A severe lack of internal policy on data collection as well as technical expertise has routinely had climate researchers and officials from Rwanda and Eastern Democratic Republic of Congo (DRC) struggle to control flooding and landslides that led to at least 595 fatalities earlier last month, according to a new study released this week.

Researchers from Rwanda, the Democratic Republic of Congo, Kenya, the United States of America, the Netherlands, Germany and the United Kingdom collaborated to assess to what extent human-induced climate change altered the likelihood and intensity of the heavy rainfall that led to the flooding and landslides.

According to Prosper Ayabagabo, senior Radar applications expert at Rwanda Meteorological Agency, who co-authored the new research, climate information is a key for all socio-economic development and if countries are able to estimate how much risk they are expecting and how frequent are they, they can plan and prepare mitigation strategies.

Flood control issue

Estimates show that at the beginning of last May severe flooding around Lake Kivu devastated communities in Rwanda and the Democratic Republic of Congo (DRC). Flooding and landslides led to at least 595 fatalities with 460 reported deaths in the DRC and 135 in Rwanda.

Prosper Ayabagabo, Senior Radar Applications expert at Rwanda Meteorology Agency (Meteo Rwanda) and Co-author of the new study

“Data collection and accessibility is key to climate services and it can be improved by adding more equipment but, the security issues may hamper its sustainability for example in the Eastern DR Congo,” Ayabagabo said.

Researchers found a troubling trend in existing weather and forecasting model in Rwanda and Eastern Democratic Republic of Congo (DRC) especially due to the data limitations. They also discovered that it is not possible to assess the spatial or temporal extent of the rainfall that led to the flooding, thus a formal attribution

study is not possible, and the role of climate change cannot be assessed.

Improving data collection and accessibility

The main cause of floods in major mountainous regions in Western Rwanda on the shores of lake Kivu is the overflowing of several rivers flowing down from neighboring villages which plays havoc in these places almost every year.

Given the large humanitarian impacts as well as the importance of drivers of vulnerability there is a huge need to improve data collection and accessibility in this area, as well as research capacity to improve preparedness in a region that is projected to experience more heavy rainfall with increasing global warming, according to the study.

The area around Lake Kivu is one of the most densely populated regions in Africa. The region is also home to important mineral reserves, which are critical for the global transition to replace fossil fuels with renewable energies. Deforestation for agriculture and mining, according to new findings has greatly increased the risk of landslides and many settlements are located in highly vulnerable areas.

To assess the effect of climate change on the heavy rain, scientists tried to analyze weather data and use computer model simulations to compare the climate as it is today, after about 1.2°C of global warming since the late 1800s, with the climate of the past, following peer-reviewed methods. This approach was successfully used in other extreme event attribution studies on heavy rainfall events, such as the 2021 western Europe and 2022 Pakistan floods.

Extreme rainfall

While the Intergovernmental Panel on Climate Change (IPCC) projects there will be increased heavy rain in the region, the scientists were unable to evaluate the contribution of climate change to the May floods. The absence of accessible, long-term and reliable meteorological data, as well as poor climate model performance in the region, meant the scientists could not confidently determine how human-caused climate change influenced the intensity and likelihood of the extreme rainfall.

Heavy rains unleased widespread flooding and several landslides in Western Rwanda in May this year

Researchers recommended that significant investment in weather monitoring stations and climate science, as well as improved access to existing data, is needed to understand changing weather extremes in central Africa. These actions will also help improve early warning to future heavy rainfall events and improve global climate models.

This is because the potential for even heavier rainfall, as projected with continued greenhouse gas emissions, highlights the urgent need for more resilience to flooding and landslides in Rwanda and the DRC, according to the study.

Severe flooding around Lake Kivu

Commenting on the new study, Dieudonne Nsadisa Faka, Team Leader of the intra-ACP Climate Services Programme of the Organisation of African, Caribbean and Pacific States, Brussels, Belgium, said: “We know the rainfall around Lake Kivu was extreme, in terms of the destructive impacts it triggered. However, due to incomplete and inaccessible meteorological records, we don’t know how to qualify it as an extreme event”

“In Rwanda and the DRC, paper-based observational records need digitising, weather stations destroyed during conflict need rebuilding and meteorological agencies need proper funding to enable them to more freely share their data,” he said.

Joyce Kimutai, who co-authored the study is also a Lead Author for IPCC Special Report on Climate Change and Land,Chp 3 Desertification.

Speaking in the same vein, Joyce Kimutai, Research Associate in the Analysis and Interpretation of Climate, Grantham Institute for Climate Change and the Environment, Imperial College London pointed out that poor model performance was one factor that prevented [researchers] from completing an attribution analysis on the Lake Kivu extreme rainfall that led to the floods.

“Increased investment in climate science and weather observations will help

improve the performance of climate models in central Africa, which will help communities and governments anticipate and adapt to changing weather extremes," she said.

Ayabagabo from Rwanda Meteorological Agency echoed the new study by saying "countries need assess the network of equipment for recording data and try to find the sufficient equipment for data collection.

"There is a need to increase parameters of data not only rainfall, temperature but also to add others like cloud cover, sunshine hours among others," he said.

Estimates by the International Federation of Red Cross and Red Crescent Societies (IFRC), indicate that A range of factors including conflict, poverty and deforestation greatly worsened the impacts of the flooding especially across Eastern DR Congo.

According to Leonard Nioulé from IFRC – Kinshasa, DR Congo, the death toll was extreme for a rainfall event in any part of the world and the potential for increased heavy rainfall in the region is incredibly concerning.