



# THE SUDD INSTITUTE

RESEARCH FOR A PEACEFUL, JUST AND PROSPEROUS SOUTH SUDAN

P. O. Box 34, Juba, South Sudan • Tel: +211 (0)956 305 780  
Email: [thesudd.institute@gmail.com](mailto:thesudd.institute@gmail.com) • [www.suddinstitute.org](http://www.suddinstitute.org)

## Weekly Review

November 23, 2020

### South Sudan's devastating floods: why there is a need for urgent resilience measures

*Nhial Titmamer*

#### Introduction

While South Sudan faces enormous threats from flood disaster on almost yearly basis, this is rarely given the policy attention it deserves. People are mostly left to fend for themselves, leading to catastrophic impacts as it is the case currently across many states. Close to a million people are affected nationwide, with a vast majority (76%) being from Jonglei.<sup>1</sup>

Recently, the author paid a short visit to Jonglei's capital, Bor Town and conducted a brief assessment on the



Figure 1: An elderly man being pulled to the dry grounds by a relative in downtown Bor on October 31, 2020

impacts of the ongoing flood. The current magnitude of the flood has never been witnessed in the area in recent history. Only the 1916-1919 and 1961-1964 floods come close to the current one.<sup>2</sup> Most of Bor Town is submerged under water, destroying infrastructure and property,

<sup>1</sup> See South Sudan Flooding Snapshot published by United Nations OCHA

<sup>2</sup> Also see Douglas H. Johnson. (1992). Reconstructing a History of Local Floods in the Upper Nile Region of the Sudan. *The International Journal of African Historical Studies*, Vol. 25, No. 3, pp. 607-649

causing damaging livelihood impacts (figure 4). This follows an equally devastating flood of 2019 which affected 8 out of ten States of South Sudan.<sup>3</sup>

This year's flood, which occurred in several devastating episodes, was triggered by heavy rainfalls caused by the Indian Ocean Dipole (IOD), a climate variability phenomenon, that saw an increase of 2 degrees Celsius in 2019. Heavy rainfalls in 2019 and 2020 led to accumulation and an unprecedented rise of water level in Lake Victoria. The water level in Lake Victoria hit 13.42 meters, a slight increase from 13.41 meters in 1964 when the Lake experienced similar water rise. IOD, and El Nino Southern Oscillation, another climate variability phenomenon, have both been exacerbated by global warming since the 1960s, causing more floods in South Sudan in the last 60 years compared to the previous 60 years.



*Figure 2: Displaced persons on the main street of Bor Town, October 31, 2020*

The October flood episode, which has been the worst of all these year's flood episodes, just swept through Bor in the last week of October. Almost the whole city has been submerged and people displaced. Displaced persons sit on the only remaining dry streets waiting to be transported to either Mingkaman across the river in Awerial County of Lakes State or Mongalla in Central Equatoria State. Many, however, had been stuck for days because they could not afford an expensive river transport, which is now the most reliable means for mobility in the area. This horrendous story is shared across over 37 other counties that are affected by this year's flood. Whole villages have been wiped out, leading to crippling impacts on people across many states of South Sudan. Despite declaration of state of emergency by His Excellency the President of the Republic some months ago to combat flood, available efforts from UN Systems, NGOs and government authorities have been overwhelmed by the magnitude of the disaster.

This Review<sup>4</sup> explores the magnitude of this year's flood and its impacts in Bor Town. We used a boat to get us around the town surveying the extent of flood water and measuring its depth in the streets and in the residential neighborhoods. We also used the GPS to capture the

---

<sup>3</sup> See Nhial Tiitmamer. (2019). South Sudan's devastating floods: why they happen and why they need a coherent national policy. Weekly Review, The Sudd Institute.

<sup>4</sup> This paper was produced in collaboration with Flood Management Initiative (FMI), a non-governmental organization established this year to manage flood in Bor town and other areas in similar conditions.

geographical coordinates submerged under water, showing exactly the depth of flood in the town by locations.

There has been no documented baseline of the depths of flood in the town from previous floods and so these measurements are useful for monitoring and managing the flood going forward. Furthermore, we conducted interviews in the city with the displaced persons, government officials and shopkeepers in Marol Market, which is the biggest market in Bor Town and we made a number of observations, which are elaborated in the subsequent paragraphs.



*Figure 3: a displaced person pulling his belongings to dry grounds in Bor on October 31, 2020*

### **The flood extent and depths**

Going by the recent history, this year's flood is unprecedented. While floods have occurred in some places in South Sudan every year, at least since 2005, this year's flood is out of proportion in terms of depth and geographical extents, making its impacts far reaching and severely consequential.

The flood has submerged most of Bor Town under water. It has cut it into two parts with a small part that houses vital facilities such as the main hospital, hotels and main market forming a small island adjacent to the Nile River while the eastern portion that houses the airport is cut off on the eastern part of the town (see the map in figure 4). In particular, areas affected by the flood in Bor Town include Hai Machuor, Hai Panjak, Panaper, Leudier, Hai Salam, Achengdiir, Hai Naivasha, Lengguet, Negil, Arek, Malou, Thonbuor, Malual Chaat, Moldoor, Langbaar, Lek Yak and parts of Block 1, 2 and 3.

The area adjacent to the Nile encircled by red, dotted lines in the map in figure 4 in the next page is dry and is where the main hospital, market, hotels and some vital facilities are being protected through the dyke, while the areas marked with blue lines have been mostly submerged under water. People now move on boats from one point to another otherwise one risks drowning or being attacked by crocodile.

Residents, particularly the elderly, who had witnessed the flood of 1961-4, said they have never

seen the flood of this magnitude. The depth of the latest floods in October as measured at Juba's gauging station was 14.1 meters. Previous episodes were 13.50 m recorded on July 25, 2020 and 13.52 m recorded on September 24, 2020 at Juba Gauging Station. The first episodes submerged most of the surrounding counties of Twic East, Duk and Bor, among other counties in Jonglei and population from these areas were displaced to Bor Town while the rest went to straight to Mongalla in Central Equatoria State and Mingkaman in Awerial County in Lakes State. Our measurements show that the depths of flood water inside Bor town range from 66 centimeters to 301 centimeters (see table 1 and the map in figure 4). This is an alarming flood level. About 4 people are

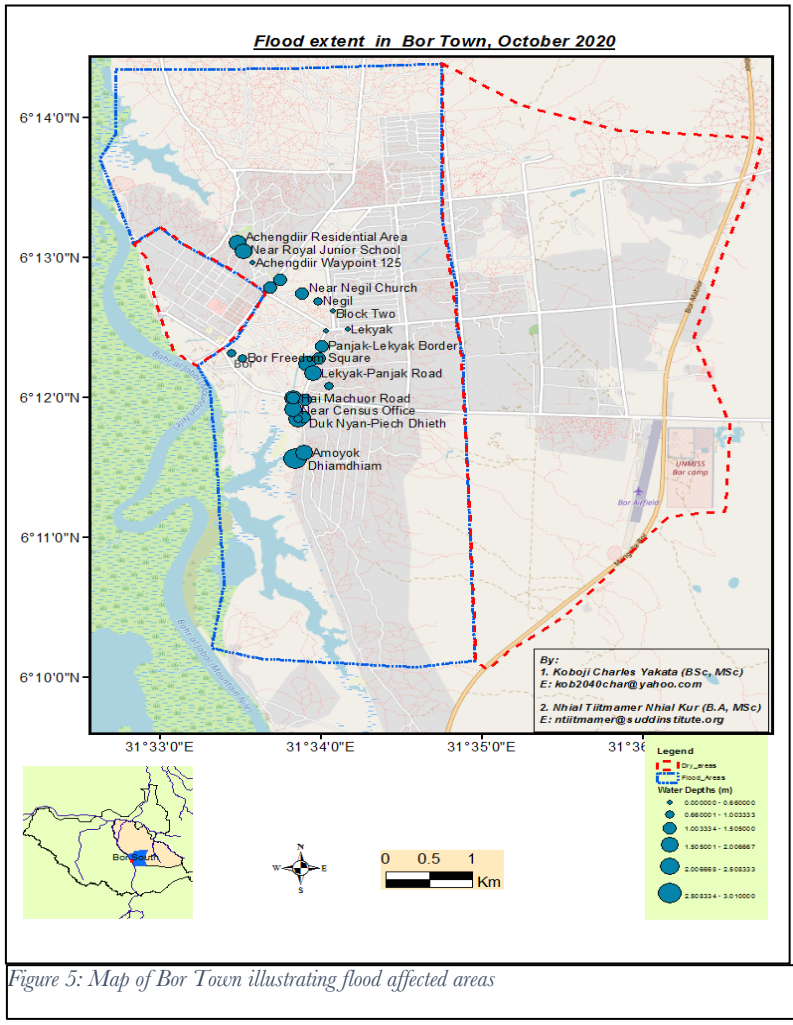


Figure 5: Map of Bor Town illustrating flood affected areas

reported to have drowned, one of whom got drowned around Royal Junior School whose water level in the vicinity as measured on November 1, 2020 was 195 centimeters (see table 1). These water depths inside the town have a lot of policy, planning and design implications. Building codes must be designed to reflect the new flood levels. Roads and residential areas must be planned and designed in the future in considerations of this year's flood magnitude.

---

Water depths in some locations in Bor, November 1, 2020

---

Location	Water Depths in centimeters
Block Two	66
Negil	87
Near Negil Church	131
Negil near Migration office	127
Langbaar Road near Bor Power Station	105
Near Royal Junior School	195
Achengdiir	197
Near Garden Resort	85
Panjak-Lek Yak Border	125
Lek Yak	150
Panjak	167
Lek Yak-Panjak Road	157
Lek Yak	76
Lek Yak-Hai Machuor Border	150
Hai Machuor Residential Area	147
Amoyok	165
Dhiamdhiam	301
Duk Nyan-Piech Dhieth	237
Near Census Office	154
Hai Machuor Road	170
Central Star Hotel	137
Bor Freedom Square	100
Malek Secondary School	67

---

## The welfare impacts

People and livestock have died. Infrastructure in form of roads, water and sanitation facilities,



*Figure 5: section of displaced persons with their belongings in Bor October 31, 2020*

health centers, schools and electricity facilities have been destroyed. Farming fields have been submerged and gone with tons of crops. People have been cut off from their sources of livelihood and have been displaced to the main streets, the ones which are still dry where they have been waiting to escape to dry grounds (see pictures 1, 2, 3, 5, 6, and 7). They have no food, no shelter and no other basic human necessities such as clean and safe water and sanitation. People sleep in the open where they are exposed to the scorching heat of the sun and cold nights, with children, the elderly, and pregnant

women exposed to malaria, pneumonia and other flood related illnesses. Yet due to shortage of boats, the transport cost has skyrocketed, making those who cannot afford remain in this deplorable situation.

Markets have severely been affected. Only Marol Market in Bor remains dry and open because it has been protected by dyke. Yet the road supply to this market has been cut off. It now only receives goods through boats from Juba. However due to high transport demand, the transport cost has gone up tremendously. In addition, the number of customers has dwindled due to a combination of displacement and loss of incomes.



*Figure 6: Section of displaced persons in Bor, October 31, 2020*

Ibal, an Ugandan vegetables seller in Marol Market, told us he has never seen such a flood in his life time. He said he is still in Bor despite the flood because he has no other options. If he goes back to Uganda, he can lose his business opportunity, even though he said the sale has tremendously plummeted following migration of people out of the town. “We stay here hoping the flood will subside and people will return to the town just like they did following the destruction of the town by rebel groups in December 2013.” In addition to reduction in the



volume of sale, the transport cost has risen steeply with impediment of the road transport. Ibal used to pay 3000 SSP to transport a 120 kg bag of onions from Juba to Bor but it is now 5000 SSP per a bag, in addition to other local transport costs such as taxes. With the increase of transport cost, prices have also followed suit. For example, a piece of tomato cost 100 SSP a week ago, but it now sells for 150 SSP. Another retailer, Elizabeth, echoed the same experience. “Business has gone down because people have migrated and nobody is buying,” she said. “I would have left but I did not leave because this is my land. I have to stay and die or live here.”

Athou, another retailer in Marol Market in Bor told us she produces and sells okra, kudra and other vegetables. “Our produce is not bought anymore because people have migrated and sales have declined and the income I earn from this business to raise my children has completely been wiped out,” she stressed. “I have no options. I have no capacity to migrate because boats are expensive. I have chosen to die here with my children.” Awuok, a farmer who produces cereals, groundnuts, and vegetables with a group of other women through a cooperative group said their farms have been destroyed by the floods and they could have migrated like the rest of the people but they said they did not want to leave their land as they fear they would not find similar opportunities elsewhere. “The government should help those who have no ability,” she said.

If we go by the past experiences, especially the 1961-1964 flood that is still in the memory of many people living now, dry season pasture lands in the Sudd may not be accessible in the next several years. In addition, wet season grazing areas and farming areas may not all still be suitable and viable in the next season; and even fishing will still not be suitable or viable with simple gears. This means people will need alternative areas to settle and earn their living in or they will continue to face acute food insecurity. The unsuitability of greater Bor areas for livelihood in the next several months and years is coupled with the fact that this latest round of displacements has already caused additional tensions with crops farmers in Equatoria region

with new influx of thousands of heads of cattle. These tensions have always been there in such circumstances and need to be managed with cool heads, enhanced with mitigation measures that can ensure the IDPs stay peacefully with host communities until the flood recedes. There are a number of options and the much talked about is the return of cattle and the IDPS to original areas. Equatorian participants in the recent National Conference of the National Dialogue called for the implementation of the 2017 Presidential Order to return cattle keepers to their original areas. The fact that this call is made even when the areas of origin for cattle keepers are submerged under water, shows that Equatoria is not an option for the IDPs due to the existing sore relations between the two groups. If the option to return the cattle keepers is impossible due to the current flood conditions, leaders of greater Bor should seriously reach out to counterparts in Equatoria to agree on how cattle keepers can stay temporary in Equatoria until this period of severe flood is over.

### **Factors that exacerbated flood in Bor**

This year's flood has been exacerbated in Bor Town by a number of factors. First, Bor lies in low lying flood plains 421 meters above sea level. And the slope between Bor and Malakal is 0.09 meters per a kilometer. This is too flat compared to 0.3m/km between Bor and Mongalla and 1.0m/km between Lake Albert and Nimule. This flatness causes the river to overflow easily during a high river, leading to flooding.

Second, poor urban planning where people settled in the lowlands and natural water courses such as streams, also worsened the flooding conditions. Natural depressions, watercourses and other water ponding prone areas in the city could have been identified through an environmental and social impact assessment, informed by a topographic survey map as part and parcel of the urban planning.

Third, the town is threatened by a stream called Koko which drains a lot of southeastern inland and Nile's overflow water into the town, dividing it into two before it then outfalls into the White Nile main stem of Bahr el-Jebel through a river outlet called Achengdiir in the northwestern part of the town (see the map in figure 4). In fact, through this watercourse of Koko and Achengdiir the upland drainage and river floods oscillate up and down, depending on whichever is high; and this way the flooding spreads into the town depressions. These factors 1 through 3, should be addressed as part of improvement to the city's flood protection.

Fourth, the flood disaster has been worsened by leadership vacuum both at the state, municipal and local levels, which was caused by the dissolution of 32 states and the subsequent intransigence by the parties to the R-ARCSS to reach agreement on the formation of the state and local administrative areas governments. Basically, it is South Sudan's politics of zero sum that has exacerbated this flood disaster in Bor Town and other towns and villages across the flood affected areas in the country.

Fifth, a dyke built in 2014 by the administration of former Bor Mayor Nhial Majak Nhial in collaboration with UNMISS' Republic of Korea Horizontal Mechanized Company (ROK



HMEC) at least helped protect the town from floods in previous years. However, lack of proper design, construction and repair over years weakened the dyke and it made it vulnerable to this year's flood. When Dr. Mach Majier became a Mayor in 2019, he opened a number of emergency drainage canals to mitigate the 2019 flood and engaged the Embassy of the Kingdom of Netherlands in Juba to assist in the flood protection. This resulted in a scoping assessment carried out last year by Mott MacDonald<sup>5</sup>, with involvement of the former Undersecretary of the South Sudan's Ministry of Water Resources and Irrigation Eng. Isaac Liabwel, as a national expert knowledgeable of the country's floods. Subsequently, a funding to build a modern dyke was secured. However, COVID 19 stopped the dyke project from taking off. So without COVID 19, the town would have gotten its dyke strengthened and the impact would have been less than it is.

### **Interventions undertaken**

In the last five months, the people of Bor Town have been involved in a very painful effort to save their town from the menacing jaws of the Nile floods. Women, youth, elders and local authorities have spent countless hours and resources to repair the dykes. Fundraising efforts have been carried to repair the dyke, provide basic necessities for the displaced and to evacuate the vulnerable groups to the dry grounds. UNMISS, FMI, South Sudan Relief and Rehabilitation Commission and IOM in Bor Town, among other international and national agencies, have joined the communities in repairing the dyke. While this looks like a drop in the ocean given the current impacts, the condition would have been worse if nothing was done.

Despite the fact the Minister of Humanitarian Affairs and Disaster Management visited the areas and the subsequent declaration of State of Emergency by His Excellency the President of the Republic, such a momentum has not been sustained by the actors and stakeholders, which have led to the level of impacts that the people are currently experiencing. A state of emergency would have been followed by a national intervention to provide basic services and help with repair of the dyke. However, this has not been the case. The lax in intervention might have been due to leadership vacuum created by the dissolution of local and state governments and the subsequent delay in putting in place such mechanisms. Besides, lack of effective intervention has also been worsened by COVID 19 pandemic which affected the start of dyke project initiated last year by the former Mayor, Dr. Mach Majier, in collaboration with the Embassy of the Kingdom of Netherlands.

Due to little intervention and blame games, there has been a frustration among various groups resulting in argument to abandon dyke repair and to focus on evacuations of the displaced.

---

<sup>5</sup> See Assessment for Bor Flood Control Initiative: A Scoping Study conducted by Mott MacDonald in October 2019. Mott MacDonald proposed a number of key considerations that included (1) resilience to storm water and sheet flow, (2) resilience to increasing Nile River water levels and discharges, (3) integrated urban spatial planning, (4) capacity strengthening and management of knowledge and skills, and (5) support for funds management for the implementation of flood control projects.

Continuous repair of the dyke is crucial. In fact, the dyke repairs have enabled the city to have some dry grounds and vital services that are being used by the displaced persons.

## **Conclusions and Recommendations**

Floods are becoming frequent and severe due to global warming, which is changing the climate. Therefore, the government should as a matter of urgency come up with immediate, medium- and long-term policy interventions to build the country's climate resilience capacity to withstand flood disasters that threaten its economic, social and environmental stability.

### **Immediate response measures**

We recommend that the government and partners, including humanitarian organizations and international development agencies, should do the following:

1. Relocate people to high grounds, provide them with basic necessities and temporary land and ensure they live in peace with host communities by seeking their consent, conducting regular dialogues and implementing projects of mutual benefits.
2. Repair existing dykes in Bor Town and other flood affected areas to ensure flood protection in the next flood season. This should be carried out this coming dry season starting in December 2020 in order to build flood mitigation in the next rainy season. It needs communities, local, national and international organizations to work closely with local, state and national governments in terms of mobilizing resources and expertise, and implementing the plan for the dyke repair and extension.
3. Conduct a feasibility assessment of suitability of eastern parts of Bor, Twic East and Duk counties for possible relocation of the current flood prone settlement areas. Such assessment should include identification of high grounds, evaluation of land use for various purposes including possible wildlife corridors, farming and grazing areas. It should also include security assessment including evaluating a feasibility of fencing as part of strengthening security as well as protecting other important land resources.

### **Medium to long term measures**

In the next 6 months to 5 years, the government and its partners should consider doing the following:

1. Establish a climate early warning system to prepare the people before a flood strikes. To be effective, such an early warning system needs improvement of hydro-meteorological stations along the Bahr el-Jebel section of the White Nile starting with improvement of infrastructure and regular gauging of water levels and discharge measurement stations in Nimule, Juba, and Mongalla as well as communication channels through which early warning messages can be disseminated for warning and decision making.
2. Negotiate and enter in a bilateral agreement on improvement of water information sharing with upstream countries of the Nile River such as Uganda and setting limit on release of excessive water from Ugandan dams.
3. Enact climate change policy and legislation; and establish a climate change agency equipped with technical, financial and political support to design and implement

adaptation and mitigation measures against floods and other climate induced disasters.

4. Conduct comprehensive feasibility, environmental and social impact assessment studies on the following flood management and resilience options:
    - a. Building of a modern dyke from Bor through Twic East, Duk, Ayot, Fangak to Pigi with a number of infrastructure components including drainage canals and dewatering pump stations, among others
    - b. Dredging and removal of aquatic weeds in the Bahr el Jebel tributary of the White Nile in the Sudd region to increase channels carrying capacity of excess flood water.
    - c. Negotiating and entering in bilateral/multilateral agreements with upstream countries of the Nile River such as Uganda and DRC, so as to build storage dams at the mouth of Lakes Kyoga and Albert inside Uganda and DR Congo, to control the flow of excessive flood water into the Sudd region that is prone to Lake Victoria rise floods
    - d. Reviewing appropriateness of completing Jonglei Canal and its potential effectiveness in increasing flow or carrying excessive flood water out of the sudd and its subsequent impacts.
- 

### **About the Sudd Institute**

The Sudd Institute is an independent research organization that conducts and facilitates policy relevant research and training to inform public policy and practice, to create opportunities for discussion and debate, and to improve analytical capacity in South Sudan. The Sudd Institute's intention is to significantly improve the quality, impact, and accountability of local, national, and international policy- and decision-making in South Sudan in order to promote a more peaceful, just and prosperous society.

### **About the Author**

Nhial Tiitmamer is the Director of the Environment and Natural Resources Program at the Sudd Institute and a part-time lecturer at the University of Juba. Before joining The Sudd Institute in 2013, Nhial completed research and consulting stints at Arletta Environmental Consulting in Calgary and at the University of Alberta in Canada. Nhial holds a B.A. in Environmental Studies with a minor in English Literature from the University of Alberta's Augustana Campus and an M.Sc. in Sustainable Energy Development from the University of Calgary in Alberta, Canada. Nhial is the co-founder of the NewSudanVision.com and has extensively commented and written on issues about South Sudan and Sudan.