

Vulnerability Assessment on Climate Change-Induced Flood Disaster Policy Communication Issues for Management of Local Community Adaptation Resilience in Uganda: (Information Services on Climate for Effective National Flood Risk Assessment Decision Communication)

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Abstract— This efficacious assessment on climate change and disaster policy communication services, are vital for enhancing the adaptive resilience capacity of the vulnerable local communities in poor countries like Uganda. This paper focuses on the efficacy of the Ugandan national climate change and disaster policy information communication strategies in addressing national flooding disaster risks, highlights the recent trends of knowledge based responses to climate change induced floods, assesses the impact of the flood on the socio-economic well-being of local households and communities, and determines the vulnerability issues with corresponding adaptation strategies to floods in the flood prone country. Climate change flood risks have continued to exact huge socio-economic loss and damage effects due to the vulnerability and weak adaptation strategies to floods. The national meteorological services tend to forecast seasonal flood events; some flood forcing factors; and the impact of floods on social, economic, ecological, and physical infrastructure are on the rise in some parts of Uganda.

Keywords—climate; vulnerability; change; flood; policy; disaster; communication; community; efficacy; adaptation; resilience; management; assessment

1. INTRODUCTION

The country Uganda, has experienced a flurry of serial climate change and variability induced flood disaster episodes that have caused wanton loss and damage of unquantifiable socioeconomic and environmental impacts at all levels of local communities (2010).The country has often suffered prevalent: multiple civil strife; famines, drought; transport accidents, earthquakes; epidemics of disease; flooding, landslides, environmental degradation, technological accidents, crop pest infestation, livestock and wildlife disease epidemics from time to time, as a result of extreme climate events in all regions of the country(GU, 2010) Reference [1].

Sequel to this, Uganda has often suffered from negative effects like; declining crops yields and increasing food insecurity; melting of snow caps and glaciers on Rwenzori Mountain; increased frequency and intensity of droughts and floods; reduced water supply; increase in pests and diseases for livestock, wildlife and crops; increase of vector-borne diseases, including malaria and rift valley fever, water-borne diseases like dysentery, bilharzias, cholera, and typhoid; increase in invasive species; declining levels of fresh water resources; rising sea levels, leading to displacement of people, and disruption of both; terrestrial and marine ecosystems and other important natural habitats; and natural resource based conflicts due to water floods that are caused by sudden heavy downpours (ICSU, 2008) Reference [2].

Information available from the Ugandan environment state agency, climate is a vital natural resource necessary for socio-economic development because the influence of climate variability on agricultural production shows that we depend on rain-fed agriculture for livelihoods and food security and climate change flood assessment strategies consider that (NEMA, 2002/Review 2014) Reference [3]:

- Climate is a vital natural resource which should be well harnessed for socioeconomic development;
- The utilization of the climate and atmospheric information is critical in aviation safety, agriculture and the efficient management of the environment;
- Resource users like farmers should participate in the monitoring and dissemination of climatic information; exact huge socio-economic loss and damage effects due to the vulnerability and weak adaptation strategies to floods. The national meteorological services tend to forecast seasonal flood events; some flood forcing factors; and the impact of floods on social, economic, ecological, and physical infrastructure are on the rise in some parts of the country.
- The promotion of international cooperation for smooth exchange of climatic information and control of transboundary atmospheric air pollution is important in the management of the resource; and
- Access to climatic data/information should be guaranteed on terms determined by the relevant authority.

- Improve coordination and exchange of meteorological information among various stakeholders;
- Strengthen the national meteorological monitoring networks with capacity to process data;
- Improve awareness among potential users and decision-makers of climatic and atmospheric information;
- Strengthen the infrastructure and man power for climate, meteorology and meteorological studies;
- Strengthen the Early Warning Information System for effective disaster preparedness and response to extreme climatic events or accidental hazardous emissions into the atmosphere;
- Strengthen national, regional, and global cooperation for climate and weather management facilities.

Furthermore, the increasing frequency and intensity of natural disasters like floods, droughts, and landslides are among the top climate change risks in the East African sub-region. Adverse impacts of climate change in the area include: sea level rise which also leads to infrastructure destruction along the coasts, submerging Indian Ocean small islands, salt water intrusion, contamination of fresh water wells along the coasts in Tanzania, beach erosions in Mombasa, Kenya, rampant floods, and droughts (GoT, 2006) Reference [4]. In the past decades, Uganda has experienced an increase in the frequency and intensity of extreme weather events like heavy floods with huge socio-economic consequences (GoU, 2010) Reference [5]. With rampant poverty, weak institutional capacity, lack of skills on climate change adaptation and mitigation, inadequate skills in disaster management, lack of technology, inadequate funds, and an economic dependence on natural resources.

Most local community Ugandans are too vulnerable to disastrous impacts of climate change relate. Poor climate conditions will continue to wipe the agricultural outputs, leading to higher food prices, dwindling national come, and worsening export trade. Low or lack of awareness of climate change global issues requires a communication strategy on the global environmental conventions of climate change and funds need to be allocated (GoU, 2010) [5]. At least 12,000 people were affected by one of a series of incidents of heavy flooding and landslides in Bukalasi and Buwali sub-counties in Bududa district in a natural flood disaster after a few days of heavy rainfall in the areas around Mount Elgon National Park with over 858 displaced persons and several cases of Flood inflicted death (ACAPS, 2018) Reference [6].

2. DISASTER RISKS POLICY FRAMEWORK

The national flood disaster preparedness and management policy for Uganda seeks to: establish a framework for a prudent sectoral and cross-sectoral objectives, principles, and strategies for an integrated disaster management (2010). In addition, it promotes positive behavioural or attitudinal change towards disaster management; legal framework; institutional flood assessment, monitoring, and evaluation system; and effective information services for flood data collection, storage, analysis and dissemination (2010).

The key issues related to climate change induced flooding include: inadequate disaster risk management as a result of impacts made worse by climate change; Uganda's position in international climate change negotiations is not strong enough to represent and effectively articulate and influence the global negotiations the interests of Uganda; water supply endangered in quality and quantity because of climate change; and inadequate mainstreaming of climate in other important sectors such as communication, energy, food security, and agriculture. The major national constraints in especially the enabling flood disaster assessment management environment in Uganda include: conflicting inter-sectoral policies and legal instruments, conflicting interests of involved entities, media less interested in covering climate change policy issues, climate change is given low priority by policy and insufficient allocation of resources, poor public information and transparency, awareness of climate change induced flooding challenges are often quite low or biased cooperative sharing of responsibilities and institutionalized gender equality mainstreaming for inclusion Uganda has accepted that climate change is one of the greatest challenges facing humanity this century. Uganda's sustainable development largely depends on sustainable use environment a land natural resources in order to avert the increasing climate frequency and intensity of variability and climate change impact on Uganda's socioeconomic development and the livelihoods of its people (GU, 2010 [1]; GU, 2015 Reference [7]) with the objective to ensure harmoniously coordination of climate change causes and effective adaptation and mitigation principles and strategies (NDP I,2010 Reference [8]; NDPII, 2015 Reference [9]).

- Promote an integrated approach to address the effects of climate change;
- Re-define climate change as a development issue;
- Mainstream climate change in all development policies; programs and projects;
- Provide and promote incentives for clean development mechanisms (CDMs);
- Promote effective response to climate change, induced disasters; and
- Promote implementation of climate change conventions;
- Develop institutional capacities for climate change management in Uganda;
- Strengthen resilience and adaptive capacity to climate induced hazards and natural disasters;
- Integrate climate change adaptation and mitigation into national strategies and plans;
- Strengthen education, awareness rising on climate change mitigation, impact reduction, and early warning;
- Strengthen advocacy and mobilization of human and financial resources to address climate change;
- Develop strategies for the transfer, acquisition and adaptation of relevant technologies to alleviate the pressure on fragile

ecosystems and natural resources and contribute to mitigation of climate change;

- Develop and implement a capacity building program for climate change induced disaster prevention and response at national, local and community levels;
- Support Development and implementation of catchment based management and restoration plans;
- Support mapping out climate disaster prone areas to guide adaptation and mitigation efforts;
- Support scaling up of ecosystem based adaptation (EBA) to climate change; and
- Develop and implement mechanisms for harnessing opportunities for carbon financing.

Another Uganda district, Ibanda district (Western Uganda) is among the few Ugandan local government districts adopt climate action into its local community focused district develop plan II (2016-2020), community awareness of climate induced flood management adaptation strategy for better climate smart agriculture outputs for food security is still a work –in-progress due to implementation gaps. Ibanda district local households and communities are quite vulnerable to the hazards of climate change risks that exacerbate the poverty ridden communities across several households and community social strata (USAID, 2016) Reference [10].

2.1 Issues and Options in Policy Communication Strategy

The Flood risk assessment in Uganda is premised on the idea that, effective disaster preparedness and management depend on accurate information, projections or forecasts based on scientific precision will enhance monitoring for responses (2010). Effective communication is a key pillar in successful disaster preparedness and management operations. The media have a vital role climate information services (CIS) to link weather forecast centres to the public to provide early warning information for state and non-state actors to facilitate both private and public decisions (GU, 2010) [1]. Uganda ratified the UNFCCC in 1993, and acceded to the Kyoto Protocol in 2002. Uganda is also a partner state in implementing the nascent East African Climate Change Policy 2011. In a move to guide Uganda’s immediate climate change adaptation actions, a national adaptation program of action (NAPA) was developed as early as in 2007. There is a national climate change policy for Uganda (GU, 2015) [7] to tackle adverse climate change impacts like: droughts, high temperatures, heavy rains, hail storms, floods, and landslides (MWE, 2013) Reference [11].

2.2 Flood Disaster Knowledge Management

The state of Uganda has a flood disaster assessment policy framework at central or national, regional, and decentralized local government district disaster risk information management systems, that need to be strengthened for institutional effectiveness (2007). The information services cover climate change induced incidents of severe floods, mudslides or landslides, droughts, environment degradation, wetlands degradation and epidemic diseases (2007). The current national flood disaster information is collected by local community workers in the field and transmitted to the center for analysis and disseminated by the media, community leaders, and politicians (2010). Following on the National Development Plan I, the NDPII (2015/16-2019/20) (Uganda, 2015b) [9] aims to achieve the objectives of Uganda’s Vision 2040. The Plan aims to strengthen Uganda’s competitiveness for sustainable development creation, employment for inclusive economic growth under these five priorities (GU, 2015) [7]:

1. Agriculture
2. Tourism
3. Minerals, oil, and gas
4. Infrastructure development
5. Human capital development

The Ugandan government has declared that the public sector must aim to (GU, 2015) [7]:

1. Develop disaster risk profile and vulnerability map of the country
2. Coordinate the development and implementation of disaster mitigation for mitigation, preparedness and response to natural and human induced disasters
3. Coordinate regular disaster vulnerability assessment at community level, hazard forecasting, and dissemination of early warning messages
4. Resettle landless communities and victims of disasters
5. Coordinate timely responses to disasters and emergencies
6. Provide food and non-food relief to disaster victims
7. Coordinate state and non-state actors in the IR mandates towards disaster issues
8. Develop and implement humanitarian interventions and support livelihoods of disaster

In due process, the following national project outputs are expected to emerge from the planned project inputs: sustainable management of environment, natural resources, and land use; enabling policy for effective environmental management/ecosystem established; economic productivity enhanced with environmental and natural resources; capacity at national, district, and community levels restored and protected ecosystems of national and global importance against degradation; climate resilient policies and measures; and financial options for national adaptation costs expanded at local, national, sub-regional, and regional

levels. It is assumed that the consequences of climate change disaster risks, from the sub-regional social, economic, political, and environmental (natural resources), are quite dire.

In recent past, frequent heavy rains had often occurred in Kasese district [Western Uganda region] and caused the many local rivers like Nyamwamba and Mobukuto burst their banks which and caused heavy floods in almost all nine sub counties of the district. Many people die and several thousands were displaced as a consequence of one of the floods (URCS, 2014) Reference [12]. In addition, the livelihoods and infrastructure were destroyed, especially around the Kilembe copper mines. Furthermore, several bridges and houses were destroyed by the fast running water and boulders from the rivers Nyamwamba and Mobuku (URCS, 2014) [12].

On the other hand, the Northern Uganda region's district of Adjumani has experienced adverse effects of climate change impacts: landslides, hail storms, heavy lightning incidences, increased accumulation of nitro oxide in the atmosphere, prolonged droughts, proliferation of new animal and plant diseases, insects attacks on plants like shrubs or trees, and sudden downpours of unpredictable heavy rains. A community communication strategy was been adopted to promote climate information services in the district (ILGDDP, 2016) [10]. Heavy flooding usually paralyses most socio-economic development activities across the entire local government district administration services.

3. PUBLIC INFORMATION COMMUNICATION SERVICES

Most the regions (western, northern, eastern, and central) of Uganda are intermittently flood-prone due to extreme climatic and weather events which are associated with the impacts of climate change in the country and the government of Uganda has developed and adopted the flood disaster mechanisms and strategies across different strata of the vulnerable local communities at flooded rural, pre-urban, and urban areas (GU,2010) [1].Hence, media personnel need to be trained on the techniques of climate science reporting for disaster preparedness and resilience (GU,2010) [1]. In addition, the national interagency technical committee does liaise with the ministry responsible for information and the private media to ensure accurate, consistent, and coordinated information and education flow (2010).

The regional community and mass media are not yet fully engaged in covering climate change science and issues. Training programs to assist both journalists and editors are essential, but civil society organizations must also improve the way they engage with the media, packaging information in a clear and simple way and actively attracting media attention. Local languages lack terms for many key concepts involved in climate change –including 'climate change' itself. Communicators should attempt to explain climate change using terms that already exist, using graphic examples of local environmental problems and innovative communication methods to get the message across.

At the same time, public figures are not being held to account for taking action on climate change due to low or no awareness of the causes and effects of climate change. Raising awareness of climate change is critical. Local and national politicians are ill informed about climate change although environmental services are decentralized under local governments. Needless to say, awareness campaigns should focus on local politicians to act on climate change. In Uganda, the members of parliament (MPs) have recently formed a special parliamentary committee on climate change.

Over 20 million Ugandans (68.5%) are classified as food insecure with the major cause of food insecurity in Uganda attributed to climate change effects that are manifested in forms of extreme weather conditions like: drought; shortage of water and pasture, crop failure, famine, increased food prices, food/Emergencies, inter district migrations, economic loss/loss of income, high temperatures; lead to escalating vectors (pests and diseases), crop wilting, poor yields, heavy rainfall; crop destruction, soil erosion and leaching, contamination of water sources, livestock and crop diseases, flooding; leads to increased crop, livestock, and human diseases; loss of lives and livestock; destruction of crops and infrastructure, post harvest losses, water pollution (GoU, 2010) [5].

3.1 INCIDENTS OF NATIONAL FLOOD DISASTERS

Climate change induced floods have ravaged parts of Uganda, several areas experienced severe effects of floods that displaced up to 300,000 people (UMD, 2007) Reference [13] and the Uganda Meteorological Department, above normal heavy rains that affected the whole country for many weeks. The worst affected areas were in the Northern and Eastern parts of Uganda included the districts of Mbale, Manafwa, Bukeda, Budadu, Kumi, Soroti, Katakwi, Amuria, (Western Uganda region). Lira, Pader, Kitgum, Nebbi, Gulu (Northern Uganda) and scattered areas of the Central region districts of Uganda (UMD, 2007) [13]. Besides, up to 40 people died of mudslides and floods when heavy rains affected homes in six Bududa district villages, eastern Uganda (Adebayo & Ntale, 2018) Reference [14].

The adverse impacts of climate change are a major challenge to socio-economic development globally (EAC, 2011) Reference [15]. The EAC sub-region is vulnerable to impacts of climate change, affecting key economic drivers like water, agriculture, energy, transport, health, forestry, wildlife, land use, infrastructure, and disaster risk management among others. The impacts include water stress and scarcity food insecurity diminished hydropower generation potential; loss of biodiversity and ecosystem degradation; increased incidence of disease burden; destruction of infrastructure; high costs of disaster management as result of increased frequency and intensity of droughts, floods, and landslides associated with the El Niño. The process of developing the EAC climate change policy was initiated. The summit directed the development of a regional climate change policy and strategies

to urgently respond to the adverse impact of climate change, including addressing the challenge of food insecurity as a result of climate change.

El Nino climate change induced rains caused two local lakes, Kayanja and Akageti, to be dramatically formed overnight after heavy rains due to incidents of extreme climate events that affected Kiruhura district in South Western Uganda sub-region. The flood severe socio-economic adverse effects to individuals, households, and the local communities when it displaced at least 170 families from the vulnerable local communities (The Vision Group, 2009). All the local government decentralized districts have been facilitated by the National Planning Authority (NPA) to develop a community strategy in which climate action planning took community participation. Isingiro district shares a common border and climate change regime with Kiruhura district (Western Uganda region) where a deluge of flood occurred in May 2009 and two dramatic fresh water lakes emerged overnight(The Nation Group, 2009). The lakes were later on used by the local pastoralists who used the El Nino formed lakes for watering over 3000 livestock. The floods affected about 170 vulnerable local community households which suffered devastating socio-economic loss and damage to livelihoods (The Nation Group, 2009).

Uganda's capital city, Kampala, is home to the majority of the country's built infrastructure and the scientific projections of future climate in the city suggest there will be a higher incidence of rainfall, putting Kampala at risk of flooding (GU, 2015) [7].The cost of inaction is high, with estimates for the cost of flooding alone suggesting annual damages arising from US\$1–7min 2013 to US\$33–102m by 2050. And the adaptation measures would mitigate some of these costs considerably and the current building codes be revised for effective flood disaster resilience (GU, 2015) [7].The study concluded that immediate steps must be taken to increase the climate resilience of Uganda's existing and new infrastructure. These hold include:

- Climate-proofing public buildings
- Developing standards for transport and infrastructure planning
- Integrating climate resilience standards into infrastructure risk assessment guidelines.

The national climate change policy cost implementation strategy outlines a range of measures for climate adaptation in new infrastructure (GU, 2015) [7]. The economic assessment places these in order of priority as follows: Integrate climate change into the existing infrastructure risk assessment guidelines (GU, 2015) [7].

The policy elements are grounded on three key pillars: adaptation, mitigation and climate change research. The pillars need capacity building; technology development and transfer; finance; education, training, and public awareness based on information and knowledge management. The East African climate change policy aims to create, develop, and sustain adaptation and mitigation capacity at all levels. Adaptive capacity refers to the potential or capability of a system to adjust to climate change, including climate variability and extremes, so as to moderate potential damages, to take advantage of opportunities, or to cope with consequences (Otitoju, 2013) Reference [16]. As the name suggests, adaptive capacity is the capability of a system to adjust to impacts of climate change. The following seven factors were identified in determining climate change impacts adaptive capacity: wealth, technology, education, institutions, information, infrastructure, and social capital.

The Uganda National Metrological Authority (UNMA, 2018) Reference [17] reported floods and landslides in low lying and mountainous areas, with more rains in most parts of the country. With lightening, floods, or landslides affected parts of Bududa, Bulambuli, Teso (Eastern Uganda), Bundibugyo, Kasese, Kabale, Rubanda, Kisoro (Western Uganda), Kapelebyong (North-Eastern) district (UNMA, 2010) Reference [18]. Eastern Uganda has always been prone to serial landslides during heavy rains and some of the worst flood disasters occurred in March 2010, when 100 people died in the villages of Nameti, Kubewo, and Nankobe in Bududa district (Eastern Uganda) and recently, heavy rains flooding and landslides caused harvocs in Bududa, Bulambuli (Eastern region), Bundibugyo, Kasese, Kabale, Rubanda, and Kisoro (Western Uganda) districts (UNMA, 2018) [18].

3.2 FLOOD DISASTER INSTITUTIONAL COORDINATION

Uganda has national flood awareness campaigns programs on disaster risk reduction held every year in a national seminar which school children and the mass the media are involved using school music festivals, debates, discussions in the mass-media, posters, road safety week, Uganda Red Cross week, Environment week, among others (GU, 2005) Reference [19]. The country has a disaster risk information management system on drought, floods, landslides, environment degradation, wetlands degradation and epidemic diseases (GU, 2005) [19]. Information is collected by community level workers in the respective field, analysed centrally and disseminated by the media, community leaders and politicians (GU, 2005) [19].

The climate induced flood disaster preparedness management assessment responsible institutions are (2010).

- Ministry of Water and Environment (Lead Institution)
- Ministry of Agriculture, Animal Industry and Fisheries
- Ministry of Lands and Housing and Urban Development
- Ministry of Local Government
- Office of the Prime Minister
- Local Governments
- Community and Private Sector
- UN Agencies and NGOs

- Ministry of Health.

A set of locally-driven criteria determined the selection of priority adaptation activities. They include (UNFCCC, 2002) Reference [20]: level of adverse effects of climate change; poverty reduction to enhance adaptive capacity; synergy with other multilateral environmental agreements; and cost-effectiveness. Ugandan marine police recently rescued many people and recovered dead bodies after the flash flooding which burst the banks of river Mayanja in Wakiso district (URN, 2018) Reference [21]. River Mayanja burst its banks around Kawanda-Matugga area along Bombo road soon after a heavy downpour of torrential rains that caused heavy damage in Gobero, Gombe, Masulita, and Kakiri town council (URN, 2018) [21]. Several people were reported missing following the floods, raising fears that they could have been swept by violent floods.

The media disseminate government disaster preparedness and management plans in the event of an imminent disaster (2010). Likewise, other key flood disaster response actors are the national telecommunication companies. Given that information and modes of communication are critical in disaster preparedness and management, government employs the principle of public-private partnerships [PPPs] to reach out to telephone companies, internet service providers, and other communication channels to ensure effective delivery of accessible information to the vulnerable communities (2010).

The Uganda Red Cross Society (URCS) is collaborating with MoWE to establish monitor flooding system in Manafwa River Basin. Sofar, Makerere University in partnership with Massachusetts Institute of Technology has completed modelling the flood characteristics. MoWE is currently installing and calibrating river gauges with plans to provide six community radios to assist communities to broadcast flood warnings (Atyang, 2014) Reference [22]. Since 2011, URCS has collaborated with UNMA to broadcast seasonal weather forecasts to communities in selected areas using community radio network of URCS volunteers (Atyang, 2014) [22]. The weather information is obtained from regional meteorological offices in Lira and Soroti for communities in Apac and Katakwi, respectively. The community radios were setup by URCS but are managed by the communities (Atyang, 2014) [22].

3.3 NATIONAL FLOOD DISASTER INCIDENTS

According to the Ugandan government flood assessment policy, a flood occur when large amounts of water cover a place that is meant to be dry on temporarily or permanently (2010). Floods build up slowly. They are seasonal and usually occur in periods of intense rainfall and el-Niño phenomena. Besides causing death due to drowning, floods destroy public health facilities such as water sources and sanitation facilities (2010). The ultimate objective of the UNFCCC is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure food security and sustainable economic development (I/UNFCCC, 2005) Reference [23].

Uganda was among the flood pruned eastern Africa countries, which bore the brutality of severe flooding and the emergency appeal sought support of USD 1,061,020 or EUR 749,788) in cash, kind or services to support Kenya, Uganda, Tanzania, Rwanda, and Burundi National Societies for 25,000 beneficiaries of floods for two months (IFRC/RCS, 2009) Reference [24]. While the El Nino effect is not expected to produce high level of impact that were seen in 1997, exceptional flooding after heavy rain falls in the in the Eastern Ugandan districts of Soroti, Amuria, Katakwi, and Mbale, and Lake Victoria Basin (IFRC/RCS, 2009) [24].

1. Damage to housing (landslides and destruction) resulting in widespread displacements.
2. Surface and ground water pollution that caused waterborne disease outbreaks.
3. Damage to crops (also increased production in some areas).
4. Livestock deaths and disease.
5. Outbreaks of disease, especially cholera, malaria, and Rift Valley Fever

Based on the predicted impacts of the floods and, the previous experience of National Red Cross Societies in the El Nino affected East African region, determined that the emergency needs of flood victims were focused in the following sectors (NRCS, 2009) Reference [25]:

1. **Shelter:** Temporary for families displaced from damaged houses and transition and/or permanent housing for families whose houses are completely destroyed.
2. **Relief:** Non-food items distribution to most affected families as well as small quantities of food to replace food stocks.
3. **Water and Sanitation:** Emergency action to restore damaged water supplies and sanitation facilities and provide safe drinking water as well as hygiene promotion to reduce risk of disease outbreaks.
4. **Health:** replacement of mosquito nets at house-hold level and essential medical supplies at health centres and clinics.

Likewise, another Ugandan decentralized district, Adjumani local government administrative district (Northern Uganda region) has developed and adopted a decentralized climate action plan for adaptation resilience to the perceived climate change impact on the vulnerable local communities: severe disruption of transport and health services; dry spell of meteorological, agricultural, hydrological droughts; increased outbreaks of pests or diseases vectors; lack of pasturelands; agriculture production or productivity decline, raging famines due to food insecurity; extreme climatic events; water-borne diseases; diseases related to toxic algae, food security decline, heat waves, stress, air pollution; and severe outbreaks of communicable and non-communicable

diseases; malaria cases; injuries, psychological impacts, death attributed to extreme disasters and lack of basic needs (USAID, 2016) [10].

3.4 FLOOD DISASTER POLICY GOAL AND OPTIONS

The overall Ugandan national flood disaster preparedness policy goal is to promote national flood vulnerability assessment, risk mitigation, disaster prevention, preparedness, effective response and recovery in a manner that integrates disaster risk management with development planning and programming(GU, 2010) [1].This approach promotes local capacity building that enables communities to minimize the serious social and economic disruptions as a result of climate relate devastating nationwide flood disaster events (GU, 2010) [1].

In addition, the targets are to: promote public awareness and socio-economic importance of climate change, including vulnerability, impacts, risks, and response measures to promote capacity building efforts through, inter alia education, training, research, technology development and transfer, information and knowledge management; promote climate change research and observations(2015).These involve effective monitoring, detection, attribution and model prediction for flood disaster preparedness. It is vital need to integrate climate action into national development planning for flood disaster risk management, gender equality mainstreaming; resource mobilization to implement regional climate change policy framework for flood disaster assessment planning or management (GU, 2016) Reference [26].

The Kampala city [Central Uganda district] suburbs like Bwaise parish, have always been an area prone to flooding with ramshackled housing distressed by natural calamity whenever there is a heavy downpour (Ngwomoya, 2018) Reference [27]. The floods get worse when water spills in the house, leaving us stranded the whole night. Victims flood prone city suburbs like: Kasubi, Katanga, Kisenyi, Nalukolongo, Kabuusu, Katwe, Namungoona, Kinawataka, Queen’s Way, SsebaanaKizito Road (old Nakivubo Mews), Kabuusu junction, Jinja Road roundabout, and Kyambogo-Banda T-junction. City floods often leave dozens dead. Since its establishment in 2011, Kampala Capital City Authority (KCCA) upgraded much drainage to control floods.

For this connection, the following policy issues and actions should be performed at national levels: enhancing capacity of regional institutions in to carry out climate change related research including climate change monitoring, detection, forecasting interventions; promoting climate change issues in education and learning curricula; promoting development of climate change tools, methods; technologies; development, deployment, adoption, diffusion; developing climate change knowledge sharing and management tools. These tools include: databanks, regional network for sharing lessons, experiences and best practices amongst states and other countries; harnessing and integration of indigenous technical knowledge in modern knowledge; promoting climate change national and regional institutions to strengthen capacities; developing human and technical skills in adaptation and mitigation. The followings are some of the approaches that should be employed to implement the policy: training, education, and learning; forming a regional climate change negotiation platform; capacity building on carbon funding mechanisms through the current global funding mechanisms; strengthening participatory planning, and decision making.

The Ugandan government’s national climate change policy (GU, 2015) [7] advocates effective decentralized climate action planning for climate change and variability disaster risks’ resilience adaptation at all local government district development planning levels. For example, Isingiro district (Western Uganda region), is one of the first Ugandan local government districts to integrate climate change into its key priority development sectors: agriculture, education, administration, community services, water sources, natural resources, health, internal audits, finance, roads and buildings, legal, planning sectors. The decentralized local community flood disaster preparedness climate action plan is to be implemented for the first five years (USAID, 2016) [10].

4. CLIMATE CHANGE INDUCED POLICY ISSUES

The flood disasters are also trigger outbreaks of water-borne diseases and malaria, hence compounding community vulnerability to health hazards (GU, 2010) [1].They also cause physical damage by washing away structures, crops, animals and submerging human settlements. The risks of floods can be minimized forecasting, studying seasonal patterns as well as the construction and maintenance of sufficient drain age systems (GU, 2010) [1].Floods could be properly managed through flood plan mapping and surveys by air and land because Uganda experiences both the flash and slow onset floods which are common in some urban areas, low lying areas and areas a long river banks and close to swamps. The areas prone to them are Kampala, Northern, and Eastern Uganda (GU, 2010) [1].

The national and local community based flood actions in Uganda were designed to (2010):

1. Create awareness in the communities on flood risk reduction measures.
2. Enforce riverbank management regulations
3. Protect and restore wetlands
4. Ensure proper physical planning of rural and urban settlements.
5. Gazette flood basins

Subsequently, the climate of Africa is diverse, and controlled by complex interactions between the oceans, land, and atmosphere at local, regional, and global scales (ICSU, 2008) Reference [28]. On average, Africa is hotter and drier than most other regions of the world, and has a less dependable rainfall. As a consequence, and considering the fact that livelihoods at all

levels – from the individual household to the regional economy– depend heavily on climate, several studies have concluded that Africa is among the most vulnerable continents to the climate changes that threaten even higher temperatures and greater variability in future (ICSU, 2007) Reference [29]. Capacity building faces key challenges in the sub-region. Knowledge, technology, and capacity gaps with a few exceptions, countries in sub-Saharan Africa lack the capacity to conduct research on natural and human-induced hazards and disasters, or to apply the knowledge and deploy technologies to mitigate disasters (ICSU, 2007) [29].

The mass media is more influential in spreading awareness about adopting new possibilities and practices of innovations to justify the importance of information dissemination as a precondition for awareness, attitudinal, and behaviour change for adoption of climate change innovations or technologies by the audiences ((Rogers,1995, Reference [30]; Okaka, 2010, Reference [31]). At the same time, climate change (Panos, 2012) Reference [32] poses a significant threat to lives and livelihoods in Uganda. Government policies, low carbon technologies and financial support from international donors will all play a role in Uganda’s response to climate change. Central to the fight against climate change in the sub-region is effective communication and public engagement. At every level of society – from ordinary citizens and farmers, to the media, civil society organizations and local and national governments on the need for accurate and reliable information about climate change is very high since little is known about how to communicate climate change (Panos, 2012) [32]. There is a major lack of national co-ordination in the communication of climate change policy information with respect to flood events.

Climate change induced flood catastrophes are significant challenge to indigenous understanding the weather and farming. Local communities must be supported with climate change knowledge and information. Public awareness must be raised about the emerging carbon trading since carbon trading delivers incomes to individuals, families, and companies. Climate action dialogues on the costs- benefits of carbon trading for Uganda will promote understanding of the green fund access procedures and benefits for local community carbon trading (Panos, 2012) [32].

There is a local need for the policy information gaps to be plugged and dissemination of information to be refined for climate change policy to have impact in Africa (Okaka, 2011) Reference [33]. Most of the severe problems of the increasing vulnerabilities to the impacts of climate change among the indigenous communities in Uganda have come about because there are still information gaps regarding the functions, values and importance of the wise use of natural and environmental resources by communities, institutions, and industries. The governments, researchers and research institutions, research networks, civil society organization (NGOs), communities, and external development partners in the EAC are aware of this fact. Many policies, initiatives, programs, projects have been unsuccessful in developing behaviour communication strategy for climate mitigation and adaptation.

There is a need for flood information gaps to be plugged and dissemination of information to be refined for climate change adaptation policy to triumph in Africa. Uganda has climate change adaptation policy advocacy strategy on the hazards of climate change induced flood disasters in tandem with climate research, international cooperation, and gender equality (UNFCCC, 2002 [20], Okaka, 2010) [31]. Studies of communication strategies for policy leaders found high demand for radio, TV, libraries, radio, books, reports, NGOs, newspapers, magazines, professional journals, internet, colleagues, telephones, and report reading on climate change and global warming (Okaka, 2010 [31]; 2019 Reference [34]).

4.1 CONCLUSION

All Ugandan (Eastern, Western, Central, and Northern) have experienced the vagaries of climate change induced flood incidents which have prompted the national government to develop and approve a national disaster preparedness policy with a well-coordinated institutional communication and assessment framework. Climate change or variability floods have caused serial disastrous social, economic, political, and environmental consequences due to climate change, with significant threats to lives and livelihoods. Ugandan government access to the green climate fund for early climate action for low-carbon technologies and multilateral financial support from international partners will enhance Uganda’s response to climate change induced flooding. Climate change policy management agencies for green fund and climate information services in Africa have developed strategies for flood assessment, research, and adaptation capacity building measures for local communities, There are effective collaborations among the African Union Commission (AUC), African Development Bank (AfDB), United Nations’ Economic Commission for Africa (UNECA), African Climate Policy Centre (ACPC), and the East African Community (EAC), that have enhanced the role of effective communication information services for climate change policy sustainable flood disaster control management in Africa. Their mandates on climate change mitigations, adaptation, and financing policy issues are vital urgent climate action in Africa.

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