THE REPUBLIC OF UGANDA

Lira District

Hazard, Risk and Vulnerability Profile

2016

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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 Organizations
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	Micro Soft
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 Organizations

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 Defense 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 Co-ordination of Humanitarian Affairs
UXO's	Unexploded Ordinances
VDPMC	Village Disaster Preparedness and Management Committees

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

EXECUTIVE SUMMARY

This Lira District Hazard, Risk and Vulnerability Profile integrates scientific information provided by Government of Uganda agencies and hazard and vulnerability knowledge provided by communities on the district base map to contribute to a Uganda National disaster risks 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	Preliminary activities
Phase II	Field data collection, mapping, verification and ground truthing
Phase III	Participatory data analysis, mapping and report writing
Phase IV	Refinement, validation and final map production/reporting

The report characterizes the district in terms of location, geography, gender demographics by sub-county and livelihoods. Lira District is located in Lango sub-region in Northern Uganda and is bordered by the districts of Pader and Otuke in the North and North East, Alebtong in the East, Dokolo in the South and Apac in the West. Physically, the district lies between: Latitudes 1^{o} 21'N, 2^{o} 42"N, Longitudes 32^{0} 51"E, 34^{0} 15. The continental climate of the district is modified by the large swamp area surrounding the southern part of the district.

The rainfall in the district is bimodal with one peak during April-May and the other in August-October. The Uganda Bureau of Statistics (UBOS) estimates the population in 2011 at 389,300 and by the end of the HS5DP in 2015/16 Lira District's population will be approximately 445,007, 48.5% of the population are male while 51.5% are female; with 88% of the population resident in rural areas.

It identifies endemic hazards in 10 classes, in order of high to low risk: animal vectors and diseases, invasive weed species, internal conflicts, crop pests and diseases, prolonged dry spell, environmental degradation, flooding, bush fires, human epidemics, and severe storms.

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 points of incidence of the hazard.

Ogur and Lira sub-counties emerged the most vulnerable communities in Lira district each with a cumulative vulnerability score of 23 and a weighted vulnerability score of 8 which lies in the top (red) category of the vulnerability scale. The rest of the sub-counties displayed medium (yellow) vulnerability all tying at a weighted vulnerability of 7. This makes Lira one of the most vulnerable districts of the region.

Early warning systems and other DRR interventions would be able to enhance the resilience of the people of Lira to the effects of climate change.

This profile is a legitimate 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 planning, district development planning process towards disaster proof plans.

INTRODUCTION

Lira District is vulnerable to a number of hazards that lead frequently to disasters. They include:animal vectors and diseases, invasive weed species, internal conflicts, crop pests and diseases, prolonged dry spell, environmental degradation, flooding, bush fires, human epidemics, and severe storms.

The Lira 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 hazards and analysing disaster risks and vulnerabilities in Lira 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 and inform the development of the district's contingency and development plans.

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 LiraDistrict.

Methodology

The multi-hazard, risk and vulnerability mapping approach employed a people-centered, multi-sectoral, and multi-stakeholder approach. A mapping team led by the Office of the Prime Minister (OPM) and involving representatives from UNDP and district sector offices deployed on a field mission to Rwenzori sub-region to capture the required information and produce the district profile.

The team employed a variety of data-collection methods including use of a mix-scale approach involving the integration of primary and secondary data. Secondary data were acquired through government sources (relevant Ministries, Departments and Agencies, the districts in Lango sub-region) and data bases from other organizations/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 critical phases as follows:

Phase I	Preliminary activities
Phase II	Field data collection, mapping, verification and ground truthing
Phase III	Participatory data analysis, mapping and report writing
Phase IV	Refinement, validation and final map production/reporting

Phase I: Preliminary Activities

In this phase the mapping team undertook a series of planning and programming activities before start of field activity including holding meetings with relevant teams, mobilizing required resources, acquiring required equipment and materials,

review of relevant literature, establishing relevant contacts and developing a checklist of activities to be undertaken in Phase Two.

The main objectives of Phase One were to prepare and undertake preliminary assessment of the quality and nature of the resources/materials, develop a quick understanding within the mapping team and other actors of the task of the multi-hazard, risk, and vulnerability mapping before any detailed physical field work was undertaken. This phase enabled the scoping and design of specific content and legends for the thematic maps.

The phase was also useful for preparing the resource deployment plan, and outlining procedure and field work plans, etc. It articulated, among other issues, the utilization 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 preliminary field meeting was held in each district to capture key local issues related to disaster incidence and trends. The meetings gave opportunities for the mapping team and stakeholders to identify other key resource persons and support staff from within the local community for consultation.

Stakeholder Participation Practices. Stakeholder participation was a key component of the mapping exercise. The team conducted consultations with district technical sector heads under the overall purview of the District Disaster Management Committee (DDMC) involved in the ground truthing 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 contribute any other relevant information vital to the mapping process.

Capture of spatial data. Spatial data were captured and complemented by base maps prepared at appropriate scales. The base maps contained relevant data including 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 organizations, including policy and legal documents, previous maps/ report and studies, was conducted. A checklist summarized the required information according to the multi-disaster risk indicators being studied/mapped. Data from documents were analysed using various methods including content analysis.

Critical observation and ground truthing. This approach 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 were 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 data collection, feedback and exit meetings with stakeholders were carried out in the district. These meetings provided additional information regarding the disaster mapping exercise, validated the data generated, and provided clarity on the expected outputs and the way forward into the next phase.

Phase III: Data Analysis and Verification

Analysis of collected data. The mapping team and district government officials analyzed the collected data, and developed thematic disaster maps by integrating features generated from GPS data with base maps and high resolution satellite images. The main activities at this phase included:

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 and geo-referencing

Discussions/FGDs

Drafting, digitizing and GIS Overlays

Compiling of different data and information

Data editing, coding and cleaning. Data entry clerks, data editors and coders digitized, edited, coded and cleaned data collected using the various tools mentioned above. Both qualitative and quantitative data obtained from the field were entered via a data entry interface customized to the layout of the field data forms. Data coding and analysis started immediately the data was available. Arrangements were made in the field to handle manual editing and coding as and when data was received from the field crew. Furthermore, data entry, verification, screen editing and system development followed sequentially to enable the preparation of draft maps.

Data analysis package. The mapping team analysed acquired data using MS Word and MS Excel for Windows, and spatial data using ArcGIS 10 software and mobile GIS applications. They performed rapid and systematic GIS overlays 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, they merged it for cross tabulation and eventual production of thematic maps for the various types of hazards.

Generation and appraisal of draft Maps: Prioritization set by the districts determined the various hazards presented on the thematic maps. The team convened a field workshop to present, appraise and validate the risk and vulnerability maps with respect to their accuracy and completeness. Information gaps were identified and filled in the final risk and vulnerability maps.

Phase IV: Refinement, validation and reporting

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

Brief overview of the district

Location and size

Lira District is located in Lango sub-region of Northern Uganda and is bordered by the districts of Pader and Otuke in the North and North East respectively, Alebtong in the East, Dokolo in the South and Apac in the West. The absolute location of Lira District lies between: Latitudes 1^{o} 21'N, 2^{o} 42"N and Longitudes 32^{0} 51"E, 34^{0} 15"E.

The District covers approximately a total area 1326 km^2 of which 1286.22 km^2 is land area suitable for human habitation and agricultural production while the rest is open water and wetlands.

Table 1: Lira District Area Size in km by Sub County

No.	County	Sub-county	Area size (km2)
		Erute County	
1		Amach	215.3
2		Agali	104.7
3		Adekokwok	67.2
4		Ngetta	65.8
5		Ogur	145.9
6		Agweng	127.1
7		Lira	85
8		Barr	293
9		Aromo	186
	Sub Total		**1,290**
	Lira Municipality		
10		Adyel Division	12.6
11		Ojwina Division	13.1
12		Lira Central Division	8.1
13		Railways Division	2.2
	Sub Total		**36**
	Grand Total		**1326**

(Source: Lira District Planning Unit, 2010)

Administrative and Local Government Units

The district is composed of the following number of administrative units: 2 Counties (Erutecounty and Lira Municipal Council); 13 Sub-counties (9 sub counties and 4 Municipal Divisions); 63 Parishes and 20 wards in Lira Municipality; 678 Villages and 64 cells in Lira Municipality.

Geology and Soils

The geological formations in the district is made of basement complex (mainly undifferentiated acid gneiss) covering most of the district.

Climate

The climate of the District is modified by the large swamp area surrounding the southern part. The rainfall in the District is bimodal with one peak during April-May and the other in August-October. The average annual rainfall in the District varies between 1200-1600mm decreasing northwards. The rainfall is mainly convectional and normally comes in the afternoons and evenings.

The average minimum and maximum temperatures are 22.5^{0}C and 25.5^{0}C respectively. Absolute maximum temperature hardly goes beyond 36^{0}C, and absolute minimum hardly falls below 20^{0}C.

The Equatorial Trough which brings rainfall passes over the District. The South easterly winds which also bring rains to the District passes over Lira. Land and sea breezes are common in the District. Wind run is low (1-4m/sec) during the rainy season and moderate (4-8m/sec) during the dry season.

Historical Background

Lira District which was formed in 1974 from the then Lango District is occupied by the Lango ethnic group with its sister districts Apac , Oyam, Otuke, Alebtong, Amolatar, Kole and Dokolo also mainly occupied by the Lango ethnic group.

The Langi originated from Abyssinia in Ethiopia. They are considered to be part of the Nilo-Hamites (also known as semi-Hamitic) group which includes the Teso, Kumam, Jie and Karamojong tribes. The Lango, in contrast of their fellows, have adopted the simpler Nilotic tongue. It is believed that their move from further North into the present habitat took place between the years 1800-1890.

Apart from times of wars, when some sort of cohesion was achieved under one or two war leaders, the Langi before the advent of British Administration in 1889, were divided into many small groups or clans each with its own leader, i.e. chieftainship. British Administration of the District dates back to 1900. Administration in the early days was in the hands of Buganda agents.

The present district headquarters at Lira were established in 1914.

Economic Background

Overview

The economy of the District is mainly based on agriculture, with 81% of the population engaged in subsistence farming. Other sectors include agro processing industries 3.1%, commercial activities and banking contribute 15.9%.

Agriculture

At independence cotton was the major cash crop but its production has declined and has lost glory. Crops hitherto were mainly food crops such as millet, simsim, cassava, Groundnuts, beans, pigeon peas, cowpeas, sorgum, sweet potatoes and other recently introduced crops such as rice, sunflower, soya beans, maize and horticultural crops serve both as food and cash crops.

Cattle used to be a big source of wealth as well, but this has totally been eroded by cattle rustling and LRA war from 1987-2006 which virtually depleted the stock of animals from 316,000 in 1987 to about 80,000 in 2002.

With improved security situation since 2006 the livestock population in the District is as below:Cattle 159,533, goats 161,711, sheep 12,749, pigs 28,631 and chicken 1,116,903.

The District is out of danger of sporadic cattle theft of the hitherto endemic problems associated with cattle rustling of the 1980's following the creation of new districts that established security checks.

Industrialization is at a very low level. Most industries are involved in agro processing such as edible oil production, bakery, maize and rice milling and grinderies.

Demography

The district has a population of seven hundred fifteen thousand one hundred (715,100) peopleasat 2012. The projected population is on the basis of the National housing and population census of 2002. The details of the population disaggregated by gender and sub–County in the table below.

Table 2: Lira District Population Projection 2012

	2008	2009	2010	2011	2012
Male	303,900	308,400	325,600	336,900	348,300
Female	322,600	327,800	344,300	355,500	366,800
Total	**626,500**	**636,200**	**669,900**	**692,400**	**715,100**

(Source: Lira District population projection, UBOS, 2010)

Table 3: Lira District Population Projection by Sub County

No.	District/Sub – county	Male	Female	Total
1	Adekokwok	15,764	16,724	32,488
2	Ngetta	15,436	16,376	31,812
3	Amach	17,089	18,502	35,591
4	Agali	8,311	8,998	17,309
5	Aromo	16,800	18,000	34,800
6	Barr	20,400	21,600	42,000
7	Lira	12,200	13,200	25400
8	Ogur	13,682	14,750	28,432
9	Agweng	11,918	12,850	24,768
10	Adyel	18,200	18,700	36,900
11	Ojwina	18,900	19,500	38,400
12	Lira Central	12,100	11,600	23,700
13	Railways	3,000	3,200	6,200
	District (total)	**183,800**	**194,000**	**377,800**

(Source: Lira District population projection, UBOS, 2010)

Table 4: Population by Age Group

Sub-country	Total population	Infants (under 1 yr)	Children under 5yrs	Children 6 - 17 yrs.	18 yrs. and above
Adekokwok	39,857	1,714	8,051	15,145	17,138
Agali	22,741	978	4,594	8,641	9,779
Agweng	25,571	1,100	5,165	9,717	10,996
Amach	33,366	1,435	6,740	12,679	14,348
Aromo	36,842	1,584	7,442	14,000	15,842
Barr	44,488	1,913	8,987	16,906	19,130
Lira	27,011	1,161	5,456	10,264	11,615
Ngetta	39,948	1,718	8,070	15,180	17,178
Ogur	34,955	1,503	7,061	13,283	15,031
Adyel	39,027	1,678	7,883	14,830	16,781
Central	25,025	1,076	5,055	9,509	10,761
Ojwina	40,715	1,751	8,224	15,472	17,507
Railway	6,554	282	1,324	2,491	2,818
District Total	**416,100**	**4,787**	**22,487**	**42,302**	**178,923**

(Source: Lira District MIS data base -2013 projection from UBOS, 2002 census)

Lira District has an area of 240,038 km2 of which 197,323 km2 is covered by land. The Uganda Bureau of Statistics (UBOS) estimates the population in 2011 at 389,300 and by the end of the HS5DP in 2015/16 Lira District's population will be approximately 445,007, 48.5% of the population are male while 51.5% are female; with 88% of the population resident in rural areas. The population growth rate is estimated at 3.4% per annum. The population of interest as segregated in 2011 is <1 year is 16,740, <5 years is 78,639, 1-5 years 79,807, 6 to 11 month 7,786, children under 15 years are 194,650. There shall be an increase in the number of females in reproductive years (15-49 yeas) (from 78,639 in 2011 with expected of 18,881 this year) over 92,072 women the years by 2016 which will put a strain on all reproductive health services.

Income levels

Poverty levels are high in Lira; 71% of the population are living below the poverty line, (hard core poor) by 2002 this situation was even made worse by increased LRA war which displaced people in IDP camps from late 2002 – December 2006. This increased the poverty levels and the Average household income declined from Ush. 170,000= per annum in 2002 to estimated shs. 110,000 per annum in 2008.

Livelihoods

Table 5: Lira District Main Livelihoods

Livelihood	% of workers
Subsistence farming	81.0
Commercial farming	1.5
Petty trading	4.5
Formal trading	2.0
Cottage industry	1.5
Property income	5.5
Employment income	2.7
Family support	1.0
Other	0.3

The economy of the district is mainly based on agriculture, with 81% of the population engaged in subsistence farming. Other sector in economy includes agro processing industries (3.1%), commercial activities and banking (15.9%).At independence cotton was the major cash crop but its production has declined. Crops hitherto were mainly food crops such as millet, simsim, cassava, Groundnut, beans, pigeon peas, cowpeas, sorghum, sweet potatoes and other recently introduced crops such as rice, sunflower, soya beans, maize and horticultural crops serve both as food and cash crops.

Cattle used to be a big source of wealth as well, but this has totally been eroded by cattle rustling and LRA war from 1987-2006 which virtually depleted the stock of animals from 316,000 in 1987 to about 80,000 in 2002. With improved security situation since 2006 the livestock population in the District is as below: Cattle 159,533, goats 161,711, sheep 12,749, pigs 28,631 and chicken 1,116,903.

Industrialization is at a very low level. Most industries are involved in agro processing such as edible oil production, bakery, maize and rice milling and hurling.

Table 6: Major Tribes and Languages Spoken in Lira District

TRIBES	LANGUAGES
Langi	
Teso	Iteso
Kumam	
Jie	
Karamojong	karimajong
Bagisha	Lugishu
Baganda	Luganda
Basoga	Lusoga

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 however, possible to increase production and productivity and guide farmers to make profit, reduce crop losses in the field and during post-harvest handling.

Women and youth play a very important role in animal production. Women have increasingly participated in workshops on production, partly because the department of Production had prioritized empowerment of women. Mobilization 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 decision on the utilization 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 mobilize women and empower them to own, control and manage enterprises. Activities and budgets should be drawn affirmatively in this direction. The main commercial fish species farmed in the district are Tilapia niloticusandClariusgariepinus, both species grow to about 350hm and 700gm within a period of 7 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.

HAZARDS

Table 7: Hazard status

Hazard	Status	Sub County
Environmental degradation	Instances of wetland encroachment, deforestation, sand, stone and marram quarrying, and overgrazing	Ngetta Agweng Adekokwok Lira TC Amach Lira SC Aromo
Crop pests and diseases	Instances of cassava brown streak disease reported Instances of cassava green mite reported Instances of ground nut rosette	Adekokwok Amach Barr Lira
	Banana bacteria wilt	All the sub counties
	Instances of citrus kangka reported	Adekokwok Amach Barr Lira SC
	Instances of fruit flies reported	Adekokwok Amach Barr Lira SC
	Cassava mosaic	All sub counties
Animal vectors and diseases	Instances of African swine fever reported Instances of foot and mouth disease reported Instances of new castle disease among chicken reported	Amach Agur Agali Baar Aromo Adekokwok Agweng Aromo Amach
	Liver flukes	Agali Baar
	Rabies	All sub counties
	Instances of tsetse flies reported Instances of nagana reported	Amach Barr Ogur Adekokwok Aromo Agali Agweng

Hazard	Status	Sub County
Internal conflict	Instances of land disputes reported	Aromo Ngetta
Human epidemic	Instances of sleeping sickness	Amach Agali Bar Aromo Adekokwok Agweng
	Instances of hepatitis b reported	Aromo Agweng
	Nodding disease/syndrome	Aromo Agweng
	Instances of river blindness	Ogur Agweng
Flooding	Instances reported	Aromo Agweng Agali
Severe storms	Instances of hailstorm, heavy strong winds reported Instances of Lightning reported	Amach Agali Ngetta Bar Agweng Ogur
Invasive weed species	Instances of lantana camara, water hyacynth reported Widespread in the region	Agweng Ogur Aromo
Extended dry spells	Widespread in the region	All the sub counties
Bushfire	Incidence of massive fires reported	Aromo Agweng Amach

Table 7 displays the status and summarizes the nature of hazards in the district and provides the locations of instances.

Table 8 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 9 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 8: Summary of Hazards by Sub County

Sub County	Environmental degradation	Crop pest and diseases	Animal vectors and diseases	Internal conflicts	Human epidemic	Flooding	Severe storms	Invasive weed spices	Prolonged dry spell	Bushfires	Vulnerability to aggregate risk
Aromo	✓		✓	✓	✓	✓	✓	✓	✓	✓	10
Agweng	✓		✓	✓	✓	✓	✓	✓	✓	✓	10
Ngetta	✓		✓	✓	✓	✓	✓	✓	✓		9
Ogur		✓	✓	✓	✓	✓	✓	✓	✓		8
Adekokwok	✓	✓	✓	✓	✓	✓			✓		7
Amach	✓	✓	✓		✓		✓		✓	✓	7
Lira Mun.	✓	✓	✓	✓	✓				✓		6
Barr		✓	✓	✓	✓		✓		✓		6
Agali		✓	✓		✓	✓	✓		✓		6
Lira SC	✓	✓	✓		✓				✓		5
Total	**7**	**10**	**10**	**7**	**10**	**6**	**7**	**4**	**10**	**3**	**74**

Table 9: 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	Animal Diseases (BQ, CBPP, F&MD)	3	5	3	11	1
2	Crop pest and diseases	3	5	3	11	1
3	Environmental Degradation (Deforestation, wet land degradation, overgrazing)	3	5	2	10	3
4	Prolonged dry spell	2	5	3	10	3
5	Internal conflicts	3	5	2	10	3
6	Human epidemic	3	4	2	9	6
7	Wild bush fires	2	3	3	8	7
8	Invasive weed spices	2	5	1	8	7
9	Heavy Storms	1	5	1	7	9
10	Floods/water logging	1	4	2	7	9

HAZARD RISK ASSESSMENT

Table 10 expresses the communities' assessment of severity and likelihood of risk in their respective sub-counties. Each of the columns in table 10 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 10: Hazard risk assessment

Sub County	Environmental degradation	Crop pest and diseases	Animal vectors and diseases	Internal conflicts	Human epidemic	Flooding	Severe storms	Invasive weed spices	Prolonged dry spell	Bushfires
Aromo	L	H	H	M	L	H	L	H	M	H
Agweng	M	H	H	M	N	H	L	H	M	H
Ngetta	M	M	H	H	H	N	M	M	M	L
Ogur	M	M	H	M	H	M	M	H	M	M
Adekokwok	H	M	H	H	L	L	M	M	H	L
Amach	M	H	H	M	M	L	L	H	M	M
Lira Mun.	H	L	M	H	H	H	H	L	H	N
Barr	M	M	H	M	M	M	L	M	M	M
Agali	L	H	H	M	M	M	M	H	L	H
Lira SC	H	M	H	H	L	H	M	M	H	L
Key: H = High, M = Medium, L = Low, N = Not reported										

RISKS

Environmental Degradation

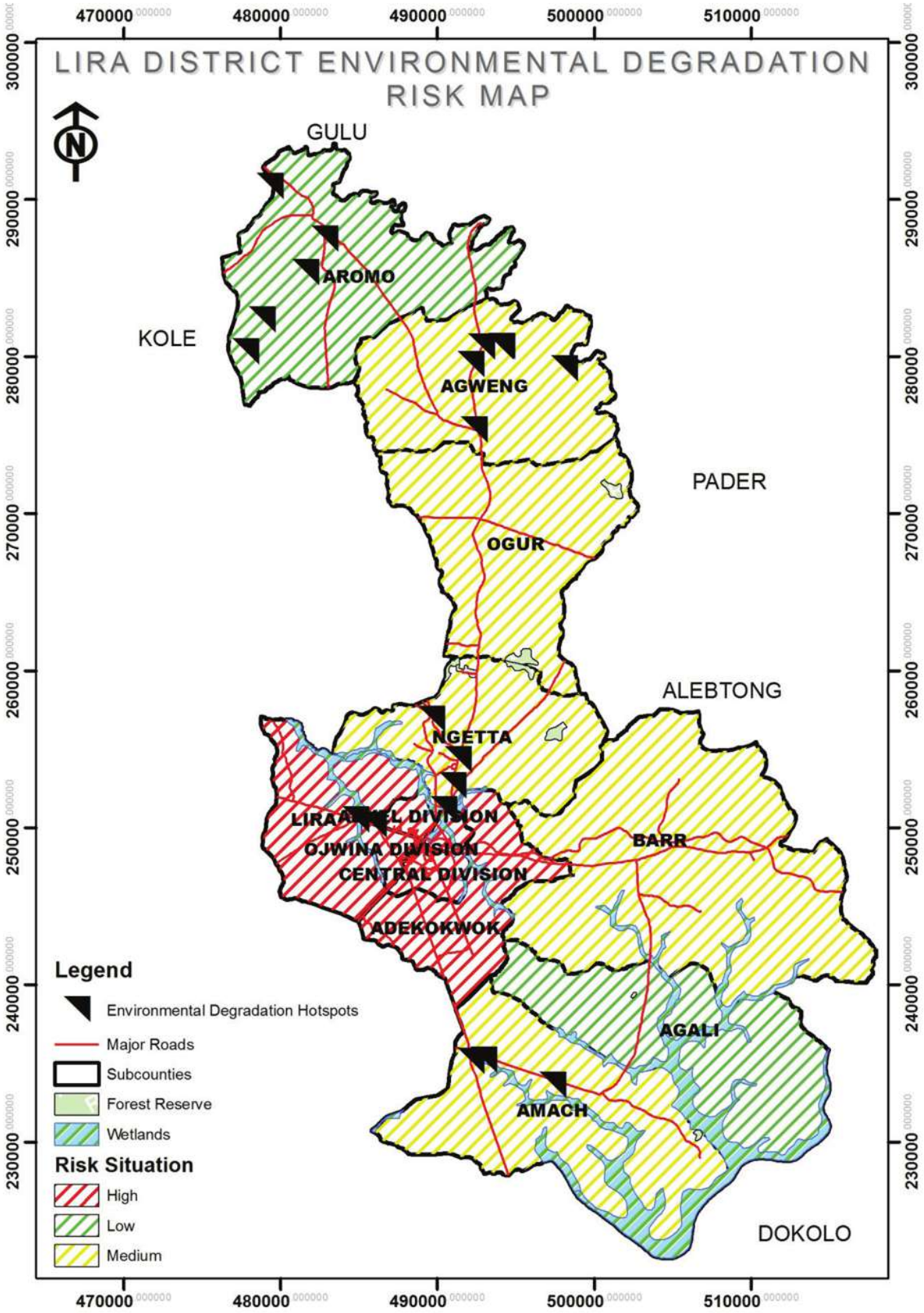


Figure 1 Environmental Degradation Risk Map

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

In Lira district, agricultural production upland is no longer productive as it used to be in the 1980's and before, this is basically due to the declining soil fertility and population growth. As a result many families are now encroaching the wetlands for agricultural cultivation and settlement. The wetland cover in the district had reduced from 11% to 8.9% by November 2013. The wetland degradation continues to undermine the availability of surface and underground water, caused flooding and destruction of roads, crops, reduced fish stock, biodiversity loss, habitat loss leading to poor ecosystem services and balance. Wetland destruction is more eminent in Lira municipality and the surrounding areas attributed to urbanization. It has also been noted that more destruction is in Okole wetland (24%) compared to the other wetlands that include the Moroto and Olweny wetland systems.

Crop pests and diseases

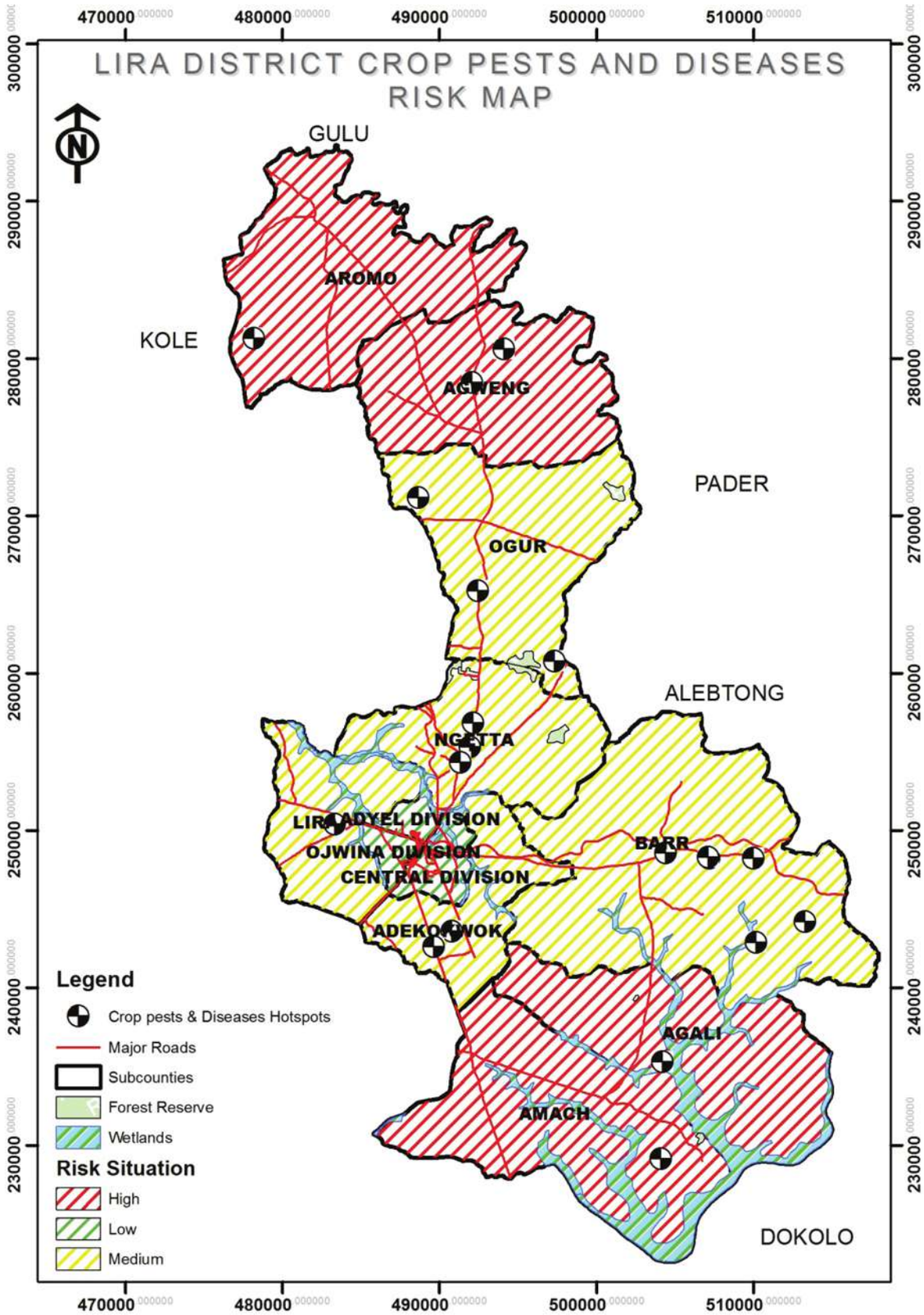


Figure 2: Crop pests and disease risk map

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

In Lira district, diseases of paramount importance are Cassava Brown streak disease (CBSD), Cassava Mosaic Disease, Banana Bacterial Wilt Disease (BBW) and citrus diseases like anthracnose, cankers, orange scab. These have greatly affected crop production and productivity leading to inadequate supply of food, reduced household income and in some cases malnutrition. The above diseases are in all the sub-counties of the district. On the other hand, vegetable pests and diseases are on the increase with increase in number of farmers growing the crops. In an attempt to combat some of those major diseases CBSD and BBW, promotions of tolerant crop varieties have been emphasized across the district. On the other hand, more prominent pests are for citrus and other food tree crops like mangoes. Fruit fly takes the lead and has enormously caused great decline in fruit production and productivity in the entire district lowering fruit quality and or quantity.

Animal Vectors and Diseases

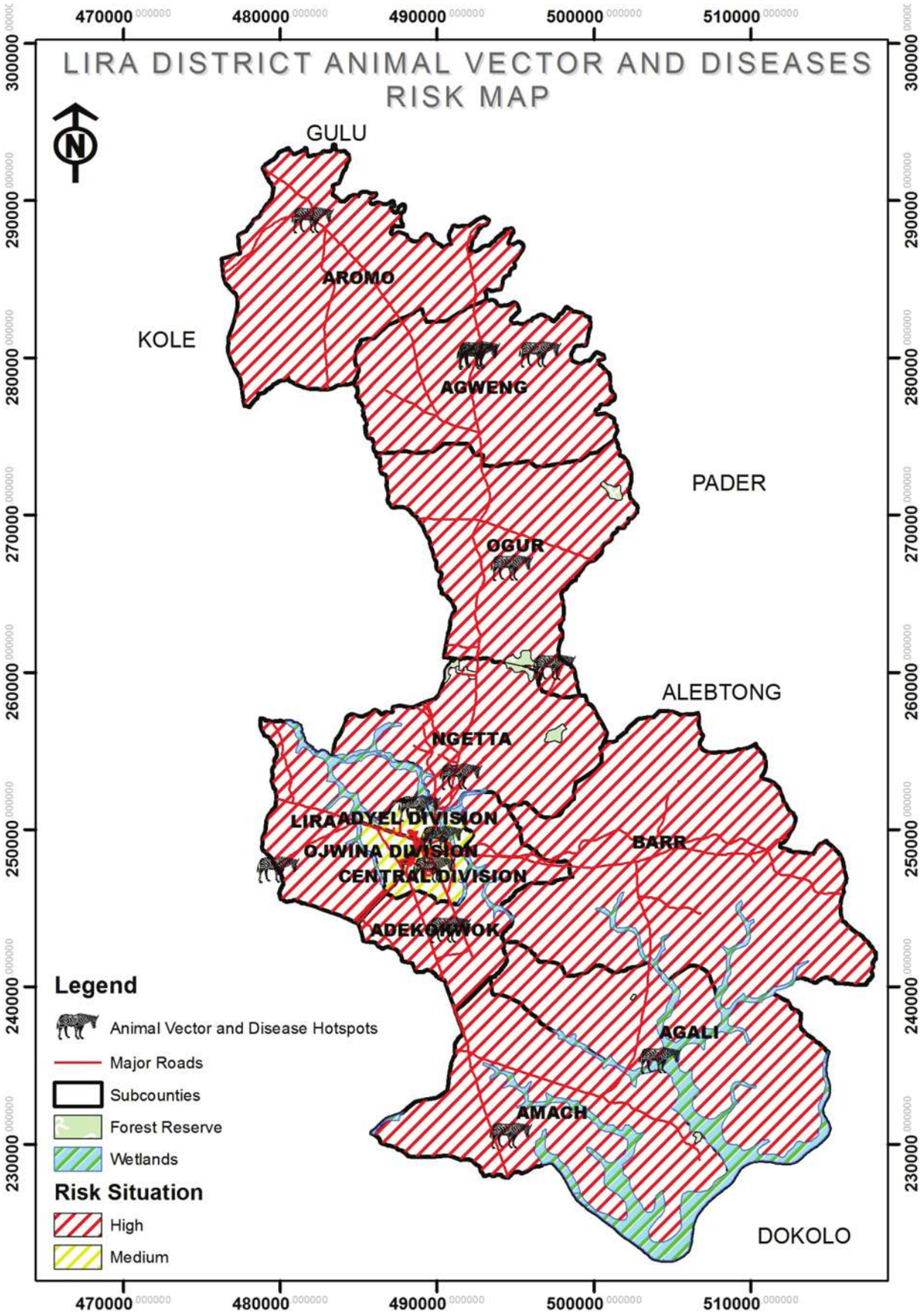


Figure 3: Animal Vectors and Diseases Risk Map

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

Tick borne diseases, swine fever, and rabies and Newcastle disease of poultry are the most common in Lira district. The diseases are rampant in all the rural sub-counties of the district which has led to low animal production and productivity in terms of milk volume, meat quality, and number of livestock across the district. Farmers are consequently not getting enough output for food security, nutrition and income. In order to address the problem, routine treatment for the above diseases including trypanosomiasis, is being carried out to reduce their impact on the livestock. In poultry, chicken are often vaccinated on request by the farming communities to protect them against Newcastle disease that quite often wipes out chicken population in villages where the attacks occur, sometimes affecting the whole parish.

The common vectors for the above diseases are ticks and tsetse flies in cattle; and viral and protozoa in pigs and chicken.

Internal Conflicts

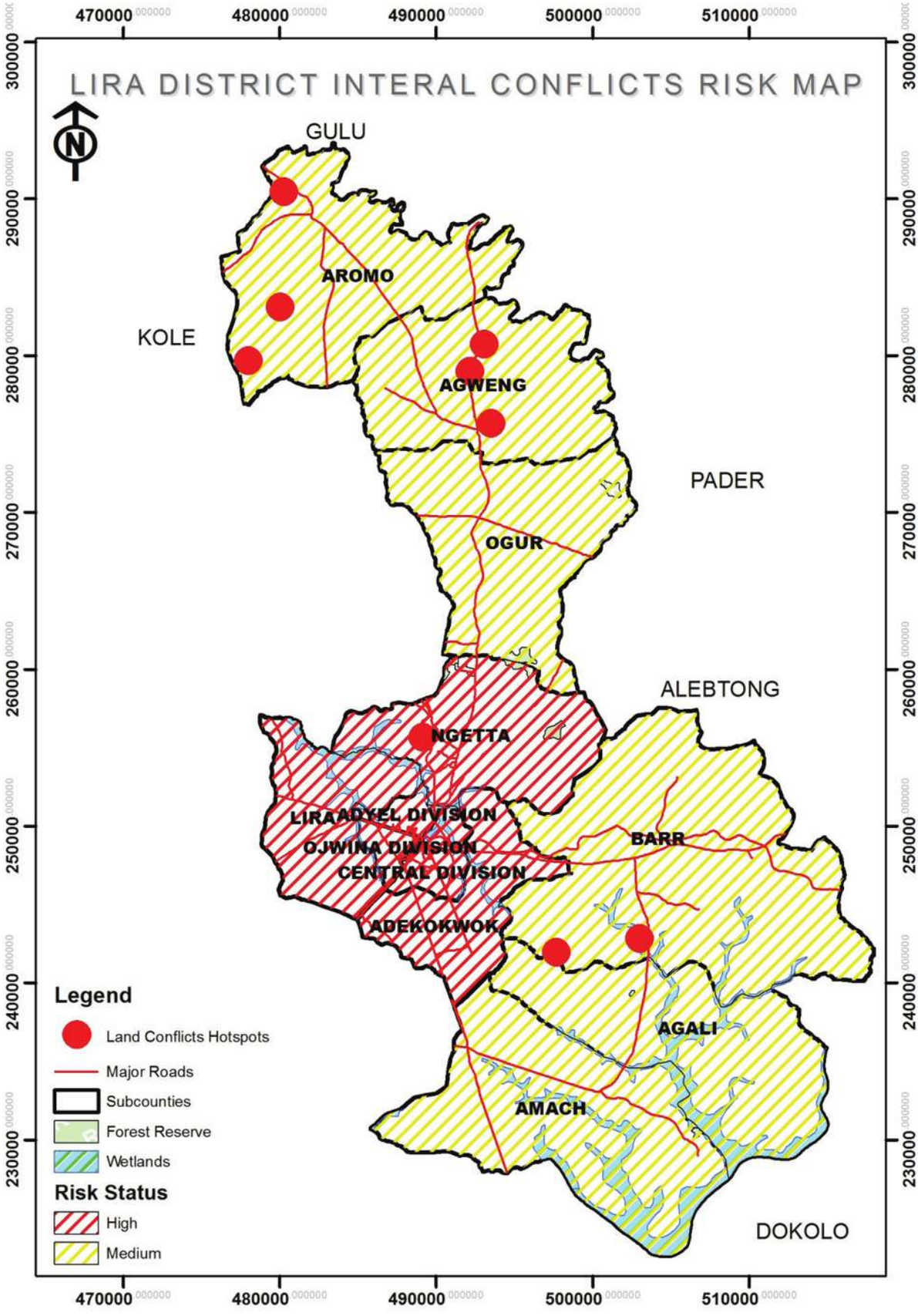


Figure 5: Internal Conflict Risk Map

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

There are overwhelming cases of land disputes within the district most especially within the peri-urban sub-counties of Lira, Ngetta and Adekokwok attributed to urbanization. There are also many cases of domestic violence in all rural sub-counties of the district where communities are failing to properly support their family needs, attributed to poverty created by the over 20 years insurgency that ravaged northern Uganda devastating communities' sources of livelihoods and incomes. Following a proposal to elevate Lira Municipality to city status and the need to plan the area and expand social services, there continue to be land disputes between communities and Municipal authorities. At sub-county level, land disputes are being handled by sub-county land committees and clan leaders. In situation where the disputes are not resolved, they are being forwarded to the sub-county local council courts for adjudication.

Human Epidemics

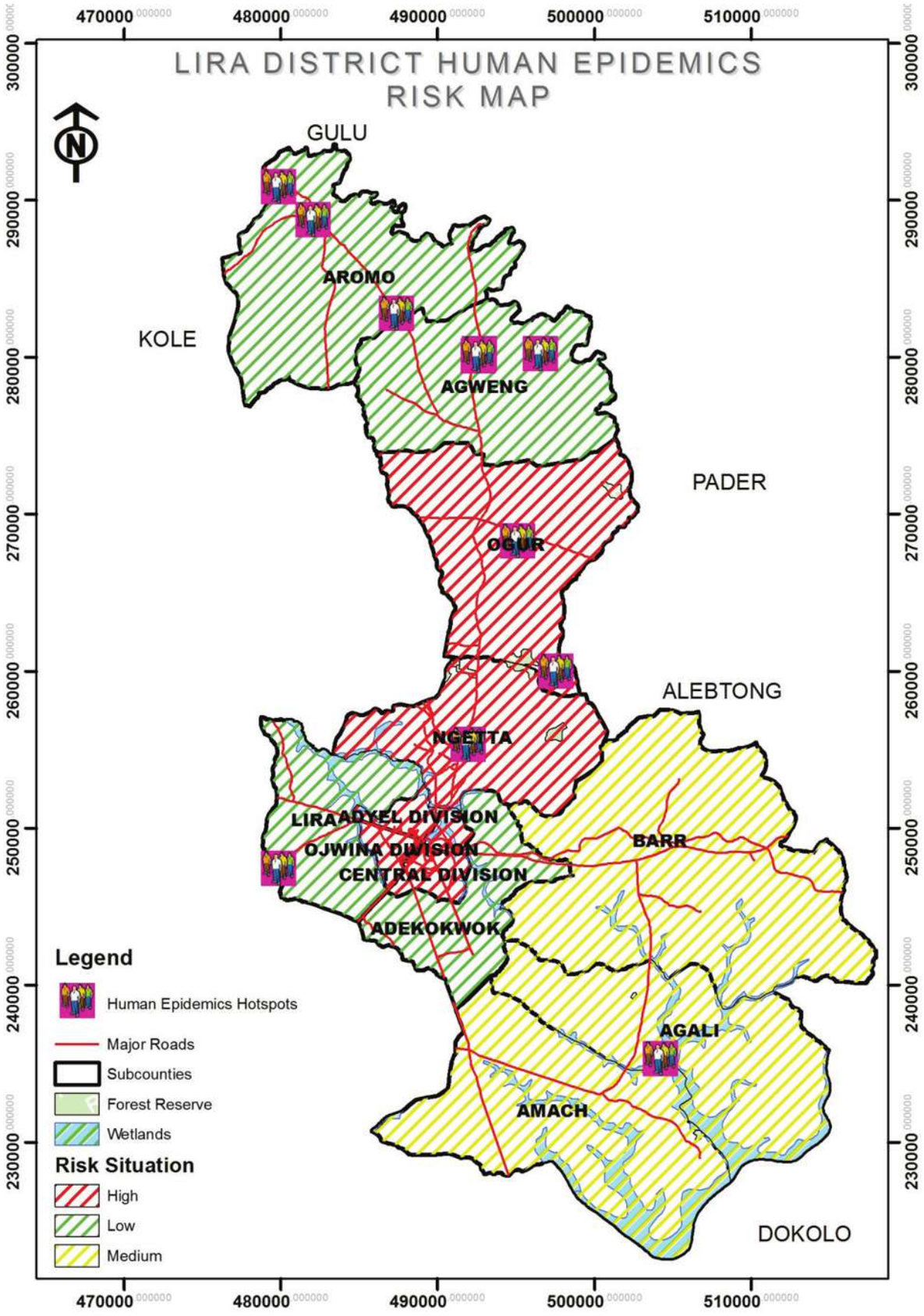


Figure 6: Human Epidemics Risk Map

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

Lira District is grappling with human epidemics, which include nodding disease syndrome in Aromo and Agwengsub-counties, Hepatitis B is wide spread in the district, cholera, dysentery and sleeping sickness are also prevalent. The human epidemic risk is variably distributed in the district: Ogur and Ngettasub-counties together with Adyel, Ojwina, Central and Railways divisions of Lira Municipal Council are exposed to high risk thus the color red on the map; BarrmAgali and Amachsub-counties are at a moderate risk of experiencing the human epidemics while Adekokwok, Lira, Ogweng and Aromo are predisposed to low risks of human epidemics thus the color green on the map.

Floods

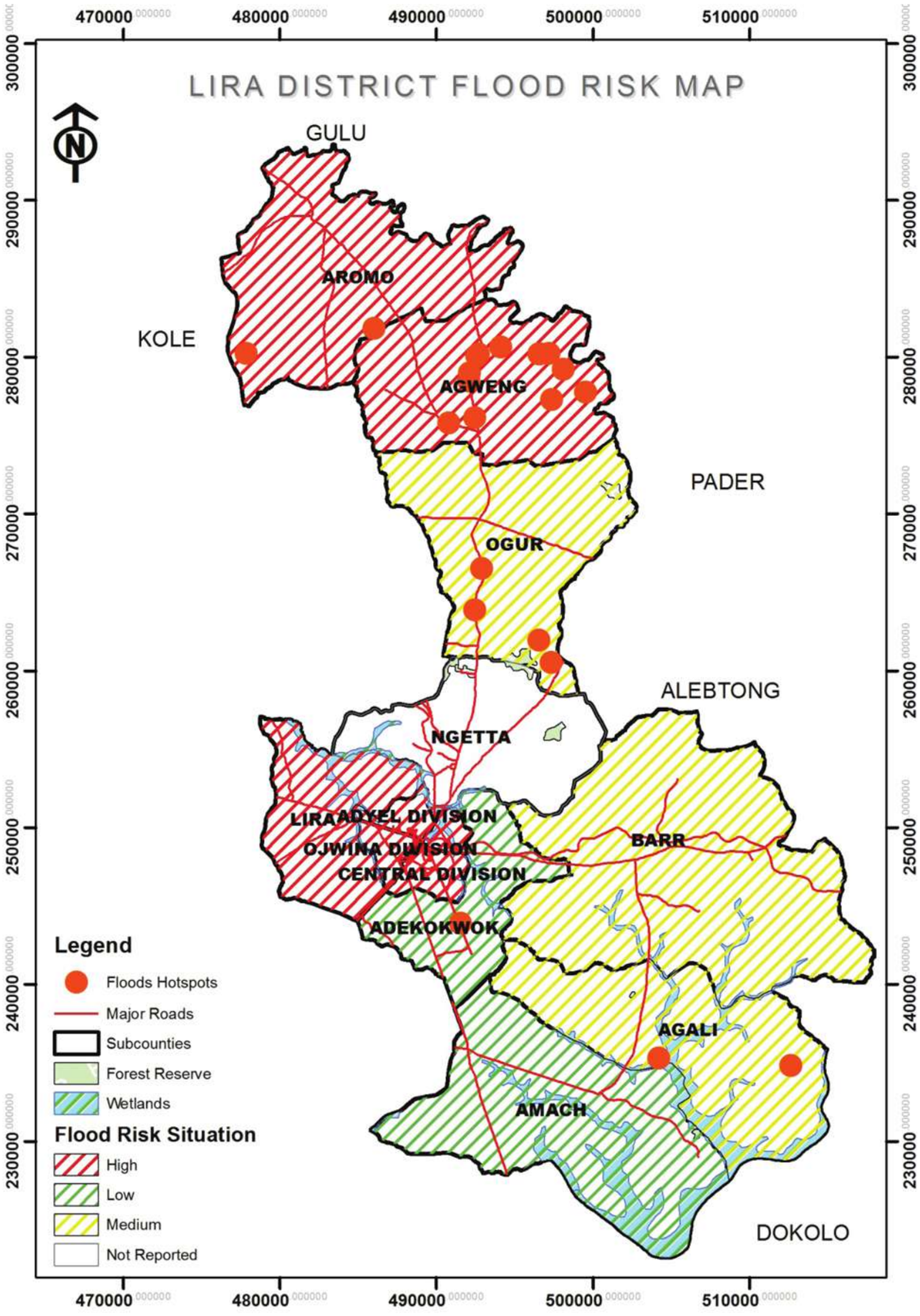


Figure 7: Floods Risk Map

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

The communities living close to the shores of River Moroto that lies to the northern border of the district, and the major swamps like Okole and Olweny and low lying areas are the most affected. These cause damage to houses, road networks with culvert crossing and bridges getting washed away, pit latrines collapsing and gardens get submerged thus causing rotting of crops. This results into food insecurity, loss of income and deals a great blow to livelihoods. Water and sanitation in both and communities also gets affected resulting in poor learning conditions and absenteeism in schools and eventually poor performance. The most affected sub-counties include Aromo, Agweng, Ngetta, and Ogur in Erute North. The other sub-counties that are equally affected include Agali, Amach and Adekokwok in Erute South.

Severe Storms

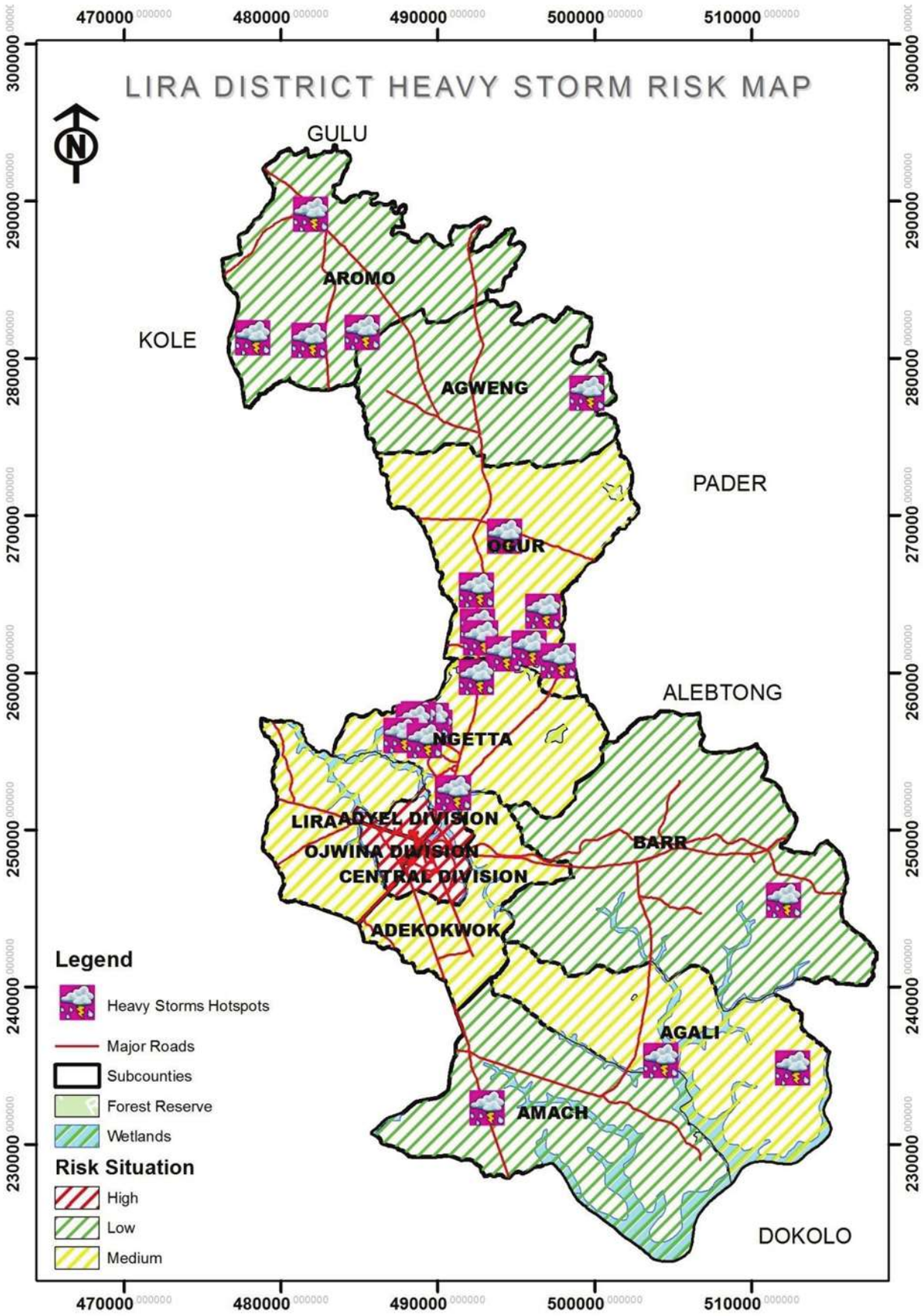


Figure 8: Heavy Storms Risk Map

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

Three major hazards have been categorized under heavy storms and these include Hailstorms, strong winds and Lightning.

Hailstorms are very common in Lira district causing severe damage to the crops, death of animals and birds. It occurs in all the sub-counties in the district, but the hazard is more frequent in Ogur, Ngetta, Agweng, Barr, Agali and Aromo than the other sub-counties.

Strong winds are also prevalent in the district, attributed to vegetation cover denudation that has resulted in reduction of tree cover in the district leaving large areas of land exposed and vulnerable to the impacts of strong winds. The hazard always results in blowing off of roofs of private houses and institutional buildings like school classrooms and health centres. Crops that grow tall are also equally affected and have always been broken down. The incidences of strong wind are pronounced throughout the district.

Lightning is one of the hazards that are becoming more pronounced in Lira district, the incidences are more pronounced during the onset of rainy seasons (March to April) and (August to September). The hazard over the last two years has struck people in the communities in Agweng, Lira Municipality, Amach and Barr sub-counties. The occurrences of the hazard has compelled the district council to pass a policy that ensures all new buildings being constructed by the district be installed with Lightning arrestors as a way of mitigating the hazard.

Invasive Weed Species

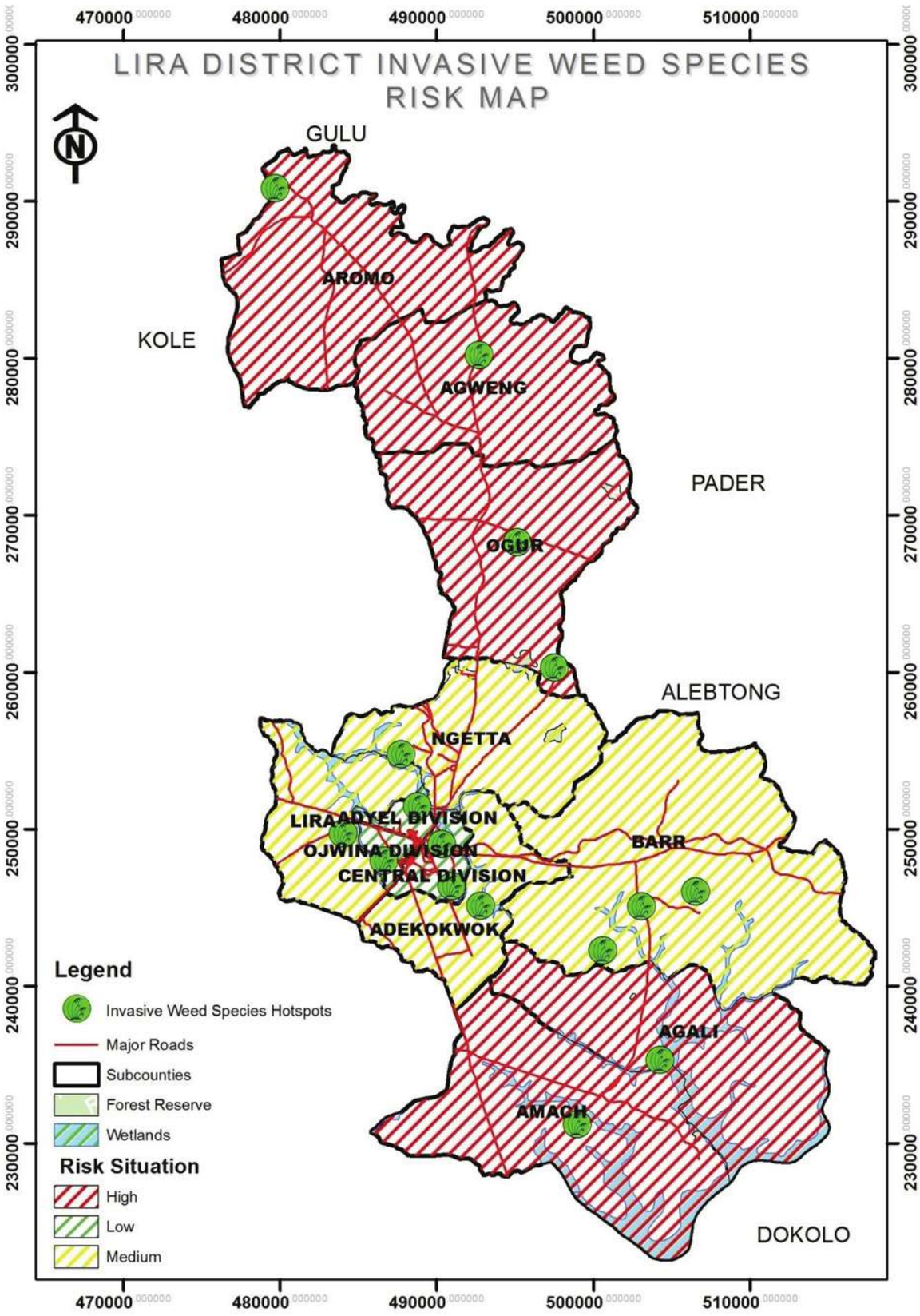


Figure 9: Invasive Weed Species Risk Map

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

The most critical weeds in the district include, Lantana camara, Striga, Bidenspilosa, among others. These species have remained a problem in the district attributed to habitat alteration and / or competition for resources. For example Lantana camara, originally introduced as an ornamental plant has since spread widely and dominated many habitats in all the sub-counties in Lira district and continues to pose problems to the farmers since they dominate the indigenous plant species. Water hyacinth (Eichhorniacrassipes) is quite common in Okole wetland system and continues to have adverse effects on aquatic communities in the littoral zones of water bodies in the district.

Prolonged Dry Spells

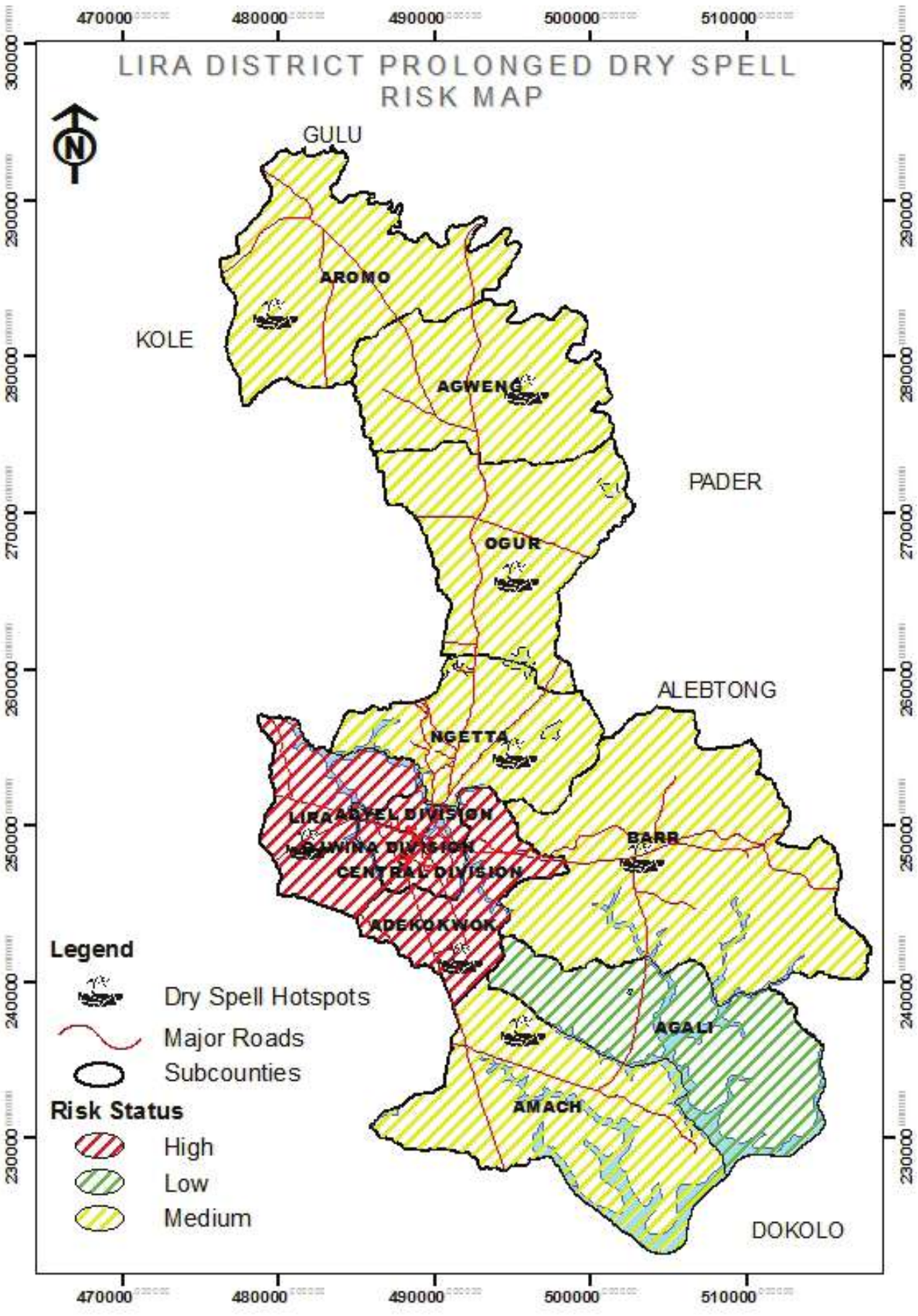


Figure 10: Prolonged Dry Spell Risk Map

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

This is one of the major hazards that affect Lira district entirely, causing drying up of most water points (shallow wells and springs) resulting into severe water shortage for the animals and people. This often leads to sharing of water resources between people and animals. During the dry seasons, communities line up and waste a lot of time fetching water from boreholes and the problem is more pronounced in the sub-counties of Barr, Amach, Lira, Ogur and Aromo. The pastures also dry up and animal keepers and their animals trek longer distances looking for water and pasture. A number of times the animals have died along the trek. The problem has been exacerbated by wetland encroachment and degradation of communal land that could have otherwise been used by the communities to support the grazing of animals during periods of prolonged droughts. This has in most cases fuelled internal conflicts between communities.

Communities also suffer acute food shortages sometimes leading to malnutrition in children and death of mainly the elderly people who cannot look for food themselves. In 2013, cases of death due to hunger were reported in Ogur and Aromo sub-counties and the communities of Aromo sub-county were supported with relief food from the office of the prime minister.

Planting materials for the next planting seasons becomes a big problem since most of the cereals would have been eaten as food and those that are planted as stems would have dried up entirely and without the intervention of government and other development partners, food shortages continue unabated. In most of the sub-counties including Barr, Ogur and Aromo, the communities were supported with cassava planting materials by World vision, Welt hunger hilfe amongst others.

Bush fires

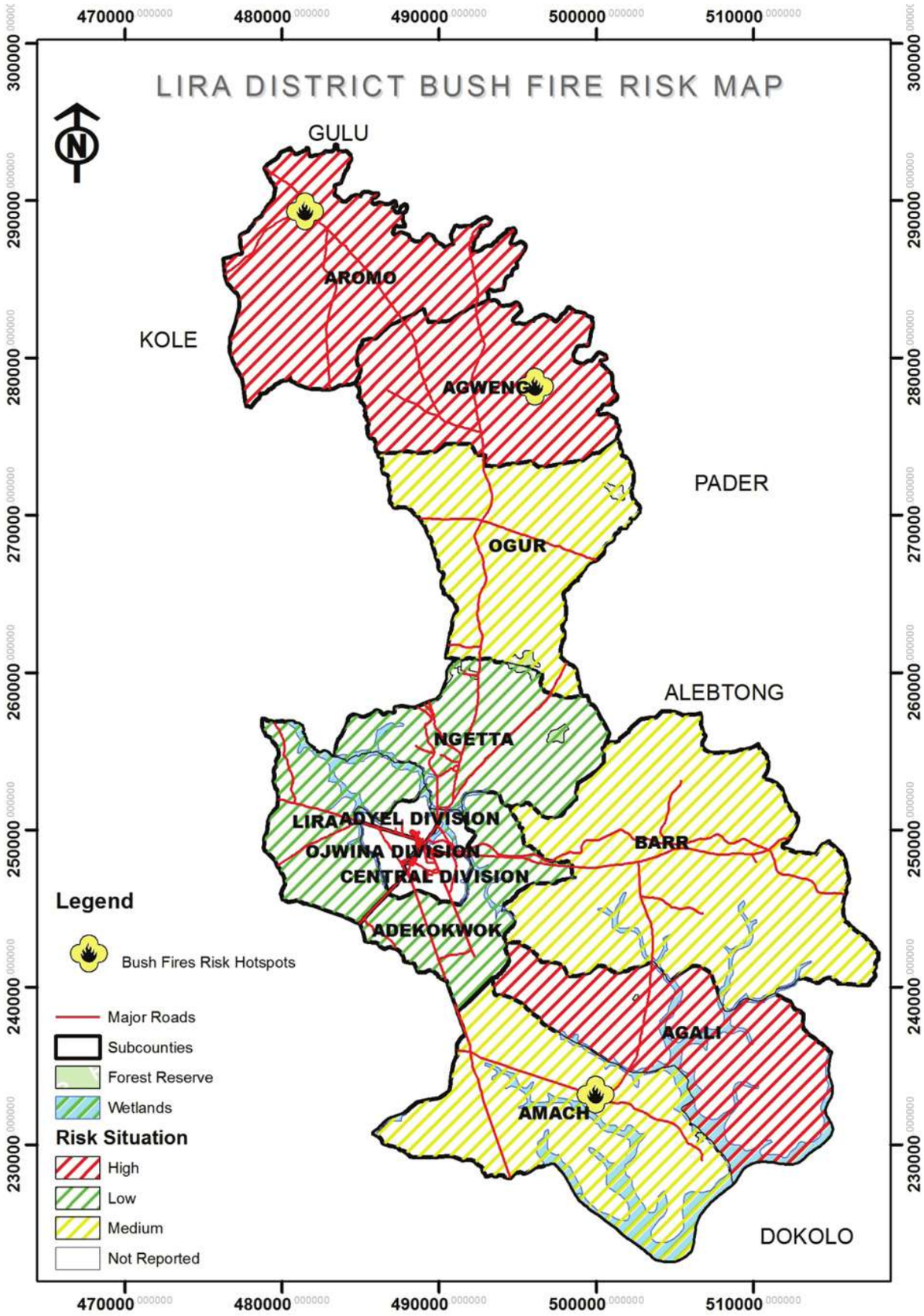


Figure 11: Bushfire Risk Map

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

The incidence of fire in the district is on the rise both in Lira Municipality and the rural sub-counties. Wild bush fires normally occur during the dry spells (January to March) destroying expanses of areas including plantation forests, wetlands, buildings, animals and crops in the field amongst others. The sub-counties in the district that suffer the problem of wild bush fire include Aromo, Agweng, Agali, Amach Barr and part of Adekokwok. Communities usually set fire in order to open land for pastures for their livestock, reduce vegetation for hunting of wild animals including edible rats, Sitatungas, wild rabbits etc., and also to open land for cultivation.

In Lira Municipality, incidence of fire outbreaks have also increased over the recent past, with commercial buildings being gutted down by fires that could have originated from electric short circuiting, accidental fires and those that could have been intentionally started to cause financial loss by ill-intentioned people. In 2013, HotelPanafric was gutted down by fire that was suspected to have been caused by electric short circuiting; Odokomit ginnery full of cotton was also burnt down by fire at about the same time.

Kitgum stage in Lira Municipality also was also ravaged by fire that was anticipated to have been started by a candle that was abandoned in a hotel room. The Kitgum stage fire burnt a number of properties including merchandise, vehicles, and houses.

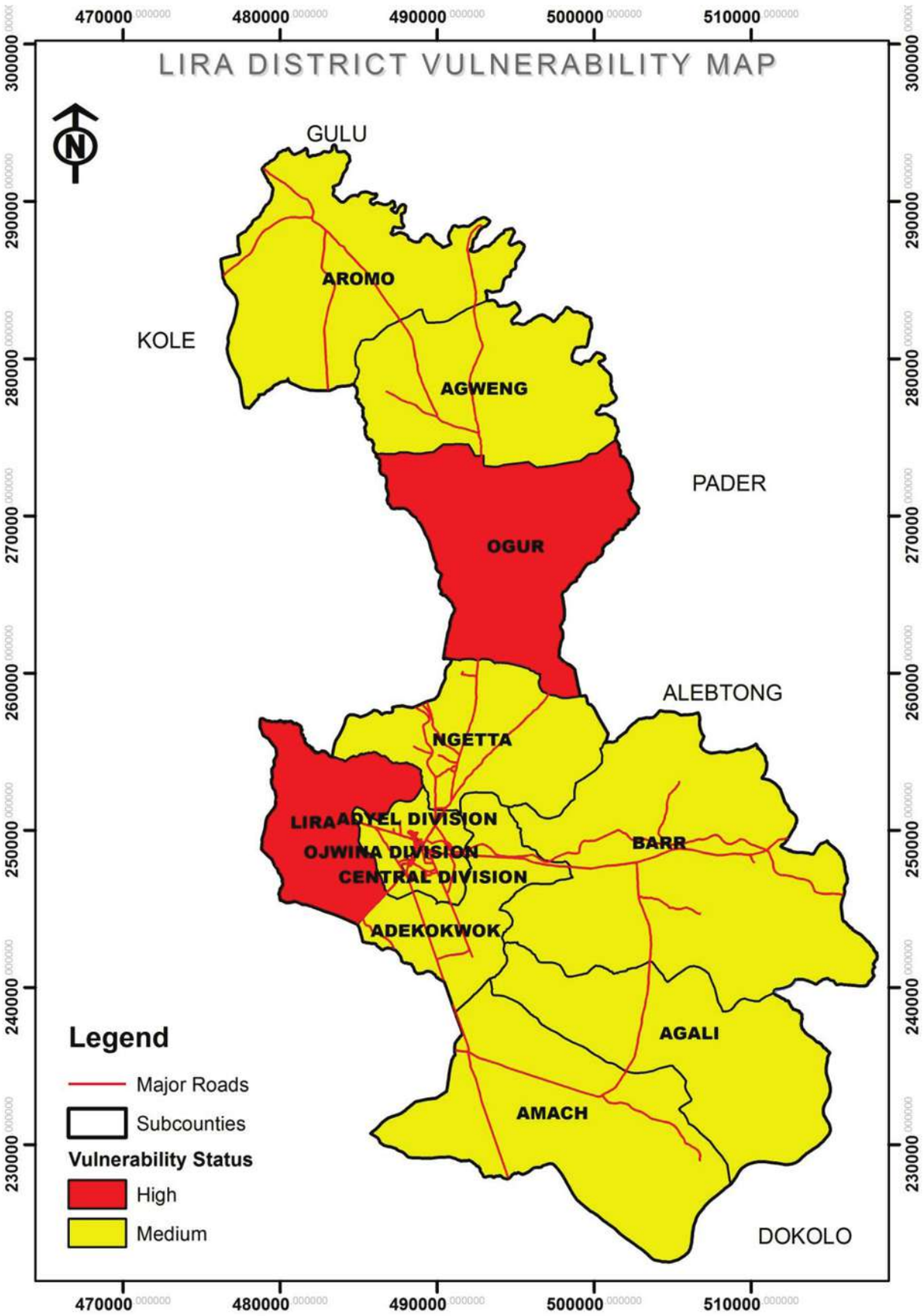
VULNERABILITY

Table 6 summarizes the communities' assessment of hazard severity and frequency in the sun-counties. Table 7 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 11: Risk and vulnerability assessment

Sub County	Environmental degradation	Crop pest and diseases	Animal vectors and diseases	Internal conflicts	Human epidemic	Flooding	Severe storms	Invasive weed species	Prolonged dry spell	Bushfires	Cumulative vulnerability (Absolute)	Weighted vulnerability (Cumulative/3)
Aromo	1	3	3	2	1	3	1	3	2	3	22	7
Agweng	2	3	3	2	0	3	1	3	2	3	22	7
Ngetta	2	2	3	3	3	0	2	2	2	1	20	7
Ogur	2	2	3	2	3	2	2	3	2	2	23	8
Adekokwok	3	2	3	3	1	1	2	2	3	1	21	7
Amach	2	3	3	2	2	1	1	3	2	2	21	7
Lira Mun.	3	1	2	3	3	3	3	1	3	0	22	7
Barr	2	2	3	2	2	2	1	2	2	2	20	7
Agali	1	3	3	2	2	2	2	3	1	3	22	7
Lira SC	3	2	3	3	1	3	2	2	3	1	23	8
Total	21	23	29	24	18	20	17	24	22	18	216	
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 12 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.

Lira district is exposed to 10 hazards namely animal vectors and diseases, invasive weed species, internal conflicts, crop pests and diseases, prolonged dry spell, environmental degradation, flooding, bush fires, human epidemics, and severe storms arranged in their order of risk from highest to lowest with total risks of 29, 24, 24, 23, 22, 21, 20, 18, 18 and 17 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.

Ogur and Lira sub-counties reported the highest vulnerability in Lira district each with a cumulative vulnerability of 23 and a weighted vulnerability of 8 which lies in thetop (red) category of the vulnerability scale. The rest of the sub-counties displayed medium (yellow) vulnerability all tying at a weighted vulnerability of 7. This makes Lira one of the most vulnerable districts of the region.

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.

CONCLUSION

This multi hazard, risk and vulnerability profile for Lira 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 Lira 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 Lira district is vulnerable to ten hazards, in order of decreasing risk: animal vectors and diseases, invasive weed species, internal conflicts, crop pests and diseases, prolonged dry spell, environmental degradation, flooding, bush fires, human epidemics, and severe storms.

Ogur and Lira are the most vulnerable sub-counties each with a weighted vulnerability value of 8 which lies in the top (red) category of the vulnerability scale. The rest of the sub-counties displayed medium (yellow) vulnerability all tying at a weighted vulnerability of 7. Therefore should also 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.

Timely early warning systems and other DRR interventions would be able to enhance the resilience of the people of Lira 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

Prolonged dry spell. This 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.

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

Epidemics. This is 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. The diseases include cholera, meningitis, hepatitis E, marbug, plague, avian influenza, Ebola and sleeping sickness among others.

Crop and animal epidemics. 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. 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 conflict these are conflicts arising from ownership and use of land and other land resources.

Environmental Degradation. This 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. Fires set deliberately to clear forest or pasture for agricultural purposes may go out of control and consume far more than intended.

Invasive Species. A non-native plant or animal that invades 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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