THE REPUBLIC OF UGANDA

Apac 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
FGD	Focus Group Discussions
GIS	Geographical Information Systems
GoU	Government of Uganda
GPS	Global Positioning System
HFA	Hyogo Framework for Action
IDP	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
NAADS	National Agricultural Advisory Services
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 Apac 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, gender demographics by sub-county and livelihoods.

Apac became a district in 1974 curved out of the then Lango District. Oyam and Kole districts were curved out of Apac in July 2006 and 2010 respectively; essentially to enhance service delivery to the communities. Apac District is located in Northern Uganda, approximately 250 km (direct) from Kampala. It lies between longitudes 32^{o} E and 34^{o} E and latitudes 2^{o} N and 3^{o} N. It is bordered by the Districts of Kole in the North, Dokolo in the East, Masindi in the West and Amolatar District in the South through Lakes Kwania and Kyoga respectively. The District covers a total area of 2,847 km^{2} of which 11 % is under open water while 15%.

Apac District has two seasons (dry and wet). The wet season extend from April to November with highest rainfall peaks in April and August, although the pattern is likely to change with the global climatic change. The dry season is from December to March, the mean annual rainfall is 1,330mm. The average monthly maximum temperature is 29^{0}C and the average monthly minimum temperature is 17^{0}C. Climate conditions in Apac are generally favourable though unpredictable. Drought prone areas are in the Southern and South West of the District in Southern Kwania and Maruzi Counties. Climatic variations are associated with air currents both the surface (water and land) and the atmosphere. The Lake Kyoga/ Kwania complex however, appear to produce significant variations within the immediate environments.

It identifies endemic hazards in 10 classes, in order of high to low risk: Internal conflicts, flooding, prolonged dry spell, animal vectors and diseases, environmental degradation, crop pests and diseases, vermin and other problem animals, bush fires, heavy storms and proliferation of invasive species.

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.

The District probably has the highest level of vulnerability to the stated hazards in the region. More than half of the sub-counties in the district are highly vulnerable while the rest portrayed medium vulnerability to the resident hazards. Chawente, Nambieso, Akokoro, Ibuje and Chegere are the most vulnerable sub-counties with weighted vulnerabilities of 9, 9, 9, 8, and 8 respectively.

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

INTRODUCTION

Apac district is vulnerable to a number of hazards that lead frequently to disasters. They include environmental degradation, flooding, prolonged dry spell, proliferation of invasive species, bush fires, crop pests and diseases, animal vectors and diseases, heavy storms, internal conflicts and vermin and other problem animal attacks.

The Apac district Local Government and the Department of 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 Apac 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 Apac 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-region 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

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 analysed 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, onscreen 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

Apac district is situated in the Lango Sub region of Northern Uganda 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, Kole in the North-East, Lira in the East, Kiryandongo district in the West, Amolatar and Nakasongola districts in the South.

The District covers a total area of 2,847km^2 of which 9% is under swamps and water while 15% is under forest with 2,970km^2 for human settlement and 2,524km^2 suitable for arable farming.

Climate

Apac district has two seasons(dry and wet). The wet season extend from April to November with highest rainfall peaks in April and August. Although the pattern is likely to change with the global climatic change. The dry season is from December to March, the mean annual rainfall is 1,330mm. The average monthly maximum temperature is 29^0C and the average monthly minimum temperature is 17^0C. Climate conditions in Apac are generally favourable though unpredictable. Drought prone areas are in the Southern and South West of the District in Southern Kwania and Maruzi Counties. Climatic variations are associated with air currents both the surface (water and land) and the atmosphere. The Lake Kyoga/ Kwania complex however, appear to produce significant variations within the immediate environments.

Natural Resources

Water

There are numerous streams/rivers in the district particularly prominent in Kwania County. Some of the main rivers include: Arocha, Okole and River Nile (Victoria Nile) in the South Western part of the district. These rivers are associated with the extensive wetland areas.

Lake Kwania found fringing the Southern border of the District, is the largest single open water body. This covers a total area of about 37,362 Ha. i.e. 8.6 % of the District.

Soils

The soils in the District are reddish 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 hyperhenia, terminalia acacia and Butterspermum species. Isolated riverine forest type vegetation is found a long River Nile while Okole & Arocha wetlands are dominated by wetland plants.

Wetlands

Total area of the district under wetland/swamps is 55,403.72 Ha of which 194.4 km^2 is permanent wetland while 653 km^2 is under 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.

Wild Life

In the 1940's, the Maruzi Peninsula and eastern part of the district were densely populated with wild life being adjacent to Murchison Falls National Park. These areas were however sparsely populated due to the prevalence of tse-tse flies and thus the establishment of entomology department in 1952 for tse-tse control.This was however replaced with cattle ranches after a series of measures like using spray chemicals, traps, destruction of animals which provided hosts to control tse-tse flies but now with no proper measures to control the vectors, the situation is worsening. Wildlife is hunted for food, medicines, and trophies, although the magnitude has reduced due to pressure on land. Detrimental methods are used to trap/kill the animals including bush burning. The flat terrain offers little cover for animals to escape.

Bush burning is in the dry season which last for 4-6 months thus destroying most vertebrates and invertebrates. Other threats include unclear policies on vermin, vector/disease control and poor land tenure systems with undefined wetland ownership/use.

For proper management of wildlife, there is a ban of shooting of animals to control tsetse fly infestation, but a more friendly method e.g. use of chemicals and traps for flies was recommended and many more people are sensitized on wildlife values and proper control mechanisms for preservation of wild life.

Land Use Pattern

88% of the population in Apac district depend on Agriculture for livelihood.

Topography
The district's topography is characterised by low plains and rolling hills along the river, at 900 metres above sea level, rising to a series of hills and peaks in the eastern and, north eastern parts of the district. The district lies at an average altitude of 1150m above sea level.

Rainfall Pattern
The rainfall pattern is bimodal and is typically convectional, but the level is changing with the current global climate 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.

HISTORICAL BACKGROUND
Apac became a district in 1974 curved out of the then Lango district. Oyam and Kole districts were curved out of Apac in July 2006 and 2010 respectively; essentially to enhance service delivery to the communities.

Demography
The district has a population of 580900as per the projection from 2002 National housing and population census and a detail of population per sub–County.

POPULATION FIGURES

Table 1: Projected 2012 Population of Apac district by Sub-countyTable 1 Projected 2012 Population of Apac district by Sub-county

SUBCOUNTY	MALE	FEMALE	TOTAL
Aboke	23000	24000	47000
Akalo	13400	14600	28000
Alito	34300	36200	70500
Ayer	21400	22600	44000
Bala	20400	22000	42400
Abongomola	17900	18800	36700
Aduku	18000	19100	37100
Chawente	14400	14700	29100
Inomo	14900	15700	30600
Nambieso	22600	23400	46000
Akokoro	19200	18300	37500
Apac	24200	25000	49200
Apac TC	6800	7300	14100
Ibuje	16700	17600	34300
Cegere	16800	17600	34400

Life Expectancy

Females	53.0 years
Males	47.7 years
Both sexes	50.3 years

Sex Ratio 96/100 (i.e. 96 males for every 100 females)

Ethnicity	98% Langi
Largest religion (Catholics)	46%
Poverty Headcount Index (2005)	50.94
Dependency ratio	94%
Disability rate	4%
Orphan hood status	16%
Population Density	119persons/km^2

Population Distribution
Generally there is uneven distribution of population in the district. Majority of the population amounting to 96 percent are in the rural areas while only 4 percent are urban-based.

Age Structure
Apac district generally has a young population with 52% of its population below 15 years. Children (below 18 years) constitute 58%. About half of the populations are between15 and 65 years while only 3.5% are aged 65 years and above.

Migration
Internal migration has of late been declining/uncommon although it escalated during the peak of insurgency in recent years especially in the Northern part of the district.

Demographic Indicators

FERTILITY

TFR	7.07
CBR	51/1000
CFR	2%

MORTALITY

IMR	114/1000
CMR	191/1000
MMR	505/100000
CDR	16/1000
MIGRATION:	uncommon
GROWTH RATE:	3.5
SEX RATIO:	96/100

LIFE EXPECTANCY:

F	-	53.0 years
M	-	47.7 years
Average	-	50.3 years

Settlement Patterns
Ease of accessibility to socio-economic infrastructure has largely determined the population distribution in the District. Soil fertility factors have not greatly influenced the settlement patterns in the district since much of the soil supports most of the crops grown in the district. However physical features like hills, rivers, forests and swamps have played significant roles in influencing the population settlement pattern. The physical features provide natural resources for social and economic activities but have not attracted settlement near-by.

Livelihoods

District Economic Activities

Agriculture:-

Subsistence agriculture is the major economic activity in the district. An estimated 80% of the district's population is engaged in subsistence agriculture, although approximately 75% of the work is done by women.

Crop production especially Tobacco, Cotton, Simsim, Maize, Beans, Sunflower, Potatoes, Cassava and Groundnuts are grown. Arable land is very fertile and makes up 57.88% of the total land area.

Some fishing is practiced in the south of the district, particularly from Lake Kwania, a component of the Lake Kyoga aquatic system. Fish farming is taking root in the district as well.

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 Apac 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 Apac is constituted by very minor and small enterprises. Apac 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.

HAZARDS

Table 2: Hazard status

Hazard	Status	Sub County
Environmental Degradation	Incidences of Wetland Encroachment, Deforestation, Sand Mining, Stone and Marrum Quarrying, and Over Grazing reported. The effect of this is water sources drying up and women trekking longer distances and spending longer periods of times in search for water. Newly constructed bore holes even dry up after 3 months of installation.	Aduku
		Chawente
		Nambieso
		Aduku TC
		Apac
		Apac TC
		Chegere
		Inomo
		Akokoro
		Ibuje
		Abongomola
Flooding	Incidences reported leading to loss of crops in the fields, loss of houses (in this case they migrate up slope), in circumstances where roads have been cut off, women seek health services from distant health facilities.	Ibuje
		Akokoro
		Chawente
		Nambieso
		Abongomola
		Chegere
		Aduku TC
		Aduku S/C
		Apac S/C

Prolonged dry spell	This is a widespread phenomena in the sub region leading to loss of a whole season and exposing the entire population to food shortages.	All sub counties
Proliferation of Invasive Species	Incidences of Lantana Camara, Water Hyacynth, 'Nankabirwa' weed and some species of Acacia reported. The water weeds depriving the rest of the ecosystem of oxygen, the yellow acacia colonizes large expanses of land thus reducing the grazing area considerably.	Inomo
		Aduku
		Akokoro
		Chawente
		Chegere
		Ibuje Nambieso
Bush Fires	Incidences of massive fires reported	All sub counties
Crop Pests and Diseases	Incidences of Cassava Brown Streak Disease reported	All the Sub Counties
	Incidences of Cassava Green Mite reported	All the Sub Counties
	Incidences of Ground Nut Rosette	Apac S/C
		Akokoro
	Banana Bacteria Wilt	Apac SC
		Chegere
	Incidences of Citrus Kangka reported	Akokoro
	Incidences of Fruit Flies reported	Chegere
	Cassava Mosaic	Ibuje
		Chegere
		Apac SC

Animal Vectors and Diseases	Incidences of African Swine Fever reported	Akokoro
	Incidences of Foot and Mouth Disease reported	Chawente
		Nambieso
		Akokoro
		Ibuje
	Incidences of New Castle Disease among chicken reported	Akokoro
	Liver flukes	Nambieso
		Chawente
		Akokoro
	Rabies	All sub counties
	Incidences of Tsetse Flies reported Incidences of Nagana reported	Cegere
		Apac S/C
		Akokoro
Heavy Storms	Incidences of hailstorm, heavy strong winds reported	Chegere
		Inomo
		Nambieso
		Chawente
		Akokoro
		Ibuje
		Abongomola
		Apac
		Aduku
		Apac S/C
	Incidences of Lightning reported	Chegere

Internal Conflicts	Incidences of Land disputes reported	Chawente
		Nambieso
		Aduku
		Apac TC
		Chegere
		Inomo
		Abingomole
		Apac S/C
		Akokoro
		Ibuje
		Aduku S/C
Vermin and other Problem animal attacks	Incidences of Crocodile attacks at water points were reported	Nambieso Akokoro Aduku T/C Ibuje Inomo Apac SC

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

Table 3: Summary of Hazards by Sub-county

Sub county	Hazards										
	Environmental Degradation	Flooding	Prolonged Dry Spell	Proliferation of Invasive weed Species	Bush Fires	Crop Pests and Diseases	Animal Vectors and Diseases	Heavy Storms	Internal Conflicts	Vermin and Other Problem Animals	Total
Aduku	✓	✓	✓	✓	✓	✓	✓	✓	✓		**9**
Aduku TC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**8**
Chawente	✓	✓	✓	✓	✓	✓	✓	✓	✓		**9**
Nambieso	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Apac	✓	✓	✓		✓	✓	✓	✓	✓	✓	**9**
Apac TC	✓	✓	✓		✓	✓	✓	✓	✓		**8**
Chegere	✓	✓	✓	✓	✓	✓	✓	✓	✓		**9**
Inomo	✓		✓	✓	✓	✓	✓	✓	✓	✓	**9**
Akokoro	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Ibuje	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Abongomola	✓	✓	✓		✓	✓	✓	✓	✓		**8**
Totals	11	10	11	7	11	11	11	10	11	6	**99**

Table 3 provides another view of the relative significance of hazards. The right most column depicts the number of hazards endemic in each sub-county, and is a measure of compound vulnerability. The bottom row shows 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 4: Ranking of hazards

S/No.	Hazard	Frequency Most Frequent=3 Frequent=2 Not Frequent=1	Area(Number of sub counties) affected >10=5 8-4=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.	Internal Conf1icts	3	5	3	11	1
2.	Environmental Degradation	3	5	2	10	2
3.	Pro1onged Dry Spell	3	5	2	10	2
4.	Flooding	2	5	2	9	4
5.	Crop Pests and Diseases	2	5	2	9	4
6.	Animal Vectors and Diseases	2	5	2	9	4
7.	Heavy Storms	2	5	2	9	4
8.	Vermin and Other Problem Animals	2	5	2	9	4
9.	Proliferation of Invasive weed species	2	5	1	8	9
10.	Bushfires	1	5	1	7	10

HAZARD RISK ASSESSMENT

Table 5 below expresses the communities' assessment of severity and likelihood of risk in their respective sub-counties. Each of the columns of hazards 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	Hazards									
	Environmental Degradation	Flooding	Prolonged Dry Spell	Proliferation of Invasive weed Species	Bush Fires	Crop Pests and Diseases	Animal Vectors and Diseases	Heavy Storms	Internal Conflicts	Vermin and Other Problem Animals
Aduku	M	H	M	L	L	M	M	M	H	M
Aduku TC	L	H	M	L	L	L	M	M	H	L
Chawente	H	H	H	H	H	M	H	M	H	H
Nambieso	H	H	H	H	H	M	H	M	H	H
Apac	M	M	M	L	M	H	H	L	H	M
Apac TC	M	H	M	L	L	L	L	L	M	L
Chegere	M	H	M	M	M	H	M	H	H	M
Inomo	M	M	M	M	M	H	M	M	H	M
Akokoro	H	H	H	H	H	M	H	M	H	H
Ibuje	H	M	M	M	H	M	H	M	H	H
Abongomola	M	L	H	L	M	H	M	M	M	M
Key: H = High, M = Medium, L =Low, N = Not reported										

RISKS

Environmental Degradation

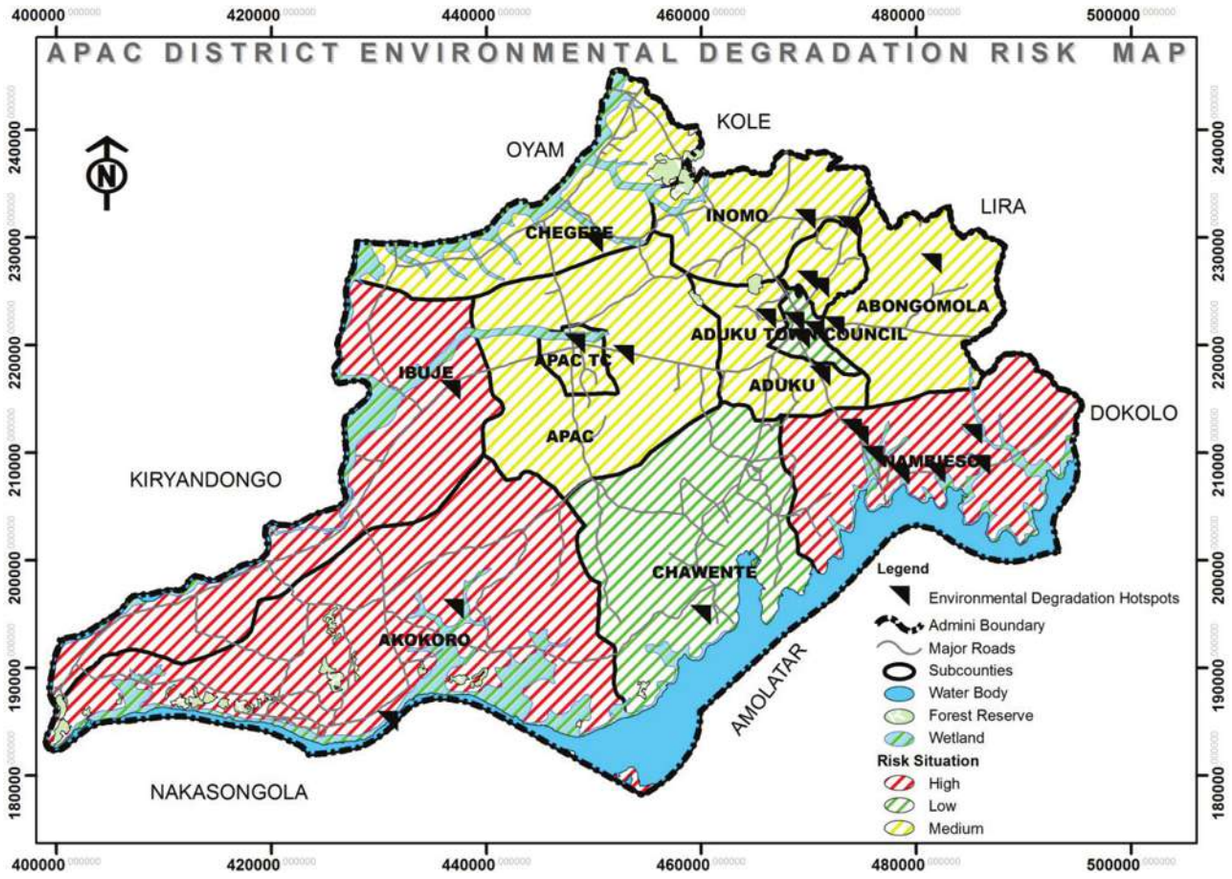

Figure 1: Environmental Degradation (Wetland Reclamation and Deforestation Risk Map)
Source: Field Data Collected by OPM (May, 2014)

Figure 1 above shows the risk status of environmental degradation in Apac District. The hazard is common in the entire Apac district, though the magnitude of the risk is varied. The communities of Akokoro, Ibuje and Nambieso are prone to high risk of environmental degradation, while those of Chawente sub county prone to low risk.

The rest of the sub counties and town councils are prone to moderate risk. It takes two major causes: Deforestation is the most rampant perpetrated by a number of factors like poor agricultural practices including ox traction, use of wood fuel, traditional cooking stoves which do not conserve energy, smoking of fish, tobacco curing, and charcoal production for sale. This is contributing to loss of soil fertility/productivity, worsening micro climate (prolonged dry spells), soil erosion, siltation of the water bodies etc.

Wetland encroachment basically due to the limited availability of water for production. The arable farmers go to the wetlands in search of water to produce rice, sugar cane, vegetables, and other cereals, which are both food and cash crops. In effect, the ground water table is getting lower and lower at an alarming rate that newly installed boreholes run dry in three months. Many of the boreholes have to take at least ten minutes to recharge after filling a 20 liter vessel.

Environmental Analysis

- Rapid concentrations of the population (100 persons per Km^2) in some areas have led to the degradation of the environment in the District.
- Wetlands and forests have been viciously destroyed.
- The degradation of the environment has already created impacts to the District like:-
- Drastic change in the rainfall patterns. Rains have increasingly become unreliable both in timing and in amounts.
- Destruction of wetlands and consequently marine life and particularly loss of fish. The shortage in fish supply has led to high incidences of malnutrition.
- Reduced crop yields due to soil degradation as a result of loss of soil cover, due to erosion (fertile soils are being washed down into the valleys), drought, pests and disease damages.
- Destruction of trees and fuel, and the disappearance of forest under enormous pressure and this has impacted inhabitants' incomes since they majorly depend on exploitation this resource.
- Environmental contamination/pollution due to human activities.

Floods

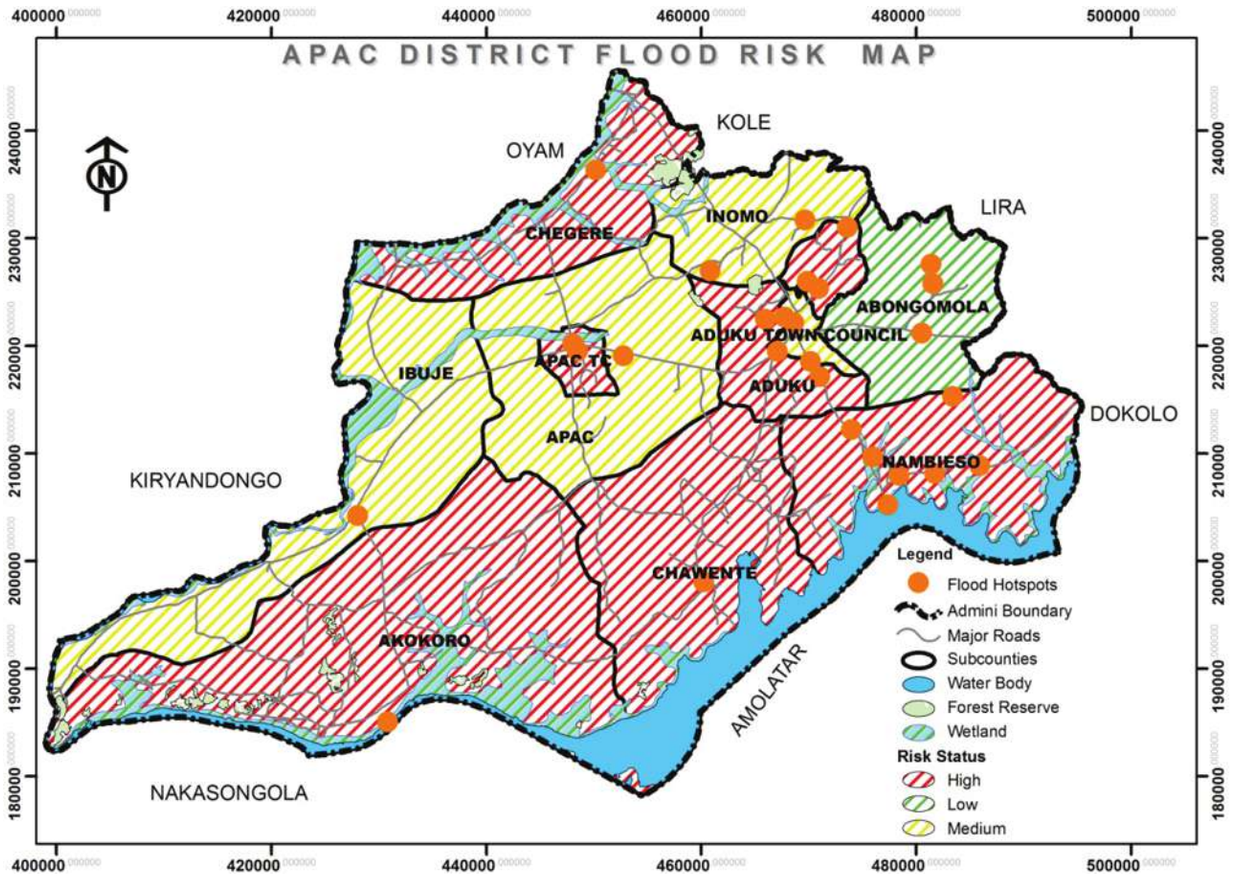

Figure 2: Flood Risk Map
Source: Field Data Collected by OPM (May, 2014)

Figure 2 above depicts the risk status of floods in Apac District. Apac district is surrounded by two water bodies and two wetland systems. The water bodies are Lake Kwania and River Nile with Arocha and Okole as the main wetland systems. Floods are mainly prominent during heavy rain periods i.e. second rains in the months of August to November.

The communities of Chegere, Akokoro, Chawente, Nambieso, Aduku sub counties and Apac TC are prone to high risk of floods while Abongomola Sub County is prone to low risk of floods. The rest of the sub counties and town councils are not prone to floods.

The effects of floods include among others: Disruption of livelihoods when road networks are cutoff or parts washed away, access to social services like health and education inhibited, Crops submerged, the loss at times goes up to 100% and displacement of communities particularly during the second rainy season.

The most affected Parishes are: Bardoilo and Ilee in Cegere Sub-County; Tarugale, Aganga and Alworoceng in Ibuje Sub-County; Aker and Atik in Apac Sub-County; Alaro, Apoi, Akokoro, Ayiolyec, Kungu, Awila and Ayago in Akokoro Sub-County.

Prolonged Dry Spells

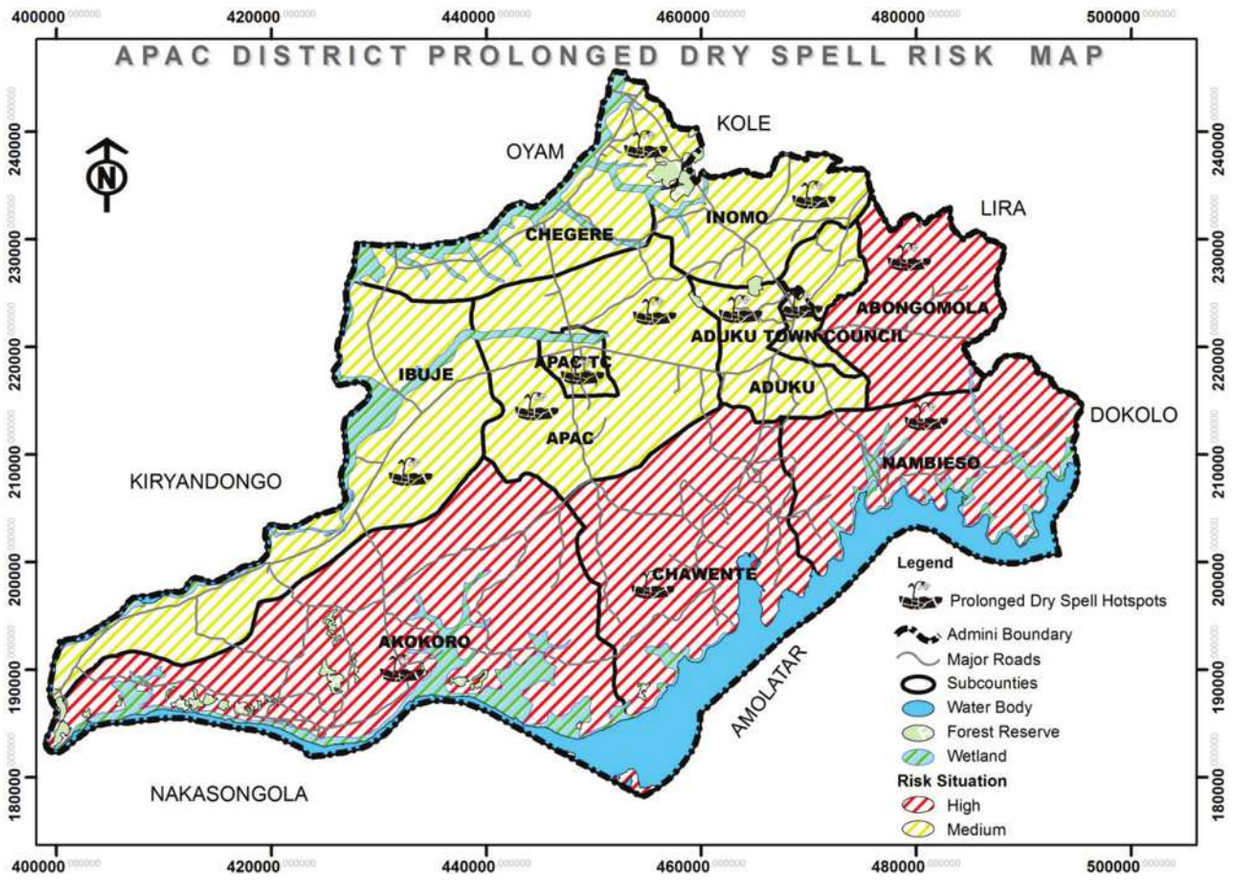

Figure 3: Prolonged Dry Spell Risk Map
Source: Field Data Collected by OPM (May, 2014)

Figure 3 above presents the risk status of prolonged dry spell in Apac District. The communities of Akokoro, Chawente, Nambieso and Abongomola sub counties are prone to high risk of prolonged dry spells while the rest of the sub counties and town councils are prone to moderate risks.

This is more in the flood prone areas along the lake shores, where two weeks of no rain is enough for the crops to dry completely. This is exacerbated by the sandy loam soils which have very low water retention capacity, wetland encroachment and deforestation. However prolonged dry spell affects the entire district and even the region.

The prolonged dry spells expose the communities to food shortages, reduced household incomes (over 90% of the people depend on agriculture for food as well as income), encroachment on wetland as people look for places with moisture to grow crops like rice, sugar cane, vegetables/horticulture and others. The most affected parishes include: Alaro, Apoi, Ayiolyec and Kungu in Akokoro Sub County. These are parishes along the Lake Kwania shores.

Proliferations of Invasive Weed Species

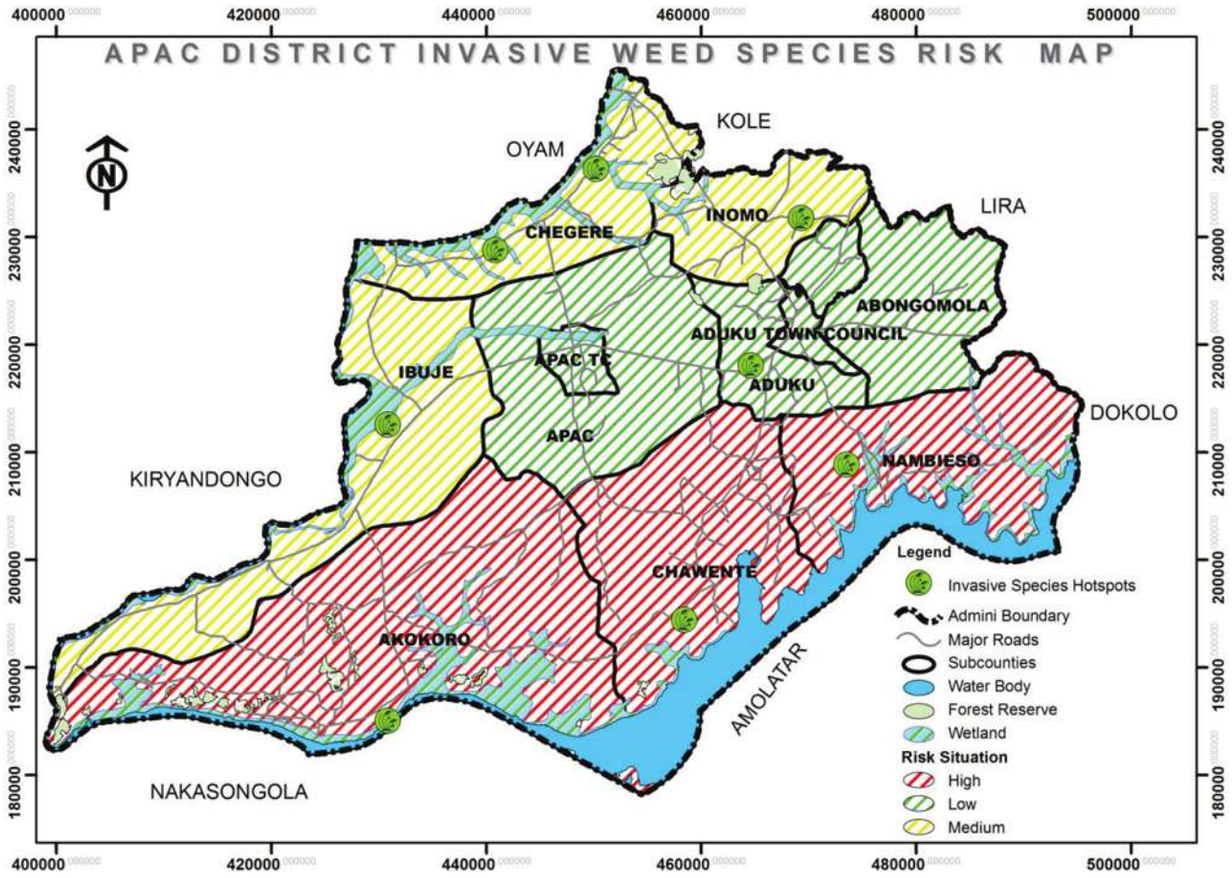

Figure 4: Proliferation of Invasive Weed Species Risk Map
Source: Field Data Collected by OPM (May, 2014)

Figure 4 above presents the risk status of proliferation of invasive weed species in Apac District. The invasive plant species are mainly dispersed by moving objects like human beings, moving vehicles and wind, some are brought by human beings as ornamental plants for decorating compounds or as fencing materials. Major types are Lantana Camara and Yellow Acacia. The communities of Akokoro, Nambieso and Chawente sub counties are prone to high risk of invasive weed species; those of Ibuje, Chegere and Inomo sub counties are prone to moderate risks of invasive weed species. All the other sub counties and town councils are not prone to proliferation of invasive weed species.

The water based invasive weed species are mainly dispersed by flowing water. Other than the known Water hyacynth, there is a new type of weed whose name is not known yet but locally called 'Nankabirwa'.

The effects of these weeds are: being poisonous to animals and are vector breeding grounds. The acacia kills any undergrowth there by reducing pasture for animals and degrading soil (reducing arable land), the water weeds affect fish breeding and multiplication.

Invasive plant species are common in all the sub-counties of the district which have fresh water bodies like lakes, rivers and swamps.

Bush Fires

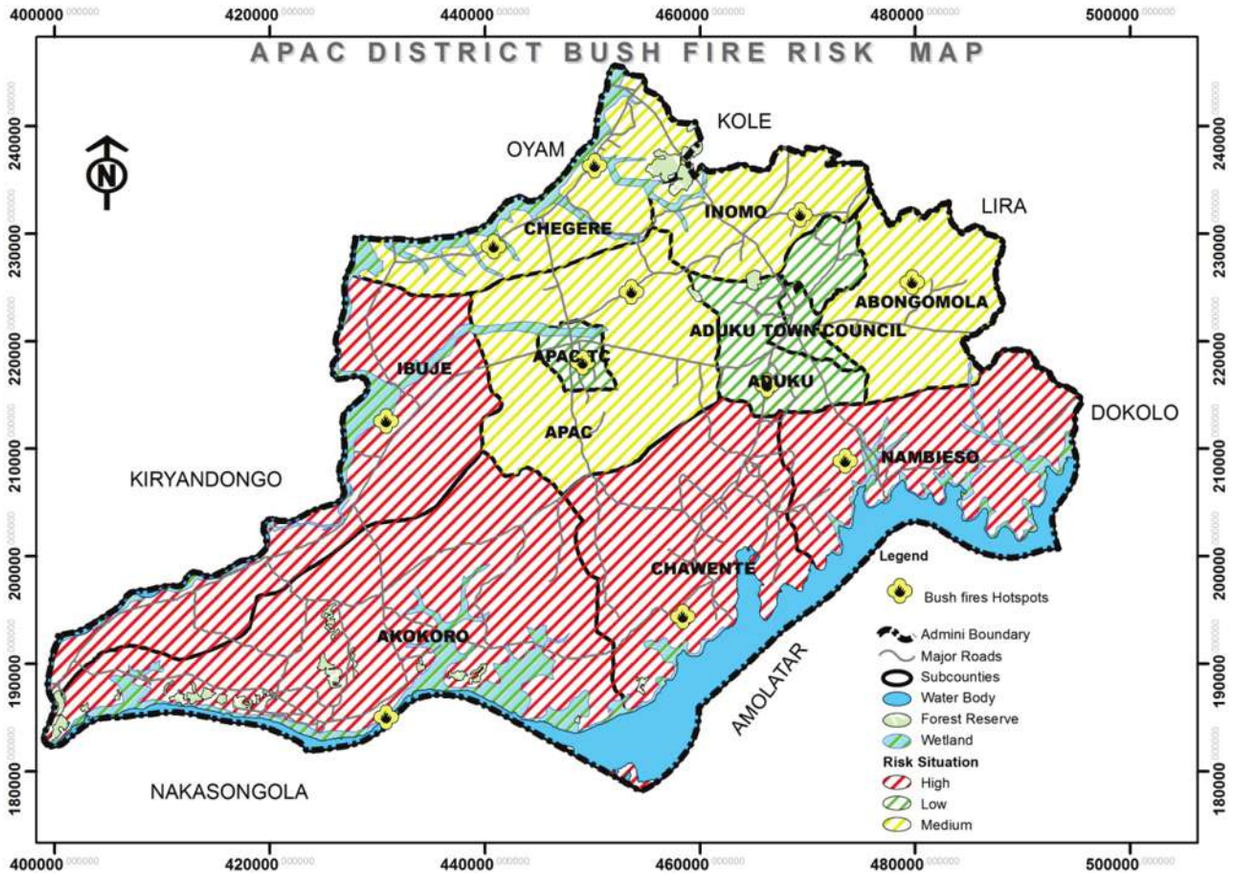

Figure 5: Bush Fires Risk Map
Source: Field Data Collected by OPM (May, 2014)

Figure 5 above shows the risk status of bush fires in Apac district. Bush fires in the District are mainly lit by farmers as they prepare land for cultivation, fresh pasture to sprout for grazing animals, clearing fish catching grounds in wetlands, hunting small animals and sometimes for fun. This makes the land susceptible to erosion due to wind as this is done during dry season and erosion due to sudden torrential rain and cyclones. The communities of Akokoro, Chawente, Nambieso and Ibuje sub counties are prone to high risk of bush fires; those in Apac, Inomo, Abongomola and Chegere sub counties are prone to moderate risks while the rest of the sub counties and town councils are prone to low risk.

Bush fires are experienced in all the sub-counties in the District but most predominant in the sub-counties along the lake shores i.e. Chawente, Nambieso, Akokoro and the shore lines of the Nile around IbujeSub-County.Some bush fires are also experienced in the sub-counties of Aduku and Chegere for digging out hibernating lung fish in wetland stretch of Arocha and Okole.

Crop Pest and Diseases

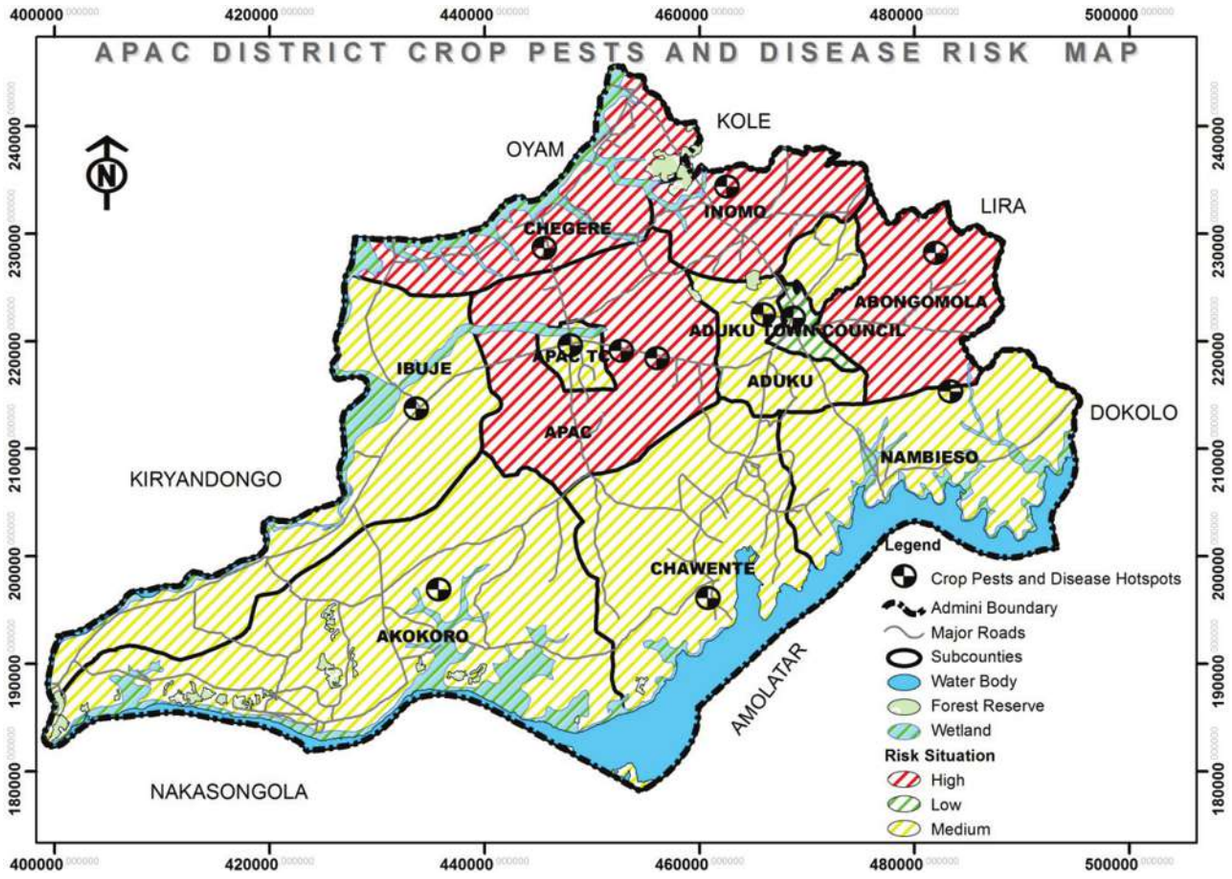

Figure 6: Crop Pests and Diseases Risk Map
Source: Field Data Collected by OPM (May, 2014)

Figure 6 above depicts risk status of crop pests and diseases of Apac District. The most rampant crop disease is cassava brown streak affecting all the sub counties in the district followed by cassava mosaic in Chegere, Ibuje and Apac sub-counties. Ground nut rosettes are in Akokoro and Apac sub-counties. Banana bacterial wilt cases were reported in Apac Sub-county and Chegere.

The communities of Apac, Chegere, Inomo and Abongomola Sub Counties are prone to high risk of crop pests and diseases, while Aduku Town Council is prone to low risk of the hazard. All the other sub counties and town councils are prone to moderate risk of crop pests and diseases.

Animal Vectors and Diseases

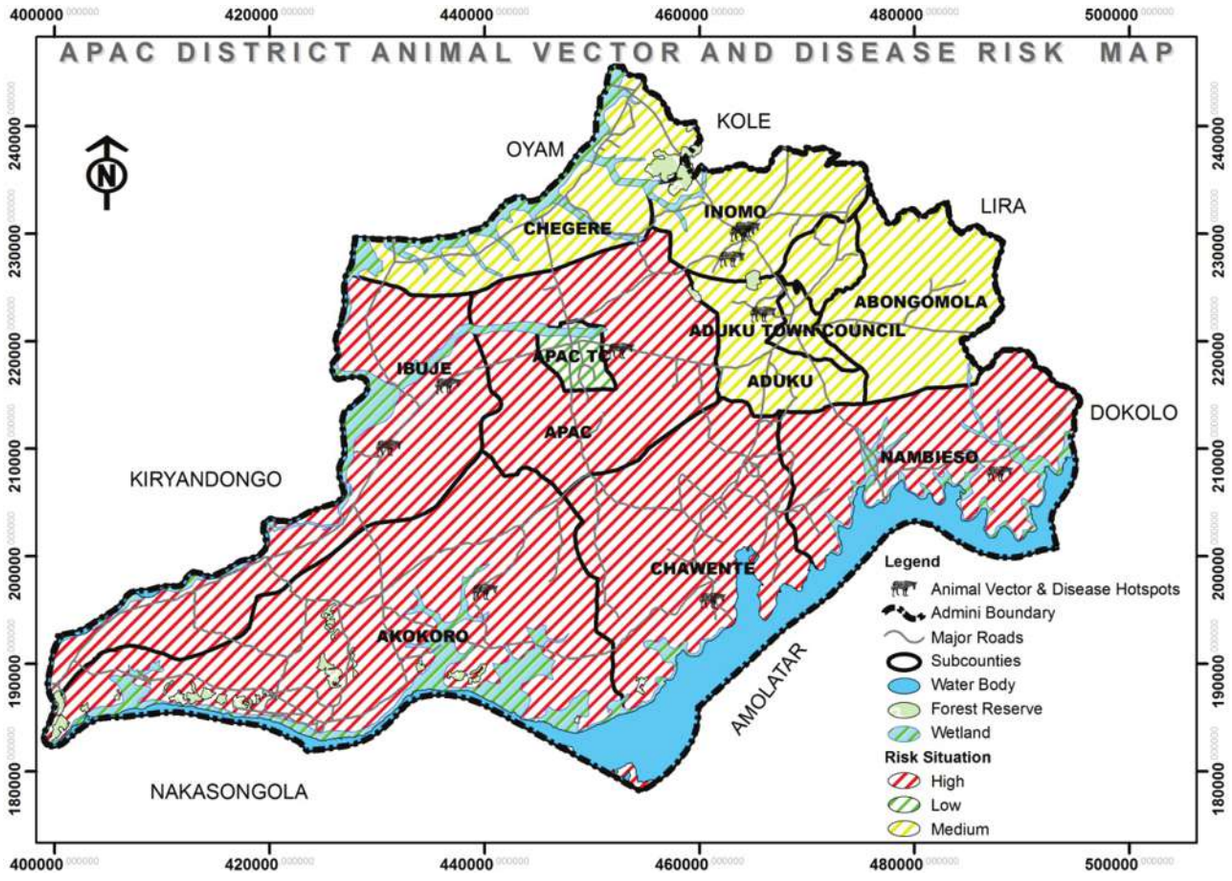

Figure 7: Animal Vector and Diseases Risk Map
Source: Field Data Collected by OPM (May, 2014)

Figure 7 above depicts the risk status of animal vector and disease in Apac District. The hazard which is rampant in the entire district has varying levels of risk. The communities of Ibuje, Akokoro, Apac, Nambieso and Chawente are prone to high risk of animal vector and diseases while Apac Town Council is prone to low risk of the hazard. All the other ssub counties and Aduku Town Council are prone to moderate risk of animal vectors and diseases.

The specific diseases common in the respective sub counties are: Foot and mouth disease is common in lake shore sub-counties namely Akokoro, Ibuje, Chawente and Nambieso. African swine fever in Akokoro Sub-county. Liver flukes are mainly found during dry season in sub-counties along the lake shores. Rabies is high in all the sub-counties. Tsetse flies are predominantly found in Chegere, Apac and Akokoro. New castle disease in chicken is in all sub-counties.

Heavy Storms

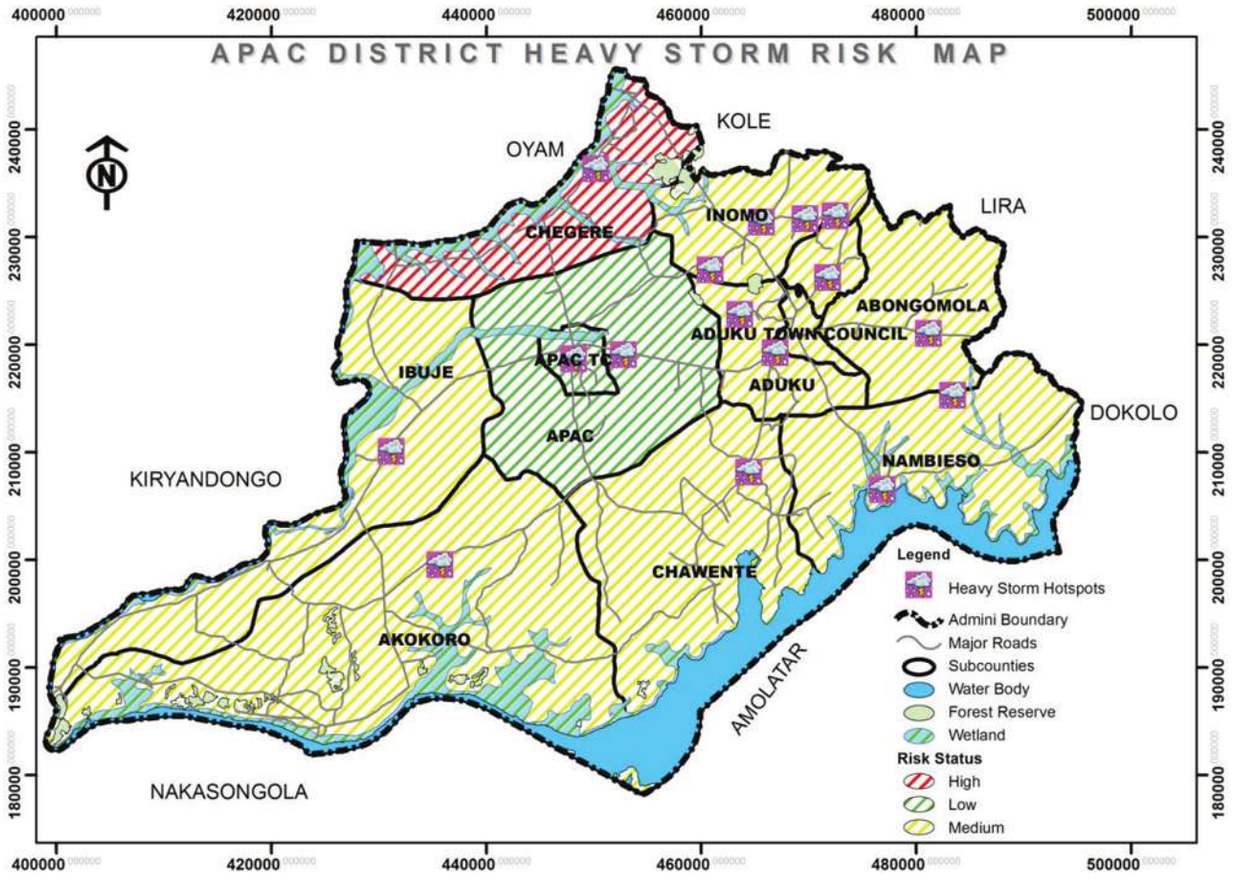

Figure 8: Heavy Storm Risk Map
Source: Field Data Collected by OPM (May, 2014)

Figure 8 above presents the risk status of heavy storms in Apac District. The hazard is rampant in the entire district though the magnitude varies from Sub County to another. The communities of Chegere Sub County are prone to high risks of heavy storms, while those of Apac Sub County and Town Council are prone to low risk. All the other sub counties and Aduku Town Council are prone to moderate risk of heavy storms.

Heavy storms are comprised of hailstones, heavy torrential rains, strong winds and lightning. Hailstones are the only form regularly experienced in Chegere, Inomo, Nambieso, Apac, and Aduku Sub-counties. This affects beans, soya beans, maize, cassava, simsim, bananas, groundnuts and fruit trees. This most times leads to over 50% loss caused to the enlisted crops especially if it struck during the vegetative stage of the crops. Losses of more than 50% of crops in one season would invariably expose the communities to food shortages to an extent that the Ministry of Disaster Preparedness has had to intervene. However, it should be noted that the mandate of the Ministry is shifting towards disaster prevention as opposed to response.

Internal Conflicts

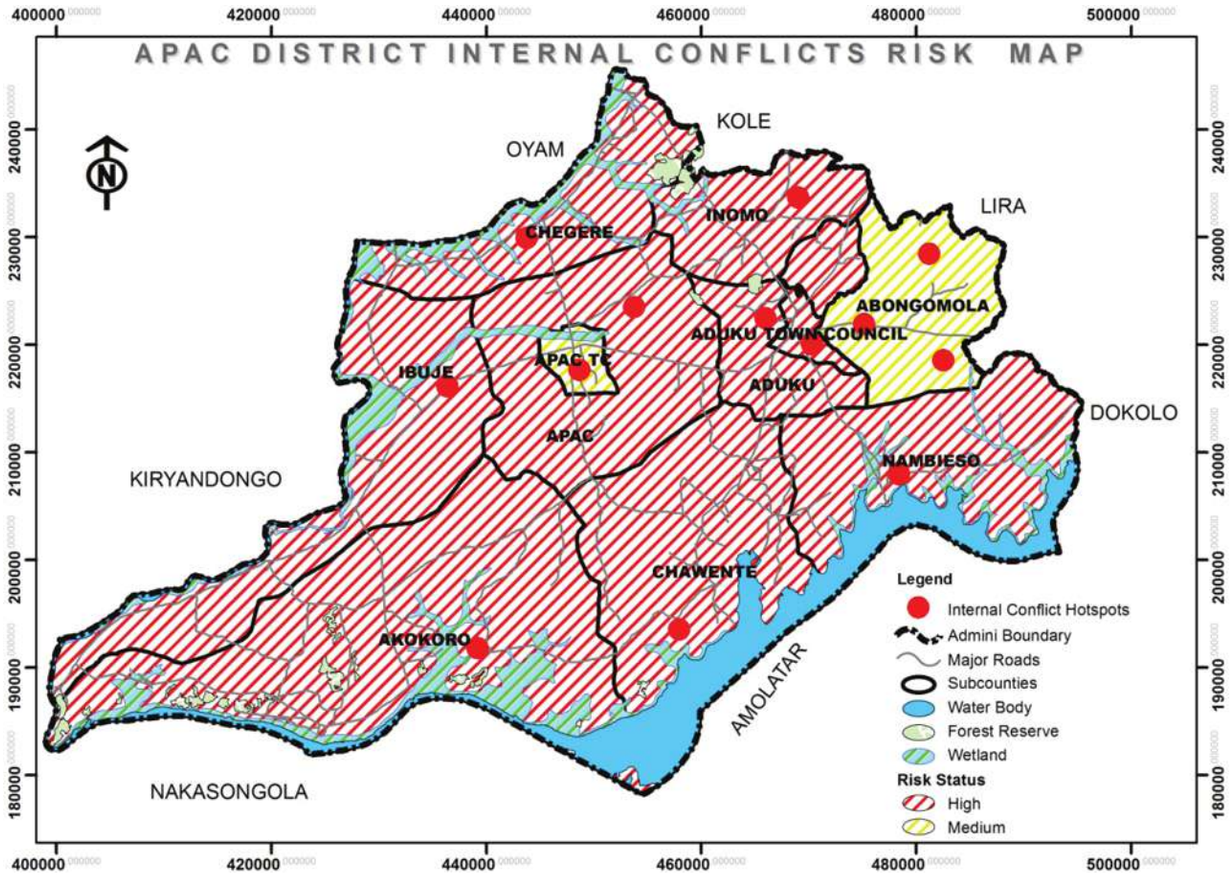

Figure 9: Internal Conflict Risk Map
Source: Field Data Collected by OPM (May, 2014)

Figure 9 presents the risk status of internal conflicts in Apac District. It is evident that internal conflicts are rampant in the entire district and apart from Apac Town Council and Abongomola Sub County which are prone to moderate risks of internal conflicts; the entire district is prone high risk of the hazard.

In Apac district internal conflicts mainly take the form of land conflicts. The land conflicts are either over ownership/boundary disputes or right of access/use of communal grazing land and watering points in the wetlands. It is a wide spread phenomenon with high risk except Apac Town Council and Abongomola Sub-county which have moderate risk levels. Several of the cases are being handled at different levels of customary, Local Council and the formal judicial systems. Some of the cases are being heard by the High Court.

The disputes are characteristic of the post IDP camp error in Lango and other sub regions of the northern Uganda. They have eroded the internal cohesion of the communities and ripped apart the communities according to clans or even the most immediate family tree. In effect lives have been lost, property damaged and crops destroyed not only by animals but also human beings.

Vermin's and other Problem Animal Attack

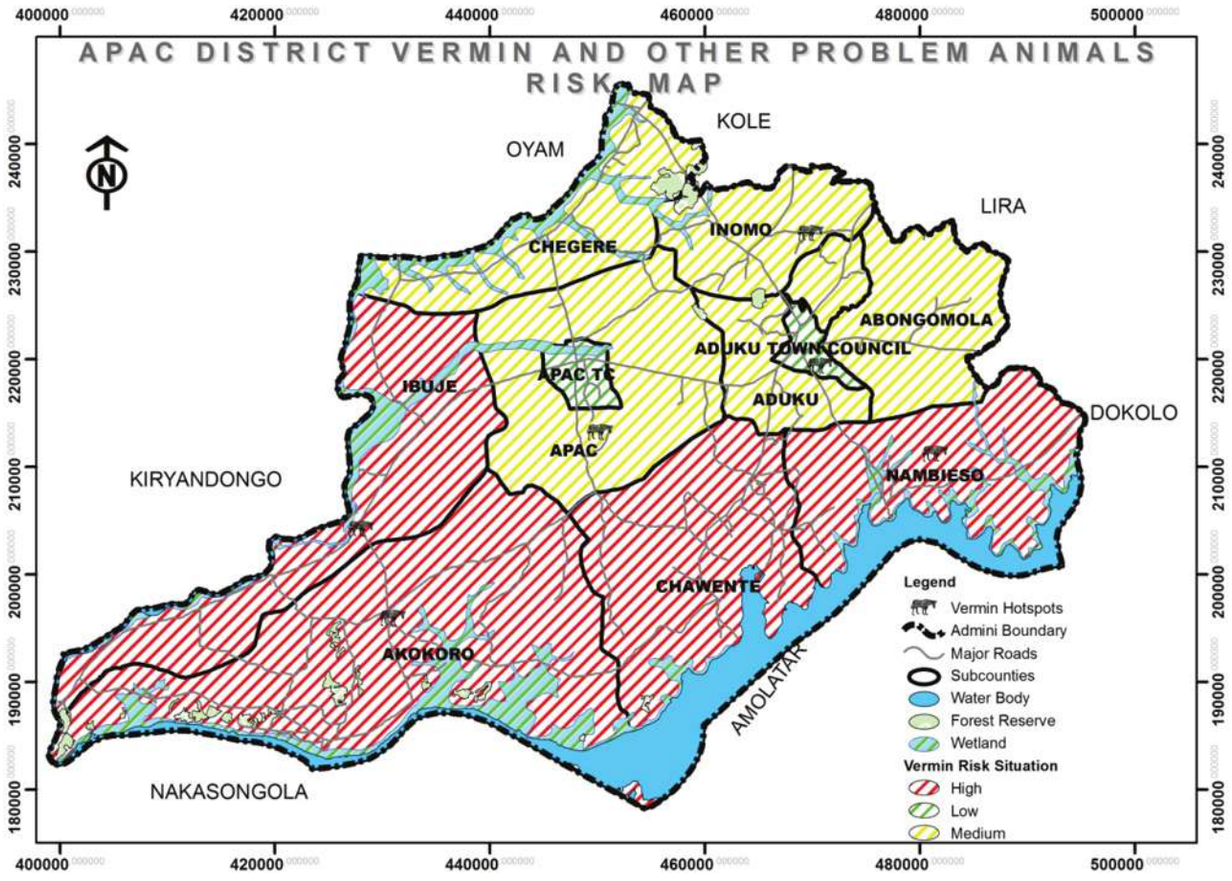

Figure 10: Vermin and other Problem Animals Attack Risk Map
Source: Field Data Collected by OPM (May, 2014)

Figure 10 depicts the risk status of vermins and other problem animals in Apac District. The hazard is rampant in the entire district, however, Ibuje, Akokoro, Chawente and Nambieso are prone to high risk and Apac together with Aduku town councils are prone to low the risk of vermin and other probloem animals. All the other sub counties are prone to moderate risk of the hazard. The most common problem animals are the crocodiles, which attack people who go to fetch water from the Nile in Ibuje sub-county. The Parishes most affected are Tarugale and Aganga. The conventional vermins particularly the velvet monkeys are reported in Inomo, Apac and Aduku Sub-counties. They commonly destroy maize, groundnuts, bananas, cassava etc.

VULNERABILITY

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

Table 6: Risk and vulnerability assessment

Sub county	Hazards										Cumulative vulnerability (Absolute)	Weighted vulnerability (Cumulative/3)
	Environmental Degradation	F1ooding	Prolonged Dry Spell	Proliferation of Invasive weed Species	Bushfires	Crop Pests and Diseases	Animal Vectors and Diseases	Heavy Storms	Internal Conf1icts	Vermin and Other Prob1em Animals		
Aduku	2	3	2	1	1	2	2	2	3	2	20	7
Aduku TC	1	3	2	1	1	1	2	2	3	1	17	6
Chawente	3	3	3	3	3	2	3	2	3	3	28	9
Nambieso	3	3	3	3	3	2	3	2	3	3	28	9
Apac	2	2	2	1	2	3	3	1	3	2	21	7
Apac TC	2	3	2	1	1	1	1	1	2	1	15	5
Chegere	2	3	2	2	2	3	2	3	3	2	24	8
Inomo	2	2	2	2	2	3	2	2	3	2	22	7
Akokoro	3	3	3	3	3	2	3	2	3	3	28	9
Ibuje	3	2	2	2	3	2	3	2	3	3	25	8
Abongonola	2	1	3	1	2	3	2	2	2	2	20	7
Totals	25	28	26	20	23	24	26	21	31	24	248	
Weighted vulnerability Scale : 8 = High, 5 - 7 = Medium, 0 - 4 = Low												

Risk Vulnerability

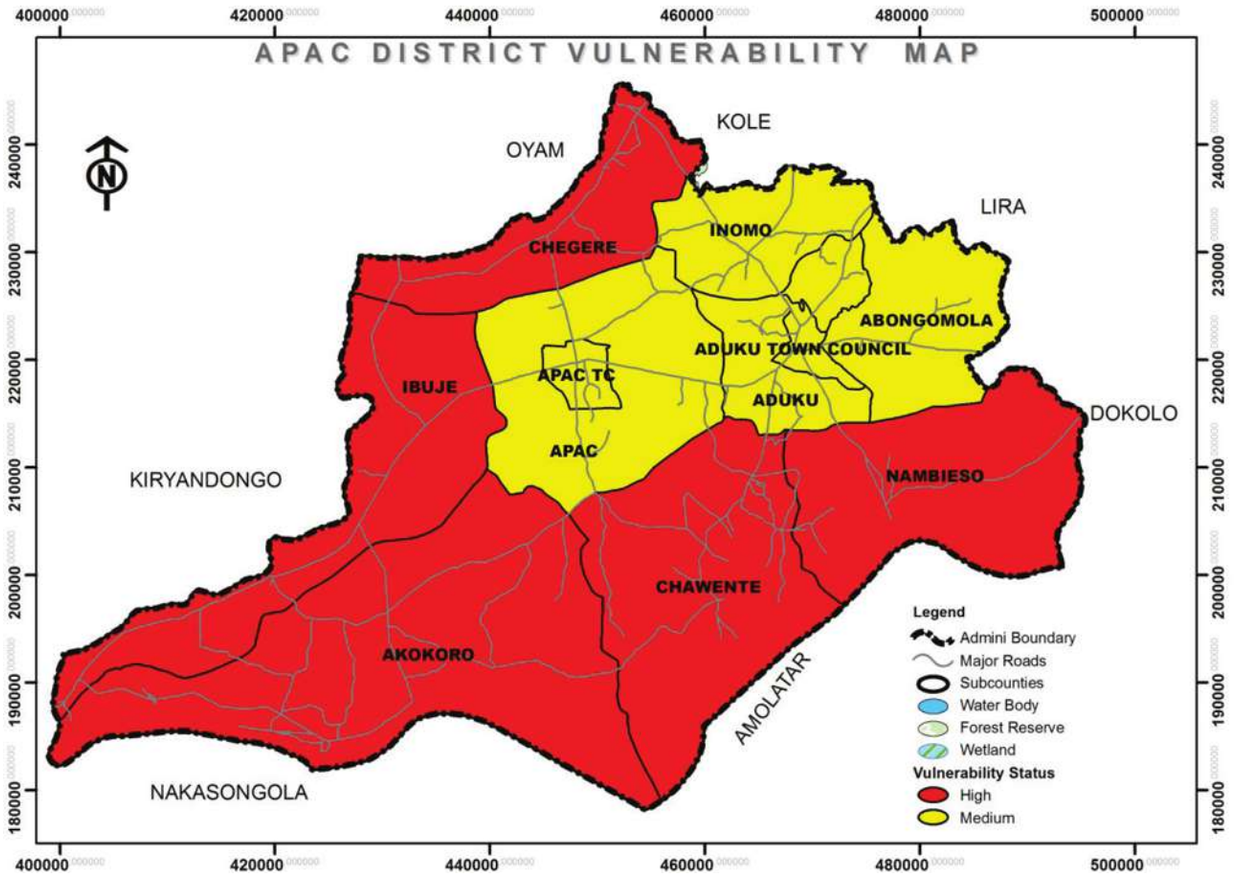

Figure 11: Vulnerability Map

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

The vulnerability map in Figure 11 shows the areas of low, medium and high vulnerability according to the risk and vulnerability table (Table 6) 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.

Apac district, probably the most vulnerable in the region is exposed to 10 hazards namely Internal conflicts, flooding, prolonged dry spell, animal vectors and diseases, environmental degradation, crop pests and diseases, vermin and other problem animals, bush fires, heavy storms and proliferation of invasive species arranged in their order of risk from highest to lowest with total risks of 31, 28, 26, 26, 25, 24, 24, 23, 21 and 20 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.

Chawente, Nambieso, Akokoro, Ibuje and Chegere sub-counties reported the highest vulnerability in Apac district with cumulative vulnerabilities of 28, 28, 28, 25 and 24respectively and weighted vulnerabilities of 9, 9, 9, 8 and 8 respectively which lie at the top (red) of the vulnerability scale. The rest of the sub-counties displayed medium (yellow) vulnerability with weighted vulnerabilities between 5 and 7. Though displaying medium vulnerability, Aduku T/C and Apac T/C are the least vulnerable in the district with weighted vulnerabilities of 6 and 5 respectively.

The social infrastructure like schools, health facilities, churches, public offices together with other infrastructure like roads and associated facilities like landing sites; gardens and crops; residential/commercial buildings are all vulnerable to any of the hazards. These elements usually suffer loses and or destruction every time an incidence is witnessed by these communities.

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.

CONCLUSIONS

This hazard, risk and vulnerability profile for Apac 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 Apac 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 Apac district is vulnerable to ten hazards, in order of decreasing risk: Internal conflicts, flooding, prolonged dry spell, animal vectors and diseases, environmental degradation, crop pests and diseases, vermin and other problem animals, bush fires, heavy storms and proliferation of invasive species.

Chawente, Nambieso, Akokoro, Ibuje and Chegere are the most vulnerable sub-counties with weighted vulnerabilities of 9, 9, 9, 8, and 8 respectively, all lying at the top (red) of the vulnerability scale. The rest of the sub counties displayed medium (yellow) vulnerability to the resident hazards with weighted vulnerabilities between 5 and 7 though 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. Aduku T/C and Apac T/C were the least vulnerable sub-counties in the district with weighted vulnerability values of 6 and 5 respectively.

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