

# THE IMPLICATION OF FLOODS TO FOOD SECURITY DURING AND THE AFTERMATH OF COVID – 19 PANDEMIC IN UGANDA

ACSA Uganda | Uganda Coalition for Sustainable Development (UCSD)

## INTRODUCTION

This is a compilation of Advocacy Coalition for Sustainable Agriculture - ACSA[1] and Uganda Coalition for Sustainable Development (UCSD) about a series of flood disasters unfolding in Uganda in the month of April and May 2020 in Lake Victoria basin and subsequent River Nile, Lake Kyoga and Lake Albert basin.

Floods have very devastating effects on socioeconomic activities through disruption of transportation networks, hence affecting food security and market distribution systems. Such disasters leave agricultural communities, especially smallholder farmers vulnerable as their capacity to respond to the shocks is significantly lower. Whereas the capital losses of individual smallholder farmers may be lower in some areas, the impact is relatively severe in terms of food production and security since smallholder farmers in rural settings contribute over 40% of total exports in addition to over 90% of the food supply on the local food market (UBOS, 2018).

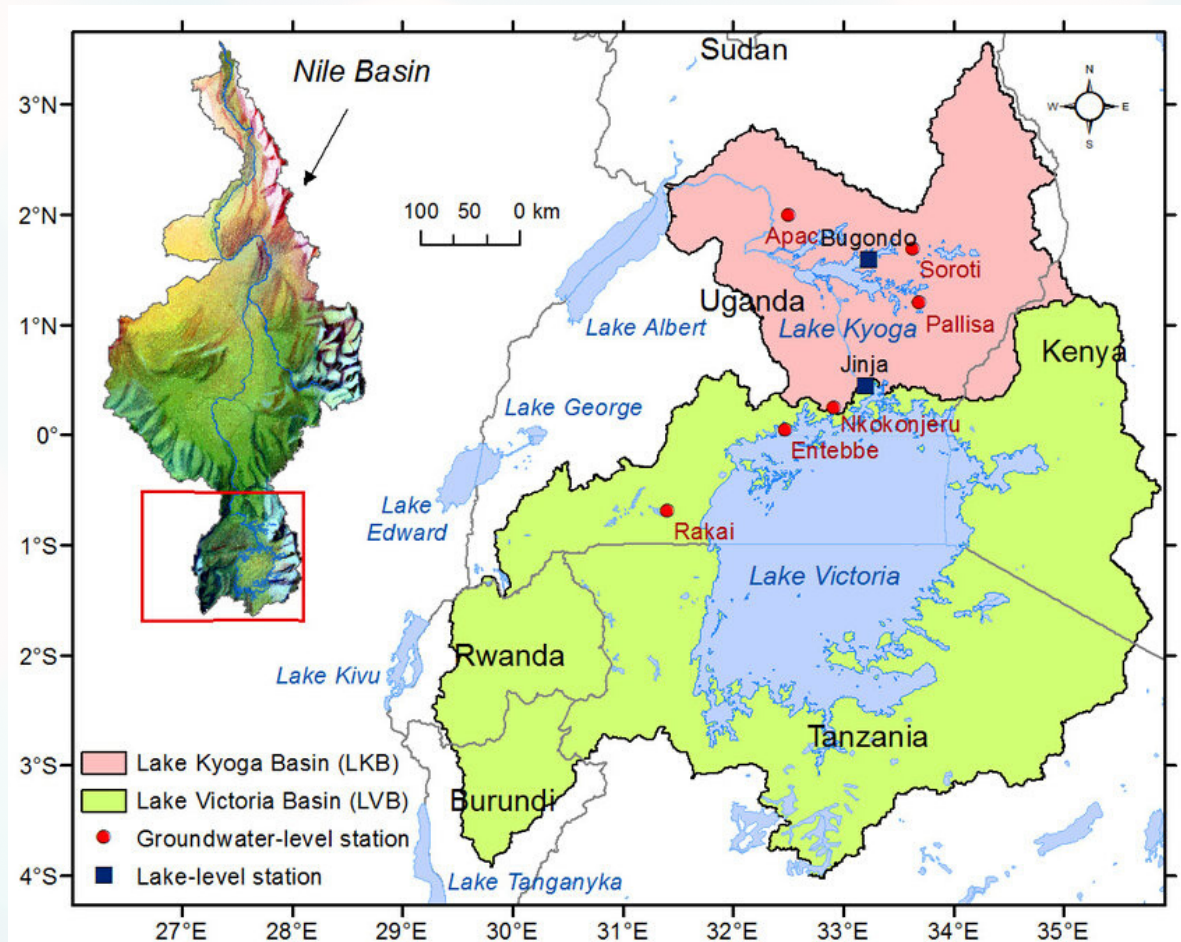
## BACKGROUND

The Lake Victoria Basin is located in the upstream part of the Nile River Basin and is shared among 5 countries, with a total area of about 251,000 km<sup>2</sup>. Tanzania covers the largest part of the basin (44%), followed by Kenya (22%), Uganda (16%), Rwanda (11%) and Burundi (7%). The lake itself, which covers an area of about 68,800 km<sup>2</sup>, is shared among Tanzania (51%), Uganda (43%) and Kenya (6%). The Lake Victoria Basin falls under the equatorial hot and humid climate with a bi-modal rainfall pattern with long rains from March to May and short rains from October to December. Annual rainfall ranges from a maximum of 2,400 mm in Uganda to 1,350 mm in the Kenyan part of the catchment. The basin has a population of about 35 million people. The rural population in Lake Victoria Ugandan basin is as high as 90% of the total, excluding Kampala city. The region is one of the more densely populated in the world, with an average of more than 500 persons/km<sup>2</sup>. This is largely due to the region's favorable conditions for agriculture related activities as well as fishing and fish farming. The vast majority of the basin's farmers depend on natural resources and small holdings of one hectare or less. The total average inflow to the lake is about 800 m<sup>3</sup>/sec. The only outflow from the lake is the Nile River, exiting the lake near Jinja, Uganda. This makes the lake the principal source of the Nile. The most important hydraulic structure in the basin is the Owen Falls Dam in Jinja, Uganda, at the outlet of the lake. The dam was built for hydropower generation and has been supplemented by one more dam straddling the Nile downstream of Owen Falls Dam near Bujagali; the Bujagali Dam completed in 2012. The dam at Owen Falls has been operated in such a way that it releases the "natural flow" of the Nile. However in situation of flooding like this, the new dam, can release up to 2000 m<sup>3</sup>/sec. Flooding in the Lake Victoria basin has an impact on the hydrology dynamics of both the Lake Kyoga and River Nile basins. Lake Victoria is unusual in that it receives most of its water directly from rainfall, not from rivers, and loses most by evaporation, rather than through its outflow: the lake level has varied by around 3m over the last 170 years.

[1] ACSA is a legally registered national network of Civil Society Organizations (CSOs), which work with Smallholder farmers and Promote Sustainable Agriculture, Agricultural market development, Environmental conservation, research and advocacy. This is aimed at increasing farmer's understanding of policy issues affecting small holder farmers in Uganda. ACSA has membership of 29 CSOs spread country wide with Mission "to Empower civil society organizations working with small holder farmers to advocate for favorable agrarian Policy environment for sustainable communities" and a Vision of "Smallholder farmers living in a Sustainable Environment"



**Fig 1: Map showing the Lake Victoria basin, Lake Kyoga basin and River Nile Basin**



Source: Lake Victoria Basin Commission

## AN OVERVIEW THE CURRENT SITUATION

Uganda has two major rainfall seasons, namely, March to May (MAM), and September to December (SOND). However, areas in Northern Uganda (above latitude 1.50N) have a prolonged rain season running from June to November. These rainy seasons are separated by two major dry periods namely, December to February, and June to August for Southern region. Due to climate change, these seasons are being affected. Dry periods are becoming wetter and wetter seasons are sometimes becoming drier. The occurrence of severe events such as droughts and floods have become more frequent, hence making the predictability of weather patterns more complex than before. This requires Government to invest more in meteorological and hydro-meteorological infrastructure to enable MWE/UNMA produce accurate weather and flood forecasts.

On the other hand the Greater Horn of Africa experienced above normal rainfall during the period September to December 2019 and this was because of the positive Indian Ocean Dipole (warming of the Indian Ocean at the East African Coast). Together with effects of tropical cyclones and westerlies between October and December 2019, this led to the Lake Victoria basin experiencing 150 to 200% of its usual rainfall. January and February 2020 also had above average rain, possibly related to persistent warm water in the western Indian Ocean. Due to the effect above, Uganda received high rainfall that extended up to February 2020. The rainfall received in this period has been the highest since 1964. As a result of the above rainfall performance, the water levels in Lakes and rivers have been rising since September 2019. Specifically, Lake Victoria water levels have risen from 12.00 meters as at 1st October 2019 to a level of 13.04 meters measured at Jinja gauging station as at 13th March 2020 and the water levels continue to rise.



It should be noted that the rising water levels are not only due to the enhanced rainfall levels but also due to environmental degradation. You may wish to note that the United Nations Food and Agricultural Organization (FAO) reports of 1997 and 2001 estimated forest cover in Uganda to have been 52% of the total land cover by 1960 and reduced to 24% by 1990. To date, the forest cover in Uganda is at 12.4% having dropped to 9% in 2015 (National Forestry Authority 2016 data). Similarly, wetland cover has reduced from 15.6% in 1994 to 8.9% in 2020. In addition to the above, urbanization has created highly impermeable surfaces like roads, roofs, pavements. All these human induced factors have reduced the water infiltration into the soil, interception and evapo-transpiration capacity of forests/wetlands. Environmental degradation has further caused alteration in land use pattern, accelerated surface runoff flow with increased erosion, siltation and reduced storage capacity of water bodies. In their research on soil erosion risk assessment in Uganda, Karamage, Zhang, Liu, Maganda and Isabwe (2017) estimated that the average rate of the potential soil loss risk in Uganda was 144.3 tons per hectare per year. In addition, the spongy water absorption characteristics, regulatory and holding effects of forests and wetlands have been lost resulting in low water retention capacity within catchments and accelerated water level rise.

Relatedly, The Intense and frequent rainfall over a long period since 2019 has led to rising water levels and floods within Lake Victoria basin and all major water catchments in the country. The onset of rains from March to May is expected to magnify the situation further as most water bodies have already high water levels. Four types of floods are anticipated (Riverine, Flash, Lakeshore and Urban). While the rains and high water levels provide great opportunities to increased water storage that support development, the projected costs are most likely higher than the benefits in terms of social, economic and environmental factors. The rise in water levels of Lake Victoria threatens to exceed the highest ever recorded in 1964, at a time when investments, environmental degradation and urbanization have increased in the water catchments and this require urgent interventions.

### IMPLICATION OF THE ENHANCED RAINFALL LEVELS AND RISE IN WATER LEVELS EXPERIENCED IN THE COUNTRY

- It is worth noting that the rainfall forecast for the period March, April, May 2020 for the area drained by Lakes Victoria, Kyoga, Albert, Edward and George and other parts of Uganda, indicate above normal rainfall during this period. The same predictions are expected for the surrounding countries that drain into Lake Victoria. The peak rainfall is expected to be received in the month of April, 2020. The areas that are historically prone to perennial floods and landslides in Rwenzori, Elgon, Kisoro, Kabale, Bundibugyo, Karamoja and Teso region will also receive above normal rainfall.
- The above conditions are likely to result in the continued rise in the Lake Victoria water levels, if drastic measures are not put in place to curb and manage the rise of lake levels during the forecasted extended rain season. The Lake Victoria water level as of Friday, 13th March 2020 recorded at Jinja water level monitoring station was 13.04 meters which was about 0.36 meters (36 centimeters) to the highest ever recorded in over 124 years.
- Despite Ministry of Water and Environment directive to increase outflow from 1000 cubic meters per second to 2200 cubic meters per second at the outlet of Lake Victoria, from Nalubaale-Kiira Dam complex, water level continues to rapidly rise.
- The largest inflow with upstream countries especially on River Kagera alone, which drains Burundi, Rwanda and Tanzania empties in to Lake Victoria has more than doubled its discharge rate and broken its banks at the onset of rains in Uganda.
- Unlike previous years where the lake levels were lower during the period of February to March, this year the water levels are exceptionally higher because of the extended enhanced rainfalls.
- The highest accumulation in lake levels is normally registered at the beginning of May or end of June of every year. Lake levels then normally subside during the year up to November with the lowest levels in a year often being registered in the month of October.



- Dam outflow, controlled through human operations, at Jinja, plays an important role on regulating inter-annual time scale variation of Lake Victoria.
- In the previous years when above normal rains were registered such as in 1964, Lake levels rose from 12.92 meters in February, peaking to the maximum of 13.40 meters in May, 1964. Given the current predicted above normal rainfall that is expected to reach a peak in April, it is most likely that a repeat of this historical occurrence will be observed with Lake Victoria water levels rising to the historical maximum ever recorded since 1896.
- The onset of the rains has found the grounds of areas prone to floods, mudslides and landslides already saturated with soil moisture and therefore are likely to be devastated by the heavy rains and flash floods that are expected to occur.
- In addition, the water bodies are currently at high levels at the onset of the rains and are expected to burst their shores and banks submerging settlements, developments and halting navigation or water transport across the water bodies. Lake Kyoga shorelines are projected to be worse hit by the rising water levels.
- The four types of floods that are likely to affect the country depending on location are flash, riverine, lakeshore and urban floods.
- Therefore, Urban Centres along the lake shores are likely to flood especially Kampala and Entebbe.

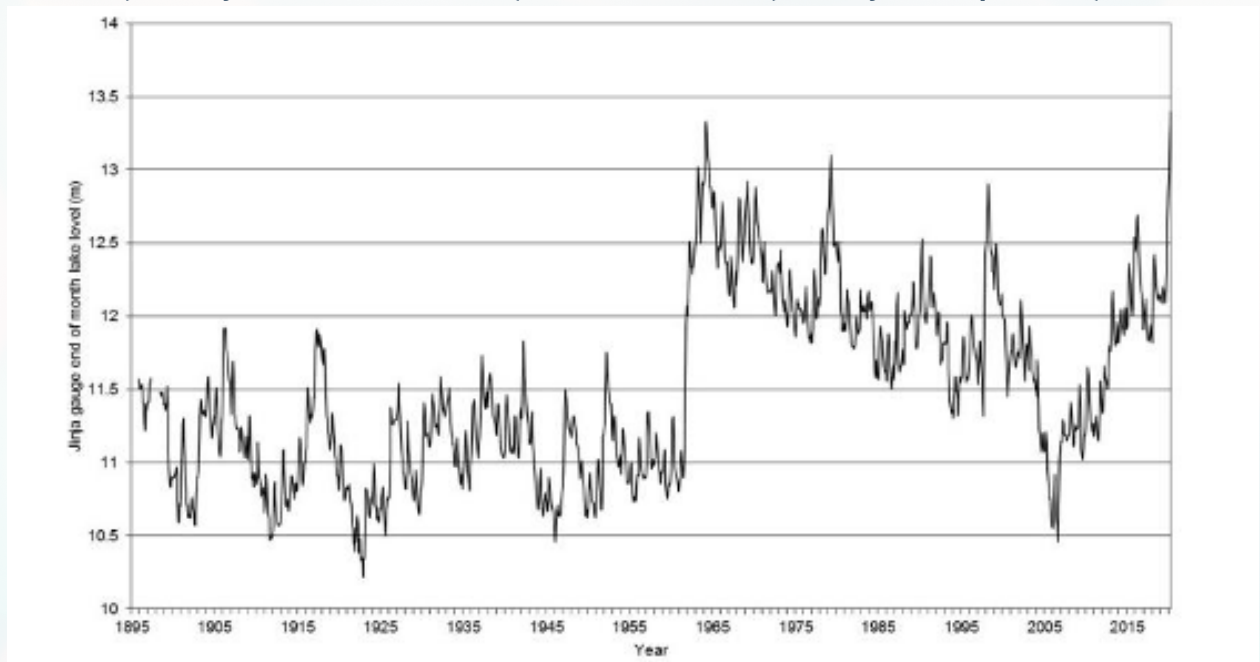
### IMPACT OF THE ENHANCED RAINFALL LEVELS AND RISE IN WATER LEVELS EXPERIENCED IN THE COUNTRY

- Settlements and developments around Lake Victoria and River Nile have been affected with many farms, hotels, beaches and individual houses already flooded. Some of the establishments submerged include Serena-Kigo Hotel, Speke Resort Hotel Munyonyo, Hotel Protea Entebbe, Gaba Beach, K.K Beach, Miami Beach, and several other beaches, markets, Gaba water works, jetties, and settlements/homes around the lake.
- Other areas surrounding which were identified as high flood risk areas are; Mukono, Masaka (Bukakata Sub County) and in the numerous islands in the lake. This has affected physical structures like homesteads, schools and health facilities. Notably floods have also been reported to cover a distance of over 12km submerging a lot of smallholder farm gardens since the area is predominantly under agriculture.
- Waterspouts around Bussi Island in Wakiso district that resulted into the loss of life and property have greatly affected economic activities around its shorelines. River Malaba was reported to have burst its banks resulting into cutting off Tororo from Busia
- In some areas, the rainfall resulted into violent winds and thunderstorms that destroyed crops, houses and other properties; these incidences were reported in districts of Kamwenge, Mayuge, Bugiri and Mubende.
- Landslides/mudslides were reported in mountainous areas of Kigezi, Rwenzori and Elgon among others
- On the other hand the increase in the water volumes in Lake Victoria has been translated to more water flowing to downstream water bodies like the Lake Kyoga and River Nile whose water levels have subsequently increased causing a similar menace to the populace around them.
- Some parts of Nakasongola district around Lake Kyoga have also experienced floods although they have not received significant amount of rainfall which is attributed to the increase in water volumes entering the lake from River Nile. This has resulted into a disruption of socio-economic activities of upstream communities in relation to transport on Lake Kyoga. During the period ending April 2020, UNRA[1] reported floods impacting a ferry connecting Nakasongola and Amolatar districts hence stopping its operations
- A number of farmers around the lake have also had their farm holdings flooded and this has led to loss of harvest for the season. Over 5,000 people in Lwampanga and Nabiswera Sub Counties of Nakasongola district were displaced from their homes because of flooding (Media - independent magazine, the daily monitor and the New Vision). The displaced persons are currently residing in churches, mosques and schools while others are hosted by friends in areas that were least affected by the tragedy.



- Further predictions by the Office of the Prime Minister (OPM) indicate that Lake Albert is not expected to reach critical flooding levels. However some areas in the surrounding districts of Hoima, Buliisa and Ntoroko may be marginally affected. [1] Uganda National Roads Authority

**Fig 2: Lake Victoria water levels on the Jinja gauge (near its outflow in Uganda), derived from gauge (January 1896-December 2017) and satellite data (January 2018-April 2020).**



**Source:** UK Centre for Ecology and Hydrology

**Selected photos showing the damage caused by flooding in the L. Victoria and Kyoga basins.**



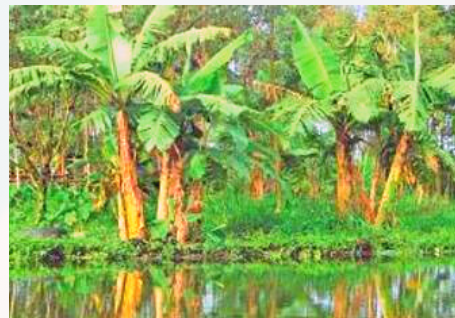
*A local market submerged at Entebbe*



*Households submerged by floods in Wakiso*



*Olam coffee factory submerged at Namanve*



*A flooded garden in Bukakata, Masaka*



*A homestead in Lwanpanga village which is about 2km from the L. Kyoga flooded*



## IMPACT ON VARIOUS SECTORS

The following MDAs are likely to be significantly affected: Ministries of; Water and Environment, Energy and Mineral Development, Works and Transport, Agriculture Animal Industry and Fisheries, Tourism Wildlife and Antiquities, Information Communication Technology and National Guidance, Disaster Preparedness and Refugees, Local Government, Health, Education and Sports. Furthermore, agencies such as National Water and Sewerage Corporation, National Environment Management Authority, Kampala Capital City Council Authority and Uganda Electricity Generation Company Limited will be affected. Nevertheless the extent of impacts per MDA is subject to further analysis and update.

## IMPLICATION OF LAKE VICTORIA AND KYOGA BASIN FLOODS ON AGRICULTURE AND SMALL HOLDER FARMERS

The areas around lakes Victoria and Kyoga are known for their fertile soils which have over time been a food basket for the numerous urban centres. Lake Victoria has numerous islands that have supported the production of various agriculture products for the mainland markets. Nevertheless a number of these islands have been swallowed destroying gardens and households.

Relatedly fishing communities and landing sites commonly known as centres for commercial activities involving the training of fish and other agricultural produce have been destroyed. These are Bukakata in Masaka, Gaba in Kampala, Kabale, Kasese, Kyegegwa, Kaberamaido, Tororo, and Busia districts in addition to other settlements in Entebbe area, Wakiso district and around L.Kyoga.

Consequences of these floods have not only affected farms and households but also the environment and other infrastructure like bridges and roads that transport food especially during this period of lock down hence rendering many communities food insecure since they cannot access markets. For example Masaka - Bukakata road has been destroyed cutting the area from reach.

Submerged islands in L. Victoria have saturated and broken up and some have been drifted out through River Nile interrupting power production for farmers and agro based industries run by hydro electric power.

Generally many communities in the region are experiencing the impacts of these flooding events both directly and indirectly, which has also been escalated by the Covid-19 pandemic lock down and curfew that has hampered mobility to access food and services.

Other effects of flooding include;

- Limited Access to safe and clean water as a control and management of Covid-19 pandemic
- Sanitation in households especially girl child to address menstrual hygiene, poor waste disposal in communities leading to waterborne diseases and frequent outbreaks of sanitation related illnesses such as typhoid and cholera.
- Changes in the Fish breeding areas, turbidity of water and change of water color affect fish attraction and spawning and subsequent low fish population in the water systems. This eventually leads to reduced fisheries biomass and less fish to feed the population.
- Floating suds and moving islands have an effect in the water by covering the fish hence reducing the sun effect on fish, lesser oxygen penetration and reduce the illumination to enable fish feeding respectively. This in turn affects the fish production which may lead to fish kills and subsequent reduction in fish supply.



## CONCLUSION

Uganda is now experiencing an annual trend of flooding in the Lake Victoria basin and the respective upstream and downstream rivers, which implies that the farming community should adopt techniques and practices that are resilient to flooding to guarantee continued food security. The government has also noted the increased vulnerability of the smallholder farmers resulting from the combined effects of exceptional rainfall, floods and the threat of locusts to the disasters. Therefore, a multi stakeholder approach ought to have been employed to provide a holistic response to disasters. In the short run, a less direct support to farming communities is expected and hence farmers should be innovative on immediate best ways of sustaining livelihoods but also engage government through the Ministry of Agriculture and other stakeholders on documenting and dissemination of IK and research about detection of early warning signals of floods.

We therefore conclude that;

- Ministry of Water and Environment instituted measures to release the equivalent of half a meter depth of water in Lake Victoria, gradually during the interim period.
- Lake Victoria outflows from the dams at Jinja have progressively been increased from 1300 to 2200 cubic meters per second. This will be progressively increased to ensure safety of lives, property and investments.
- In the event that the undesirable and extreme case scenario manifests itself in such a way that the Lake levels at any one time exceed the historical maximum of 13.40 m, it will be inevitable to increase the lake outflow to over 2200 cubic meters per second or open the emergency sluice gates to release 4,500 cubic meters per second in accordance to the existing Dam Safety and Emergency Preparedness Plan.
- Ministry of Water and Environment has intensified monitoring and forecasting of water levels, flooding and effectiveness of interim measures to guide on next course of action in mapping the floods and possible consequences, strengthening flood forecasting and early warning in addition to managing the flood itself.
- Ministry of Water and Environment and the Ministry of Energy and Mineral Development have advised all dam operators and owners to ensure the proper functioning of their flood gates and spillways to safeguard large, small dams, downstream communities, minimize loss and damages to property and lives.
- The Local Governments are required henceforth enforce the Environmental law by removing people who are within 100 meters of river banks, 30 meters of wetlands and 200 meters of lake shores. In addition, those cultivating along the steep slopes should stop to reduce high run off.
- Major wetlands, flood plains, degraded hill slopes should be evacuated to give room for the rivers and lakes
- There is need to engage the Disaster Committees at all levels to step up their actions and activate the early warning system.
- There is need to sensitize the public on the current emergent situation that has developed especially those settled along the shorelines.
- Enhance translation of early warning products in local languages for easy planning and uptake.
- As an immediate measure there is need to install and reinforce both weather and water level monitoring stations with appropriate technology for real time data relay from flood and landslide prone areas.



## OUR RECOMMENDATIONS

Smallholder farming communities are annually being affected by floods in a wake of climatic change effects in Uganda and yet the response of the relevant ministries, agencies and other stakeholders has continued to be untimely and sometimes inadequate to match the extent of the damages. This period in particular has seen a divided attention between a tragedy of flood disasters, locust invasion and the COVID-19 pandemic. This implies that the farming community in general will be affected for the coming season as well due to no harvest.

We therefore recommend that;

- The affected communities be educated and supported to survive by avoiding diseases associated with flooding and taking up the necessary preventative measures as they await government disaster response actions. Most importantly, a need for vigilance of local authorities and Ministry of Health to ensure that Covid-19 pandemic does not creep into these communities to escalate the impact of floods.
- Ministry of Agriculture Animal Industries and Fisheries (MAAIF) and agencies in addition to other stakeholders (CSOs, Private sector organizations etc.) support the farming communities in the rest of the country with the required extension service messages along value chains of agriculture production to provide a buffer for the impending deficit in production in the affected areas.
- Enterprises selection should be tailored to the current weather in the affected areas to ensure minimum cost of the production to avoid additional losses at farm level to support community and regional markets in the aftermath without price disruption.
- The inaccessibility of Lakes Victoria and Kyoga for the fishing industry should be an opportunity for farmers to diversify into fish farming to maximize their incomes. This should be integrated with poultry farming to maximize the benefits.
- MAAIF and Civil Society Organizations (CSOs) should provide technical support to farmers towards fish farming and National Agriculture Advisory Services (NAADS) / Operation Wealth Creation (OWC) to incorporate the provision of fingerlings as one of the essential agro inputs.
- Collaborative efforts between various stakeholders like Ministry of water and Environment, Local government, Uganda National Roads Authority, relevant government institutions and agencies, private sector and Civil society organizations should be fostered towards establishing functional storm-water drainage systems including culverts and channels to quickly convey runoffs during this season. While farming communities on the other hand should collectively open up channels and drainage systems to harness runoff water for irrigation during drought as well as increase water evacuation from settlements to avoid damage to property.
- The affected communities should continue monitoring and surveillance of water resources for any impacts that might come as a result of increased water levels due to enhanced rainfall and report to nearby authorities.
- Water harvesting is encouraged so that enough water is stored for home and irrigation use during periods of scarcity.
- Routine maintenance of infrastructures in flood prone areas such as road sections, bridges in such areas.
- Farming communities should undertake continuous weeding and pruning and other essential agronomical practices for crops by farmers.
- Farmers should carryout crop monitoring and surveillance for pests and diseases and report new epidemics to nearest extension officers
- The Ministry of Health should undertake Disease surveillance and stocking of medicine to prepare for potential diseases such as cholera, malaria and cold surges such as pneumonia



## REFERENCES

1. Lake Victoria Basin Commission Atlas
2. UK Centre for Ecology and Hydrology factsheets. Accessed
3. <https://www.ceh.ac.uk/factsheets>
4. UBOS (2018). Statistical Abstract

