THE REPUBLIC OF UGANDA

Kole 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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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.

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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 Kole 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 characterizes the district in terms of location, geography (Topography, Soils, Vegetation, Wetlands, and rainfall pattern), gender demographics by sub-county and livelihoods.

It identifies endemic hazards in 11 classes, in order of importance as per the district stakeholders' assessment: heavy storms, environmental degradation, crop pests and diseases, internal conflicts, prolonged dry spell, animal vectors and diseases, flooding, human epidemic, proliferation of invasive weed species, bush fires and vermin.

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.

Kole district in general is moderately vulnerable whereof the most vulnerable communities are Alito, Akala, Bala, Aboke and Ayer sub-counties with weighted vulnerabilities of 7, 6, 6, 6 and 6 respectively, all lying in the middle (yellow) of the vulnerability scale. Ayer T/C displayed the least vulnerability in the district with a weighted vulnerability value of 4.

Whereas Kole district is moderately vulnerable, early warning systems and other DRR interventions would still be able to enhance the resilience of the local communities 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

Kole District is vulnerable to a number of hazards that lead frequently to disasters. They include Heavy Storms, Crop Pests and Diseases, Animal Vectors and Diseases, Environmental degradation, Internal Conflict, Prolonged dry spell, Human Epidemic, Flooding, Bush Fires, Proliferation of Invasive weed species, and Vermin.

The Kole 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 analyzing disaster risks and vulnerabilities in Kole 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 is to produce a District Profile that will aid planning and decision making processes in addressing disaster threats/risks in Kole District.

Methodology

The multi-hazard, risk and vulnerability mapping approach employed a people-centred, 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 Lango 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-regions studied) 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: Refining and final map production/reporting

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: Dissemination Workshop

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

OVERVIEW OF THE DISTRICT

Location

Kole District is situated in the Lango Sub Region of Northern Uganda. It lies between longitudes 32^0 East and 34^0 East and latitude 2^0 North and 3^o North. The District is bordered by Oyam District in the North, Pader District in the North-East, Lira District in the East, and Apac District in the South.

The District is made of one county, six (6) Sub Counties including one urban council, forty one (41) parishes and six hundred ninety two villages as May, 2014.

It is approximately 350Km from Kampala Capital City and Administrative center of Uganda. The District covers a total area of 2,847Kms^2 of which 9% is under open swamps and water while 15% is under forest with 2,164Kms^2 for human settlement and suitable for arable farming.

It has not been easy to trace the history of Kole District since it was just curved out of Apac District in July 2010. Available information only indicates that the name Kole was derived from the famous Okole wetland which traverses 3 sub counties of the district.

Topography

Kole District is characterized by low plains and rolling hills along the river, at 900 meters above sea level. The District lies at an average altitude of 1150mm above sea level.

Soils

The soils in the District are sandy and black cotton with isolated brown layer of clay loam. This covers about 60% of the cultivable Land. This soil is very suitable for rain fed agriculture. The rocky soils account for 3% and black clay soils accounts for 97% of the total soil mass in the region.

Vegetation

The vegetation of the District is predominantly dry savannah type comprising mainly hyperhania, terminalia acacia and Butterspermum species. Isolated riverine forest type vegetation is found a long Okole & Arocha wetlands dominated by wetlands plants.

Wetlands

Total area of the District under wetland/swamps is 55,403.72Ha of which 194.4 km^2 is permanent wetland while 653 km^2 is seasonal wetlands. These are mainly papyrus swamps which have been found to have high biological diversity. At least 13.4 km^2 i.e. 1.2% of the total seasonal wetlands have been reclaimed and converted to various forms of land use i.e. farm land, residential and business areas.

Rainfall Pattern

The rainfall pattern is bimodal and is typically convectional, but the level is changing with the current global climatic change. The April to May rains are considered the peak of the short rains and August – September for the longest wet seasons.

The annual rainfall ranges from 875 mm – 1500 mm.

Culture:
The Lango are traditionally conservative and have preserved the principles and practices of Lango customs, rights and norms under the leadership of his highness the Won Nyaci of Lango (Paramount Chief).

The leadership structure is pyramidal with the Won Nyaci at the top, followed by Owitong, Rwode, Jagi and Won paco each complete with a powerful council and committees.

Demographics

Table1 Projected 2012 Population of Kole District by Sub-county

S/No.	S/County	Projected Population as at 2012		
		Male	Female	Total
1	Aboke	23,000	24,000	47,000
2	Akalo	13,400	14,600	28,000
3	Alito	34,300	36,200	70,500
4	Ayer	21,400	22,600	44,000
5	Bala	20,400	22,000	42,400
Totals		**112,500**	**119,400**	**231,900**

Livelihoods

Agriculture:
Crop production is the major economic activity in Kole, employing about 90% of the population of which the majority are women. Arable land is very fertile and makes up 57.88% of the total land area.

Livestock:
Livestock could easily rank high on the list of asset and economic activities in the District. Before 1986, livestock was the financer of school fees, security of the family, welfare and source of protein. Ox ploughing was further more vital part of crop production but with the cattle rustling of 1986 to 1988, the economic vulnerability of the population worsened considerably but now re-stocking of the animals has improved the situation.

At present there are only approximately 100 dairy farmers in the district and use of conventional manual ploughing is still witnessed as more and more ox ploughing continues to be on the rise, hence increase productivity. Trade in general merchandise especially in produce.

Private Sector:
The private sector in Kole district is constituted by very minor and small enterprises. Kole is thus among the Districts in Uganda with the least number of industries. Only a few grinding mills and rice hullers, garages, wood and metal workshops and the construction industry are present.

Women's livelihood:
Investigations of peoples' asset base and livelihoods reveal that lack of control over productive resources by women remains one of the root causes of poverty in the district. Women lack control over land, the crops they produce, livestock and other productive resources, yet they are responsible for meeting family needs. Men are known for wasting time and family resources on drinking while women are bogged down with more family responsibility now than in the past. For instance paying school fees used not to be the responsibility of women.

In Kole District generally women neither own nor control land. They only have access to the land. However, decisions on what to produce and in what quantity remain the domain of men. Furthermore, women do not control proceeds of neither whatever is produced nor what they sell in the market. Research has shown that men tend to use most household financial resources for leisure, while women use the same more for household welfare.

HAZARDS

Table 2 Hazard status

Hazard	Status	Sub County
Heavy Storms	Incidences of hailstorm, heavy strong winds and lightning reported	Alito
		Akalo
		Bala
		Aboke
		Ayer
Crop Pests and Diseases	Incidences of Cassava Brown Streak Disease reported	Aboke Alito Ayer Ayer TC Bala Akalo
	Banana bacteria wilt	
	Incidences of Citrus Kangka reported	
	Incidences of Fruit Flies reported	
	Cassava Mosaic	Alito
		Ayer
		Bala
	Incidences of caterpillars affecting Soya beans reported	Bala
		Ayer
	Incidences of Variegated grass hoppers reported	Ayer
Animal Pests and Diseases	Incidences of African Swine Fever reported	Aboke Alito Ayer Ayer TC Bala Akalo
	Incidences of Foot and Mouth Disease reported	
	Incidences of New Castle Disease among chicken reported	
	Incidences of Tsetse Flies reported Incidences of Nagana reported	Bala
		Akalo

Environmental Degradation	Incidences of Wetland Enchroachment, Deforestation, Sand and Marrum extraction, stone quarrying, and Over grazing reported	Aboke Alito Ayer Ayer TC Bala Akalo
Internal Conflicts	Incidences of Land disputes and Domestic Violence reported	Aboke Alito Ayer Ayer TC Bala Akalo
Extended dry spell	Widespread in the region	Akalo
		Aboke
		Bala
		Alito
		Ayer TC
		Ayer
Human Epidemic	Incidences of Sleeping Sickness	Akalo
		Alito
		Bala
Flooding	Incidences reported	Aboke Alito Ayer Ayer TC Bala Akalo

Bush Fires	Incidences of massive fires reported	Aboke Alito Ayer Ayer TC Bala Akalo
Invasive species	Incidences of Lantana Camara and Yellow cassia reported	Aboke Alito Ayer Ayer TC Bala Akalo
Vermin	Incidences of Velvet Monkeys destroying crops reported	Alito Akalo Aboke Ayer

Table 2 displays the status and summarizes the nature of hazards in the district and provides the locations of instances.

Table 3 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 4 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 3 Summary of Hazards by Sub-county

Sub county	Heavy Storms	Crop Pests and Diseases	Animal Vectors and Diseases	Environmental Degradation	Internal Conflicts	Prolonged dry spell	Human Epidemic	Flooding	Bush Fires	Proliferation of Invasive Weed Species	Vermin	Total
Alito	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**11**
Akalo	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**11**
Bala	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		**10**
Ayer	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	**10**
Aboke	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	**10**
Ayer TC				✓		✓		✓		✓		**4**
Totals	**5**	**5**	**5**	**6**	**5**	**6**	**3**	**6**	**5**	**6**	**4**	**56**

Table 4: Hazard Ranking

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 (Descending order)
01	Heavy Storms	3	5	3	11	1
02	Environmental Degradation	3	5	3	11	1
03	Crop Pests and Diseases	2	5	3	10	3
04	Animal Vectors and Diseases	2	5	3	10	3
05	Internal Conflicts	2	5	2	9	5
06	Flooding	2	5	2	9	5
07	Prolonged dry spell	2	5	2	9	5
08	Human Epidemic	1	5	2	8	8
09	Bush Fires	2	5	1	8	8
10	Proliferation of Invasive Weed Species	1	5	1	7	10
11	Vermin	1	4	1	6	11

Hazard risk assessment

Table 5 expresses the communities' assessment of severity and likelihood of risk in their respective sub-counties. Each of the columns in table 5 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 5: Hazard risk assessment

Sub county	Heavy Storms	Crop Pests and Diseases	Animal Vectors and Diseases	Environmental Degradation	Internal Conflicts	Prolonged dry spell	Human Epidemic	Flooding	Bush Fires	Proliferation of Invasive Weed Species	Vermin
Alito	H	H	M	H	M	M	M	M	L	L	L
Akalo	M	M	H	M	L	L	M	L	L	L	M
Bala	L	H	M	M	H	M	L	L	L	L	L
Ayer	H	M	L	H	M	M	L	M	L	L	N
Aboke	H	M	M	M	M	M	L	L	L	L	L
Ayer TC	M	L	L	L	L	M	L	M	N	L	N
Key: H = High, M = Medium, L = Low, N = Not reported											

RISKS

Heavy Storms

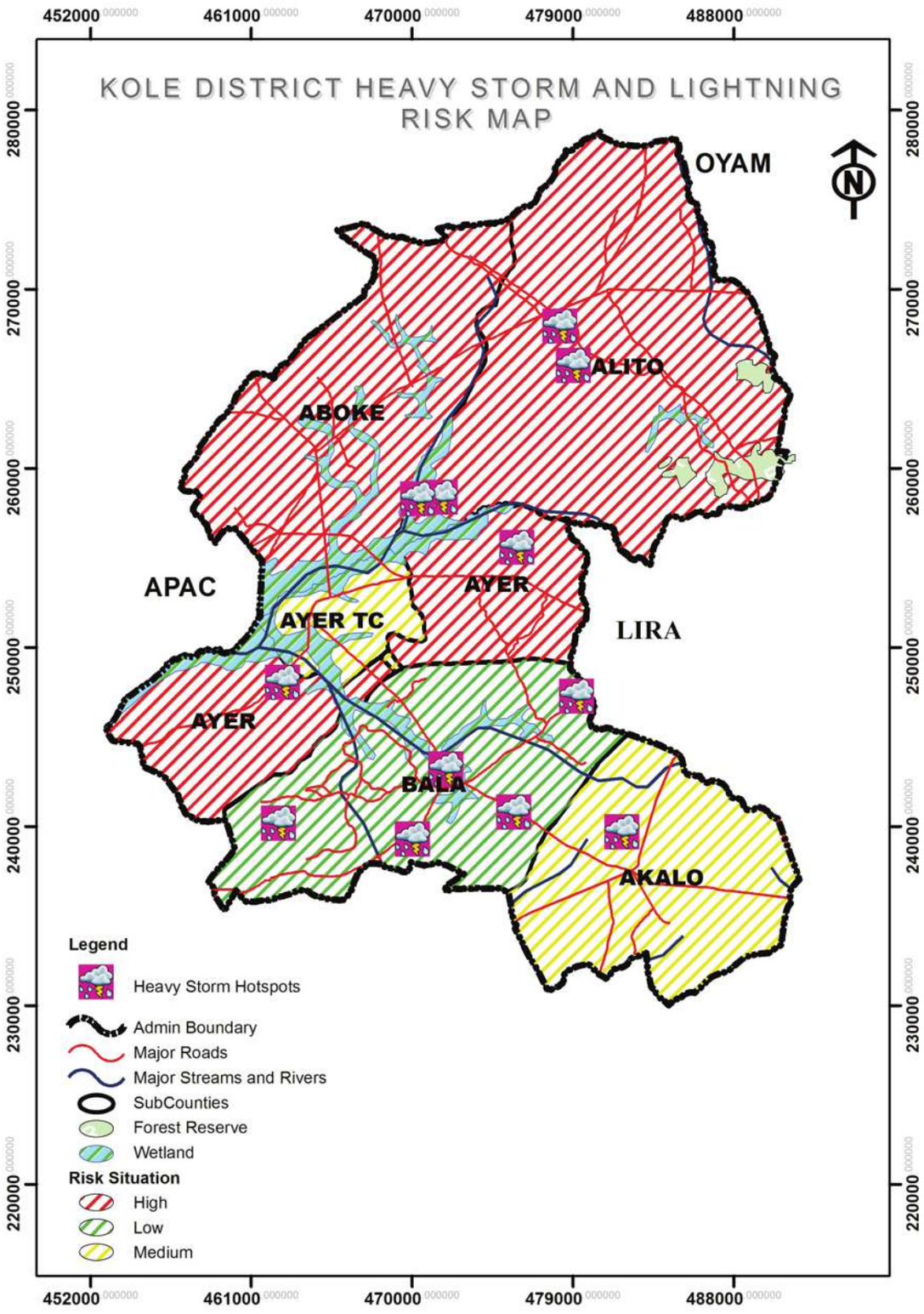

Figure 1: Heavy Storms Risk Map
Source: Field Data Collected by OPM (May, 2014)

Heavy storms in Kole are comprised of hailstorms, thunder storms, lightning and violent winds. Heavy storms can cause flooding and related public health hazards. Various parts of the district are prone to hailstorms to varying degrees. The sub-counties of Alito, Aboke and Ayer are facing high risk of heavy storms as denoted by the color red on the map; Ayer Town Council and Akalo Sub County are exposed to moderate risk of Heavy Storms, with color yellow on the map while Bala has low risk thus the color green on the map.

Thunderstorms, lightning and hailstorms normally occurs during rainy season, however, strong winds are experienced both during rainy and dry seasons. This has led to loss of lives and property such as crops, animals and houses; these in turn have led to seasonal food shortage, unprecedented hunger, malnutrition, and trauma and over reliance on relief supplies from central government and other donor agencies.

Crop Pests and Diseases

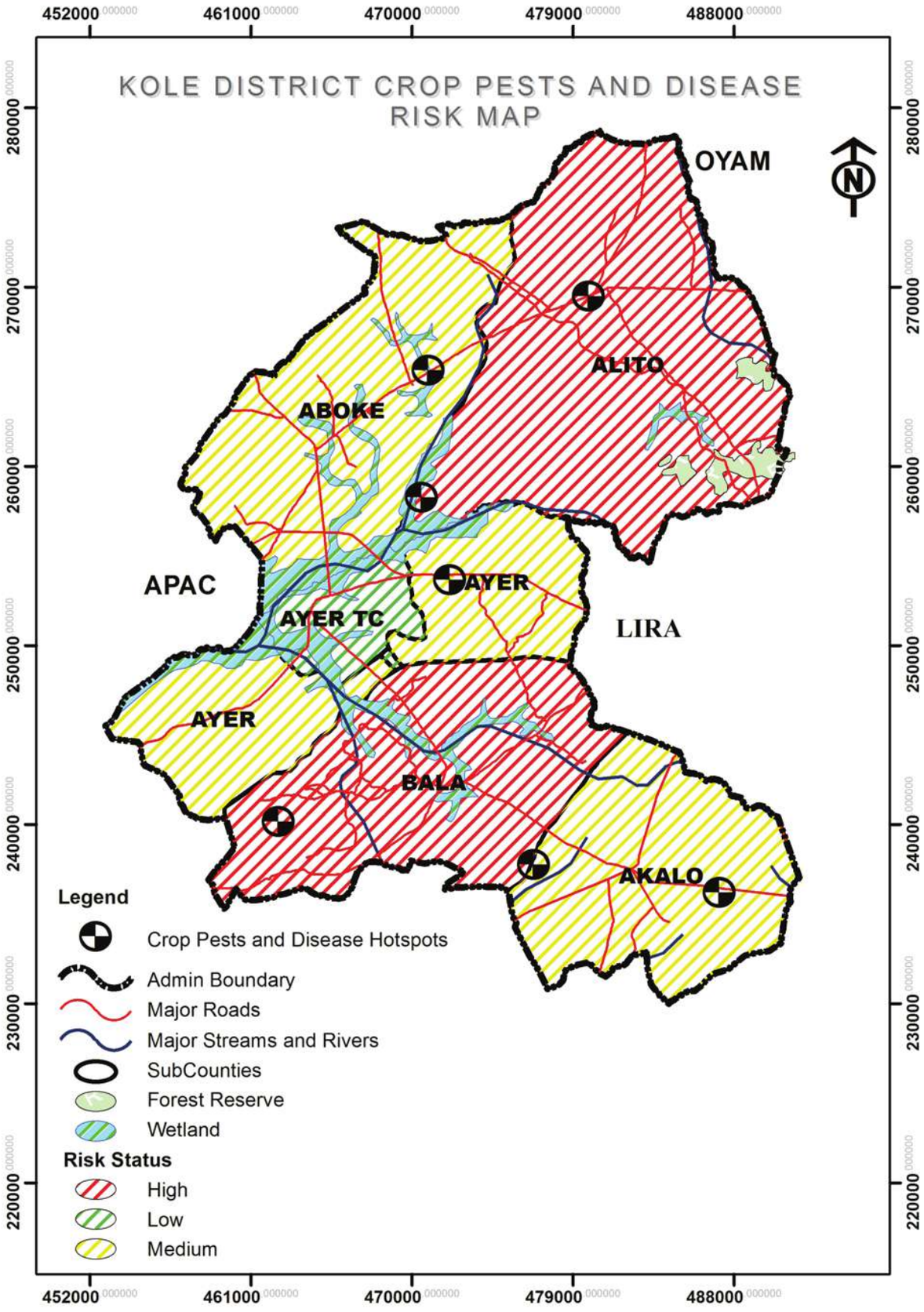

Figure 2: Crop Pests and Diseases Risk Map

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

Pests are unwanted so are destructive insects or any animals that attack food or livestock both during the growing and post-harvest seasons. Pests increase in numbers due to one or a combination of ecological factors among others, temperature, monoculture, introduction of new pest species, weak genetic resistance, poor pesticide management, bad weather patterns and migration.

Crop pests and diseases pose varied levels of risk to the communities of Kole district: Bala and Alito sub-counties have high risk thus the color red on the map; Aboke, Ayer and Akalo face moderate risk of crop pests and diseases thus the color yellow on the map; and Ayer Town Council is faced with low risk of crop pests and diseases thus the color green on the map.

Pests lead to damage of plants and harvested crops, consequently leading to food shortages, famine and economic stress. Common pests in Kole include; millipedes, caterpillars, aphids, variegated grasshoppers, army worms in all the sub counties. This has resulted into low yields in agricultural produce. This has also affected the quality of the products thereby unable to compete in favorably in the open market. This in turn leads to poverty and malnutrition. While diseases include; cassava brown streak, banana bacteria wilt, citrus kangka, fruit flies, cassava mosaic.

Animal Vector and Diseases

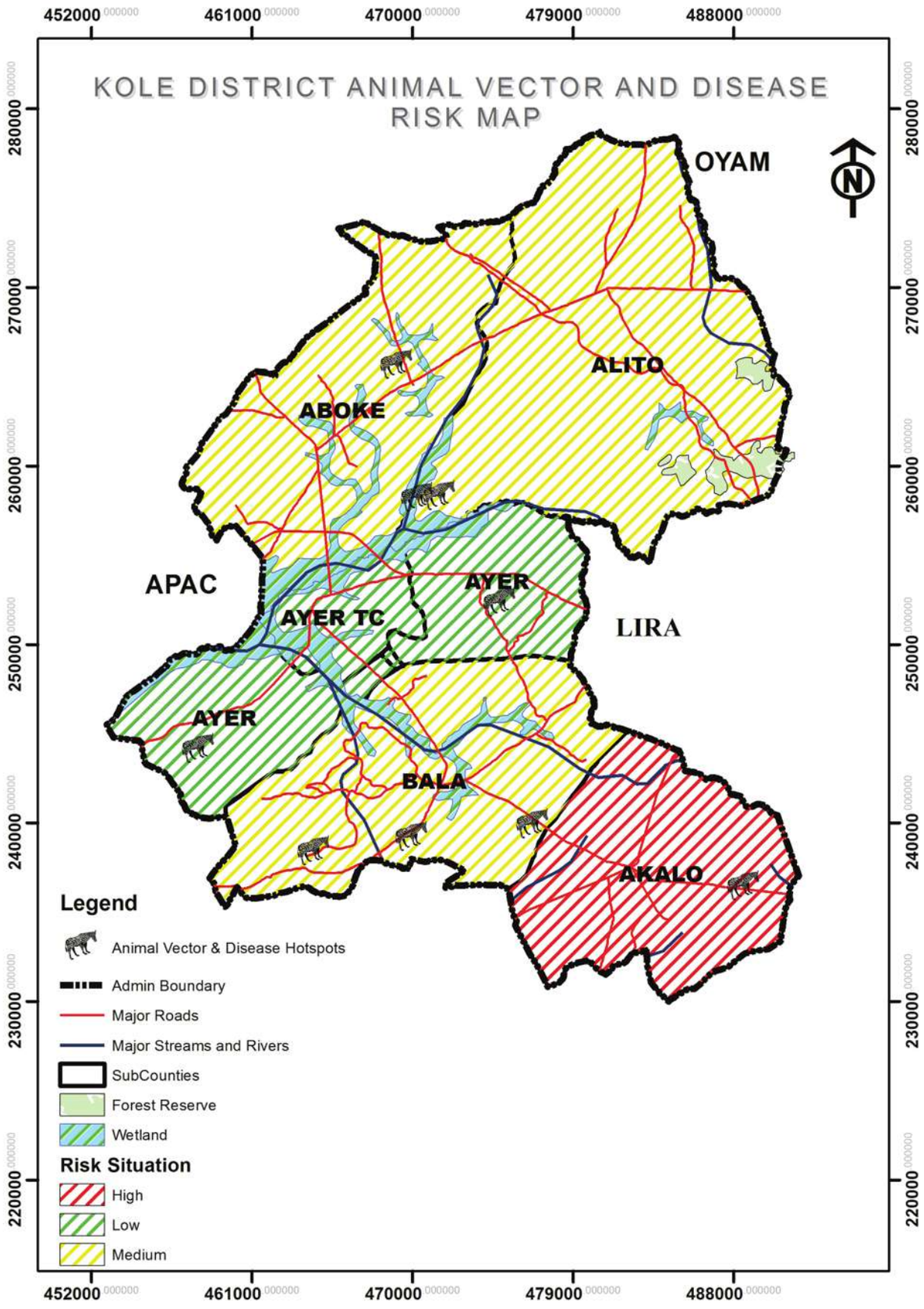

Figure 3: Animal Vectors and Diseases Risk Map

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

The people of Kole district are grappling with a number of animal vectors and diseases. The most rampant vectors are ticks and tsetse flies and the most common diseases include: African swine fever in pigs, foot and mouth diseases, Newcastle in poultry, liver flukes, rabies, nagana and lumpy skin disease. These are widespread phenomena in all the six (6) sub-counties of Kole district. However, Akalo sub-county is the epicenter of the hazard exposed to high risk; Bala, Aboke and Alito sub-counties are exposed to moderate risk of animal vector and diseases while Ayer T/C and sub-county are exposed to low risk of the hazard as shown in the map above.

Animal vector and diseases have always resulted in to poor health and death of animals. This consequently leads to loss of not only anticipated economic gains but also accumulated wealth in form of these animals. Animals are the main form of accumulated wealth, source of prestige, and main items for paying pride wealth/price such that anything that affects the wellbeing of animals directly impacts the family and the clan at large.

Environmental Degradation

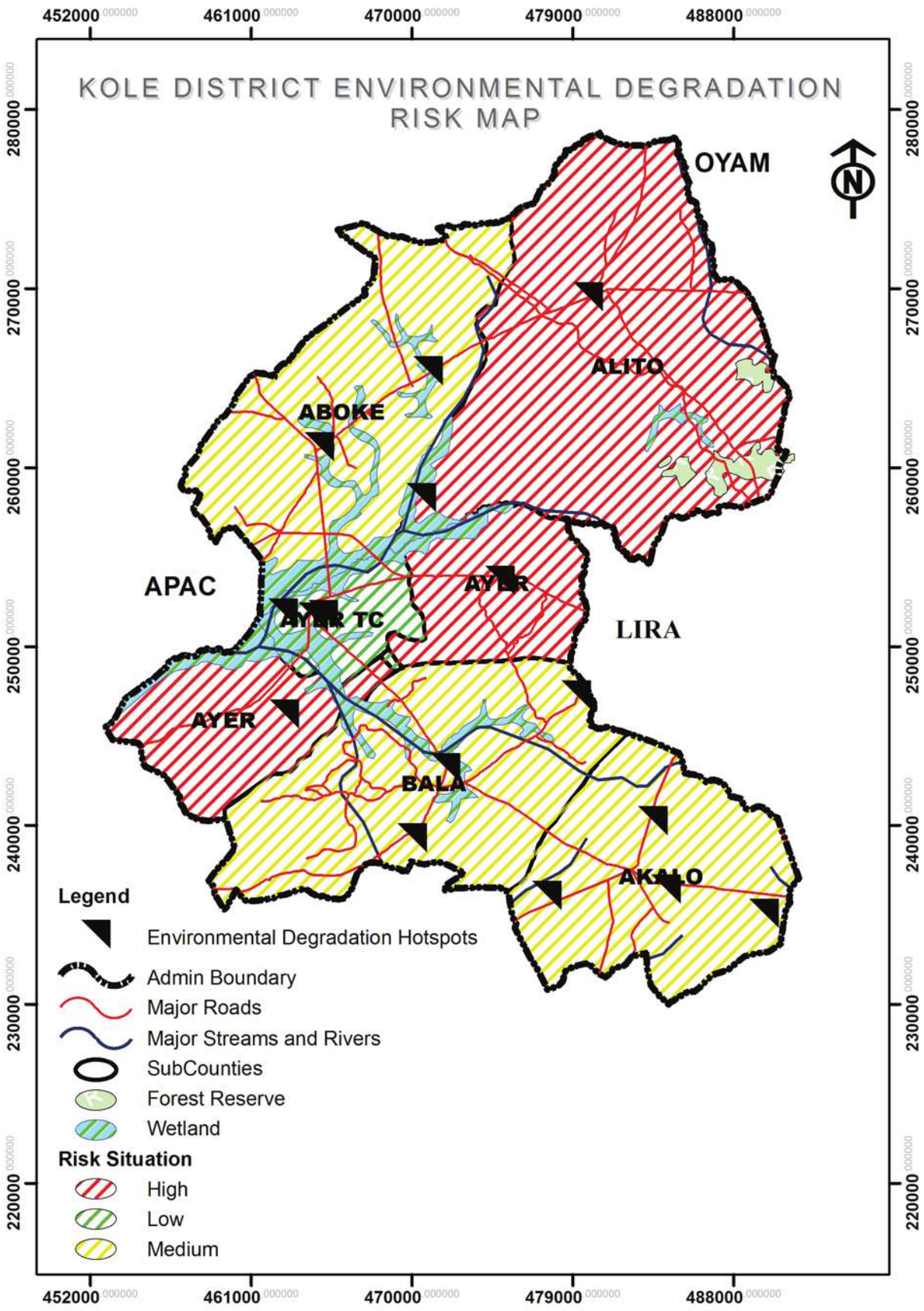

Figure 4: Environmental Degradation Risk Map

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

This phenomenon results from poor land use practices and other practices that lead to disruption of ecological systems. Environmental degradation takes the form of over grazing, destructive tilling practice on sloping landscapes, monoculture, unguided and uncontrolled use of fertilizers and pesticides, wetlands reclamation, bush burning, deforestation and over or poor methods of harvesting wetland resources e.g. Papyrus. However, trees are normally cut for wood fuel, brick baking, tobacco curing and fish smoking.

This is observed/reported in all the sub-counties due to the fact that Kole population is increasing in a way that is not matched with the available land. Therefore, more vegetation and wetlands are being destroyed to find land for settlement, cultivation and construction of houses, roads and factories. As depicted in the risk map above, Ayer and Alito sub-counties are faced with high risk of environmental degradation; Aboke, Bala and Akalo face moderate risk of environmental degradation while Ayer Town Council is faced with low risk of environmental degradation.

Internal Conflicts

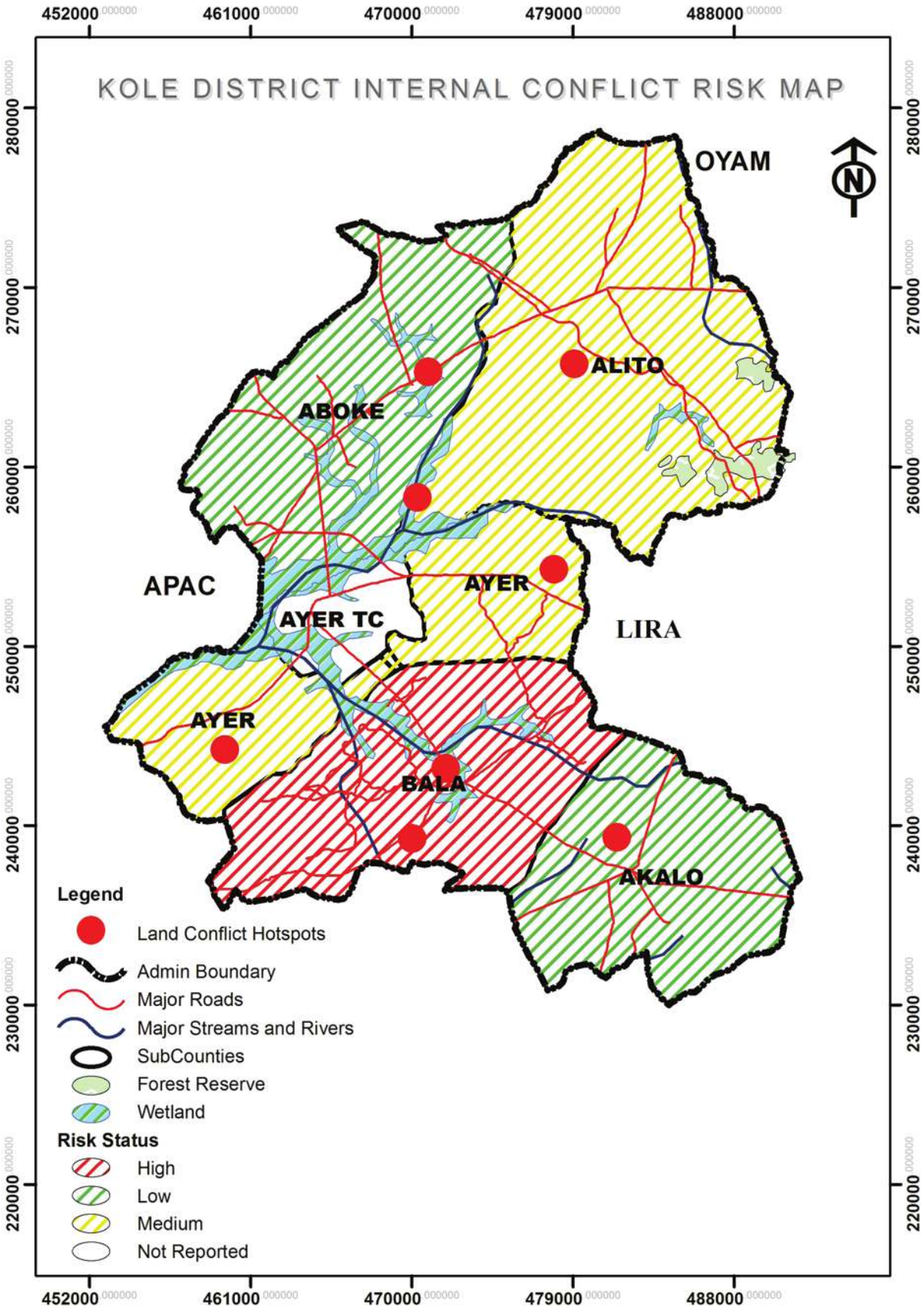

Figure 5: Internal Conflicts Risk Map

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

Internal conflicts take the form of land disputes and domestic violence. Land conflicts are twofold: ownership and right to use/access. The post conflict/IDPs camps is characterized by many claims and counter claims over ownership as well boundaries of land in almost all villages in the district. Many could be due to loss of the elderly who knew the actual boundaries of the customarily owned lands but could also be due to false claims with intensions of getting money from sale of the claimed lands. It is observed that while in the IDP camps, many locals got to know the value of land and therefore consider it to be a quick way of making money notwithstanding the fraudulent wars involved. The second scenario of right of use/access is most commonly between the crop farmers who encroach on the wetlands and the cattle keepers who rely on the communal watering points in the wetlands. The conflict arises in that the crop farmers fence off the common access points to the watering points for fear of animals destroying their crops, which on the other side amounts to denial of the right of access/use of the communal resource (water) of the cattle keeper. The results are usually detrimental including cutting animals with machete while the worst case scenario has often resulted into deaths which are reported yearly.

Just like the case of land conflicts, domestic violence takes the form of sex and gender based violence. This is exacerbated by the unequal powers women and men have over the resources of their homes and also the divergence in the roles and responsibilities the two parties share in the process of creating and nurturing the resources. Though women do most of the garden work, almost all the proceeds from the garden produce end up in men's pockets. These men unfortunately have the audacity to spend the hard earned moneys on other non-relevant errands. The irony is that the woman is not supposed to say anything about the misuse of these funds and should the woman refuse to declare these funds or spend them without the consent of the husband; unfortunate events closely associated with SGBV will ensue. Many times women have been battered due to circumstances such as above and it is very rampant not only in Kole but the entire sub-region.

Internal conflicts are reported in all sub-counties except Ayer T/C. However, this is to varied levels of risks: Bala is exposed to high risks of internal conflicts; Ayer and Alito sub-counties are faced with moderate risk of internal conflicts; while Aboke and Akalo sub-counties are faced with low risks of internal conflicts. These internal conflicts result into loss of life, displacement and loss of property. It is eminently characterized by disputes among families, communities' verses individuals and across boundaries; this leaves the community fragmented and desperate to do anything possible to secure their 'rights'.

Prolonged Dry Spell

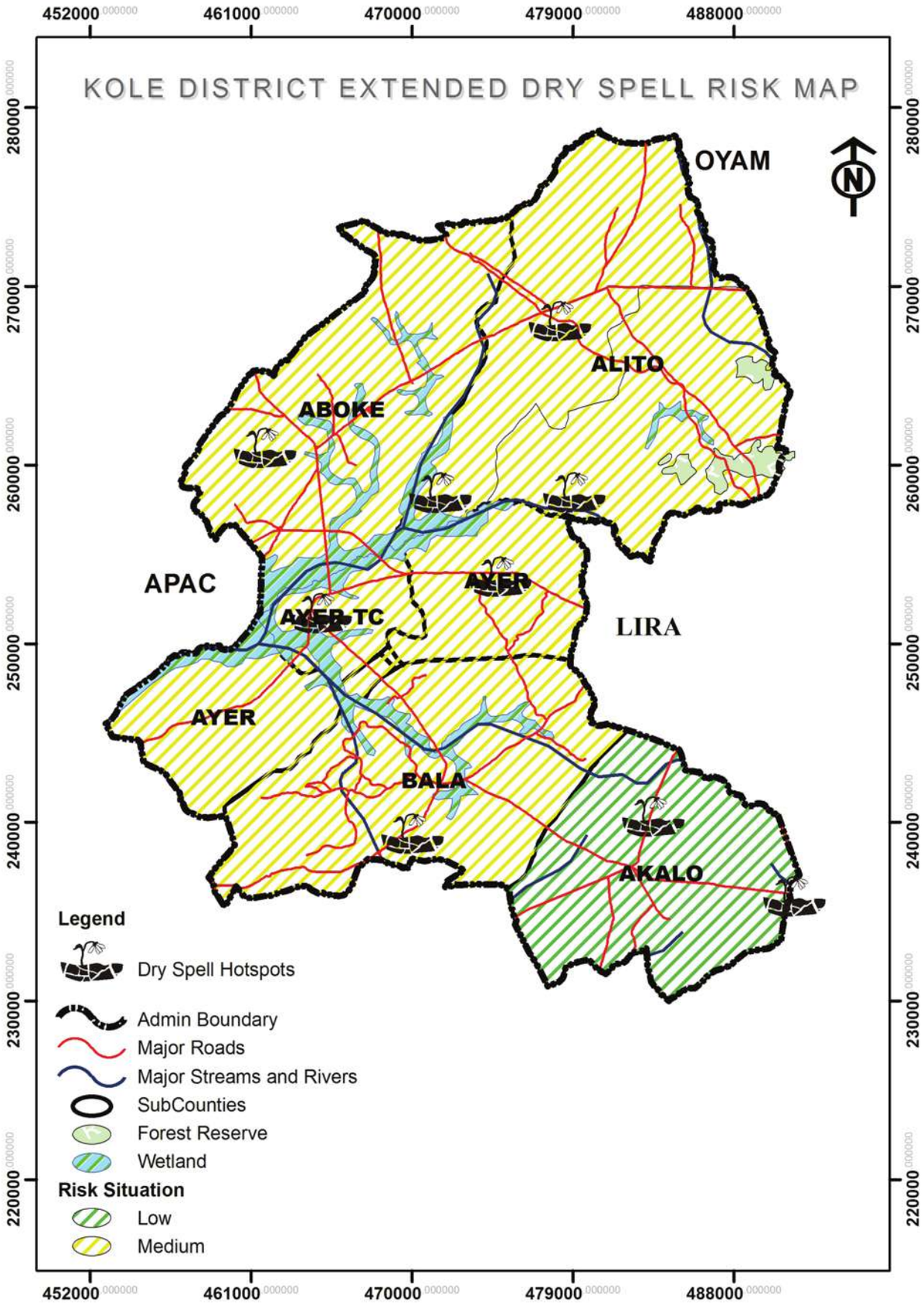

Figure 6: Prolonged Dry Spell Risk Map

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

The indiscriminate human activities on wetland reclamation and deforestation not only in the district but also in the entire sub-region if not the entire country are compounding factors for weather variability and climate change.

Wetland reclamation mainly for rice, sugarcane and vegetable growing predisposes the wetlands to drying up as all the water that would have been retained under the usually thick vegetation cover of thickets, papyrus and other shrubs runs down the stream. Similarly, indiscriminate tree felling for opening up agricultural land, timber, charcoal, firewood and other human needs has a devastating effect. Large expanses of land are now left bare without any tree cover. This exposes the soils to agents of soil erosion, quick loss of soil water, and sweeping of crops by strong winds due to lack of wind breaks. This is further associated with wilting of perennial crops and natural vegetation. It has constantly led to failure of the first planting season resulting in food shortages between July and September. The loss of vegetative cover coupled with the quick run off of water in the streams contributes to the negative modification of the microclimate resulting into the extended dry spells in places which used not to miss rains in any traditionally known rainy seasons.

This affects the whole district moderately though Akalo sub-county is predisposed to low risks. It is most common from March to May and this is characterized by high temperatures, strong winds and unreliable rainfall. The period is always associated with cough and trachoma in humans.

Human Epidemics

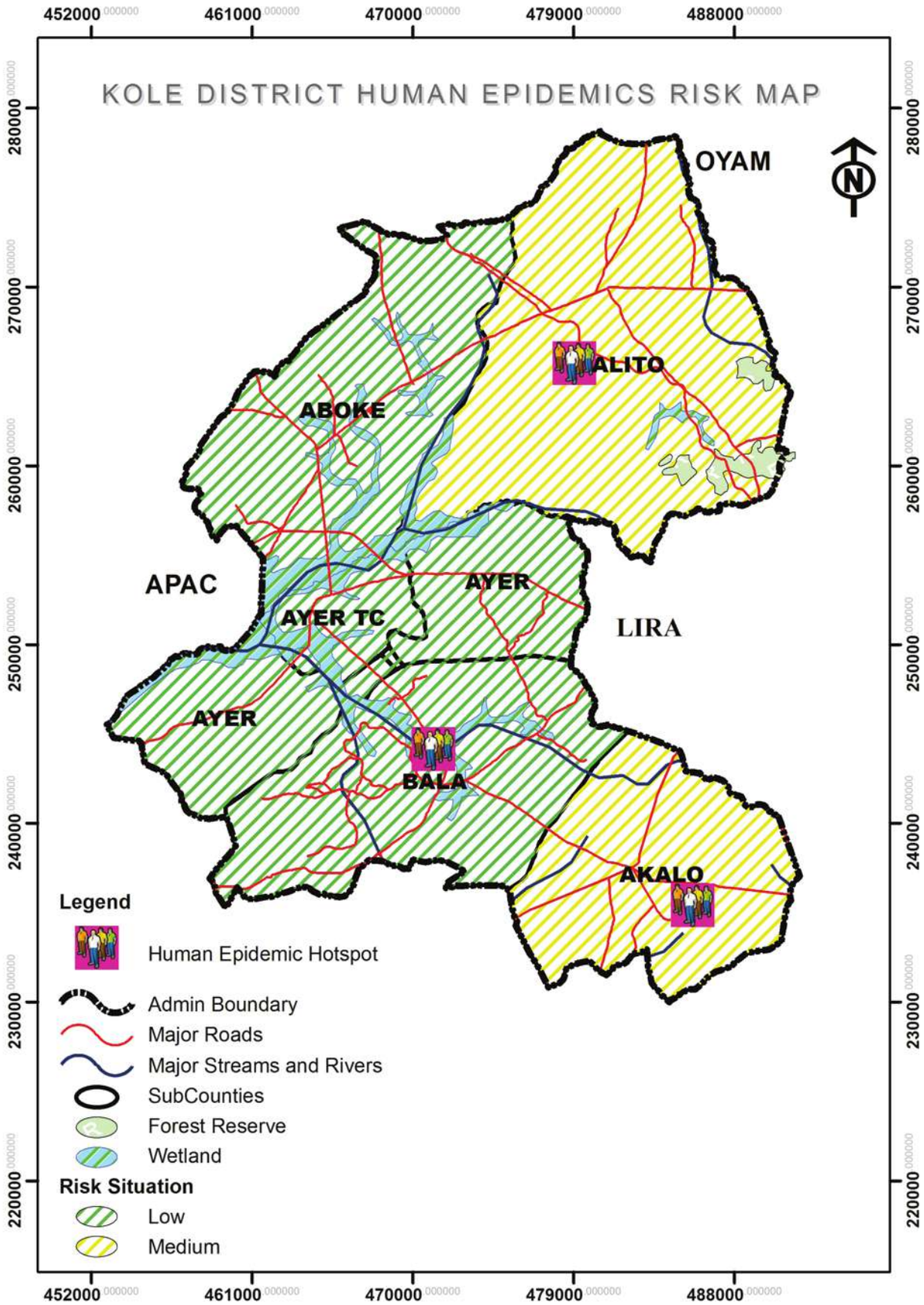

Figure 7: Human Epidemic Risk Map

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

Epidemic is the prevalence of disease in a particular community and at a particular period, whose magnitude goes beyond normal or expected levels.

Human epidemics in Kole district are: sleeping sickness which is prevalent in Akalo, Bala and Alito sub-counties; Hepatitis B; cholera and dysentery. Sleeping sickness is one of the neglected tropical diseases which is affecting the livelihoods of the people of Kole district. It is a serious disease to an extent that only one case confirmed amounts to an epidemic in a given locality. The disease is transmitted by the infectious tsetse flies.

The tsetse flies are found in damp and dark habitats along the swamps and river banks conducive for their breading. Kole district is traversed by several of such riverine areas that interventions like the tsetse traps are not effective in eliminating the flies.

In general, Alito and Akalo are exposed to moderate risk of human epidemics while the rest of the sub-counties are facing off with low risk of human epidemics as portrayed on the map with yellow and green colors respectively.

Floodings

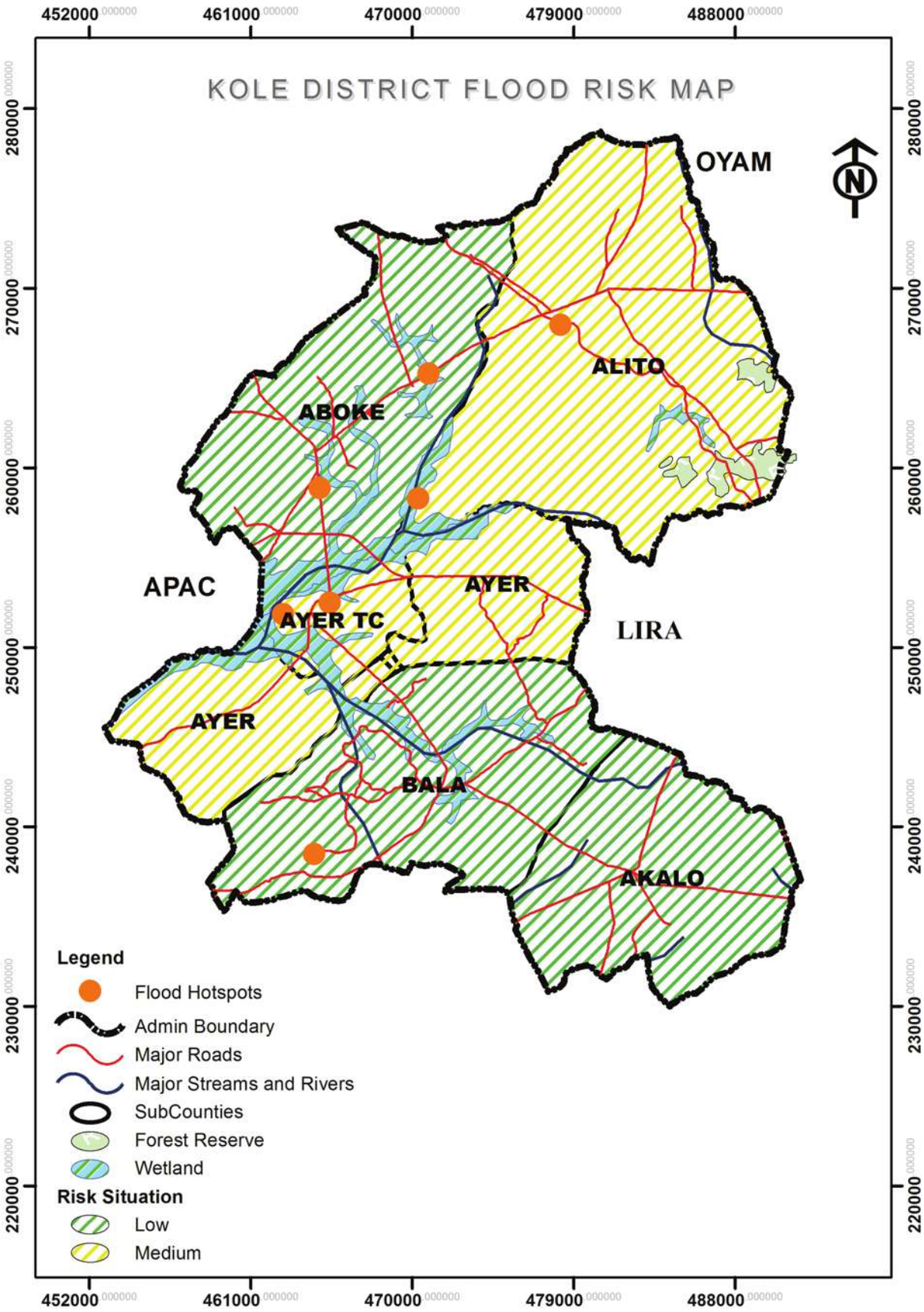

Figure 8: Flooding Risk Map

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

Floods are common occurrence in the district especially during rainy season with the peak in August-October.

This is attributed to the fact that the district is endowed with Arocha wetland and the famous Okole wetland with their tributaries which subdivide the catchment area. Wetlands take approximately 20% of the total land area of Kole district.

Whereas Flooding in Kole district is majorly caused by heavy rains, human activities like construction of roads, valley dams, and other inappropriate agricultural practices, poor methods of disposing non-biodegradable wastes make the situation worse off.

Flooding in the district has resulted in to loss of lives, destruction or loss of household property like houses, crops, animals. It has also led to reduction in animal grazing grounds, outbreak of waterborne diseases such as typhoid, diarrhea, cholera and dysentery.

Floods in the district have also been a menace in road accessibility during peak rainy seasons by causing destruction of culvert bridges and submerging/washing away sections of roads especially along Aboke – Alito, Aboke – Ayer T/C, Ayer – Bala and Akalo – Bala roads.

The map above shows that Alito, Ayer sub-counties and Ayer T/C are moderately susceptible to the risk of floods while the other sub-counties face low risk of floods.

Bush Fires

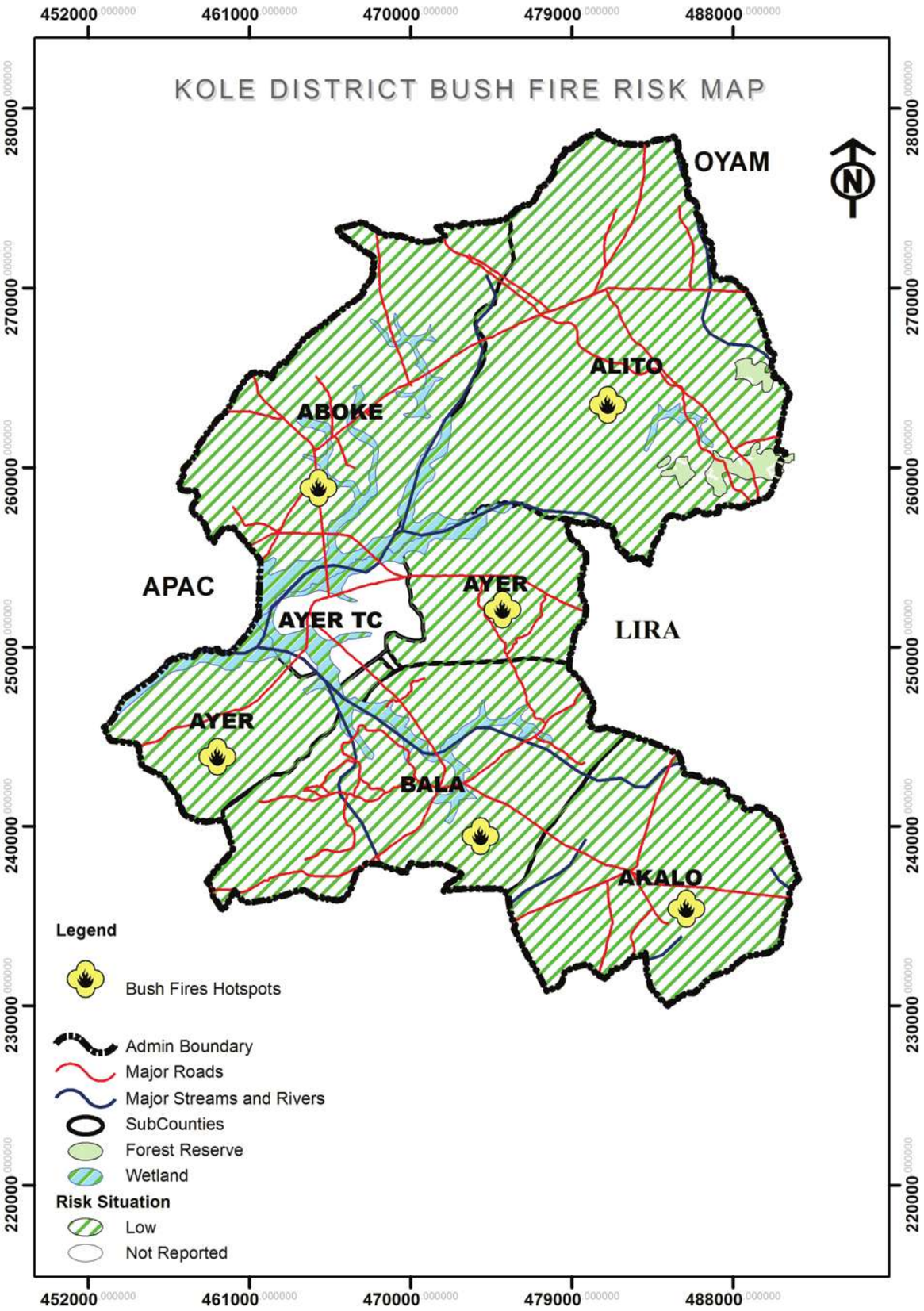

Figure 9: Bush Fires Risk Map

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

This is also experienced district wide especially during the dry season between December and February annually. Apart from Ayer T/C which reported no incidence of the hazard, the other sub-counties of the district displayed low risk to the hazard. This vice is mainly caused by hunters who want to reduce the thick vegetative cover so as to increase chances of catching their prey which are commonly the edible rats (Anyeri) by exposing them; farmers who want new grass to sprout for their animals but also crop farmers who want to prepare their gardens for the new planting season and to a lesser extent children, who set up wild fires for fun.

This results into loss of mature crops which get burnt in the fields. The crops include sorghum, simsim, cassava and millet. Sometimes the fires also burn down houses which will not have been secured by the time the fires are set. Household property including food stuff already stored in the granaries and lives are normally at stake during such instances.

The most affected and always neglected by the locals is the loss of biodiversity both in the terrestrial and aquatic ecosystem. The soils are left whereof total loss of soil moisture is inevitable and erosion by wind and water eminent.

Proliferation of Invasive weed species

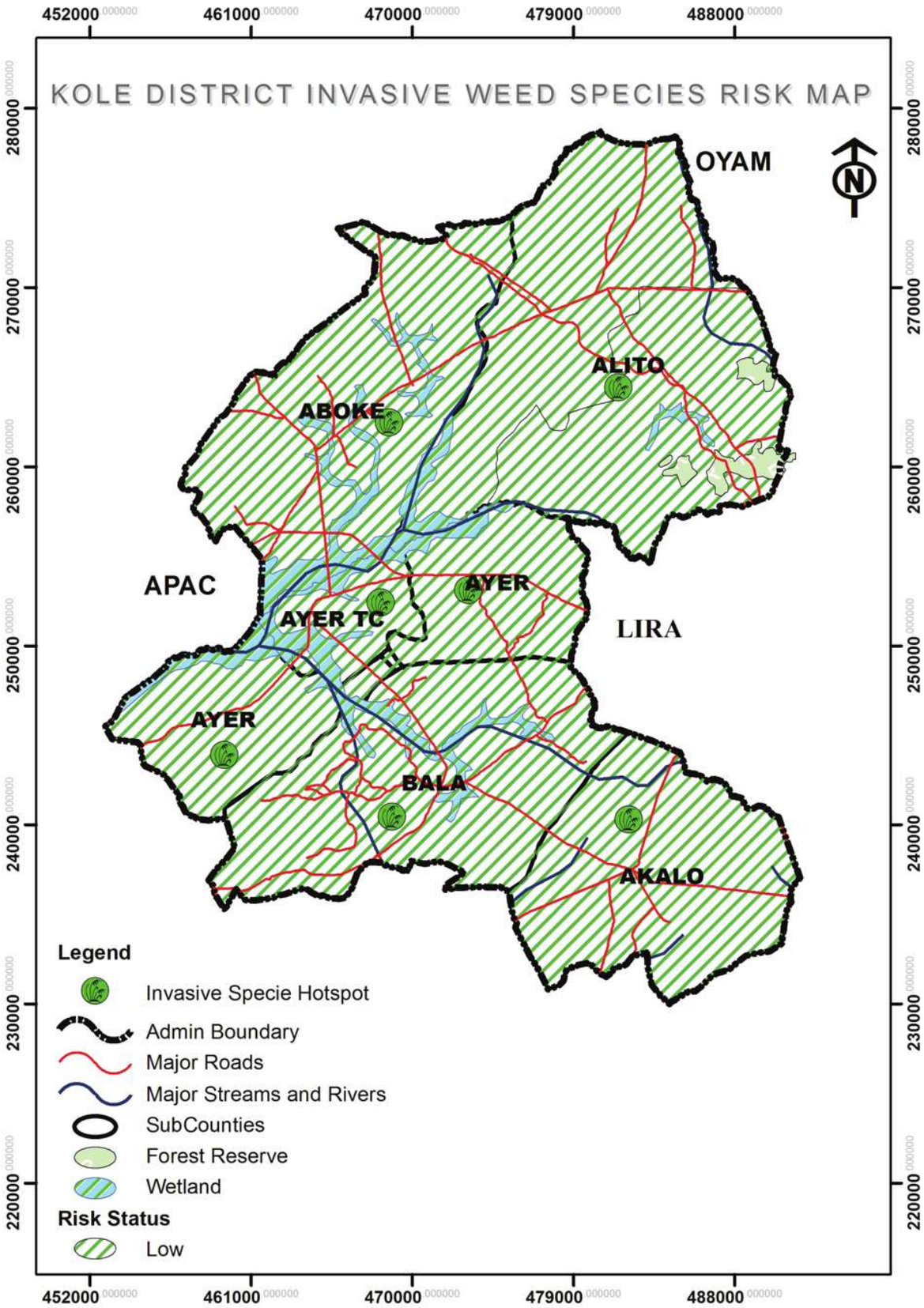

Figure 10: Proliferation of Invasive Weed Species Risk Map

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

Lantana camara was noted in all sub-counties of the Kole district, though to quite low risk levels. The weed is dangerous to animals such that it kills animals once eaten and also the smell of the flowers causes abortion in animals. Cases of low milk production have also been reported by the District Veterinary Officer. Lantana camara also proliferates to the extent that it drastically reduces the quantity and quality of grazing grass lands for animals.

Vermin and other wild animals

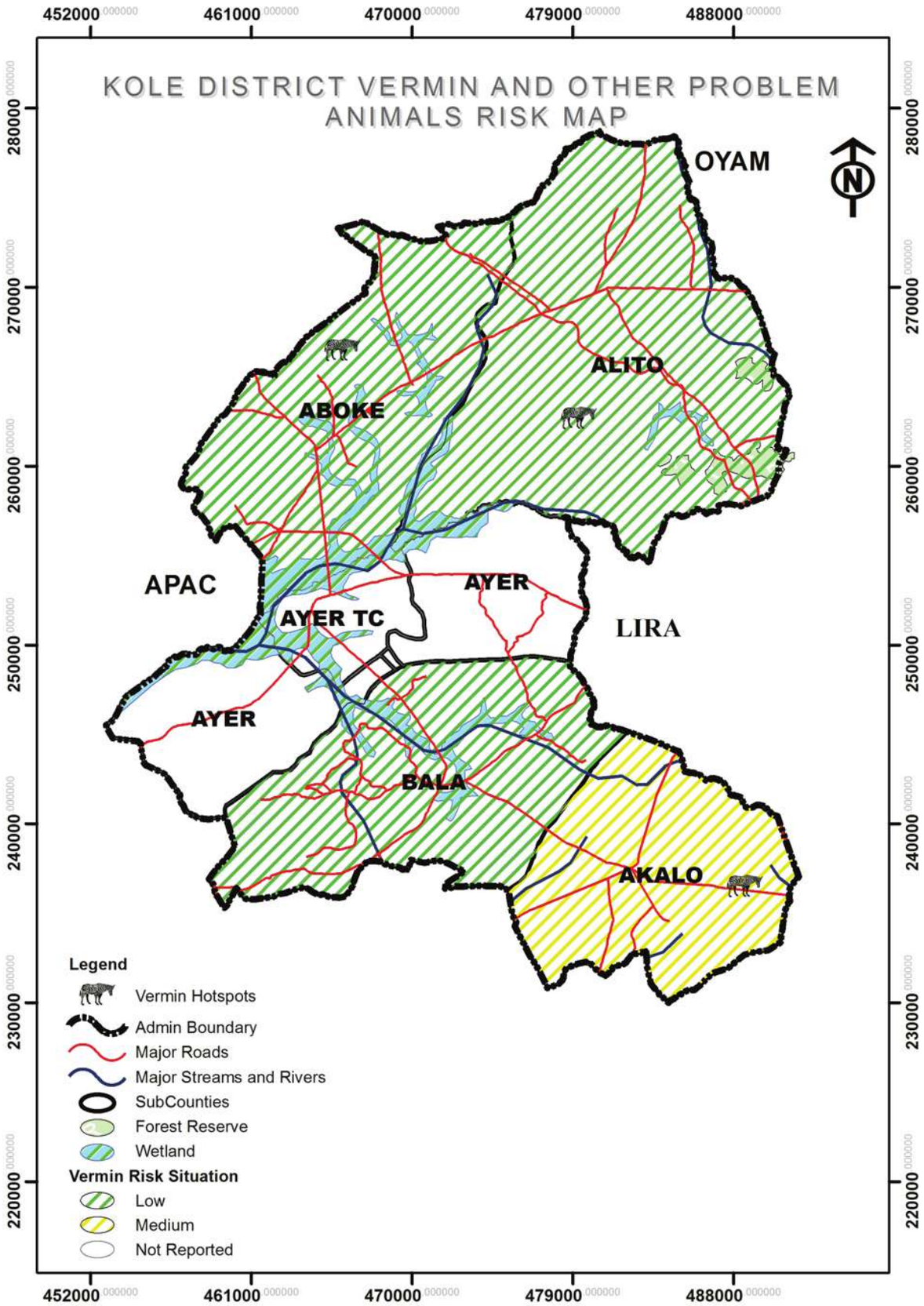

Figure 11: Vermin Risk Map

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

Common species include velvet monkeys, bush babies and wild bats. Whereas the most affected sub-county is Akalo, they are also present in Ayer, Alito and Aboke sub-counties. The vermin are known for crop destruction especially maize, bananas, groundnuts and fruits like guava, passion fruits, mangoes etc. resulting in low harvests.

VULNERABILITY

Table 5 summarizes the communities' assessment of hazard severity and frequency in the sun-counties. Table 6 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 6: Risk and Vulnerability Assessment

Sub county	Heavy Storms	Crop Pests and Diseases	Animal Vectors and Diseases	Environmental Degradation	Internal Conflicts	Prolonged dry spell	Human Epidemic	Flooding	Bush Fires	Proliferation of Invasive Weed Species	Vermin	Cumulative vulnerability (Absolute)	Weighted vulnerability (Cumulative/3)
Alito	3	3	2	3	2	2	2	2	1	1	1	22	7
Akalo	2	2	3	2	1	1	2	1	1	1	2	18	6
Bala	1	3	2	2	3	2	1	1	1	1	1	18	6
Ayer	3	2	1	3	2	2	1	2	1	1	0	18	6
Aboke	3	2	2	2	2	2	1	1	1	1	1	18	6
Ayer TC	2	1	1	1	1	2	1	2	0	1	0	11	4
Total	14	13	10	13	11	11	8	9	5	6	5	105	
Key: 3 = High, 2 = Medium, 1 = Low, 0 = Not reported													

Risk Vulnerability

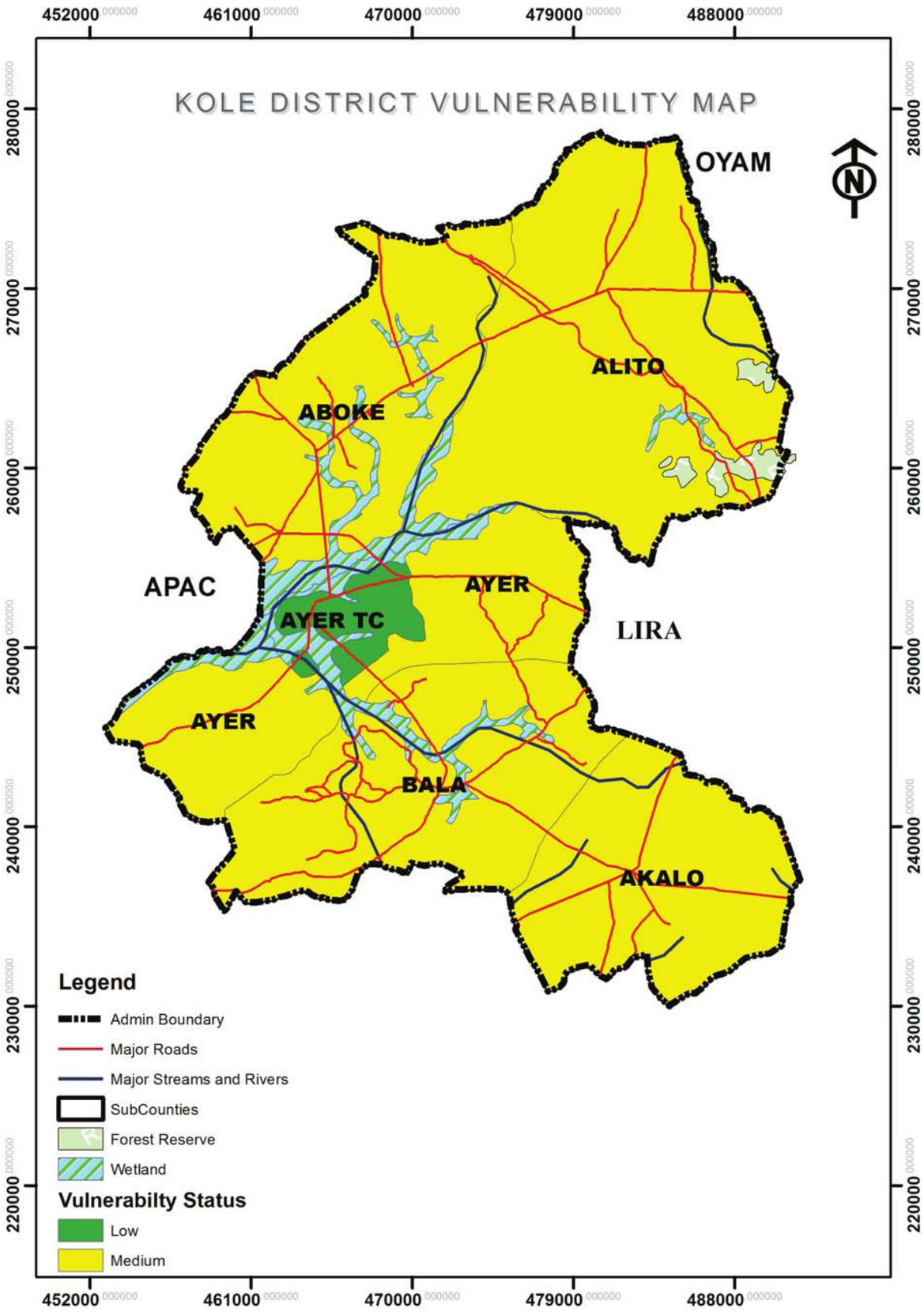

Figure 12: Risk Vulnerability Map

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.

Kole district is exposed to 11 hazards namely heavy storms, environmental degradation, crop pests and diseases, internal conflicts, prolonged dry spell, animal vectors and diseases, flooding, human epidemic, proliferation of invasive weed species, bush fires and vermin arranged in their order of risk from highest to lowest with total risks of 14, 13, 13, 11, 11, 10, 9, 8, 6, 5 and 5 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.

Alito, Akala, Bala, Aboke and Ayer sub-counties reported the highest vulnerability in Kole district with cumulative vulnerabilities of 22, 18, 18, 18 and 18 respectively and weighted vulnerabilities of 7, 6, 6, 6, and 6 respectively which lie in the middle (yellow) of the vulnerability scale. Ayer T/C was the least vulnerable sub-county in the district with a weighted vulnerability value of 4.

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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CONCLUSIONS

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

Alito, Akala, Bala, Aboke and Ayer are the most vulnerable sub-counties with weighted vulnerabilities of 7, 6, 6, 6 and 6 respectively, all lying in the middle (yellow) of the vulnerability scale. Ayer T/C displayed the least vulnerability in the district with a weighted vulnerability value of 4 though too 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.

Timely early warning systems and other DRR interventions would be able to enhance the resilience of the people of Kole 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. 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. Food Insecurity is the severe shortage of food that may lead to malnutrition and death.

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

Landslides. These are rapid movements of large mass of mud, rocks, formed from lose soil and water. Landslides occur mainly during the rainy season, but they can also be precipitated by earthquakes. Community settlement on steep slopes and other uncontrolled land use practices increase the probability of landslides.

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, naganan, and bird flu. Crop disease epidemics include coffee wilt, banana bacterial wilt, 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.

Cattle rustling. This is when one community raids another to steal livestock.

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.

Mines and unexploded ordinance. Mines are devices designed to explode with fatal effect when disturbed. Unexploded ordinance are unspent bullets, grenades, rockets, etc., which are discarded or stored.

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

Earthquakes. Earthquakes results from sudden violent movements of the earth's surface, sometimes causing massive loss of lives and property due to building collapse.

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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