformation & geo-referencing
- Discussions/FGDs
- Drafting, digitising and GIS Overlays
- Compiling of different data and information

Data editing, coding and cleaning: Data collected using the various tools mentioned above was edited, coded, and cleaned by data editors, coders and entrants. Both qualitative and quantitative data obtained from the field was entered via a data entry interface customised to the layout of the field data forms. Data coding and analysis started soon after information was secured from the field. Arrangements were made in the field to handle manual editing and coding as and when data is received from the field crew. Furthermore, data entry, verification, screens editing and system development followed sequentially to enable the preparation of draft maps.

Data analysis package: After data has been secured, it was analysed by the mapping team using windows-based package or MS Office processing programmes (MS Word, MS Excel for Windows). Spatial data was analysed using the latest ArcGIS software and mobile GIS applications. Rapid and systematic GIS overlays were performed to generate base maps and risk and vulnerability maps.

Descriptive statistics: The mapping team investigated trends per given indicator using tables, graphs, charts and frequencies. As processing of data developed, it was merged for cross tabulation and eventual production of thematic maps for the different types of hazards.

Generation and appraisal of draft maps: Thematic maps for the different hazards were developed based on the prioritisation set by the districts. These risk and vulnerability maps were presented and validated appraised in a field workshop based on the accuracy and completeness of the information. Missing information gaps were identified and incorporated in the final risk and vulnerability maps.

Phase IV: Dissemination Workshop

A final workshop was conducted by the OPM to facilitate dissemination of the district hazard, risk, and vulnerability profile to relevant partners.

Location
Dokolo District is located in Northern Uganda and is bordered by the districts of Lira to the North, Amolatar to the South, Kaberamaido to the East and Apac to the West Physically.

The district lies between: Latitudes $1^{0}21^{o}$ N; $2^{0}42^{o}$ N Longitudes $32^{0}51^{o}$ E; $34^{0}15^{o}$ E. The District covers approximately a total area of 1,352 km^{2}.

Overview of the district
Dokolo District was curved out of Lira District in July 2006. Over the years, it has registered tremendous milestones in the fields of good governance and quality service delivery to the population.

The district is composed of the following number of administrative units:

Counties	=1
Sub-counties	=10
Town Council	=01
Parishes	= 62
Villages	=479

Climate and vegetation
The district is characterised by the equatorial/tropical climate with a dry and wet season in a year. There is also bimodal rainfall pattern with one peak in April–May and the other in September–October.

Vegetation The whole district is tropical savannah consisting of shrubs and dominated mainly by Combretum, Albezia and Accacia sp.

Topography and soils
The area is dominated by flat land with isolated inselbergs concentrated near the district headquarters. Loamy, fairly fertile soils dominate the entire district. Part of the district, especially the sub-counties of Kwera, Kangai and Agwata, is delimited by Lake Kwania.

Historical background
The present Dokolo District started as a settlement point for the British Colonial Administrators who came through Teso land now Soroti District. The colonialists are said to have left Dokolo and relocated to Nambieso in the current Apac District.

Historically, the inhabitants of Dokolo are Langi by tribe believed to have originated from Abyssinia in Ethiopia. They are believed to have moved in the general migration of the Nilo-Hamites (also known as semi-Hamitic) group which includes the Teso, Kumam, Jie and Karamojong tribes between 1800 and 1890 and settled in the present location where they took up the agrarian life.

Demographics

The total population of Dokolo District was about 129, 000 people as per the 2002 Census having increased from about 85,000 during 1991 Census. The projected district population as of June 2010 is 171,000 people. 82,700 are males while 83,300 are females.

Table 1: Projected 2012 Population of Dokolo District

	2008	2009	2010	2011	2012
Male	76,800	78,200	82,700	85,800	88,900
Female	82,400	83,900	88,300	91,300	94,500
Total	**159,200**	**162,100**	**171,000**	**177,100**	**183,400**

Table 2: Projected 2012 Population of Dokolo District by Sub-county

No.	District/Sub – county	Male	Female	Total
1	Agwata Sub County	19,200	20,300	39,500
2	Bata Sub County	16,200	17,000	33,200
3	Dokolo Sub County	23,600	25,400	49,000
4	Kangai Sub County	16,400	17,500	33,900
5	Kwera Sub County	13,500	14,300	27,800
6	Amwoma	2,900	3, 100	6,000
7	Adeknino	4,000	4,400	8,400
8	Okwongodul	3100	3300	6400
9	Okwalongwen	3200	3400	6600
10	Adok	2600	2700	5300
11	Dokolo T/C	3600	4300	8100
	District (total)			

Table 3: Population proportion by age groups for Dokolo District in 2012 census

Age group	Male (%)	Female (%)	Total
0-5	25.6	24.2	24.8
6-10	16.9	16.1	16.6
11-20	23.3	22.4	23.0
21-30	12.7	15.1	13.9
31-40	8.9	9.0	7.3
41-50	5.3	5.2	5.2
51-60	3.4	3.7	3.6
61-70	2.3	2.6	2.5
71+	1.6	1.7	3.1
Total	**100**	**100**	**10 0**

Main Livelihoods

The major cash crop used to be cotton but the production has generally been on the decline because of the deteriorating cooperative movement system, insurgency and low prices. Over time, some crops which had hitherto been grown as food crops are now becoming cash crops e.g. maize. Cattle used to be reared largely to meet traditional obligations e.g. marriage and as a stock of wealth. In extreme cases the animals would be sold to meet pressing requirements like school fees. Over time the number of cattle has drastically dropped due to cattle rustling and LRA insurgency.

Agriculture

Agriculture is the major economic activity in most rural populations of Uganda, Dokolo District inclusive. It employs over 90% of rural populations and is their major source of livelihood. It is imperative that a detailed analysis be carried out on this important sector in order to improve the living conditions of the population.

The major agricultural activities undertaken by households in Dokolo District include: crop production, animal rearing and fish farming. Other activities within agriculture include bee keeping, input distribution, output distribution and marketing, and outreach services.

Major crops

The major food crops grown in Dokolo include: millet, cassava, maize, sweet potatoes and sorghum in order of importance. Banana, rice and Irish potatoes are of minor importance in the district. The major pulses grown for sauce are beans, pigeon peas, cowpeas and soya beans in order of importance. The major oilseed crops are simsim and groundnuts. The major horticultural crops are: egg plants, dodo, cabbages and tomatoes. Fruits grown are: oranges, mangoes, pineapples, jack fruit and pawpaw.

Major livestock
The important livestock in Dokolo District include goats, indigenous cattle, sheep and pigs. There are some households that keep exotic cattle, donkeys and rabbits. Most of the indigenous cattle are kept for cultivation and milk. Commercial livestock rearing is not developed yet in the district.

Major poultry
The major poultry kept by households in Dokolo District are local chicken, ducks and turkeys. Some few households keep guinea fowls, pigeons and exotic chicken. The local chicken is kept for market and home consumption. Ducks are mostly kept for subsistence purposes.

Fish farming
Fish farming is a new development in Dokolo. This is because some lake fishing takes place in the Sub-Counties of Kwera, Kangai, Okwongodul and Agwata. However, there are few fish farmers, especially in the Sub-Counties of Bata and Dokolo.

The main commercial fish species farmed in the district are Tilapia niloticus and Clariusgariepinus. Both species grow to about 350mm and 700mm within a period of seven months under poly culture farming practices. The district is encouraging commercial aquaculture with support from MAAIF/ADB.

Participation of women in this sub-sector is very high. Women are involved in construction of fish ponds. Feeding and marketing of fish though men mostly dictate on how to spend the proceeds from fish sales. There is a deliberate move through NAADS to have at least a third of the registered members of each group to be women. Fish farmers groups with membership having majority women are more successful and active.

Women's livelihoods
Both men and women participate in crop production but the role of women is much greater than that of men, (70% more than men) especially in weeding, processing and storage. Unfortunately very often women hardly take part in the decision making process at the household level, which is an area which is almost entirely controlled by men. Through gender mainstreaming it is possible to increase production and productivity and guide farmers better to make profit, reduces crop losses in the field and post-harvest.

Women and youth play a very important role in animal production. Women have increasingly participated in workshops on production, partly because the department had given enough attention to this aspect. Mobilisation by community department, NGOs and the Department of Production is aimed at increasing the participation of women and youth in workshops and other extension activities.

In bee keeping, women come in during harvest and processing but have very little say at marketing and making decisions on the utilisation of funds accruing from sales of bee products. It is important that women are encouraged to participate in all those activities and especially more in the decision making.

Women are involved in small market based enterprises such as sale of fresh farm produce, fish, making and sale of garments, and some processed farm products like flour, pottery and handcraft. There is need to mobilise women and empower them to own, control and manage enterprises. Activities and budgets should be drawn affirmatively in this direction.

HAZARDS

Table 4: Hazard status

Hazard	Status	Sub County
Environmental degradation	Incidences of wetland encroachment, deforestation ,sand mining, stone quarrying and over grazing reported	Dokolo SC
		Bata
		Okwalongwen
		Agwata
		Adok
		Kangai
		Amwoma
		Dokolo T/C
		Kwera
		Okwongodul
		Adeknino
Heavy Storms	Incidences of hailstorm, heavy strong winds reported Incidences of lightning reported	Dokolo SC
		Bata
		Okwalongwen
		Agwata
		Adok
		Kangai
		Amwoma
		Dokolo T/C
		Kwera
		Okwongodul
		Bata
Prolonged dry spell	Widespread in the region	All sub counties
Internal Conflicts	Incidences of and disputes and domestic violence reported due to communal grazing lands and water points	All Sub Counties

Crop Pests and Diseases	Incidences of Cassava Brown Streak Disease reported	Dokolo T/C
		Bata
		Agwata
		Adok
	Banana bacteria wilt	District wide
	Incidences of citrus Kangka reported	
	Incidences of fruit flies reported	
	Cassava Mosaic	
	Incidences of millipedes eating cereals at germination stage (during dry spells) reported	
	Incidences of caterpillars affecting soya beans reported	
Human Epidemic	Sleeping Sickness	Dokolo TC
		Kangai
		Dokolo S/C
		Kwera
		Okwongodul
		Bata
		Adeknino
Flooding	Incidences reported	Agwata
		Dokolo SC
		Amwoma
		Okwongodul
		Adok
		Kwera
		Adeknino
		Bata

Proliferation of Invasive Weed Species	Incidences of Striger weed reported	All Sub Counties
Animal Vector and Diseases	Incidences of African Swine Fever reported	All sub counties but most in
		Dokolo
		Bata
		Okwalongwen
		Adok
	Incidences of New Castle Disease among chicken reported	Bata
		Dokolo
		Dokolo
	Liver flukes	Dokolo
	Rabies	Dokolo T/C
		Adok
		Bata
	Tsetse Flies Nagana	All Sub Counties
Bush Fires	Incidences of massive fires reported	All the sub counties
Vermin and other problem animals	Incidences of Velvet Monkeys reported	Adok, Kwera and Agwata Sub Counties

Table 4 displays the status of hazards and summarizes the nature of hazards in the district and provides the locations of instances.

Table 5: Summary of hazards by sub-county

SUB COUNTY	HAZARDS											
	Environmental degradation	Heavy storms	Prolonged dry spell	Internal conflicts	Crop pest and diseases	Human Epidemics	Flooding	Invasive weed species	Animal Vectors and diseases	Bushfires	Vermin	Vulnerability to Agg. risk/ disaster
Bata	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		**10**
Okwalongwen	✓	✓	✓	✓	✓	✓		✓	✓	✓		**9**
Dokolo T/C	✓	✓	✓	✓	✓	✓		✓	✓	✓		**9**
Amwoma	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		**10**
Dokolo S/C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		**10**
Okwangodul	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		**10**
Kangai	✓	✓	✓	✓	✓	✓		✓	✓	✓		**9**
Adeknino	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		**10**
Kwera	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**11**
Adok	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**11**
Agwata	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**11**
Total	**11**	**11**	**11**	**11**	**11**	**11**	**8**	**11**	**11**	**11**	**3**	**104**

Table 5 provides another view of the relative significance of hazards. The right most column is ordered by the number of hazards endemic in each sub-county, and is a measure of compound vulnerability. The bottom row is ordered by the number of sub-counties that experience each hazard, giving an indication of its geographic prevalence. Table 6 ranks the hazards in their order of occurrence, frequency and magnitude. Their ranking reflects the perception of stakeholders of the relative severity of the corresponding impacts on them.

Table 6: Ranking of hazards

S/No.	Hazard	Frequency (Most Freq=3, Freq=2,Not Freq=1)	Area (No. of sub counties) affected >10=5, 8-10=4, 5-7=3, 2-4=2, <2=1	Magnitude (High=3, Medium=2, Low=1)	Total (Sum of Columns 3,4 &5)	Rank (Ascending order)
1	Environmental Degradation	3	5	3	11	1
2	Heavy Storms	3	5	2	10	2
3	Prolonged dry spell	3	5	2	10	2
4	Animal Vectors & Diseases	2	5	3	10	2
5	Internal Conflict	2	5	2	9	5
6	Crop Pest & Diseases	2	5	2	9	5
7	Invasive Weeds	2	5	2	9	5
8	Bush fires	2	5	2	9	5
9	Human Epidemics	2	5	1	8	9
10	Vermin	1	5	1	7	10
11	Flooding	2	2	1	5	11

HAZARD RISK ASSESSMENT

Table 7 below expresses the communities' assessment of severity and likelihood of risk in their respective sub-counties. Each of the columns of hazards in table 7 below translates into respective hazard risk maps in the following section. The colours red, yellow, and green showing the severity of the hazard risk in the table are also reflected in the corresponding maps.

Table 7: Hazard risk assessment

SUB COUNTY	HAZARDS										
	Environmental degradation	Heavy storms	Prolonged dry spell	Internal conflicts	Crop pest and diseases	Human Epidemics	Flood	Invasive weed species	Animal Vectors and diseases	Bushfires	Vermin
Bata	M	H	M	L	M	M	N	M	M	M	L
Okwalongwen	M	H	M	L	M	M	L	M	M	M	L
Dokolo T/C	H	M	M	H	M	M	N	M	M	L	L
Amwoma	M	H	M	L	M	M	N	M	M	M	L
Dokolo S/C	M	M	M	M	M	M	N	M	M	M	L
Okwongodul	M	M	M	M	M	M	L	M	M	M	L
Kangai	M	M	M	M	M	M	N	M	M	M	L
Adeknino	M	M	M	M	M	M	N	M	M	M	L
Kwera	H	M	M	M	M	M	L	M	M	M	M
Adok	M	H	M	M	M	M	N	M	M	M	M
Agwata	H	H	M	M	M	M	L	M	M	M	M
Key: H = High, M = Medium, L = Low, N = Not reported											

RISKS

Flood

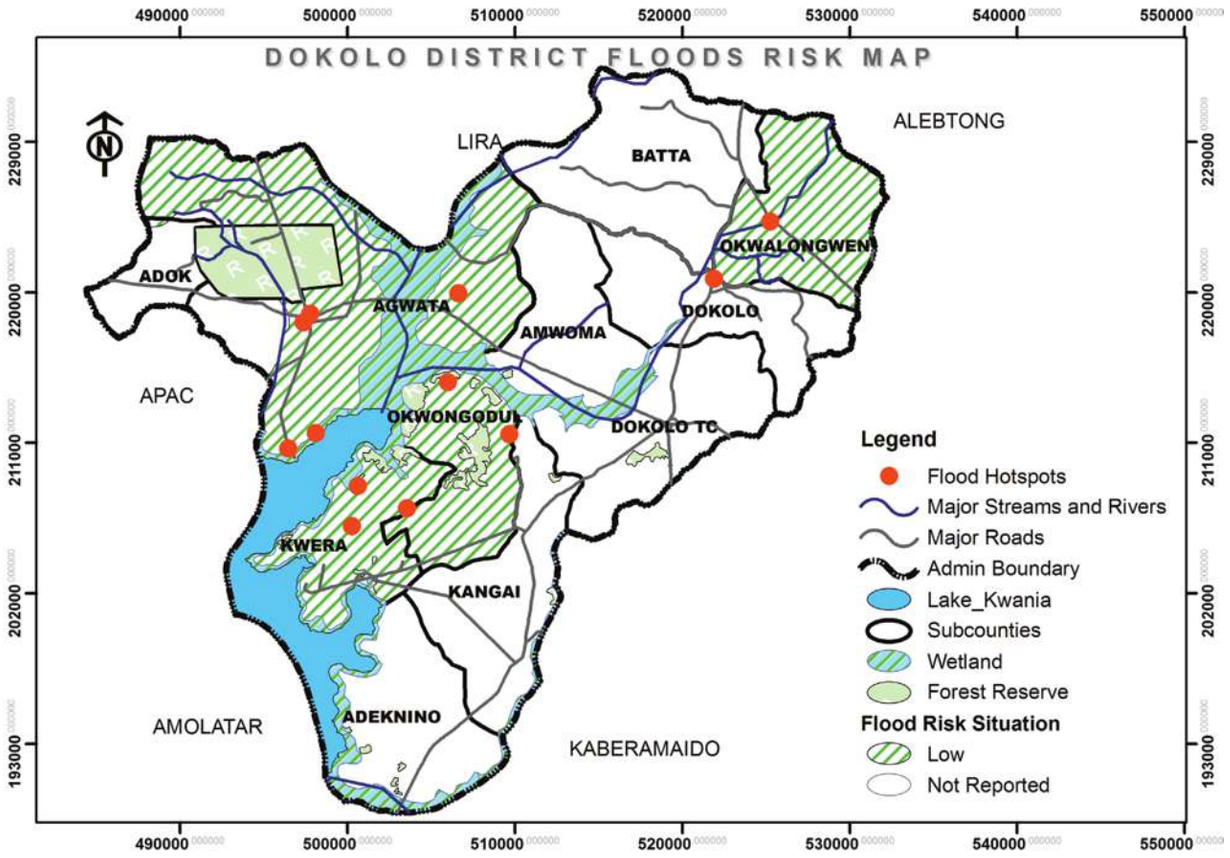


Figure 1: Flood Risk Map

Source: Field Data Collected by OPM (May, 2014)

Floods in Dokolo District result from the heavy rains that occur most especially in the second rainy season during the months of August and September. In areas where there is flooding, gardens and homes are submerged, roads eroded and fish also washed to the river banks. Flooding occurs in the whole district but in 2013 it was more pronounced in the sub-counties of Bata, Okwongodul, Agwata, Amwoma, Kwera, Dokolo and Dokolo Town council.

Where flooding occurred, diseases like malaria, cholera have been rampant. Food insecurity has been very common since most of the food is destroyed in the gardens.

Internal Conflicts

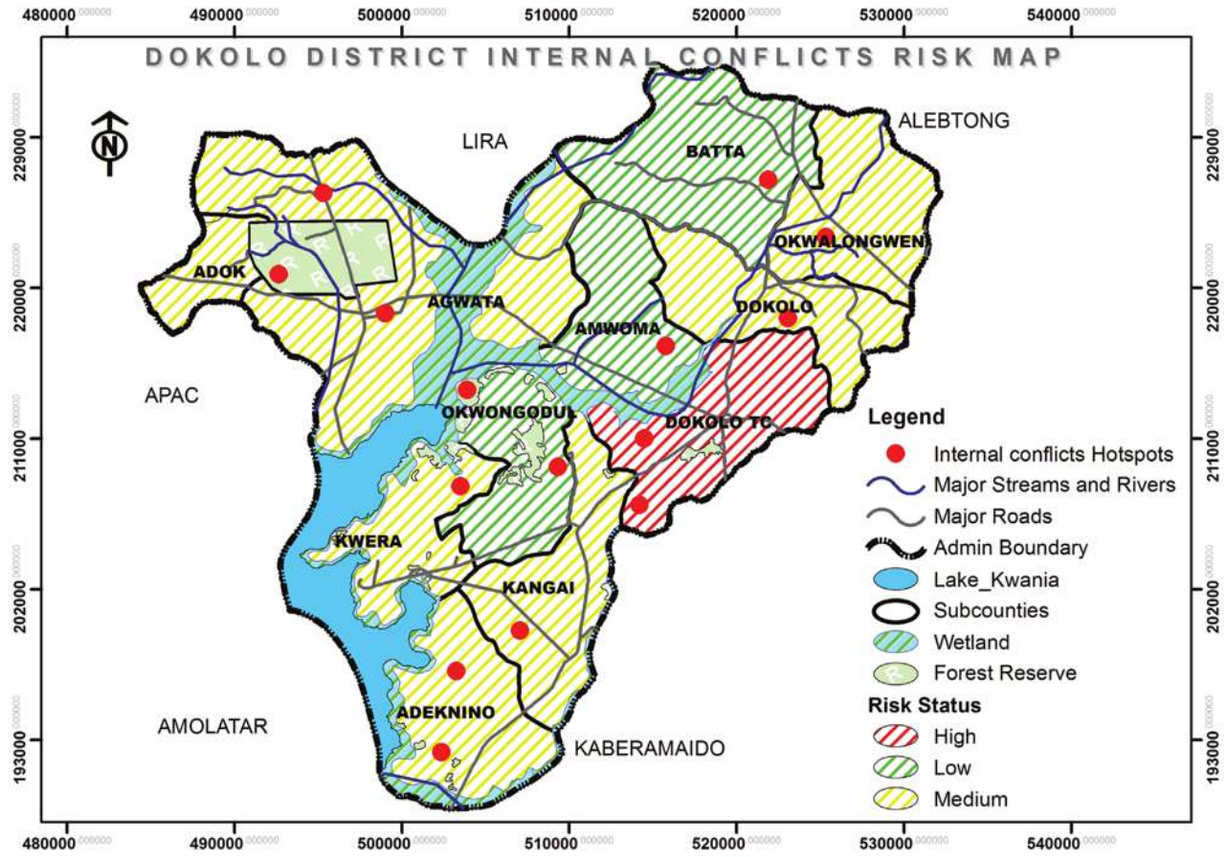


Figure 2: Internal Conflicts Risk Map
Source: Field Data Collected by OPM (May, 2014)

The growing population in Dokolo District and the changing dynamism of economic and social lives of the population has led to conflicts. The most pronounced conflicts are in the following forms: Land disputes, gender based violence and witchcraft.

Records in the probation department at the district, sub-counties and police indicate that homesteads have been burnt, lives have been lost, and social services have been interfered with. This is mainly attributed to the effects of war in the district that sowed seeds of hatred in the hearts of people, the growing population, the misinterpretation of gender equality that has given leeway to men and women to manhandle each other whenever conflict occurs, and also the growing tendencies of families to resort to selling of land whenever a money related need occurs. Most notably were the conflicts in the sub-counties in Kangai, Kwera, and Bata, Dokolo T/C, and Dokolo Sub-county.

Heavy Storms

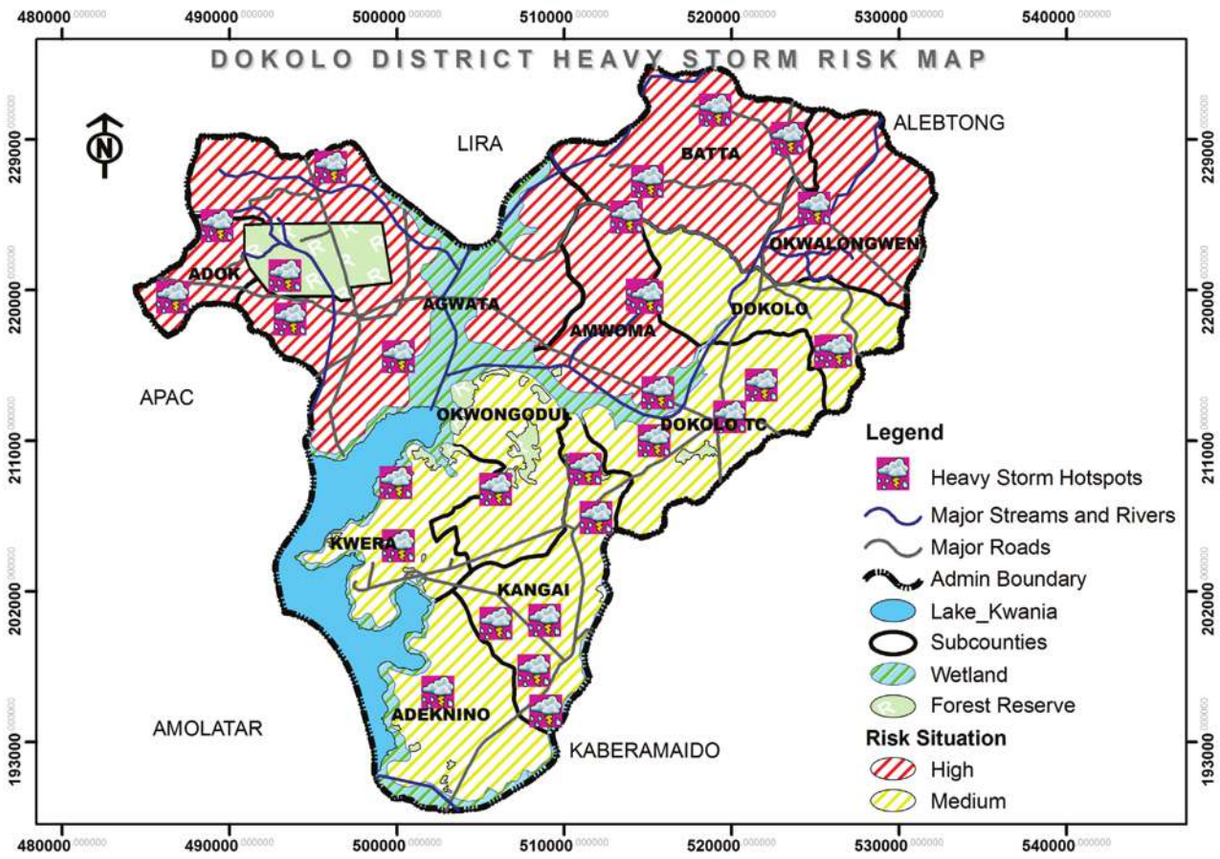


Figure 3: Heavy Storm Risk Map

Source: Field Data Collected by OPM (May, 2014)

Prolonged dry spells attributed to environmental degradation and onset of rains have sometimes culminated into heavy winds, lightning and heavy storms in Dokolo District mainly during the beginning of the rains in first season. During the last six years, whenever they have occurred, homesteads have been destroyed, social services (schools, health centres) have been disrupted, animals and their habitats destroyed and death has also occurred. In the sub-counties of Bata, Atabu Primary School roof was blown off, pupils in Barlela Primary School were affected with lightning. In Amwoma, Dokolo sub-counties and Dokolo Trading Centre, roofs of buildings in St John Bosco Senior School were blown off. In Okwalongwen sub–county, Abakuli Primary School was de-roofed and Adok where Pupils of Bardyang Primary School died due to lightning.

Environmental Degradation

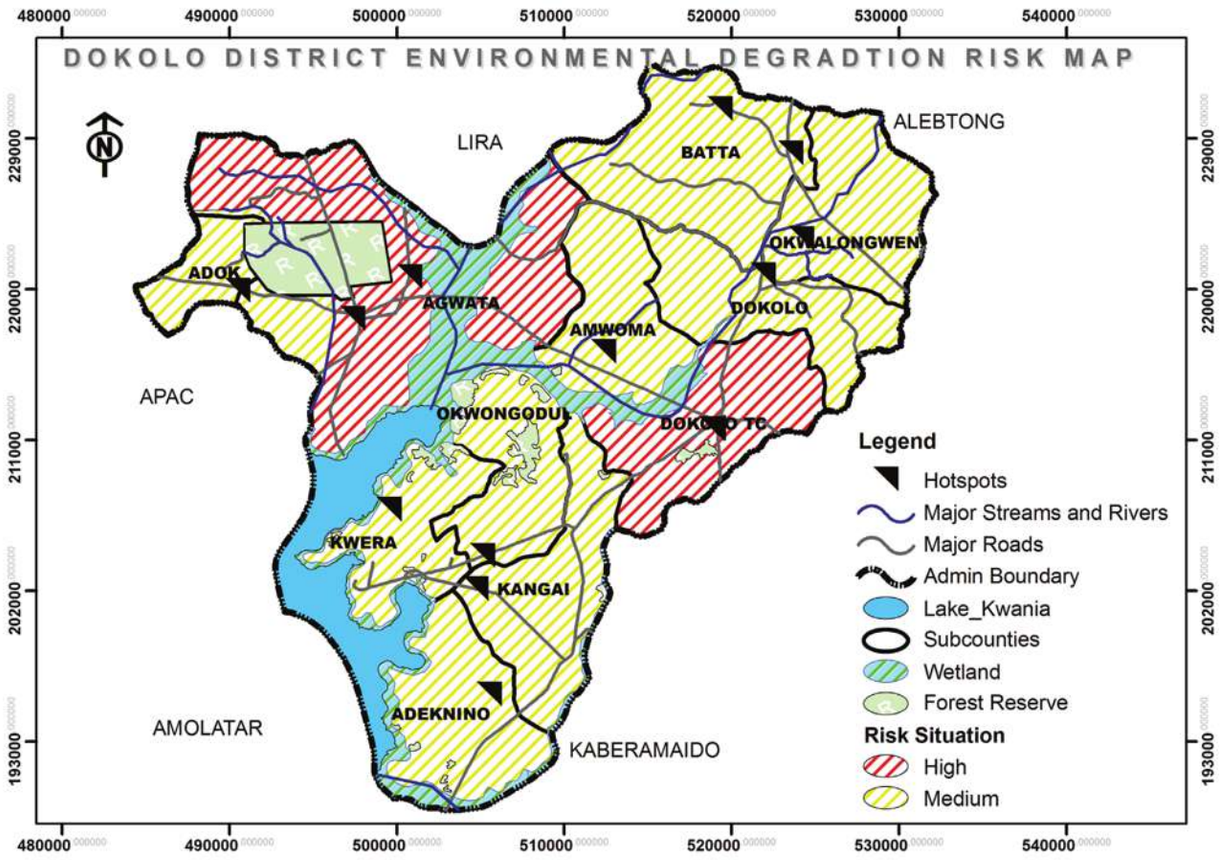


Figure 4: Environmental Degradation Risk Map
Source: Field Data Collected by OPM (May, 2014)

Environmental degradation in Dokolo District manifests itself in the forms of uncontrolled tree cutting for fuel wood, charcoal and land clearance for agriculture; wetlands and lakeshore degradation for farming which has led to siltation of water bodies and lowering of underground water tables leading to drying of boreholes and spring wells. This has resulted to habitat and eco-system destruction.

A lot of tree cover is lost since communities depend on wood fuel for cooking and also as a source of income from charcoal burning and selling. With the growing tendencies of demand for construction of permanent buildings, a lot of trees have been cut for use in construction. In as much as there is a policy by government to increase household incomes, the act of cutting down trees to increase arable land for growing sun flower, soil fertility has reduced. Destruction of trees has affected the ecological systems hence leading to loss or migration of animals and birds out of the district. Thus whereas this hazard is envisaged district wide, it is most notable in the sub-counties of Kwera, Kangai, Okwongodul, Bata, Okwalongwen, Agwata, Amwoma, Dokolo Town Council.

Crop Pests and Diseases

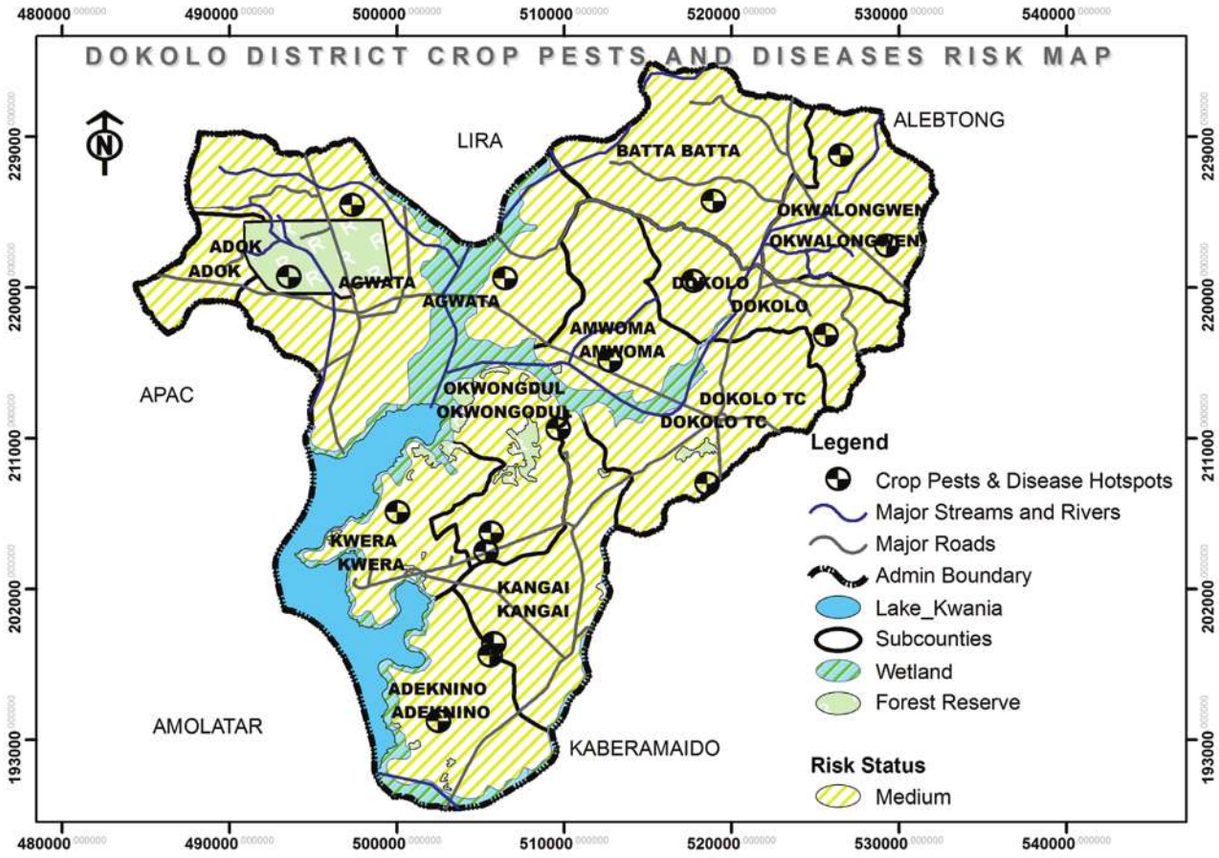


Figure 5: Crop Pests and Diseases Risk Map
Source: Field Data Collected by OPM (May, 2014

Dokolo district being predominantly an agrarian community is prone to crop pests and diseases. The most commonly noted diseases are: cassava brown streak, cassava mosaic and millipedes which have had occurrences district wide, manifests themselves in reduction in yields hence famine. This has mainly been due to the fact that communities have failed to adopt modern techniques and new varieties of cassava preferring the traditional varieties.

Banana bacterial wilt has been common district wide since the sub-counties through the NAADS interventions have attempted to promote banana growing hence reduced yields of the bananas. Fruit flies, anthracnose and citrus canker have led to loss of inputs distributed to farmers' district wide. Caterpillars have also been affecting soya beans. Crop pests and diseases affect crop production and productivity leading to increased cases of malnutrition, inadequate supply of food and reduced household incomes.

Animal Vectors and Diseases

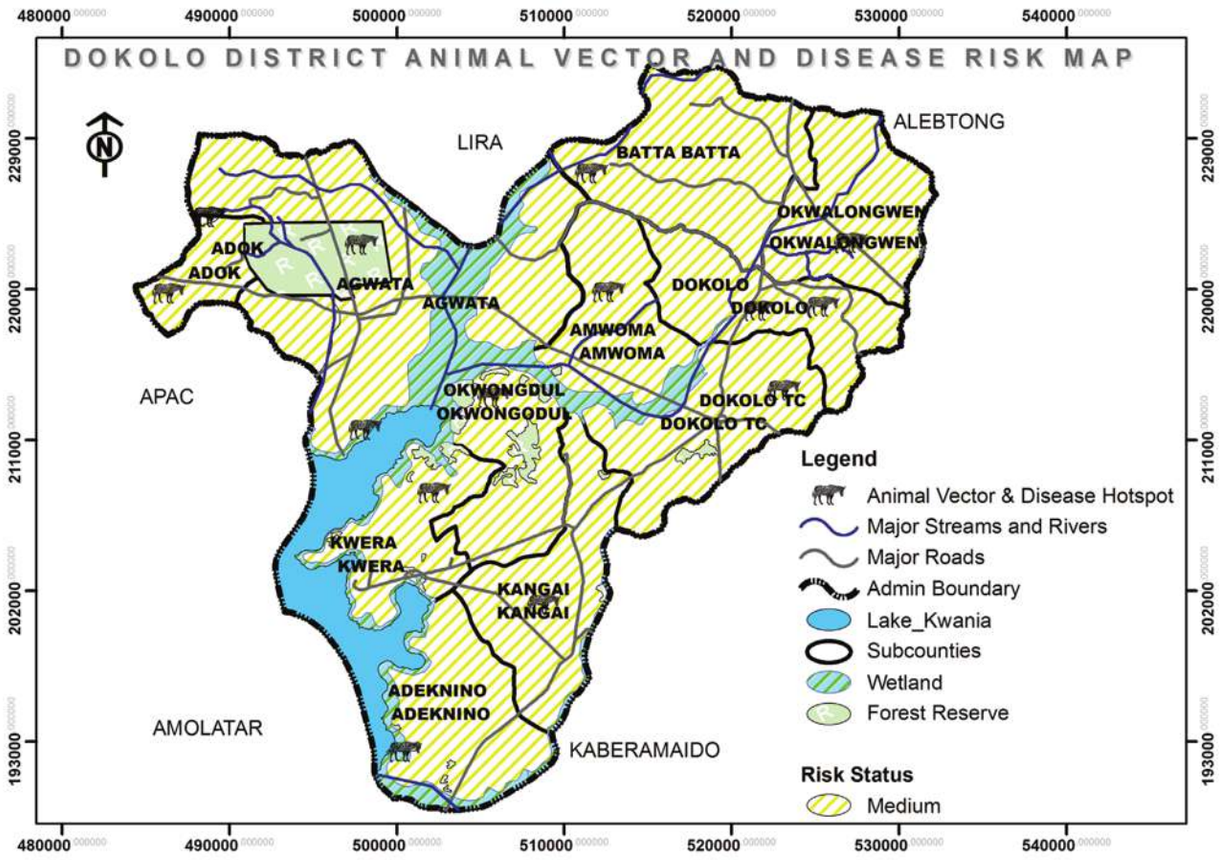


Figure 6: Animal Vectors and Diseases Risk Map
Source: Field Data Collected by OPM (May, 2014)

Most families practice mixed agriculture by practicing animal husbandry since it contributes greatly to household incomes. Livestock keeping in the district has for the past six years been affected with livestock diseases such as Newcastle disease. It has sometimes led to mass destruction of all the chicken in the sub-counties and sometimes sweeping across the district. This has been compounded by massive transfer of chicken through the district to South Sudan and other markets. Fowl pox, which affects the beaks and eyes of the birds, has also been notable district wide. African swine fever has been notable across the entire district since the farmers in prioritising enterprises under the NAADS programme have increased the uptake of piggery as a lead enterprise. Tsetse flies have been greatly affecting cattle by spreading Nagana thus affecting the cattle.

Human Epidemics

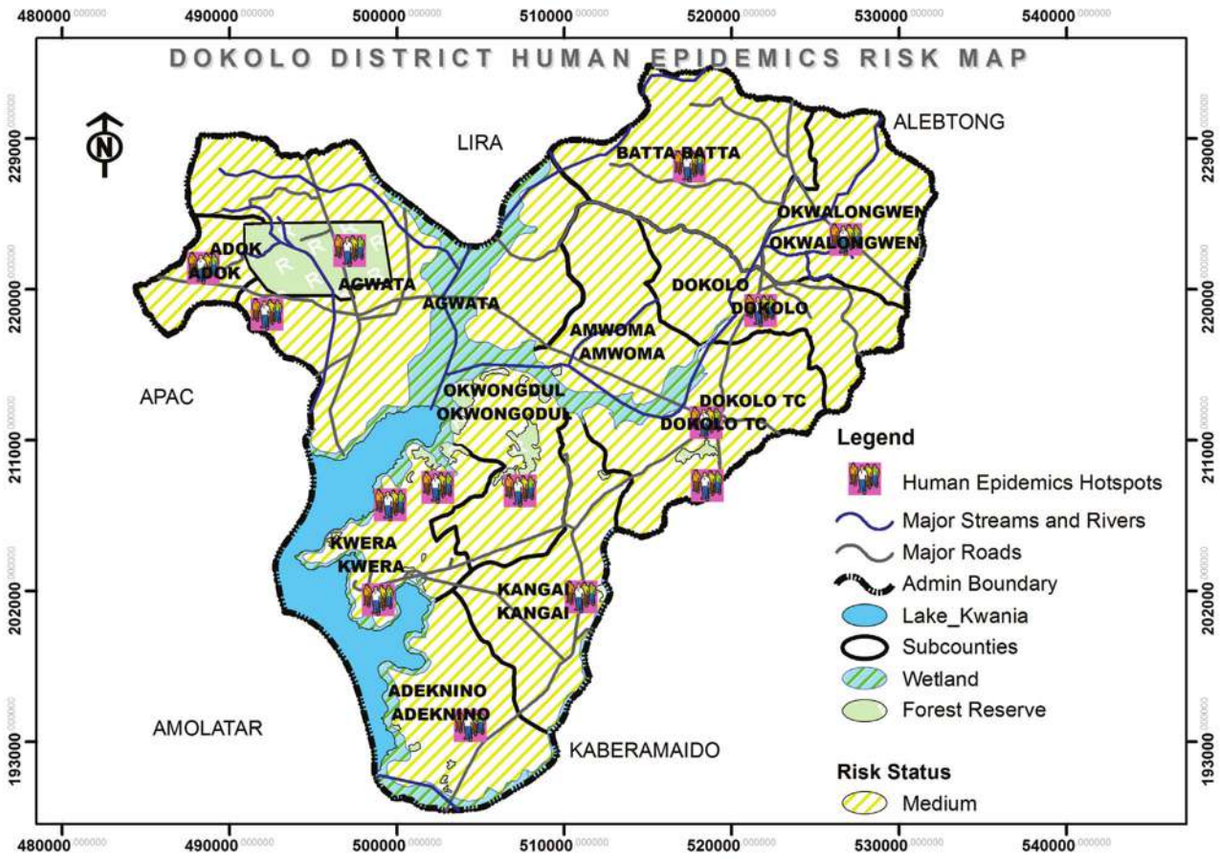


Figure 7: Human Epidemics Risk Map

Source: Field Data Collected by OPM (May, 2014)

The tsetse fly attacks on human beings in Kangai, Kwera, Okwalongwen, Okwongodul, Agwata and Dokolo T.C has led to people contracting sleeping sickness. This made the WHO to set up a treatment centre in Dokolo Health Centre IV and Lwala Hospital in Kaberamaido District. However tsetse flies also attack animal causing nagana. These emerge from the surrounding swamps and thickets. It's important to note that these transfer diseases to mammals in general at a very high rate.

Invasive Weed Species

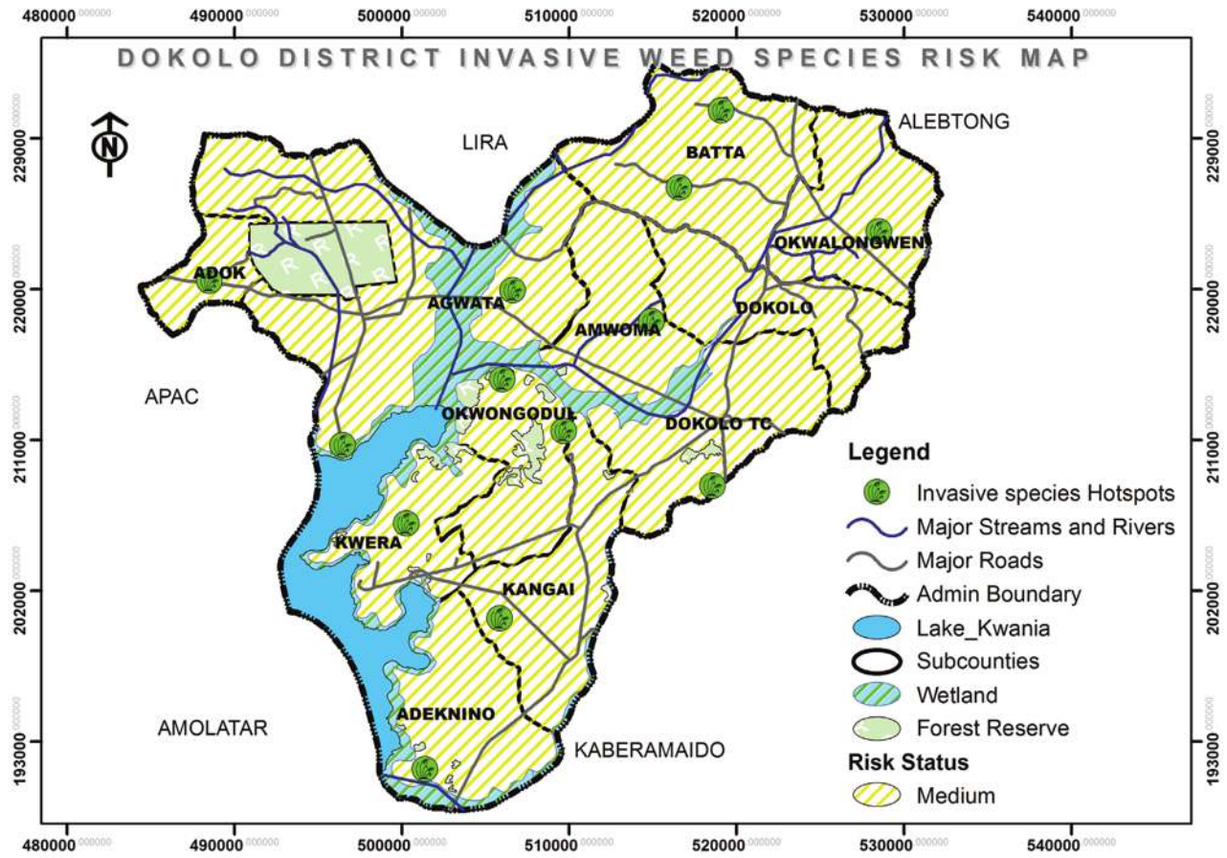


Figure 8 : Invasive Weed Species Risk Map
Source: Field Data Collected by OPM (May, 2014)

This is mainly happening in all the 11 lower local governments in Dokolo District. The Striga weed has led to crop failure since it multiplies faster and covers the whole garden and it germinates first before the crops themselves.

Lantana Kamara is a serious invasive species that covers the farmland and it spreads very fast. It is always used for fencing the land but now it has become so invasive that it covers the crops underneath leading to crop failure.

Vermin

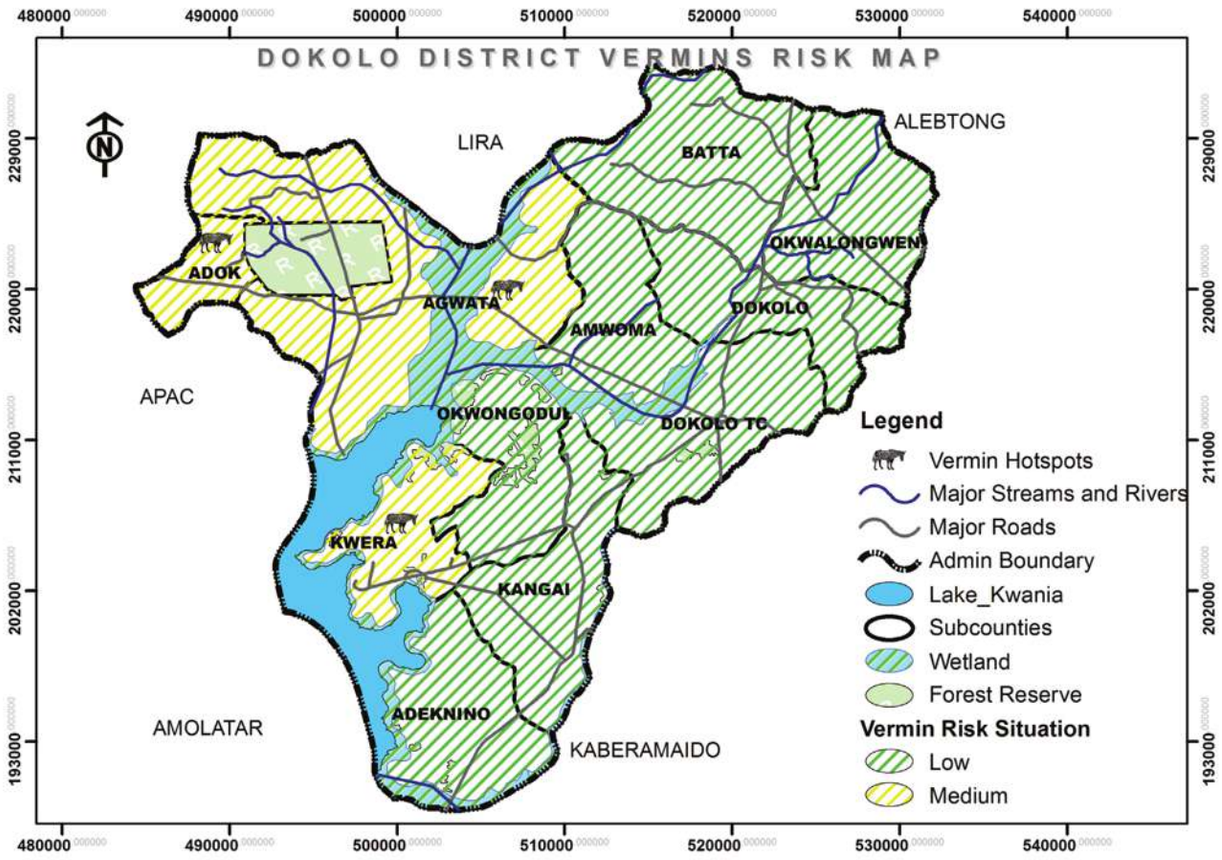


Figure 9: Vermin Risk Map

Source: Field Data Collected by OPM (May, 2014)

The velvet monkeys have in many occasions invaded farmlands destroying crops and also the fruits like mangoes, guavas, passion fruits etc. This hazard poses moderate risk in Agwata, Adok and Kwera sub-counties, while the rest of the district has faces low risk. This has also caused a conflict between the Uganda Wildlife Authority and the local people since the farmers have resorted to killing vermin.

Bush Fires

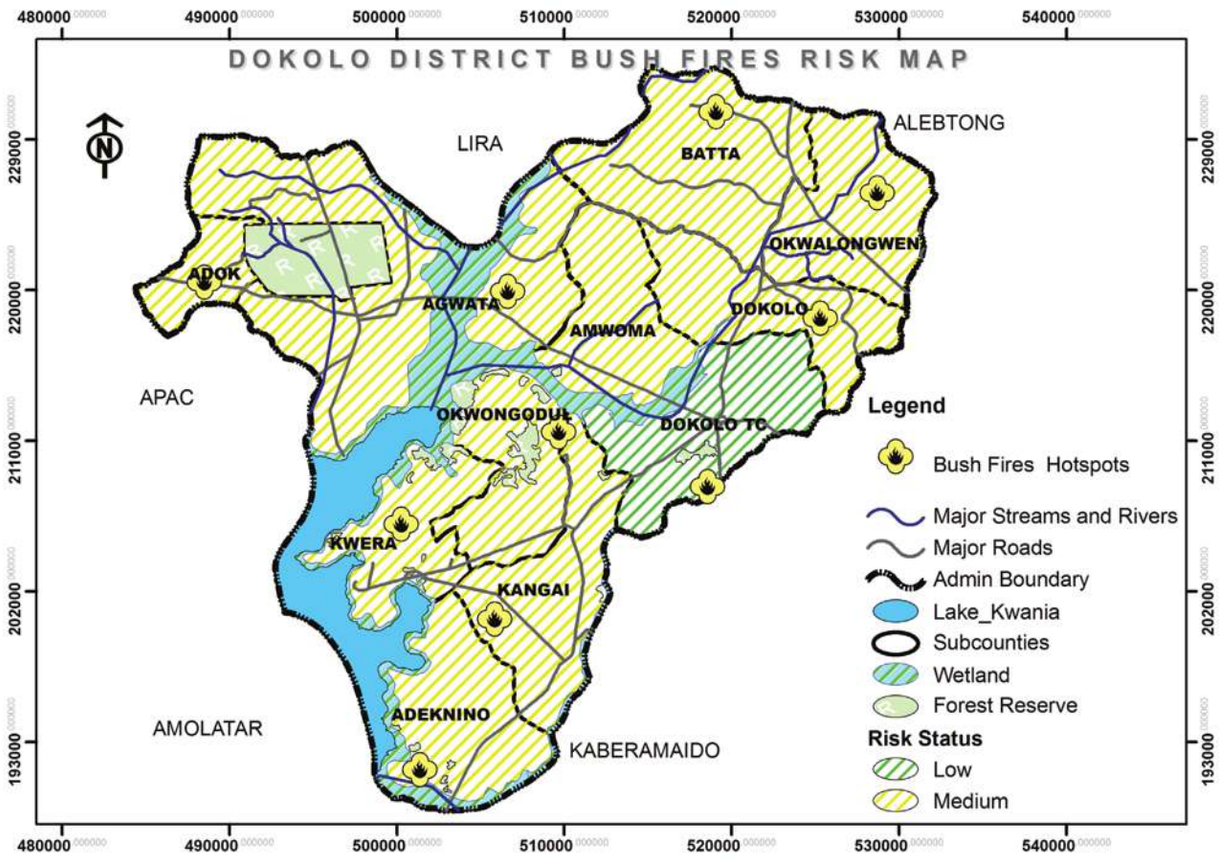


Figure 10: Bush Fires Risk Map

Source: Field Data Collected by OPM (May, 2014)

Some people set up bush fires for fun but it ends up destroying crops and property. The District Disaster Management Committee has received reports of large amount of crops and property destroyed by this act. This is so rampant in all the sub-counties in Dokolo posing moderate risk except Dokolo Town Council. The fires also burn the protective vegetative cover of wetlands and swamps which in effect contributes to change in the microclimate.

Prolonged Dry Spells

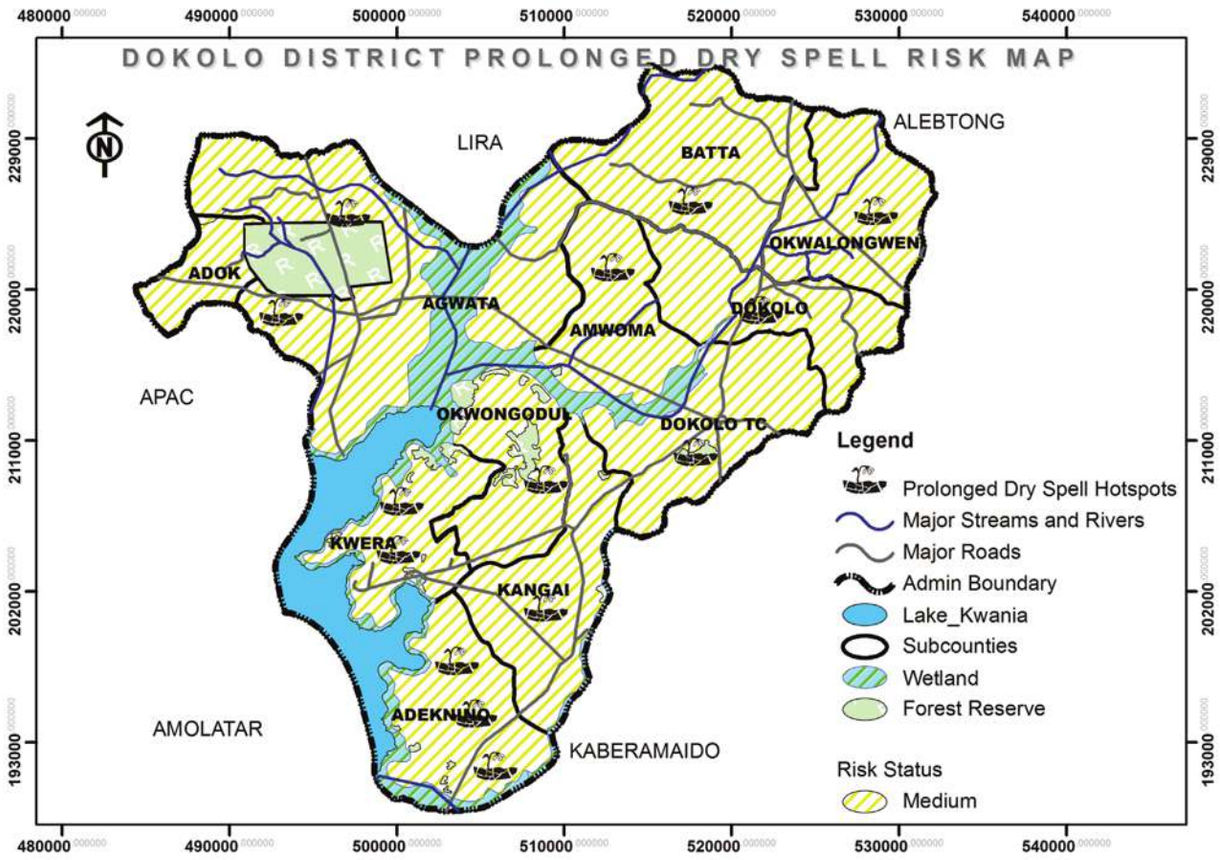


Figure 11: Prolonged Dry Spell Risk Map
Source: Field Data Collected by OPM (May, 2014)

This is a serious hazard that affects the entire district exposing the communities to moderate risk. The recent rains delayed especially, in the first rainy season (March to May) and disappeared for over four months after two weeks from their onset. This exposes the farmers to the risk of losing the crops which would just have germinated then the rains again disappear. This will lead to crop failure and later on famine will loom in. This occurs in all the sub-counties in Dokolo district.

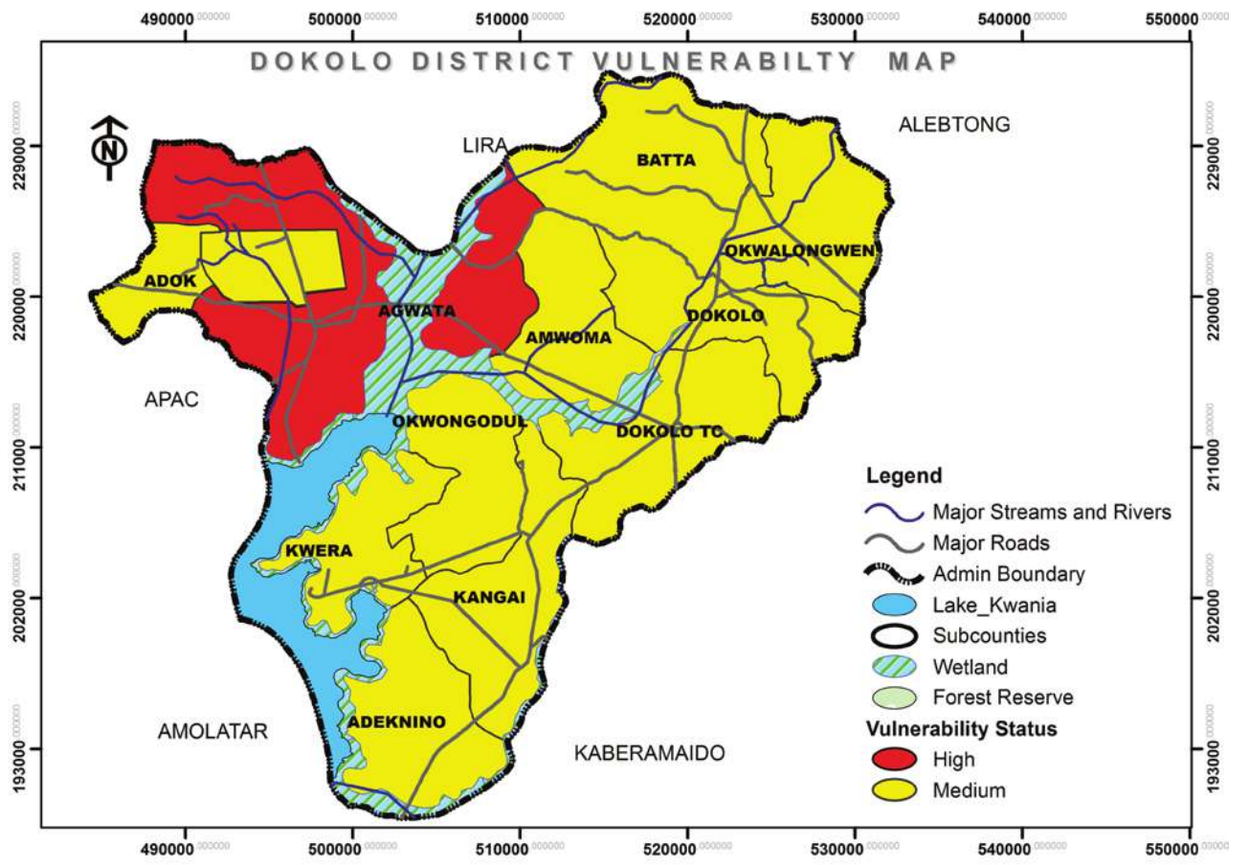
VULNERABILITY

Table 7 summarizes the communities' assessment of hazard severity and frequency in the sun-counties. Table 8 transforms those qualitative low/medium/high judgements to numerical values 1/2/3 which when summed vertically show the relative risk per hazard. The horizontal sums show both cumulative and weighted vulnerability

Table 8: Risk and Vulnerability Assessment

SUB COUNTY	Environmental degradation	Heavy storms	Prolonged dry spell	Internal conflicts	Crop pest and diseases	Human Epidemics	Flooding	Invasive weed species	Animal Vectors and diseases	Bushfires	Vermin	Cumulative vulnerability (Absolute)	Weighted vulnerability (Cumulative/3)
Bata	2	3	2	1	2	2	0	2	2	2	1	19	6
Okwalongwen	2	3	2	1	2	2	1	2	2	2	1	20	7
Dokolo T/C	3	2	2	3	2	2	0	2	2	1	1	20	7
Amwoma	2	3	2	1	2	2	0	2	2	2	1	19	6
Dokolo S/C	2	2	2	2	2	2	0	2	2	2	1	19	6
Okwongodul	2	2	2	2	2	2	1	2	2	2	1	20	7
Kangai	2	2	2	2	2	2	0	2	2	2	1	19	6
Adeknino	2	2	2	2	2	2	0	2	2	2	1	19	6
Kwera	3	2	2	2	2	2	1	2	2	2	2	22	7
Adok	2	3	2	2	2	2	0	2	2	2	2	21	7
Agwata	3	3	2	2	2	2	1	2	2	2	2	23	8
Total	25	27	22	20	22	22	4	22	22	21	14	221	
Key: 3 = High, 2 = Medium, 1 = Low, 0 = Not reported													

Figure 12: Risk Vulnerability Map



Source: Field Data Collected by OPM (May, 2014)

RISK VULNERABILITY

The vulnerability map in Figure 13 shows the areas of low, medium and high vulnerability according to the risk and vulnerability table (Table 8) above. In this analysis, the cumulative vulnerability of each sub-county is calculated and then weighted to provide weighted vulnerabilities for individual sub-counties. Therefore sub-counties with weighted vulnerability values less than 4 are coded “low”, termed low vulnerability areas and are assigned green, those from 5 to 7 are coded “medium”, termed medium vulnerability areas and are assigned yellow while those whose weighted vulnerabilities are 8 or more are coded “high”, termed high vulnerability areas and are represented by red.

Dokolo district is exposed to 11 hazards namely heavy storms, environmental degradation, prolonged dry spell, crop pests and diseases, human epidemics, invasive weed species, animal vectors and diseases, bush fires, internal conflicts, vermin and flooding arranged in their order of risk from highest to lowest with total risks of 27, 25, 22, 22, 22, 22, 22, 21, 20, 14 and 4 respectively. These are worsened by poor practices that include building houses close to rivers, lack of protective embankments/walls, constructing houses with weak designs, and deforestation of slopes with poor soils.

Agwata sub-county reported the highest vulnerability Dokolo district with a cumulative vulnerability of 23 and a weighted vulnerability of 8 which lies at the top (red) of the vulnerability scale. The rest of the sub-counties displayed medium (yellow) vulnerability with weighted vulnerabilities between 5 and 7. Though still portraying medium vulnerability, Bata, Amwoma, Dokolo, Kangai, and Adeknino sub-counties were the least vulnerable sub-counties in the district with a weighted vulnerability value of 6 each.

Though all the elements of the community are vulnerable to the fore mentioned hazards, the burden lies heaviest on the elderly elements, the children and the women. The school children and the farmers are especially vulnerable to floods than any other groups. The poor elements of these communities too feel the pinch of the hazards more than their wealthy counterparts therefore are more vulnerable.

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CONCLUSION

This multi hazard, risk and vulnerability profile for Dokolo District was produced after conducting a rigorous people centred, multi-sectoral, and multi stakeholder field data collection/mapping, analysis, and map production. It is therefore a synthesis of primary data, secondary data and the perception/experiences of the local people, the community leadership at all levels. Thus it portrays how the people of Dokolo perceive each of the hazards based on the past trends and the predicted likelihood of their occurrences and impact on the communities.

The stakeholders perceive that Dokolo district is vulnerable to eleven hazards, in order of decreasing risk: heavy storms, environmental degradation, prolonged dry spell, crop pests and diseases, human epidemics, invasive weed species, animal vectors and diseases, bush fires, internal conflicts, vermin and flooding.

Agwata is the most vulnerable sub-county in the district with a weighted vulnerability of 8, lying at the top (red) of the vulnerability scale. The rest of the sub counties displayed medium (yellow) with weighted vulnerabilities between 5 and 7 but should be fortified against occurrences of new hazards and exacerbation of resident hazards now occurring at lower magnitudes but which may be worsened by climate extremes expected in the near future. Bata, Amwoma, Dokolo, Kangai, and Adeknino sub-counties were the least vulnerable sub-counties in the district with a weighted vulnerability value of 6 each though still they portray medium vulnerability at the vulnerability scale.

Timely early warning systems and other DRR interventions would be able to enhance the resilience of the people of Dokolo to the effects of climate change.

This profile is therefore a compelling outcome of an integration of the spatial information obtained from the mapping exercise and the community perception of the hazards. It should henceforth inform the contingency as well as the district development planning process towards disaster proof plans.

DEFINITION OF TERMS

Drought is the prolonged shortage of water usually caused by lack of rain. Drought and food insecurity are related because crop and livestock productivity suffer in droughts.

Food insecurity is the severe shortage of food that may lead to malnutrition and death.

Floods occur when large amounts of water cover a place that is meant to be dry. Floods usually occur with high rainfall.

Epidemics the occurrence of a disease, in a particular community and at a particular period, beyond normal levels and numbers. Epidemics may affect people, crops or livestock.

Human epidemics diseases include cholera, meningitis, hepatitis E, marbug, plague, avian influenza, Ebola and sleeping sickness among others.

Crop and animal epidemics include swine fever, foot and mouth disease, nagana, and bird flu. Crop disease epidemics include coffee wilt, banana bacterial wilt, and cassava mosaic and cassava brown streak disease.

Heavy storms in Uganda are often accompanied by hail, lightning and violent winds. Storms can result in destruction of crops, animals, public facilities and human settlements. Lightning can be deadly and may be mitigated by lightning ground conductors on buildings.

Pest infestation these are destructive insects, worms, caterpillars or any other animal that attacks crops or livestock. Common pests in Uganda include weevils, locusts and caterpillars.

Vermin Baboons, chimpanzees, bush pigs and other animals which raid crops cause damage and losses which may significantly diminish agricultural productivity.

Land conflicts arise from ownership and use of land and other land resources.

Environmental degradation results from poor land use and other unsustainable ecosystem exploitation that lead to deterioration of the environment. Overgrazing, cultivation on sloping land, unguided and uncontrolled use of fertilizers and pesticides, bush burning, overfishing, deforestation, mining, poor wastewater treatment, inappropriate waste disposal and wetlands reclamation are examples of causes of environmental degradation.

Bush fires set deliberately to clear forest or pasture for agricultural purposes may go out of control and consume far more than intended.

Invasive Species non-native plants or animals that invade a habitat or bioregion with adverse economic, environmental, and/or ecological effects. An example is a grass that is dominating pasture in the Lango sub-region, reducing the grazing capacity of the land.

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