THE REPUBLIC OF UGANDA

Pader District

Hazard, Risk, and Vulnerability Profile

2016

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Acronyms

ALREP	Agricultural Livelihood and Recovery Programme
BBW	Banana Bacterial Wilt
BW	Bacterial Wilt
CBPP	Bovine Contagious Pleuropneumonia
CBSD	Cassava Brown Streak Disease
DDMC	District Disaster Management Committee
DRM	Disaster Risk Management
FMD	Foot and Mouth Disease
GIS	Geographical Information System
GoU	Government of Uganda
GPS	Global Positioning System
HC	Health Centre
HCII	Health Centre Two
HCIII	Health Centre Three
HCIV	Health Centre Four
IDPCs	Internally Displaced Peoples Camps
LRA	Lord's Resistance Army
NAADs	National Agricultural Advisory Services
NCD	New Castle Disease
NUSAF	Northern Uganda Social Action Fund
S/C	Sub County
T/C	Town Council
UNDP	United Nations Development Programme
UPDF	Uganda Peoples' Defence Force
UTM	Universal Transverse Mercator

Acknowledgment

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

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

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

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

My appreciation also goes to Pader District Team.

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

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

Executive Summary

Pader 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 Ugandan atlas of disaster risk. 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.

Pader District is located in Northern Uganda, Acholi Sub-region bordered by Lamwo District to the Northwest, Kitgum District to the Northeast, Agago District to the East, Otuke District to the Southeast, Lira District to the South, Oyam District to the Southwest and Gulu District to the West with flat undulating land and rolling hills along are rivers, at about 900 meters above sea level.

The UTM coordinates of the District are: 02^0 $50^{'}$N, 33^0 $05^{'}$E. The projected population as per 2002 National Housing and Population Census is at about 142,300 with agriculture as the prime engine of economic growth and development. The vegetation is predominantly savannah woodlands and grasslands. The District experiences variable climatic conditions.

It identifies endemic hazards in three classes, in order of high to low risk: environmental degradation, flooding, heavy storms, crop pests and diseases, internal conflicts, prolonged dry spell, bush fires, animal vectors and diseases, human epidemics, proliferation of invasive weed species, vermin and wild animals and rock falls.

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.

In comparison to its neighbours, Pader District is generally a high vulnerability District. Lapul, Pajule, Puranga, Pader, Angagura, Awer Sub-counties and Pader Town Council reported the highest vulnerability in Pader District with cumulative vulnerability values of 27, 26, 25, 25, 24, 24 and 24 respectively and weighted vulnerability values of 9, 9, 8, 8, 8, 8 and 8 respectively which lie in the top (red) category of the vulnerability scale.

The rest of the Sub-counties displayed medium (yellow) vulnerability with weighted vulnerabilities between 5 and 7. Acholibur Sub-county though also moderately vulnerable to the resident hazards, was the least vulnerable in the District with a weighted vulnerability value of 6. These Sub-counties 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 enhance the resilience of the people of Pader in their hazard and climate change situation.

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, Nagana, and bird flu. Crop disease epidemics include coffee wilt, banana bacterial wilt, and cassava mosaic and cassava brown streak disease.

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

Pest infestations. 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, cause massive loss of lives and property due to building collapse.

Invasive specie. A non-native plants or animals that, invades a habitat or bio-region with adverse economic, environmental, and/or ecological effects. An example is a grass that is dominating pasture in the Rwenzori Sub-region, reducing the grazing capacity of the land.

INTRODUCTION

Pader District is vulnerable to a number of hazards that lead frequently to disasters. They include environmental degradation, bush fires, pro-longed dry spell, invasive weed infestation, crop pest and disease, animal vectors and human epidemic diseases like nodding disease syndrome and hepatitis B.

Apart from the human diseases, floods, pro-longed dry spell and bushfire, the District has also experienced animal disease outbreaks and crop failures. The animal diseases include Bovine Contagious Pleuropneumonia (CBPP), swine fever, foot and mouth disease; and Newcastle disease in chicken. Major crop failures have been due to prolonged dry spell, water logging and hailstorms leading to hunger.

The Pader 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 Pader 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 Pader District.

Methodology

The multi hazard, risk and vulnerability mapping employed a people-centred, multi-sectoral, and multi-stakeholder approach. To capture the required information for production of the District profiles, a team of four led by the Office of the Prime Minister (OPM) visited stakeholders in a field mission to Acholi region from 11th to 30th May, 2014. The team had One Disaster Preparedness Officer, One GIS Expert and two GIS Specialists. They worked in each District for an average of two days.

The field team interviewed District, Sub-county and Parish officials, and community members. They acquired secondary data through Government sources (relevant Ministries, Departments and Agencies, and District authorities in the Acholi Sub-region) and data bases from other organizations/NGOS operating in these Districts. The mapping team integrated the field data, secondary data and spatial data and analyzed them to produce hazard and vulnerability maps, interpretation and conclusions in District hazard, risk and vulnerability profiles.

The District profile production process had four phases:
Phase I: Preliminary Activities

Phase II: Field Data Collection and Mapping

Phase III: Data Analysis, Map Production, Report Writing and Verification

Phase IV: Dissemination

Phase I: Preliminary Activities
Before the start of field activity the team undertook a series of planning and preparation activities. These included meetings with relevant stakeholders, mobilization of required resources, acquisition of required equipment and materials, review of relevant literature, establishment of study contacts and preparation of a checklist of activities to be undertaken in Phase II.

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

This phase was also useful for preparing the resource deployment plan, and outlining procedural and field work plans. It articulated how various stakeholders would be consulted to ensure maximum participation in locating hazard-prone communities and other information relevant to the mapping exercise.

Phase II: Field Data Collection and Mapping

Stakeholder mapping and local meetings: The team held an entry meeting in each District to facilitate capture of key local issues related to hazard occurrence and trends. The meeting gave an opportunity for the team and stakeholders to identify other key resource persons and support staff for consultation in the local community.

Stakeholder Participation Practices: Stakeholder participation was a key component of the mapping exercise. The team consulted District technical sector heads, usually members of the District Disaster Management Committee (DDMC), and involved them in the ground-truthing exercises to ensure ownership of the data and results by the District leadership. They gave stakeholders, particularly those at District level, the opportunity to validate/update the data and make useful observations and additions of any other information relevant to the mapping process.

Capture of spatial data: The mapping team acquired spatial data and digital base maps at appropriate scales. When necessary they digitized feature layers of paper maps. The base maps contained relevant feature data including terrain, District and Sub-county boundaries, forest reserves, national parks, roads, rivers, streams, water bodies and wetlands, and the locations of infrastructure, services and settlements.

Secondary data and desk research: The team reviewed relevant documents at the District offices and other organizations, assimilating policy and legal documents, and existing maps, development plans, reports and studies to characterize the socioeconomic and geographic nature of the District. They used a checklist which summarized the information required for each of the various risk indicators being mapped.

Critical observation and ground truthing: To critically assess the conditions, nature and location of hazard prone zones, current human activities and settlement patterns in hazard prone areas, the team visited infrastructure elements, observed principal household economic activities and spot-checked the locations of map features. They took the locations of hazard instances, called “hotspots”, using a GPS receiver and used satellite imagery to validate and extend map features.

Main instruments of data collection: The main tools for data collection were methodology guidebooks, key informant guides, notebooks, GPS receivers, digital camera, document scanner, Google Earth, Satellite images and topographic sheets of the mapping areas.

Phase III: Data Analysis, Map Production, Report Writing and Verification

Analysis of collected data: The team and District Local Government officials analyzed the collected data. The mapping team added thematic layers and hazard incident points (hotspots) to the base maps to develop the hazard, risk and vulnerability maps. The main activities in this phase include:
Data entry, cleaning and coding
Preparation of base maps and process maps
Preparation of disaster risk and vulnerability maps

Methods used for data analysis: The following data analysis methods were used: Scanning, geo-referencing, digitizing, geo-processing, and data transformation Focus group discussions and team discussions Drafting, digitizing and GIS overlays Compiling data and information.

Data editing, cleaning and coding: The mapping teams used the various tools mentioned above for editing, cleaning and coding. They transcribed the qualitative and quantitative data obtained from the field into spreadsheet tables using a data entry interface analogous to the field data forms. They cleaned the data by reconciling differences among the perceptions of the various stakeholders and resolving data anomalies as they edited the spreadsheet tables that listed the hazards perceived in each Sub-county. They chose coding schemes to distinguish and represent on the hazard maps the levels of risk perceived by the stakeholders.

Data analysis: After data were collected from the field, the mapping team analysed and represented them using MS Office software (MS Word and MS Excel for Windows). They analysed spatial data using ArcGIS software and mobile GIS applications, systematically overlaying hazard feature (layers) onto base maps to produce the risk and vulnerability maps.

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

Generation and verification of draft maps: The mapping team elaborated a series of hazard risk maps which reflect the severity of each hazard risk in each Sub-county, encoded as high (red), medium (yellow), low (green) , and "not reported" (clear), reflecting the perception of stakeholders. They summarized the vulnerability situation in the District on a single map by colour-coding the Sub-counties according to the sum of the Sub-county hazard risk scores divided by 3, using the following classification scheme:

Table 1: Vulnerability classification scheme

(Sum of hazard risk severities) / 3 in the Sub-county	Vulnerability	Map colour code
0	None	Clear
1 – 4	Low	Green
5 – 7	Moderate	Yellow
8 or more	High	Red

The hazard summary table ranks the hazards according to the ascending order of the values of the sum of Sub-county hazard risk scores for each hazard.

Several weeks later, the team returned to the region to present the draft District Hazard, Risk and Vulnerability Profiles in a verification workshop. They invited stakeholders to assess the maps' accuracy and completeness, identify errors and gaps, and provide correct information to be incorporated in the final map versions.

Phase IV: Dissemination Workshop

After publication of the set of the District hazard, risk, and vulnerability profiles of the region, OPM staff led a final workshop to dissemination them and promote awareness of their usefulness to Local Partners.

Overview of the District

Location

Pader District is bordered by Lamwo District to the Northwest, Kitgum District to the Northeast, Agago District to the East, Otuke District to the Southeast, Lira District to the South, Oyam District to the Southwest and Gulu District to the West. The District headquarters are at Pader located approximately 130 kilometers (81 miles), by road, Northeast of Gulu, the largest city in the Acholi Sub-region. The UTM coordinates of the District are: 02^0 $50'$ N, 33^0 $05'$E.

Terrain

The District is characterized by flat undulating land and sloppy along are rivers and streams, at about 900 meters above sea level. The District lies at an average altitude of 1100m above sea level. Further West of the District, the Land falls as the relief becomes gentle in Northeast.

Administration Units

The District currently has only one county called Aruu, 12 Sub-counties, 52 Parishes and 608 Villages.

Table 2: Administrative units in Pader District

Sub county	No. of Parishes	No. of Villages
Acholibur	4	57
Latanya	5	58
Atanga	5	57
Angagura	4	35
Awere	4	41
Ogom	4	42
Pader	4	31
Laguti	3	58
Pader T. C	3	30
Pajule	6	86
Puranga	6	54
Lapul	4	59
Total	52	608

Source: DPU Data base, Pader

Historical Background

Pader District was curved out of Kitgum District and begun its operations on the 14th, December 2001, with two Sub-counties; Aruu and Agago County were curved out of Kitgum District and Later Agago County curved off Pader to form Agago District. The seat of the District Government is Pader, located in the center of the District.

The District, along with Amuru District, Agago District, Gulu District, Lamwo District, Nwoya District and Kitgum District, constitutes Acholi Sub-region, considered to be the historical homeland of the Acholi ethnic group.

Population and Demographics

The District projected population as of June 2010 was 225,700. The 2002 National Housing and Population Census estimated the population of the District at about 142,300. For the greater part of the first decade of the 2000s, the majority of the populations within the District have been living in camps, as the result of the Lord's Resistance Army's insurgency. With the cessation of hostilities between the LRA and the UPDF in 2006, the majority of the people who lived in the IDP camps have moved back to their homes. In 2012, the population of Pader District was estimated at approximately 248,900. The population density is 68.9 per Km^2 (178 per square miles) and a total land area is 3.362.5 km^2 (1,298.3 square miles).

Pader District has an annual population growth rate of 5% compared to the national population growth rate of 3.2%. Life expectancy in the District is 45 and 45 years for men and women respectively as compared to national average of 50 years. Infant mortality rate is 165/1000; child mortality is 279/1000, compared to national averages of 83/1000 and 279/1000 respectively.

Table 3: Projected 2012 Population of Pader District by Sub-county

	2010			2011			2012		
Sub-county	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Acholibur	14,000	14,800	28,800	14,700	15,500	30,200	15,500	16,200	31,700
Latanya	7,600	8,000	15,600	8,000	8,300	16,300	8,400	8,700	17,100
Atanga	8,400	9,100	17,500	8,900	9,500	18,400	9,400	9,800	19,200
Angagura	7,200	7,600	14,800	7,600	8,000	15,600	8,000	8,500	16,500
Awere	15,400	13,000	28,400	16,200	13,600	29,800	17,100	14,200	31,300
Pader	3,900	3,200	7,100	4,100	3,300	7,400	4,300	3,500	7,800
Ogom	5,300	5,500	10,800	5,600	5,800	11,400	5,900	6,000	11,900
Laguti	7,000	7,100	14,100	7,400	7,500	14,900	7,800	7,800	15,600
Lapul	11,600	11,900	23,500	12,300	12,400	24,700	12,900	13,000	25,900
Pader T/C	6,600	6,200	12,800	7,000	6,500	13,500	7,300	6,800	14,100
Pajule	15,400	15,700	31,100	16,200	16,400	32,600	17,100	17,200	34,300
Puranga	10,900	10,300	21,200	11,500	10,800	22,300	12,200	11,300	23,500
Total	**113,300**	**112,400**	**225,700**	**119,500**	**117,600**	**237,100**	**125,900**	**123,000**	**248,900**

Source: UBOS, 2002 census.

Climate

The District experiences variable climatic conditions with two season in a year i.e. tropical climate The District has two seasons; wet and dry seasons with two major precipitation peaks in a year ranging from between March-May and July-October and later followed by prolonged dry spell from November to early late February. The average annual rainfall is estimated at about 1100mm per annum which is usually unreliable and unevenly distributed. However due to climate variability in the past five years, first season rainfall falls in early April to July while the second rain fall sets in from October up to late November. The maximum temperature of Pader is 35^0 C and minimum temperature of 18^0 C.

Soil

The soil type in District is mainly ferruginous tropical soils (clay-sandy and loamy in some areas) with poor drainage. The soils are fertile thus supports a wide range of agriculturally activities (crops and livestock grazing). The land in the District arable as exhibited by a range of crops grown in the District namely: maize, sweet potatoes, cassava groundnuts, millet, peas, banana, sorghum, beans, simsim, rice, vegetables and cotton produced in the District.

Vegetation

The predominant vegetation in the District is savanna grassland and woodlands. The common native tree species are sheared tree species, Butyrospermum Paradoxium terminalia spps, acacia spp, combreta spps, Milica exclesa and bamboo amongst others. However the human activities like bush burning, indiscriminate cutting of trees for charcoal production, timber and firewood is diminishing the vegetation cover within the District and Exotic Species are Pine, Eucalyptus, Gmelina and Grevilla species, Cedrella odorato, and Tectona Grandis amongst others.

Relevant cultural and ethnic issues

The District is predominantly inhabited by an ethnic tribe known as Acholi who originated from Nilotic migrants from Southern Sudan. A small percentage of people from Lango Sub-region are settled in the District. A number of other tribes (Bagandas, Bagishus, and Itesots) are residents working in the District either with the District Local Government, Non-Governmental Organizations, Civil Society Organizations or operating private businesses. The major spoken throughout the District is Luo with English and Kiswahili.

Environmental Concerns

Pader District is endowed with a wealth of natural resources; however it still faces a myriad of sustainable development challenges due to environmental degradation. The rate of deforestation and wetland reclamation is very high in the District. Trees are being cut for charcoal, timber for commercial purpose and the driven demand for more land for agricultural activity thus exercabating the rate of environment degradation in the District. Wetlands are severely being encroached and reclaimed for rice paddy rice, vegetable growing, and brick making. Lanyadang stream.

Economic activities

Agriculture is the backbone of the District economy. Over 90% of the District population are engaged in agriculture making it the mainstay of majority of the people thus key in socio-economic growth and development of the District. The major food crops grown are groundnuts, maize, cassava, beans, millet and vegetables. Economic crops are simsim cotton, bananas, citrus, groundnuts, rice, tobacco soya beans and sunflower. A small percentage of the population are now adapting to piggery, poultry, and livestock production as alternative economic activity.

Livelihood

The majority of the people in the District drive their livelihoods mainly from agricultural produce like sorghum, beans, peas, millet and maize. A good of the population own local zebu breed and local, and East African goats. However because of the pro-longed dry spells and frequent incidence of floods that severely affects crop production and dwindling of pasture for livestock grazing, the people also engaged in Village savings, charcoal production and craft making. Fish farming and hunting are commonly practiced seasonally in River Agago and River Aswa.

Table 4: Pader District main Livelihoods, by Sub-county and Town Council

Sub-county	Major Livelihoods
Puranga S/C, Awere S/C, Acholibur S/C, Atanga S/C, Laguti S/C, Angagura S/C and Ogom S/C	Crop farming, Apiary, Livestock rearing, Sand quarrying, Charcoal burning, brick making, timber sale, fuel wood, Livestock trade and fish farming
Pader T/C	Farming, Small scale business, poultry and brick making
Pajule S/C, Latanya S/C, Pader T/C and Lapul S/C	Farming, trade in forest products, small scale business, and Apiary
Latanya S/C, Ogom S/C, and Acholibur S/C	Crop production, brick making.

Women's livelihoods

The women in Pader District are hard working and responsible for the most the houses hold work as compared to men. They are engaged in crop farming, goat rearing, small scale business in dried fish, vegetables and fresh foods in market places, fetching wood fuel and Village saving schemes for their livelihood. Men are mostly engaged in charcoal burning, quarrying and running of small scale business. Most families are being taken care of by women as most the spent most of their time running the family business.

HAZARDS

Table 5: Hazard status

Hazard	Status	Sub County	Rank
Environmental Degradation	Cases of wetland reclamation. Deforestation - indiscriminate tree felling reported. Open dumping of solid wastes reported in town council and growing trading centres. Incidences of unrestored burrow pits reported.	Across the entire District.	**1**
Floods/water logging	Cases of flooded crop gardens, subsidence of latrines, and destroyed homesteads reported.	The entire District is sriked.	**2**
Heavy Storms	Incidences of hailstorm, strong winds and lightning reported. Crops destroyed, residential/Commercial houses de-roofed, Lacani Primary School classroom block, Pajule Market, residential houses in Olok Kilee ward and Government Prisons house de-roofed in Kineni Village. Reported incidences of roofs blown off school, other institutions and some farmers' dwellings were common.	Occurs across the District.	**3**
Crop and Diseases	Incidences of cassava Mosaic, Cassava Brown Streak disease (CBSD), Maize Stock borer, Sorghum Smut, Aphids, Afflotoxins, beans/maize weevils, Boll warm, Banana Bacterial Wilt (BBW), and Tomato Blight/ Bacterial Wilt reported and the Black Sigatoke in bananas. These occur mainly during the first growing season have varied magnitudes of destruction to crops but ultimately reduce the harvest considerably	It is experienced across the District.	**4**

Internal Conflicts	Incidences of Land disputes and Domestic Violence (SGBV) reported. Lives are lost, people displaced, destruction of crops and property including burning of houses.	Across the District.	**5**
Bushfire	Incidences of massive fires reported. Loss of mature crops in gardens especially sorghum, pigeon peas, houses are burnt, lives are occasionally lost, and loss of soil fertility, humidity and erosion.	All Sub-counties	**6**
Prolonged dry spell	Strikes the District yearly resulting to late planting of crops, reduced crop yield, malnutrition and increased crop pests like the Variegated grasshoppers. It is severe between April and May.	Across the District.	**7**
Animal Vectors and Diseases	Incidences of Tsetse Flies and Trypanosomiasis (livestork tryps), Ticks and Liver Flukes; Foot Rot, Foot and Mouth disease (FMD), Nagana and CBPP reported. The extreme effect has been placing quarantine in the District. In addition, frequent incidences of New castle diseases (NCD) amongst poultry flocks both local and exotic has been report to be a limiting factor development of poultry enterprises in the District. African swine fever is a great limiting disease to piggery industry too.	Pader T/C, Ogom S/C, Pajule S/C, Lapul S/C are the most affected while the following are less affected. Pader S/C, Puranga S/C, Acholibur S/C, Latanya S/C, Laguti S/C, Atanga S/C, Angagura S/C, and Awere S/C.	**8**

Human Epidemics	Incidences of nodding diseases syndrome and River Blindness reported.	Angagura S/C, Atanga S/C, Awere S/C and Lapul S/C	**9**
	Incidences of Sleeping sickness reported.	Angagura S/C, Pajule S/C Puranga S/C , Pader T/C, Atanga S/C, Pader S/C and Laguti S/C,	
Invasive species	Incidences of Congress weed and striga reported. Pistia Species (Nile cabbage)	Pader T/C, Pader S/C, Awere S/C, Lapul S/C, Puranga S/C and Pajule S/C, Atanga S/C Pajule S/C	**10**
Vermin	Incidences of monkeys, rodents and weaver birds reported to have destroyed banana gardens, maize, groundnuts, and rice.	Angagura S/C, Atanga S/C, Puranga S/C, Awere S/C, and Latanya S/C	**11**
Rock falls	Incidences of rock falls reported. These rocks crash whatever may exist on their pathway: crops, trees, buildings etc	Latanya S/C	**12**

Table 5 displays the status and summarizes the nature of hazards in the District and provides the locations of instances. It also ranks the hazards according to their magnitude.

Table 6 provides another view of the relative significance of hazards. The right most column is ordered by the number of hazards endemic in each Sub-county, and is a measure of compound vulnerability. The bottom row is ordered by the number of Sub-counties that experience each hazard, giving an indication of its geographic prevalence.

Table 6: 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 Epidemics	Flooding	Bush Fires	Proliferation of Invasive Weed Species	Vermin	Rock falls	Total
Puranga S/C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		11
Awere S/C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		10
Pader S/C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		11
Pader T/C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			11
Ogom S/C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		11
Pajule S/C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		11
Lapul S/C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		11
Latanya S/C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	11
Acholibur S/C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		10
Laguti S/C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		11
Angagura S/C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		11
Atanga S/C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		11
Total	**12**	**12**	**12**	**12**	**12**	**12**	**9**	**12**	**12**	**12**	**11**	**1**	

Hazard Risk Assessment

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

Table 7: Hazard risk assessment

Sub county	Hazards											
	Heavy Storms	Crop Pests and Diseases	Animal Vectors and Diseases	Environmental Degradation	Internal Conflicts	Prolonged dry spell	Human Epidemics	Flooding	Bush Fires	Proliferation of Invasive Weed Species	Vermin and other Problem Animals	Rock falls
Puranga S/C	M	M	H	H	H	M	M	H	M	M	L	N
Awere S/C	M	M	M	H	M	M	H	H	M	M	L	N
Pader S/C	H	H	L	H	M	M	M	H	M	H	L	N
Pader T/C	H	M	H	H	H	M	L	M	L	H	L	N
Ogom S/C	M	M	L	H	M	M	N	H	M	M	L	N
Pajule S/C	H	H	H	H	M	M	L	H	M	M	L	N
Lapul S/C	H	H	H	H	M	M	H	H	M	M	L	N
Latanya S/C	H	M	L	M	M	M	N	M	M	L	L	L
Acholibur S/C	M	M	L	M	M	M	N	M	M	L	L	N
Laguti S/C	M	M	M	H	M	M	H	H	M	L	L	N
Angagura S/C	H	M	L	H	M	M	H	M	M	L	H	N
Atanga	L	M	M	H	M	M	H	H	M	L	L	N
Key: H = High, M = Medium, L = Low, N = Not reported												

Risks

Environmental Degradation

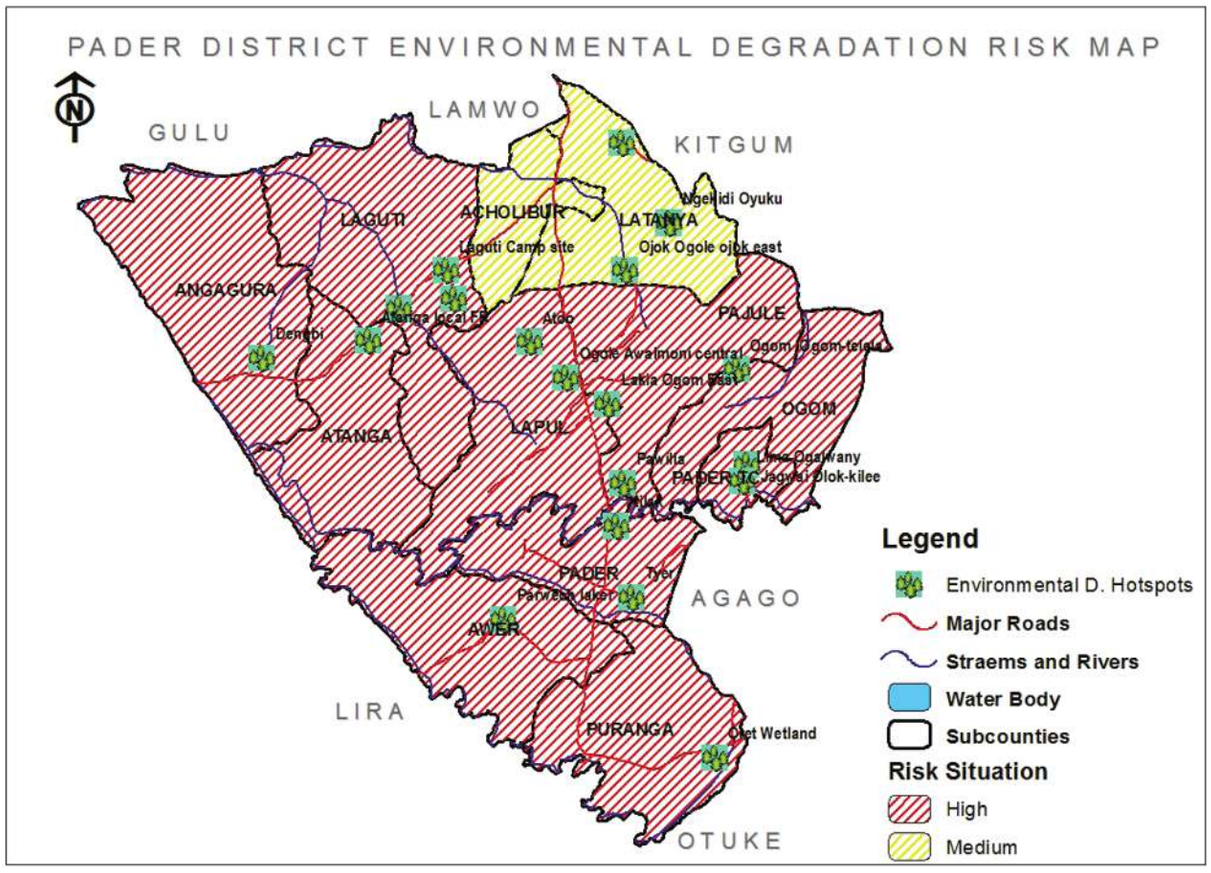

Figure 1 Environmental Degradation Risk Map
Source: Field Data Collected by OPM (May, 2014)

The rate of environmental degradation is high in the District.
This phenomenon results from poor land use patterns and other practices that lead to waste and destruction of ecological patterns. Environmental degradation in Pader District is in form of overgrazing, destructive tilling practices on sloping river banks and wetland buffer zones, monoculture, bush burning, and deforestation. The local community is often found planting rice and vegetables in the buffer zones and a few farm in the middle of the wetlands causing sedimentation of the wetlands, Bush fires set by hunters mainly to clear hunting grounds, increasing population, indiscriminate cutting trees to open land for agriculture, for charcoal , firewood and timber generate their household income and meet energy needs in households and open dumping of solid waste behind the homes and along road sides which are washed away into wetlands, streams and river causing water pollution.

Thus changes in climate regimes, flash floods/water logging, impaired water quality, water shortages, reduced soil fertility, crop damage, water-born related diseases, increased pest and disease incidence.

Cases wetland reclamation are high in Parakaka wetland in Parakaka Village, wang Turubu wetland in Omunyu Turubu Village, Awalmon wetland in Awalmon Central Village, Ogole Parish-Lapul Sub-county, Wang Curana wetland in Oloki-lee Village Lagwai Parish, Pader T/C and Ogwaleng wetland in Ogwaleng Village in Luna Parish Pader T/C. Open dumping of solid waste is on rise in urban areas like Pader T/C and Pajule Sub-county. In addition, unrestored burrow pits cases are reported. It is intense along Lira-Kitgum Highway with stagnant waters which are good breeding habitat for mosquitoes thus rampant malaria incidences and siltation of streams and during surface run-offs. Hot-spots for siltation are Awete stream in Puranga Sub-county, Alele stream, Pader Sub-county, Atup stream in Awere bordering Pader Sub-county, Lanyadang stream in Acholibur Sub-county.

Flood

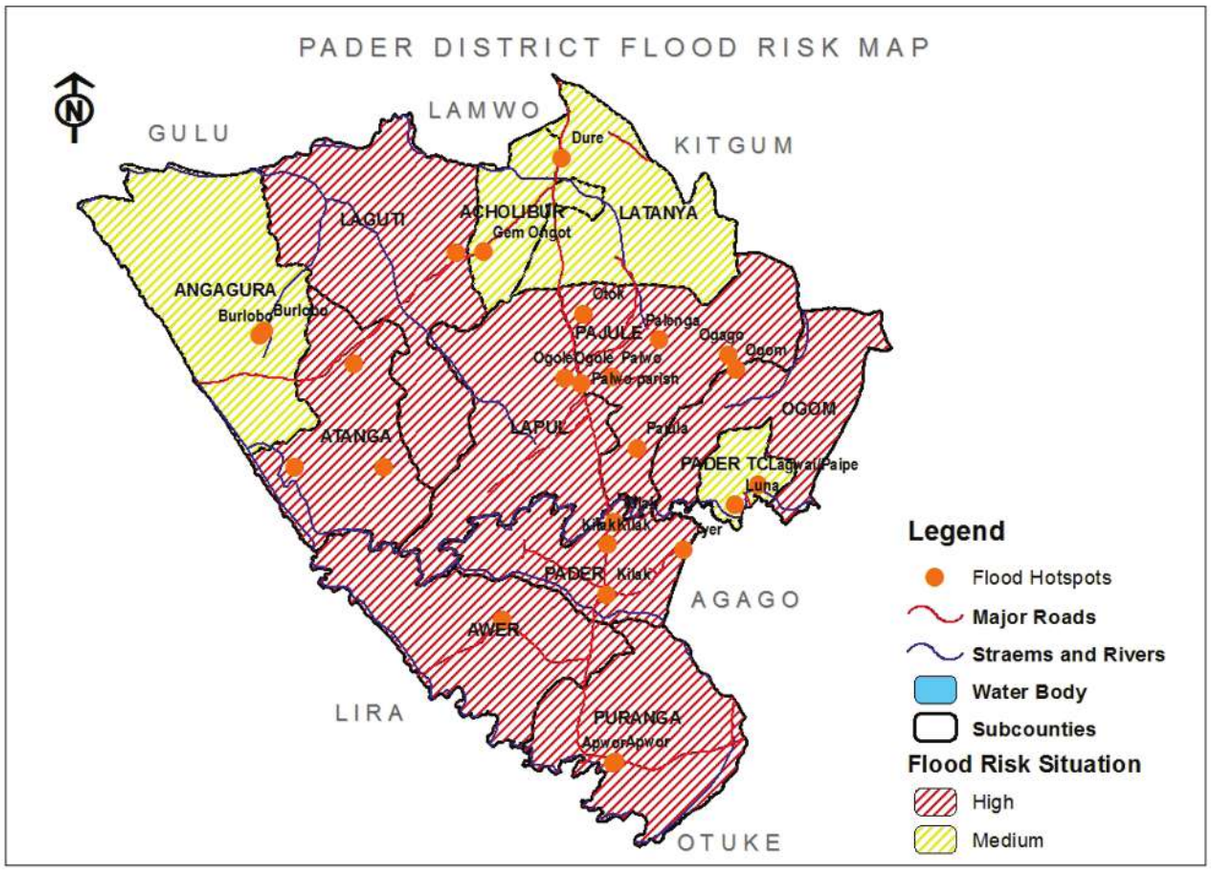

Figure 2 Flood Risk Map
Source: Field Data Collected by OPM (May, 2014)

Cases have been reported throughout the District. The occurrence is usually in three phases; early floods/water logging season from June-July, mid-season from August-September and late season from August-September. Wetlands reclamation, degrading streams and riverbanks, poorly drained soils; land-use make the District vulnerable to recurrent flooding thus crops destroyed, increased pest and diseases, infrastructural damages, animals and submerging human settlements thus reduced crop yield, shortage of food, hunger, malnutrition, displacement, increased rehabilitation and maintenance road cost, casualties and deaths among young children. Hot spots are Pader Aluka Primary School in Ogom Sub-county, schools classrooms flooded and latrines sunk, Kineni Government prison flooded/ water-logged, numerous acres of crop gardens damaged. Jaka Central Ward in Atoo Parish, Akwara East in Ogole Parish, Bar-Ayom, Lukome Village in Koyo Parish all in Lapul Sub-county, Dog Nam East and Te-Oryang Village in Luna Parish, Pader Town Council, Tyer Village, Tyer Parish Pader S/C, Lamogi Omenyi Kimac, Lamogi Lapeny in Paiula Parish, Ogan Ayila West, Lapede East in Palwo Parish, Bar Oywec, Wang Ogali Villages in Ogago Parish, Amoko Lamogi and Ladyangata Villages in Palenga Parish in Pajule Sub-county, Apwor Parish in Puranga Sub-county, Burlobo Parish in Angagura Sub-county, Gem Onyot Parish in Acholibur and Lapyem Parish in Laguti Sub-county.

Heavy Storms

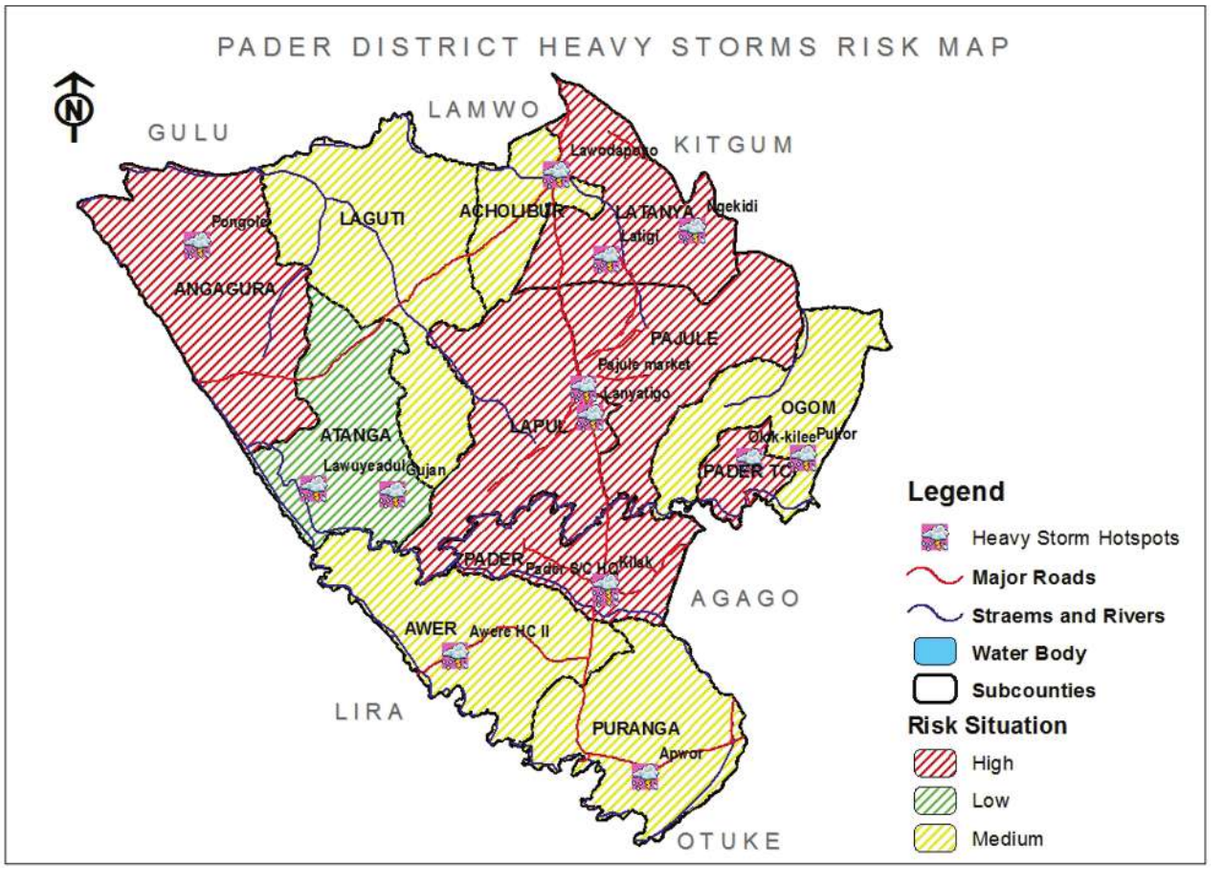

Figure 3 Heavy Storms Risk Map
Source: Field Data Collected by OPM (May, 2014)

Heavy storms (hailstorm, strong wind, cyclone and lightning).The District has been historically battered by hailstorms causing widespread loss to crops, life and property, especially, in the Sub-counties of Pader, Latanya, Pajule, Lapul, Angagura and Pader Town Council. Deadliest cyclone occurred in June, 2013 at Lacani Primary School, locked up shops destroyed at Pajule Market in Central ward in May, 2014, commercial buildings and other houses in April, 2014 in Lapede East destroyed. Residential house in Olok Kilee ward Pader T/C and Government Prisons house de-roofed in Kineni Village, Ogom Sub County. Hailstones devastation in Dako-lwayo, Adak and Angoko Toki Villages, Negkidi Parish in Latanya Sub County is a yearly phenomenon for the past years since 2004. It is severe especially in the month of August.

Crop Pest and Diseases

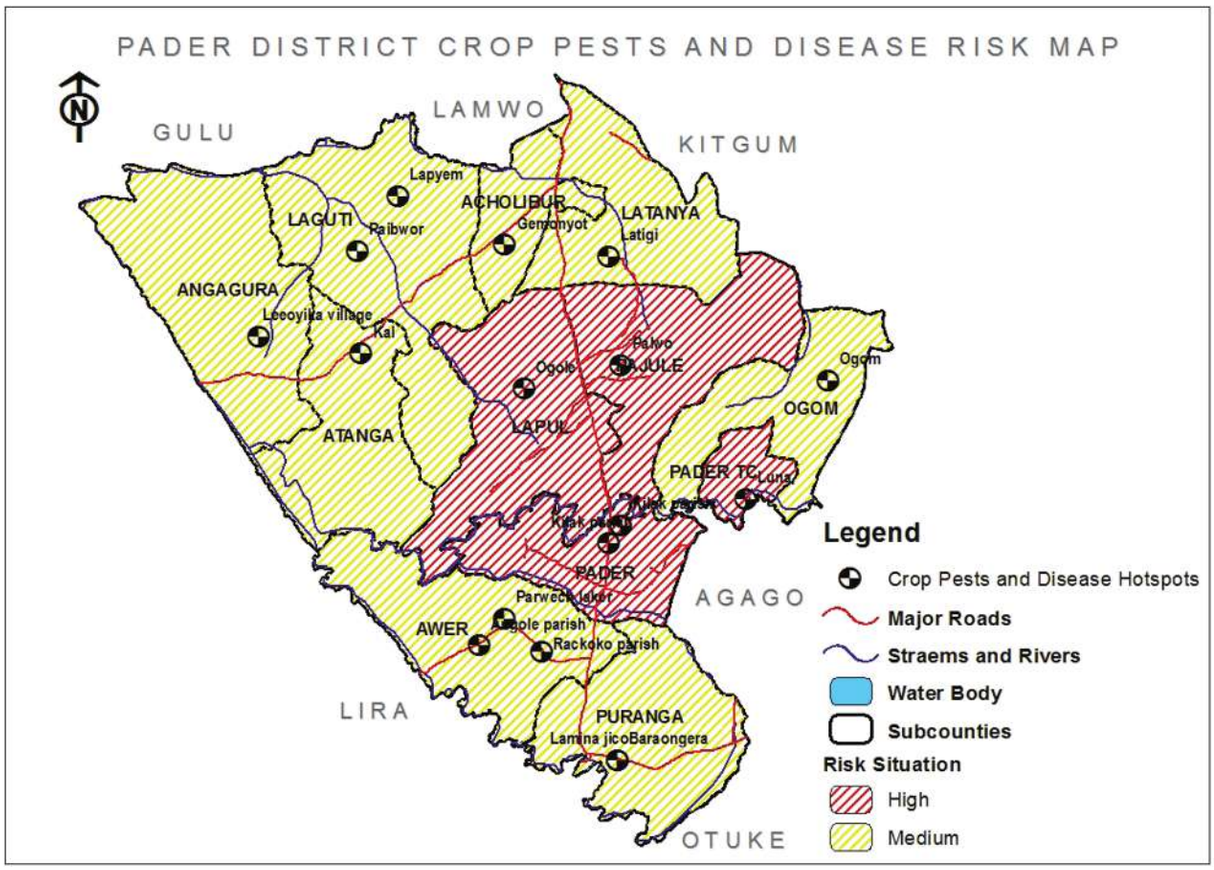

Figure 4 Crop pest and diseases Risk Map
Source: Field Data Collected by OPM (May, 2014)

Outbreaks of pest and diseases occur frequently throughout the District. Pest and diseases is attributed to one or a combination of ecological factors including temperature, overcoming genetic resistance in host, poor weather patterns, and migration, poor agronomic practices and improper post-harvest handling. Pests leads to damage of crops, consequently leading to food shortages, hunger and economic stress; examples of the common pests in the District are weevils, caterpillar, Aphids, beetles, American Boll worm, caterpillars, glowing insects, Maize Stock borer, and termites. While diseases include cassava mosaic, Cassava Brown Streak disease (CBSD), Sorghum Smut, Banana Wilt (BW), Black Sigatoke, Rosette and dumping off in groundnuts, Tomato Blight.

Internal/Land Conflict

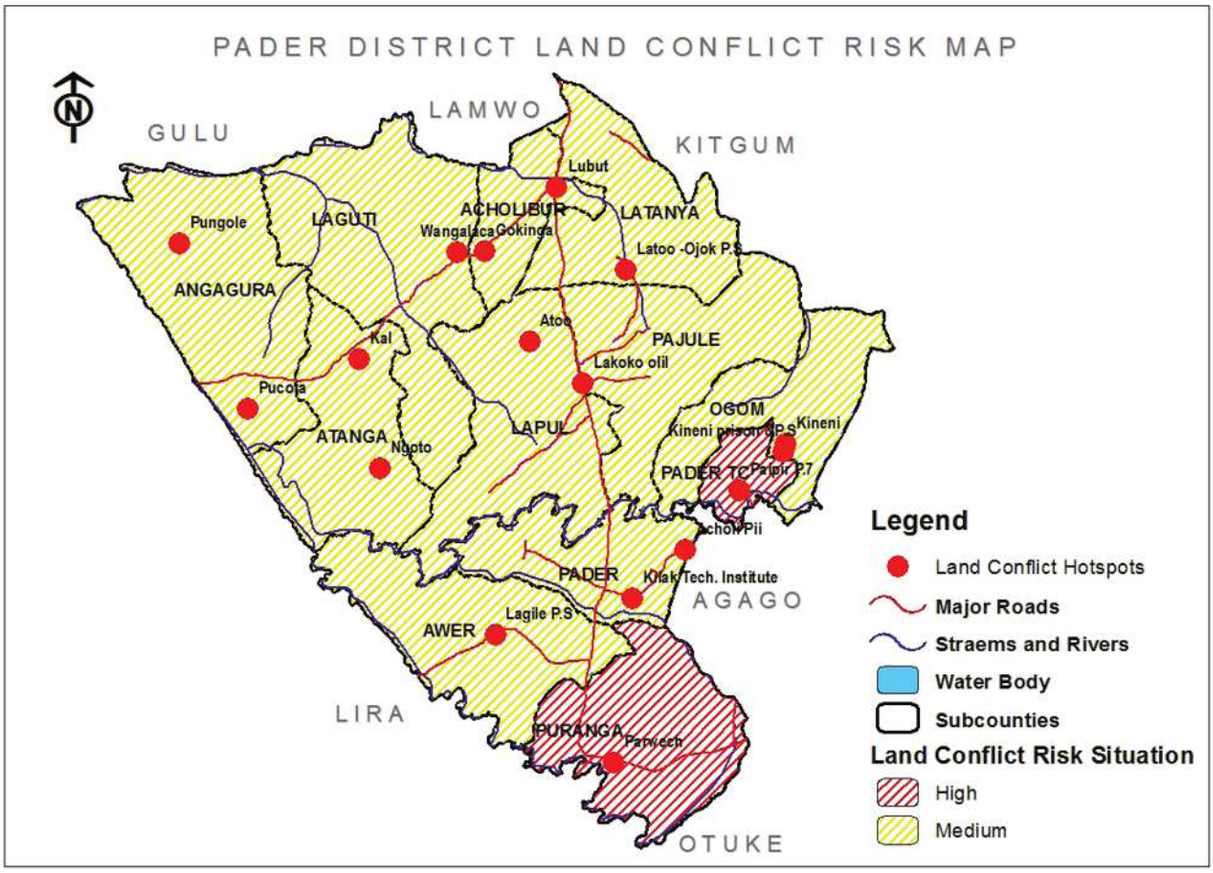

Figure 5 Internal/Land Conflict Risk Map
Source: Field Data Collected by OPM (May, 2014)

Land wrangles and Gender based violence reported in all the 12 Sub-counties in the District. Land conflict is identified as the major case, classified as intra-land conflicts which take places between family and clans individuals and inter-land wrangles mainly between the individuals and Government institutions like schools, health centres amongst others. This has been severe in Puranga Sub-county and Pader T/C. It is mainly due to unclear boundaries and no formal agreement on ownership of Government institutions. As a result, many people are displaced away from their homes, increasing death cases, crops destroyed and vandalisation of Government structures. It rampant in schools and health centres especially the water tanks, windows, doors amongst others.

Bushfire

Figure 6 Bush Fire Risk Map
Source: Field Data Collected by OPM (May, 2014)

Bushfires occurs yearly throughout the District. The major cause is due hunting as fire is always set by hunters during the dry season to open hunting for wild edible rats commonly known as Ayeri. However sometimes is accidentally. Many crops especially simsim, sorghum, cassava and sugar cane, homesteads, food storage facilities like granaries and death. These results into low yield harvest, food shortage hunger and reduced household incomes. The hot spots are Coorom Village Kalangore Parish in Ogom Sub-county, the Parishes of Dure, Negkidi and Awee in Latanya Sub-county. Most of the bushfire in Sub-county mainly originates from Lalano Parish in Lagoro Sub-county, Kitgum Matidi.

Prolonged Dry Spell

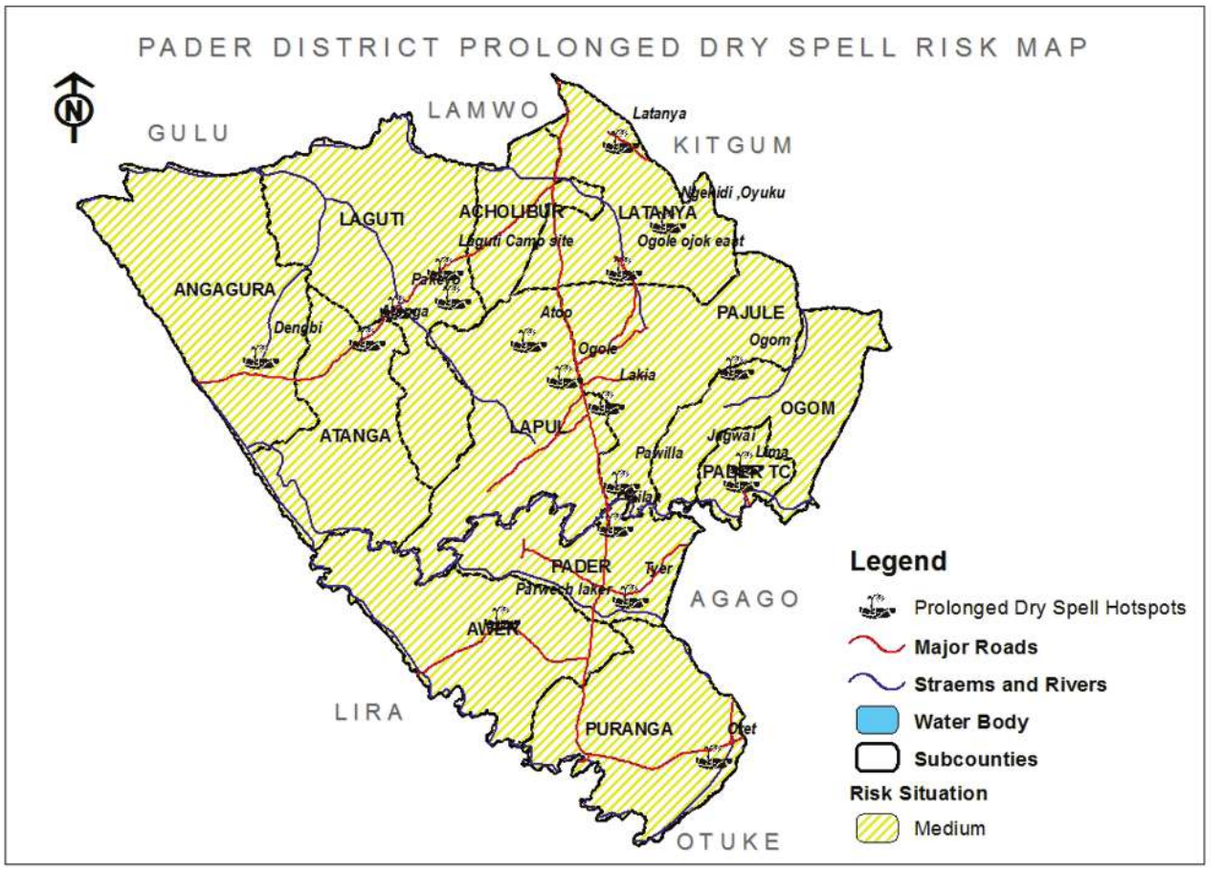

Figure 7 Prolonged Dry Spell Risk Map
Source: Field Data Collected by OPM (May, 2014)

Cases reported throughout the District as looming effects of global warming. Pro-longed dry spell is one of the possible consequences of global warming resulting in a sharp fall in water table levels and drying up of wetlands to dry weather conditions throughout the District for about 3 months. Pro-longed dry spell, ranges from March to May. The effects are late cropping, increased incidences of pest and disease, lowered crop yields, and reduced household income, hunger and malnutrition in households and water problems. The level of risk is moderate across the District as most of the communities are engaged in alternative livelihood activities like Village saving schemes, animal rearing, charcoal and firewood business and sand mining. The hot-spots are Lacani Village in Lapul Sub-county, Villages of Ipabo, Oyuku and Dako-Iwayo in Latanya Sub-county.

Animal Vectors and Diseases

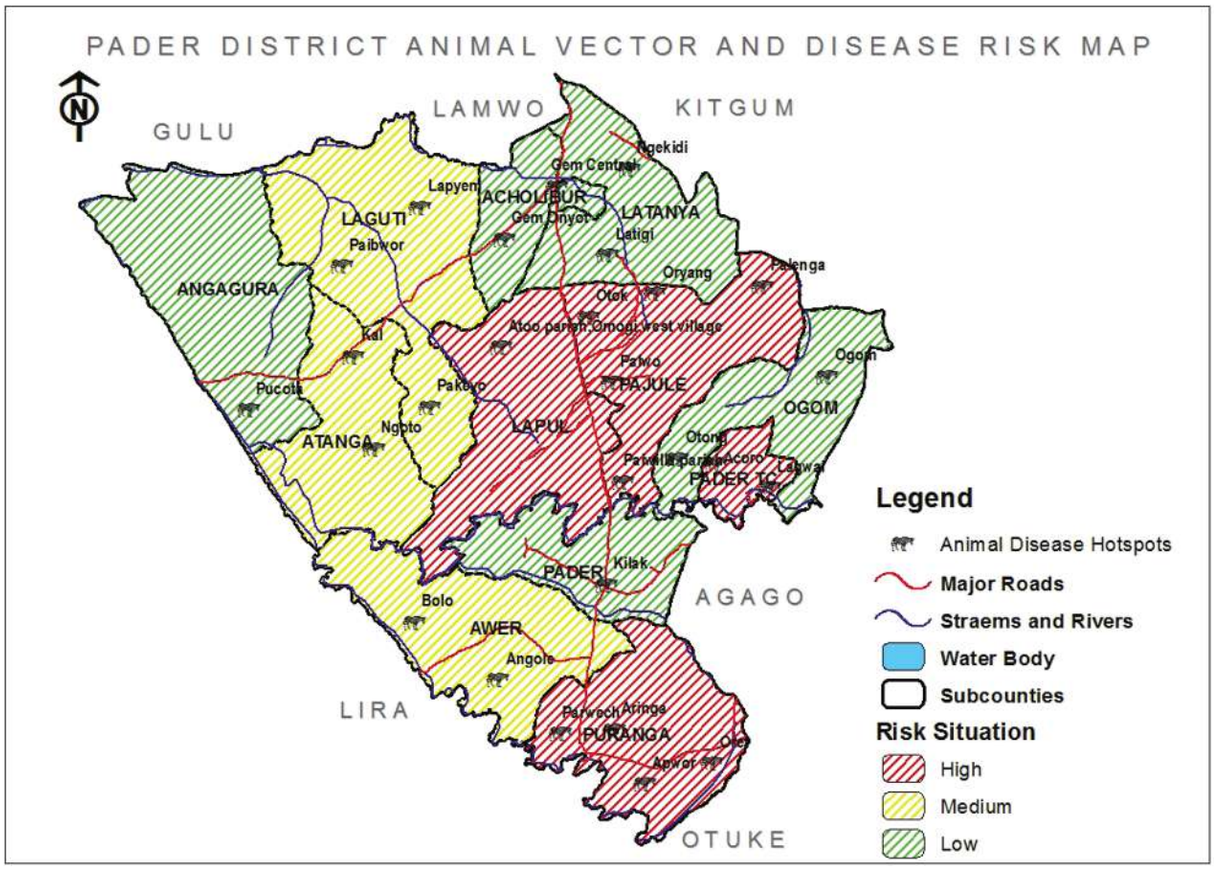

Figure 8 Animal Vectors and Diseases Risk Map

Pader District has many households owning cattle, sheep and goats in the sub region as a positive result of NAADs, NUSAF, ALREP and Restocking programmes under the Office of the Prime Minister. As a result of increased livestock number in the District, a number of animal vector and diseases have been reported. The most prevalent vector and diseases include Tsetse flies, Ticks and Liver Flukes; CBPP, Trypanosomiasis, Foot Rot, Foot and Mouth disease (FMD), Nagana and CBPP reported in cattle and African swine fever in pigs. Currently there is quarantine in the District. In addition, frequent incidences of New castle diseases (NCD) for poultry throughout the District. The major disease vectors are ticks and Tse Tse flies. Wan Meko Wetland in Lamogi Omenyi Kimac Village, Paiula Parish in Pajule Sub-county has been citated as key hot-spot for tsetse flies. Cases of Foot and mouth, Nagana, CBPP have been severely reported in the Sub-counties of Sub-counties of Puranga, Pajule, Lapul, Ogom and Pader T/C. Increased animal dead tolls, retarded agricultural productivity and reduced households.

Human Epidemics

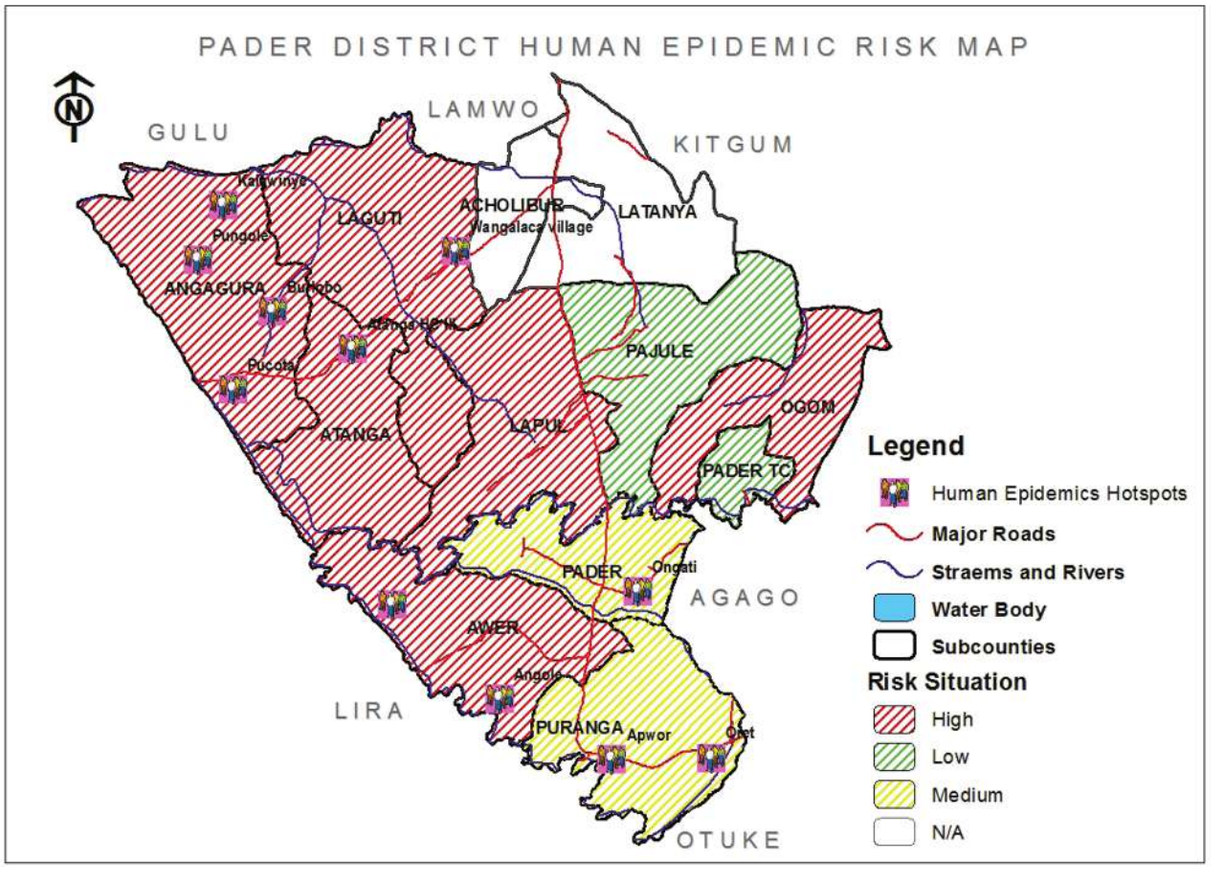

Figure 9 Human Epidemics Risk Map
Source: Field Data Collected by OPM (May, 2014)

Much as the District is experiencing a calm security situation since 2010, the post LRA insurgency have been associated with disease incidences. Cases of nodding disease Syndrome have been reported in Atanga HC IV in Atanga Sub-county, Pajule HC IV in Pajule Sub-county, Angagura HC II in Angagura Sub-county and Lapul HC III in Lapul Sub-county and Awere HC III in Awere Sub-county. Human epidemics in the District are highly associated migrations from the neighbouring Districts and lack of preparedness. Severe in children, many school going children dropping out of school and low agricultural production as the parents of the Nodding syndrome victims spent a lot of time in caring for the sick than in farming activities.

Invasive Weed Species

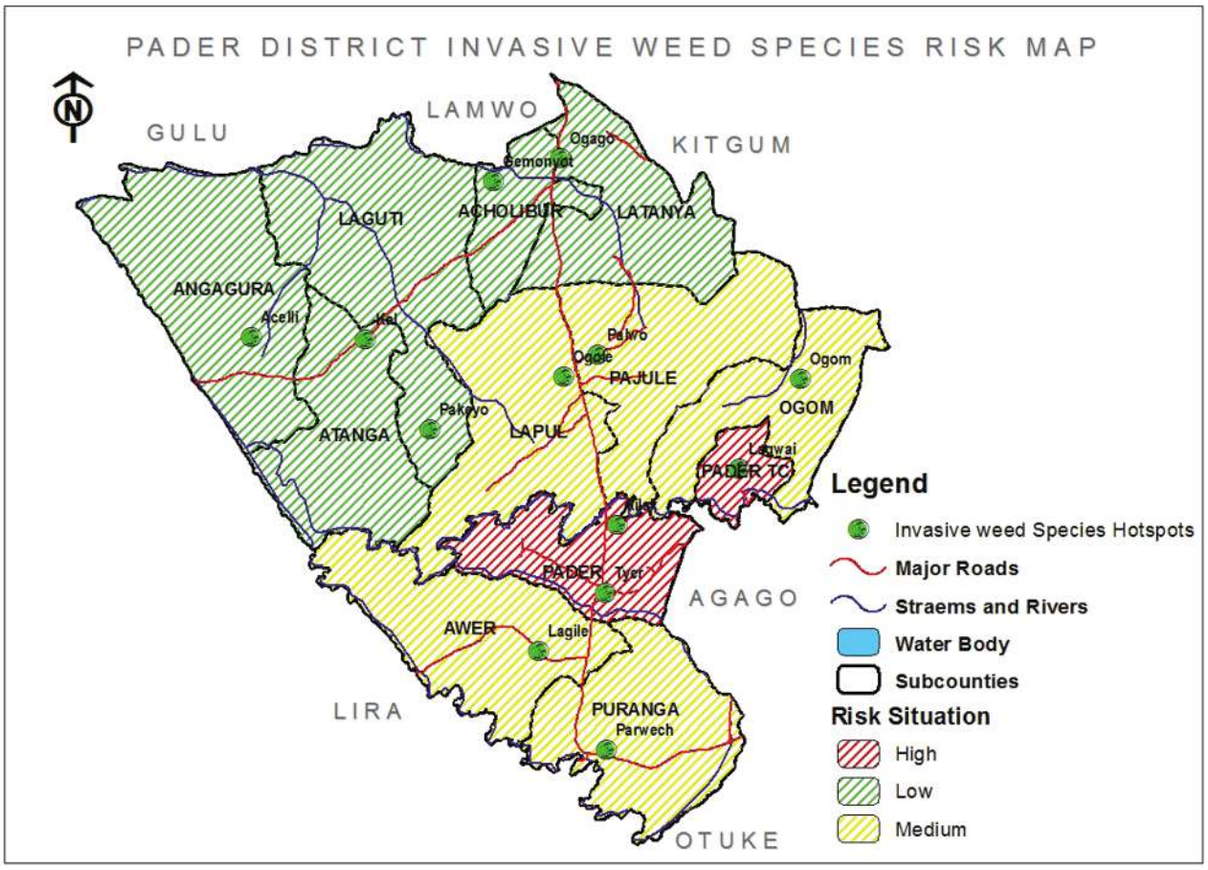

Figure 10 Invasive Weed Species Risk Map
Source: Field Data Collected by OPM (May, 2014)

Cases of invasive weed species reported include the congress weed which is common in Sub-counties where major former Internally Displaced Persons' Camps (IDPCs) were established during the LRA insurgency particularly in Pader T/C and Pader S/C; Striga weed has been recorded throughout the District with hot-spots in Alima West in Dure Parish, Latanya Sub-county; Pistia stratiotes commonly known as Nile cabbage reported in Ayilla stream in Pajule Sub-county. These weeds are associated with reduced crop yield/total loss, reduction in pasture lands due to colonization by the deadly weeds; abortion in animals and death of animals in the worst case scenario, exhaustion of soil fertility and financial loss in control of the weeds.

Vermin and Wild Animals

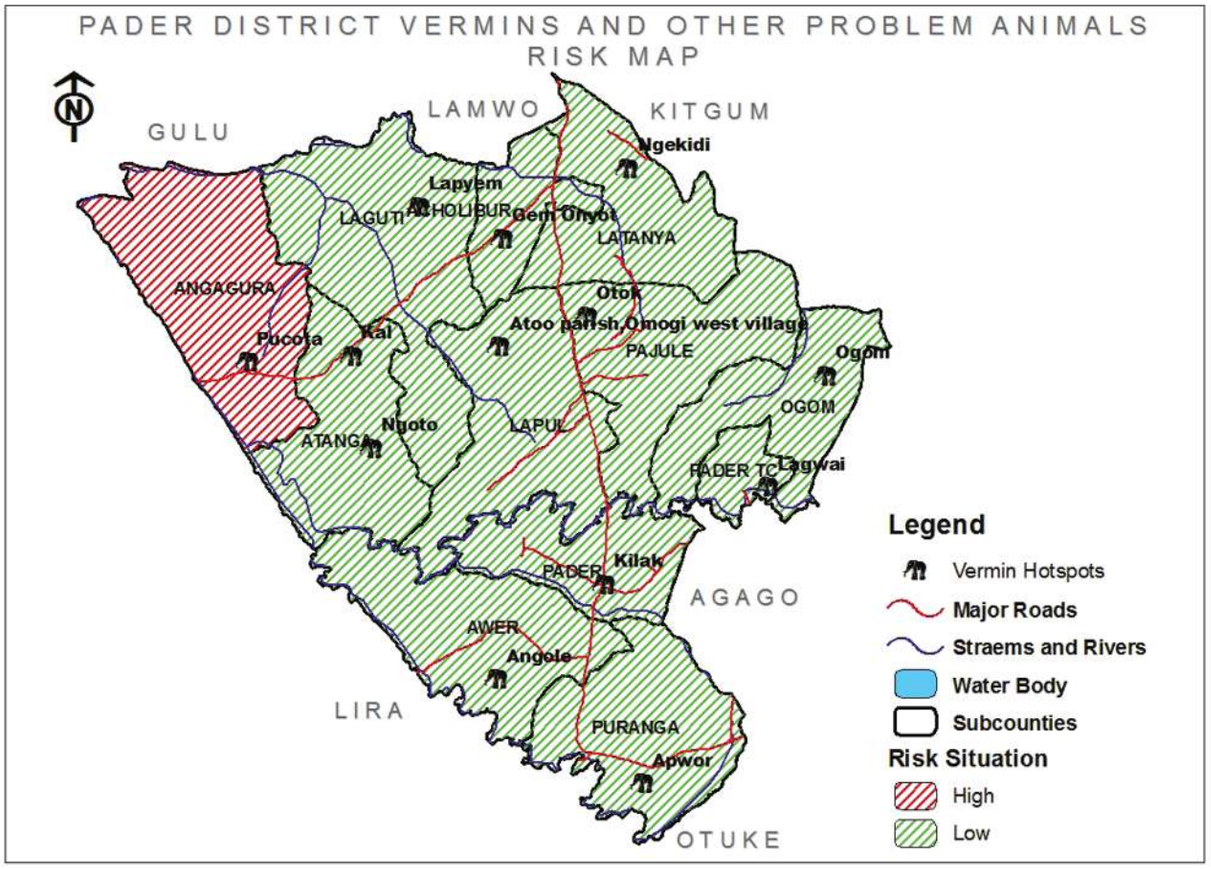

Figure 11 Vermin and Wild Animals Risk Map
Source: Field Data Collected by OPM (May, 2014)

Cases of squirrels and rats reported throughout the District. Much as the squirrels and rats are wide, there clear quantification of damages caused. Cases of monkeys have been reported in hilly areas, along rivers in the vicinity of forest and thickets. Hot-spots have citated in Bar-ongera Village in Puranga Sub-county, Awere Sub-county, Angagura Sub-county and Latanya Sub-county. The severity of the risk is high during harvest and storage. Destruction of crops thus reduced yield, hunger and financial loss.

Rock falls

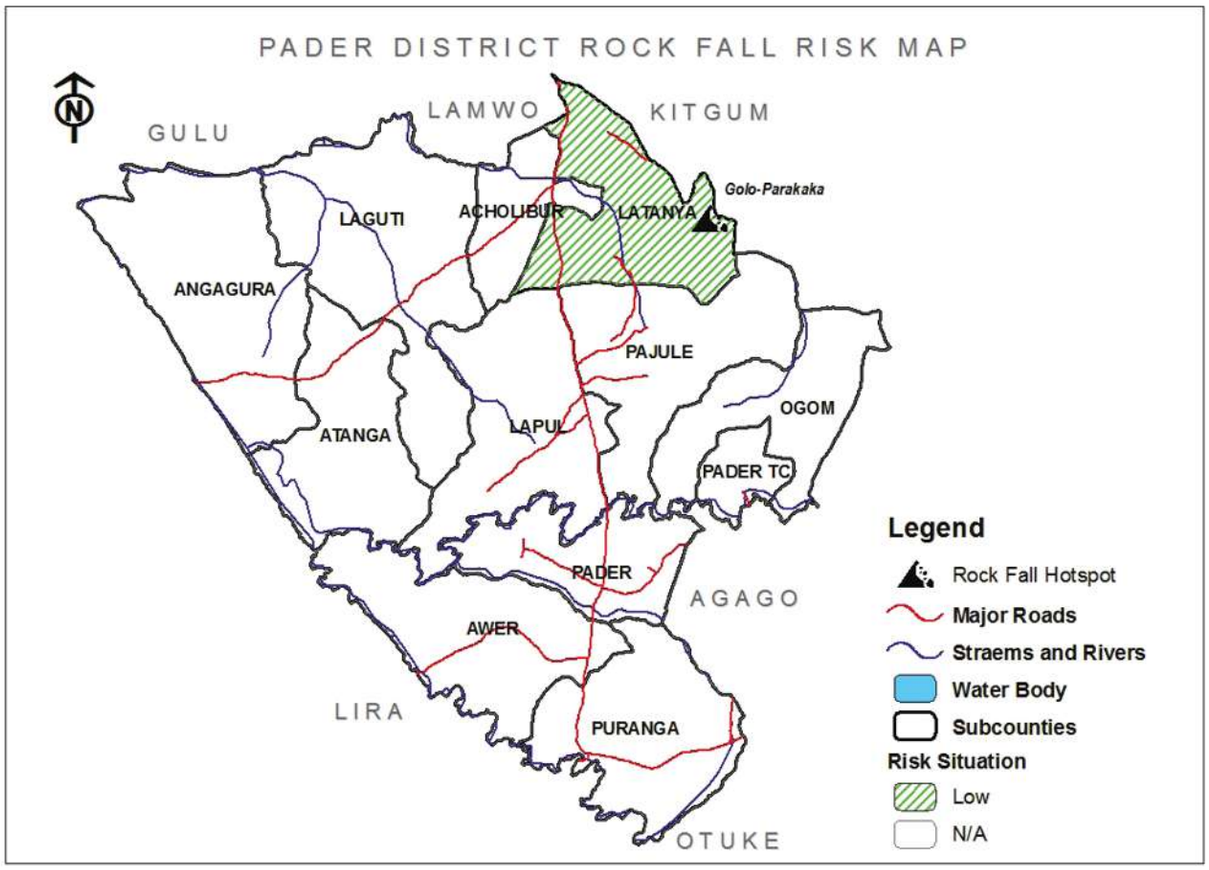

Figure 12 Rock falls Risk Map
Source: Field Data Collected by OPM (May, 2014)

Cases of rock falls has only been reported in Latanya Sub-county. The hot-spot area is Parakaka Village in Golo Parish. It occurs often in the Sub-county. Cases of dead and homesteads damaged have not been recorded.

Vulnerability

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

Table 8: Risk and vulnerability assessment

Sub county	**Hazards**													
	Heavy Storms	Crop Pests and Diseases	Animal Vectors and Diseases	Environmental Degradation	Internal Conflicts	Prolonged dry spell	Human Epidemics	Flooding	Bush Fires	Proliferation of Invasive Weed Species	Vermin and other Problem Animals	Rock falls	Cumulative vulnerability (Absolute	Weighted vulnerability (Cumulative/3)
Puranga S/C	2	2	3	3	3	2	2	3	2	2	1		25	8
Awere S/C	2	2	2	3	2	2	3	3	2	2	1		24	8
Pader S/C	3	3	1	3	2	2	2	3	2	3	1		25	8
Pader T/C	3	2	3	3	3	2	1	2	1	3	1		24	8
Ogom S/C	2	2	1	3	2	2		3	2	2	1		20	7
Pajule S/C	3	3	3	3	2	2	1	3	3	2	1		26	9
Lapul S/C	3	3	3	3	2	2	3	3	2	2	1		27	9
Latanya S/C	3	2	1	2	2	2		2	2	1	1	1	19	6
Acholibur S/C	2	2	1	2	2	2		2	2	1	1		17	6
Laguti S/C	2	2	2	3	2	2	3	3	2	1	1		23	7
Angagura S/C	3	2	1	3	2	2	3	2	2	1	3		24	8
Atanga S/C	1	2	2	3	2	2	3	3	2	1	1		22	7
Total	29	27	23	34	26	24	21	32	24	21	14	1	276	
	Key: 3 = High, 2 = Medium, 1 = Low, 0 = Not reported													

Table 9: Hazard status and rank

Hazard	Status	Sub County	Rank
Heavy Storms	Incidences of strong winds, hailstorm and lightning reported. Roofs of classrooms blown off YY Okot, in many schools with cases of death due to lightening on the rise. One child struck dead in Omiya Anyima; crops were destroyed by hailstones as well.	Orom S/C, LabongoAmida S/C, Kitgum Matidi S/C Omiyanyima S/C Mucwini S/C Labongo Akwang Labongo Layamo Namokora, Kitgum T/C	5
Crop Pests and Diseases	Incidences of Aphids reported.	LabongoAmida S/C, Kitgum Matidi S/C Omiyanyima S/C Mucwini S/C Labongo Akwang Labongo Layamo	3
	Incidences of Cassava Brown Streak, G/ Nut Rossette, Bean Blight and Anthracnose reported	Widespread in all the sub counties	
	Simsim Gall midge	Wide spread in all sub counties.	
	Citrus canker	Wide spread in all sub counties.	
Animal Vectors and Diseases	Incidences of CBPP, African Swine Fever reported	Labongo Layamo S/C Widespread in all the sub counties	8
	Incidences of Foot and Mouth Disease suspected (not confirmed).		
	Incidences of New Castle Disease among chicken reported		
	Incidences of Tsetse Flies reported along the courses of rivers Aringa and Pager Incidences of Nagana reported	Kitgum Town Council, Labongo Akwang, Pager, Kitgum Matidi and Labongo Amida Sub Counties, Omiyanyima S/C Namokora S/C, Lagoro S/C	
	17 cases of rabies between July 2013 and June 2014reported	Mucwini, Orom, Labongo Amida Sub Counties and Kitgum Town Council.	
	Worms and manges in Goats	Wide spread in all S/Cs	
Environmental Degradation	Incidences of Wetland Encroachment, degradation especially along Pager and Aringa Deforestation (illegal timber cutting, Charcoal burning and large chunks of woodlands cleared for charcoal and agric land, reported. Wetland degradation is in form of encroachment, dumping of non-biodegradable wastes and grazing.	Orom S/C, NamokoraS/C, Lagoro S/C, KitgumMatidi S/C, Mucwini S/C, LabongoAmida S/C, Kitgum T/C Labongo Akwang S/C, Labongo Amida Labongo Layamo S/C	3

VULNERABILITY

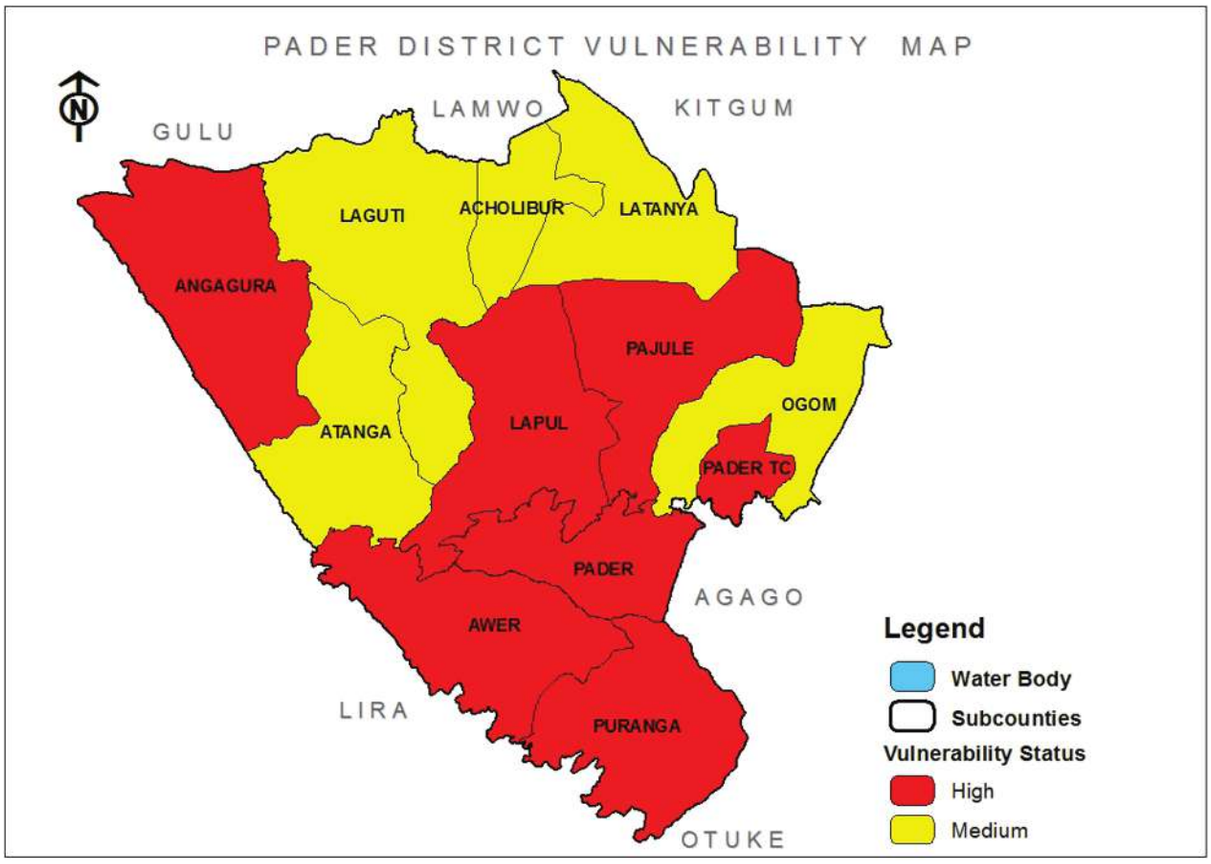

Figure 13 Risk Vulnerability Map
Source: Field Data Collected by OPM (May, 2014)

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

Pader District is exposed to 12 hazards namely environmental degradation, flooding, heavy storms, crop pests and diseases, internal conflicts, prolonged dry spell, bush fires, animal vectors and diseases, human epidemics, proliferation of invasive weed species, vermin and other problem animals and rock falls arranged in their order of risk from highest to lowest with total risks of 34, 32, 29, 27, 26, 24, 24, 23, 21, 21, 14 and 1 respectively. These are associated with indiscriminate tree cutting to open farm lands or for wood fuel and timber, low lying areas with poor drainage, wetland reclamation for agriculture, poor land-use, lack of clear land boundaries among the communities, migrations from the neighboring Districts and lack of preparedness and several improper documentation scenarios on land ownership among individuals, and between individuals and Government institutions.

As shown by both the table and map, Lapul, Pajule, Puranga, Pader, Angagura, Awer and Pader T/C Sub-counties reported the highest vulnerability in Pader District with cumulative vulnerability values of 27, 26, 25, 25, 24, 24 and 24 respectively and weighted vulnerability values of 9, 9, 8, 8, 8, 8 and 8 respectively which lie in the top (red) category of the vulnerability scale as shown in the map above. The rest of the Sub-counties displayed medium (yellow) vulnerability with weighted vulnerabilities between 5 and 7. Acholibur Sub-county though also moderately vulnerable to the resident hazards, was the least vulnerable in the District with a weighted vulnerability value of 6.

The most vulnerable communities are; women, children and the elderly. Women play a greater role in most the households which include but are not limited to water and firewood collection, cooking and caring for the sick children and the elders.

CONCLUSION

This multi hazard, risk and vulnerability profile for Pader 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 Pader 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 Pader District is vulnerable to twelve hazards, in order of decreasing risk; environmental degradation, flooding, heavy storms, crop pests and diseases, internal conflicts, prolonged dry spell, bush fires, animal vectors and diseases, human epidemics, proliferation of invasive weed species, vermin and other problem animals and rock falls.

Pader is generally a high vulnerability District. Lapul, Pajule, Puranga, Pader, Angagura, Awer and Pader T/C Sub-counties reported the highest vulnerability in Pader District with cumulative vulnerability values of 27, 26, 25, 25, 24, 24 and 24 respectively and weighted vulnerability values of 9, 9, 8, 8, 8, 8 and 8 respectively which lie in the top (red) category of the vulnerability scale. The rest of the Sub-counties displayed medium (yellow) vulnerability with weighted vulnerabilities between 5 and 7. Acholibur Sub-county though also moderately vulnerable to the resident hazards, was the least vulnerable in the District with a weighted vulnerability value of 6. These Sub-counties 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 Pader 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.

Available online: http://www.necoc-opm.go.ug/

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