

# Enhancing resilience against floods in the Lower Motowoh community, Limbe, Southwest Cameroon<sup>1</sup>

---

*Gaston Buh Wung, Geotechnology, Environmental Assessment and Disaster Risk Reduction (GEADIRR), Limbe, Cameroon, and*

*Festus Tongwa Aka, Institute for Geological and Mining Research, Yaoundé, Cameroon and GEADIRR, Limbe, Cameroon*

## Keywords

Politics, Local/non local knowledge sharing, Receptiveness/reticence, Collaboration and influence, Power or powerlessness

**This paper forms part of the DRR2DEV programme including a range of case studies, discussion and analysis and inviting further participation in thinking critically about how to do development differently and better.**

**Visit [www.drr2dev.com](http://www.drr2dev.com)**

---

<sup>1</sup> An edited version of this paper was published in the Special Edition of the "Disaster prevention and management: An international journal" Vol. 28 No. 1  
[Gaston Buh Wung](#) and [Festus Tongwa Aka](#) (2019) "Enhancing resilience against floods in the Lower Motowoh community, Limbe, Southwest Cameroon", [Disaster Prevention and Management](#), Vol. 28 No. 1, pp. 76-83

DOI

: <https://doi.org/10.1108/DPM-06-2018-0193>

---

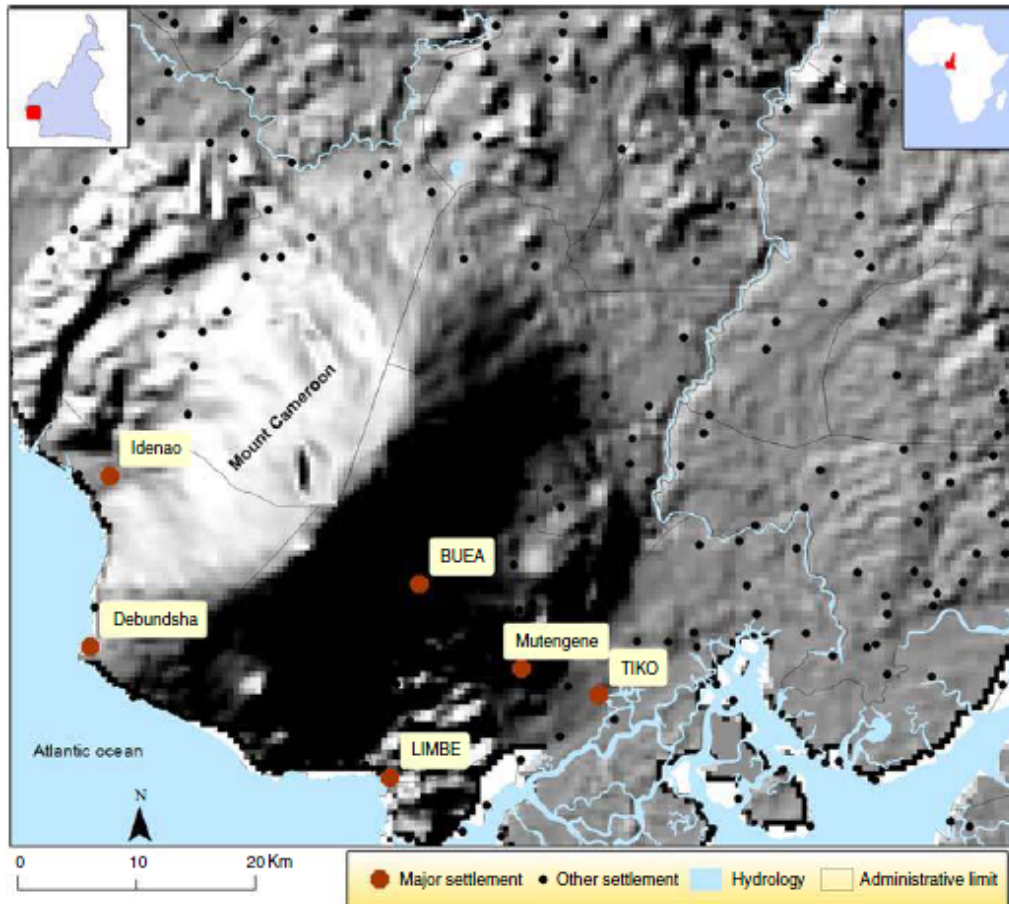
## Summary

Limbe City in Cameroon is dotted with unconsolidated pyroclastic cones formed by the activity of nearby Mt Cameroon. Poverty is considerable and most of the inhabitants are low-income earners who live in unplanned settlements in the low-lying (only 1–2 m above the sea level) areas of the city that are seasonally flooded. The quest for cheap land results in people cutting the slopes of, and building on unconsolidated pyroclastic cones that are prone to landslides and floods. A 2015 frontline survey result showed inundation as an important threat to the Lower Motowo community. Other threats include coastal erosion, fire, landslide and poverty. Floods have impacted on the community over the last 20 years, with increasing intensity. Consequences range from loss of life (death), injury, loss of livelihood (houses, crops/farmland and animals), destruction of greenery, to disease and complete disruption of the community life. Five consultative meetings were organized with the community to better understand the situation. The unanimous action adopted was to dredge the river. This needed the hiring of a caterpillar tracked digger. The cost of hiring and the work plan were agreed upon at a series of consultation meetings. Community leaders coordinated the collection of funds from community members. The river dredging action was completed in early May 2016. Follow-up shows that after many years of misery from floods, Lower Motowoh community residents did not have floods during the rains of 2016 and 2017. It was a big sigh of relief for the about 500 people who benefited from the action. Mud removed from the dredged river bed was deposited as levees on its banks thus reclaiming vast patches of land that had turned into wasteland by being flooded every year. People are currently rebuilding on the reclaimed land. Despite the fact that they had not heeded to the people's call for help for a long time, local government got convinced by the Frontline action results, and sent representatives to the site during the dredging exercise. The local government has also up-scaled the river dredging action further downstream. Community members who had refused to contribute their time for the meetings and money for the digger finally did so.

## Background

Cameroon is a West-Central Africa country, with a surface area of 475,440 km<sup>2</sup> (Figure 1). It is a middle/lower income food-deficient country (2013 GDP per capita of \$2,400) with a population (2016 estimates) of ~24.4m, giving a population density

of 51 persons per km<sup>2</sup>. People of 24 years and below constitute about 62 percent of the population. In total, 60 percent of the population – projected to reach 40m in the next 30 years – live in cities. This means that the need for largely under-developed services like electricity, water and housing leads to growth of shanty towns in which people are vulnerable to disasters. Cameroon can be divided into



four zones based on climate, geography, vegetation and socio-economy.

Figure 1: Location of Limbe city, Mount Cameroon, the coast and the lower Motowoh

The disaster risk profile of the country reflects these divisions. Common intensive risks are earthquakes, volcanic eruptions and gas explosions from lakes. Extensive risks are floods, landslides, epidemics, urban fires, conflicts, industrial/transport accidents and social pressures resulting from poverty (Aka et al., 2016). Increasing climate change and variability exacerbate the situation. Temperatures have generally risen throughout Cameroon, with an average annual temperature increase of 0.7°C from 1960 to 2007, representing an average rate of 0.15°C/decade. Predictions indicate that temperatures will be up to +4.8°C and + 3.6°C in 2100, respectively in the northern and southern parts of the country. Projections of extreme climate events indicate a further increase in the frequency and magnitude of droughts, erosion and floods. Mass movements (landslides, mudslides, rock-falls, earth collapses, etc.) will also increase in intensity, particularly in mountainous areas. It is projected that sea level will rise by 9 to 38 cm by the year 2050, and by up to 80 cm by 2100. Consequences of this include disappearance of trees, which will speed up erosion and cause degradation of mangrove ecosystems. Floods, splashes, storms, sedimentation, soil erosion and sediment load in rivers will increase (Cameroon National Adaptation Plan to Climate Change (CNAPCC)).

### **The case study**

One important outcome of the VFL program carried out by GNDR and her CSO partners including GEADIRR was that in order to strengthen disaster resilience and policy making, local knowledge is indispensable. However, views of local people are often not taken into consideration enough, so GEADIRR participated in the GNDR initiated-Frontline process in Cameroon with the aim to gather local risk knowledge and priorities, support local learning and action, contribute to the national frameworks for policy making and effective implementation, and participate in the global baselines and DRR monitoring mechanisms.

Frontline survey was conducted in Cameroon in 2015. The survey was piloted by six CSOs and focused on mapping community member's perceptions on priority local threats/risks, consequences of each threat, actions undertaken vis-à-vis the threats and barriers to the actions. The survey targeted 54 communities in eight of the ten administrative regions of the country with 64 threats identified. Aggregation of the survey data indicate that the three top threats in Cameroon were traffic accidents, (

first), flooding (second) and fire (third), while the last two were temperature rise and war (as of then).

Common threats have both natural and anthropogenic causes. Disaggregation of the results per community provides an idea of important threats facing members of those communities, thus providing evidence for engagement with the communities in addressing localized threats or undertaking national campaigns such as the ongoing campaign on road safety. This case study presents work carried out in Lower Motowo in Limbe city.

Limbe is located in the southwestern part of Cameroon with a population of ~120,000 people, and lies between the Atlantic Ocean coast and the windward foot of active Mt Cameroon volcano. The city receives very heavy rainfall and is one of the wettest places on Earth. The western slopes of Mt Cameroon receive 6,000–9,000 mm (240–350 in) of rainfall a year (Encyclopedia of Cameroon Climate, 2015). The period 1981 to 2000 in Cameroon had 20–40 percent lower rainfall than from 1961 to 1980, with a roughly 2.2 percent decline in rainfall per decade since 1960, and increasing intensity in some parts of Cameroon (Cameroon National Adaptation Plan to Climate Change (CNAPCC), 2015). Changes in rainfall amount and variability caused a number of landslides and floods in the city of Limbe. Between 1990 and 2007, landslides and floods killed about eight people every year in the city (Ayonghe et al., 2002; Ndaley, 2014). Many buildings, roads, bridges and life lines like electricity and water were damaged. The June 2001 flood and landslide disasters killed some 30 persons, displaced over 2000, and destroyed property like roads, telephone/water lines worth thousands of US dollars (Aka et al., 2001; Buh, 2009).

Limbe is dotted with unconsolidated pyroclastic cones formed by the activity of nearby Mt Cameroon. The facts that it is a coastal city, is located near the only petroleum refinery of the country (SONARA), and has fertile volcanic soils on which huge oil palm, banana and tea plantations, and agro-industries are located, have all contributed in pulling people to the city from other regions of Cameroon and other countries. It attracts inward migration for work in agro-industry and at the oil refinery. The majority of the inhabitants lack regular employment and are involved in petty businesses. The drainage infrastructure is poor and there is general lack of institutionalized household waste management. Poverty is considerable and most of the inhabitants are low-income earners who live in unplanned settlements in the low-lying (only 1–2 m above the sea level) areas of the city that are seasonally flooded. The quest for cheap land results in people cutting the slopes of, and

building on unconsolidated pyroclastic cones that are prone to landslides and floods.

Within the context of the VFL 2011 local governance in DRR, and the 2013 community resilience and everyday disaster surveys conducted by GNDR members, and their follow-up Frontline Action initiative of learning, reflection and action, GEADIRR routinely held meetings with communities in informal settlements in Limbe prone to landslides and floods (Coconut Island, Unity Quarters, Mile-2, Lower Motowoh, Clerk's Quarters, Church Street). This was in order to determine their level of awareness to the threats they face, what coping strategies they have developed to sustain their livelihoods and also how they can strengthen their capacities to cope and be more resilient communities requires building local capacity and ensuring that the communities are fully aware of the local hazards, understand their level of exposure and how to cope with shocks. This does not only require the availability of necessary resources, but also the incorporation of local knowledge and effective planning in the communities (Buh et al., 2012).

In this case study, we highlight work with the Lower Motowo community that faces damaging (often deadly) seasonal flooding as their most challenging threat. Houses of residents are inundated every rainy season and their livelihoods destroyed. Their frequent request for support from the local government was not heeded because local government does not have resources allocated for DRR work, and the government system is still heavily centralized.

### **The challenge**

The Cameroon disaster risk profile and Frontline survey results showed Limbe among the most disaster-prone cities in the country, with common threats being floods, landslides, coastal erosion and volcanic eruptions. The challenge was how to ensure the effective involvement of local communities (i.e. those at the frontline), the civil society and traditional stakeholders in knowledge creation and decision-making on matters of disaster risk reduction, and to engage local communities through a participatory inclusive approach in building their resilience.

### **Threats, consequences and actions**

A 2015 frontline survey result showed inundation as an important threat to the Lower Motowo community. Other threats include coastal erosion, fire, landslide and poverty. Floods have impacted on the community over the last 20 years, with

increasing intensity. Consequences range from loss of life (death), injury, loss of livelihood (houses, crops/farmland and animals), destruction of greenery, to disease and complete disruption of the community life (Plate 1). Threat drivers were exhaustively identified and range from sediment deposition in the river bed to blockages by household waste. Common community actions over the years vary from informing the local government about the problem, to self-efforts through manual labor. Dredging the clogged waterway causing the flooding was selected and implemented as the optimal action to reduce vulnerabilities and increase resilience.

### **The approach**

Five consultative meetings were organized with the community to better understand the situation. Reflections on the primordial role of the community members in building their own resilience were carried out during these meetings. The river course was visited and the extent of blockage assessed. Preparatory meetings involved GEADIR and ten community leaders. The unanimous action adopted was to dredge the river Njengele that runs through the community from Makuka quarters, and causes floods downstream. This needed the hiring of a caterpillar tracked digger. The cost of hiring and the work plan were agreed upon at a series of consultation meetings. Community leaders coordinated the collection of funds from community members which amounted to ~35 percent of the total direct cost for hiring the bulldozer, with the Frontline project contributing about 65 percent of the cost. The funds were used to hire a digger for undertaking the dredging exercise at a cost of about ~\$2,500.

### **Achievements**

With contributions from the Frontline project and from the community, Njengele River was effectively dredged (April 29–May 2, 2016) of its mud and rubbish, thus clearing the course for faster water flow and mitigating the flood hazard. June and July are the rainiest months in Limbe during which flooding occurs.





*Plate 1. Flooding, one of the top threats in Limbe,*



*Plate 2. River Njengele dredging exercise using a caterpillar tracked digger*

The Frontline Njengele River dredging action was completed in early May 2016. Follow-up shows that after many years of misery from floods, Lower Motowoh community residents did not have floods during the rains of 2016 and 2017. It was a big sigh of relief for the about 500 people who benefited from the action. Mud removed from



the dredged river bed was deposited as levees on its banks thus reclaiming vast patches of land that had turned into wasteland by being flooded every year. People are currently rebuilding on the reclaimed land. Despite the fact that they had not heeded to the people's call for help for a long time, local government got convinced by the Frontline action results, and sent representatives to the site during the dredging exercise. The local government has also up-scaled the river dredging action further downstream. Community members who had refused to contribute their time for the meetings and money for the digger finally did so. The effort through this process in bringing local government and recalcitrant community members onboard emphasizes the need for all stakeholders working together in a transparent manner to enhance disaster resilience, reduce vulnerabilities and improve community livelihoods.

Excerpt of an appreciation letter from the community (May 2016):

*"On behalf of the population of Lower Motowoh, we are writing to thank you for the massive support you gave us by excavating the mud in the main stream that runs from Makuka through Lower Motowoh [...]. The population of Lower Motowoh was so grateful that the Mayor of Limbe-I Council came in with three members of his technical staff to supervise the job [...] [...] and some men of the media. Once more, we say thank you for the support and we pray that you continue to help us as we struggle to develop our risk zone [...]."*

In perspective, we hope the dredged waterway will be monitored for sedimentation and refill. This can be done by community-scale enhancement of management, maintenance and restoration of river banks. The Lower Motowoh case should be up-scaled to other communities. Long-term transformation will require the canalization of the river Njengele from upstream to the ocean. This will provide more free flow and sustainable mitigation of floods.

## **Barriers**

Barriers to action include the lack of DRR awareness and education. Some community members think that because floods occur after heavy rains, they are due to unstoppable forces of nature. Inward migration leads to settlement in

unplanned and often risk-prone parts of the city, thus increasing vulnerability. Other barriers are the lack of local disaster risk maps; lack of DRR-sensitive town planning; limited human, material and financial resources for DRR activities at the local level; no clear laws at national-level defining the role of local government in DRR matters; poor local governance in DRR in the country (lack of transparency, and accountability, limited inclusive approach, hyper-centralized government system); lack of environmental awareness; and no DRR included in school curricular.

### **Local actors**

Actors already taking action to impart positive change:

- Civil society organizations like GEADIRR and its partners who participated in the
- VFL Project (Aka et al., 2016).
- Local community members themselves through organize rudimentary community actions/efforts like cleaning of waterways, use of sandbags to prevent landslides, etc.
- Universities and research institutions via DRR student projects, workshops, focus group discussions (Del Marmol et al., 2017).
- The DRR focal point in Cameroon is the Department of Civil Protection in the Cameroon Ministry of Interior. However, DRRM is still very centralized, and based more on response and rehabilitation than on prevention and preparedness.
- Development and humanitarian agencies like the International Federation of Red Cross and Red Crescent Societies (IFRC). During the devastating 2001 floods and landslides in Limbe the local branch of the IFRC was damaged (Rees-Gildea and Geleta, 2001).
- Agencies such as United Nations Development Program, United Nations Environment Program, United Nations International Strategy for Disaster Risk Reduction.

Actors who have potential to impart positive change:

- Local communities could and should improve their civic behavior by not inappropriately disposing of garbage that clogs waterways, and in general they can help DRR by raising community members' awareness on good practices and through this, enhance cohesion toward the benefit of the whole community.
- Local government should include DRR in their budget, by employing DRR personnel in the local council, and by including DRR in town planning – such as producing local (town/city-level) large-scale disaster risk maps, and raising awareness on DRR in different local communities via workshops. In the Limbe context, establishing risks maps, creating and above all enforcing laws on illegal settlement on risk zones of the city are important. There is a need to move away from preaching to actually practicing good governance.
- National government should decentralize DRR management, ensure inclusive, transparent and accountable governance, and operationalize the national DRR platform. The decentralization process in the country could be a perfect vehicle in empowering local councils only if it were effective. It can ensure effective engagement of local government in the different stages of the disaster risk management cycle. It can also ensure effective participation of local communities on DRR decision- making and the availability of necessary resources to address DRR issues.
- Development agencies, embassies and UN agencies should consider an inclusive approach in addressing issues of climate change adaptation and DRR at the frontline through effective involvement of civil society organizations and local communities, by making available necessary resources to these entities.

## **Dedication**

We dedicate this paper to Chief Enow John and Pa Vando Pius, respectively Quarter Heads for Lower Motowoh and Unity Quarters who gave us tremendous support since 2009 in our DRR work with local communities in Limbe. Chief Enow John passed away in March 2016 while Pa Vando Pius passed away in Jan 2017.

## **Acknowledgments**

The authors thank GNDR, especially Marcus Oxley for his strategic management of the network, Stu Solomon and Lucy Pearson for their valuable guidance during the Frontline. Special gratitude to the ten members who constituted community leadership in Lower Motowoh and facilitated the authors' engagement with the community. The authors thank Development Workshop France (J. Norton and C. Gordon), and *Inventing Futures* (T. Gibson), for inviting the authors to the Kathmandu (Nepal, October 2017) workshop on "Local Voices and Action."

## References

- Aka, F.T., Ubangoh, R., Ntepe, N. and Ateba, B. (2001), "The June 2001 catastrophic landslides and floods in Limbe, Southwest Province", unpublished report to IRGM, 14pp.
- Aka, F.T., Buh, G.W., Fantong, W.Y., Issa, Z.T.I., Djomou Bopda, S.L., Ghogumo, R., Gibson, T., Marmol, M.A., Sigha, N.L., Ohba, T., Kusakabe, M., Yoshida, Y., Tanyileke, G., Nnange, J.M. and Hell, J.V. (2016), "Disaster prevention, disaster preparedness and local community resilience within the context of disaster risk management in Cameroon", *Natural Hazards*, doi: 10.1007/s11069-016-2674-5.
- Ayonghe, S.N., Suh, C.E., Ntasin, E.B., Samalang, P. and Fantong, W.Y. (2002), "Hydrologically, seismically, and tectonically triggered landslides along the Cameroon volcanic line, Cameroon", *Africa Geosciences Review*, Vol. 9, pp. 325-335.
- Buh, W.G. (2009), "Geographic information systems based demarcation of risk zones: the case of the Limbe sub-division – Cameroon", *Jamba Journal of Disaster Risk Studies*, Vol. 2 No. 1, pp. 54-70.
- Buh, W.G., Aka, F.T., Burnley, C. and Isabella, Z.T. (2012), "Local governance in disaster risk reduction in Cameroon", *Jamba Journal of Disaster Risk Stud*, Vol. 4 No. 1, pp. 54-70, doi: doi.org/10.4102/Jamba.v4i1.56.
- Cameroon National Adaptation Plan to Climate Change (CNAPCC) (2015).
- Del Marmol, M.A., Fontijn, K., Atanga, M., Njome, S., Mafany, G., Tening, A., Wantim, M.N., Fonge, B., Che, V.B., Aka, F.T., Ernst, G.G.J., Suh, E.C., Jacobs, P. and Kervyn, M. (2017), "Investigating the management of geological hazards and

risks in the Mt Cameroon area using focus group discussions”, *Advances in Volcanology*, pp. 1-22, doi: 10.1007/11157\_2017\_3.

Encyclopedia of Cameroon Climate (2015), available at: [www.nationsencyclopedia.com/Africa/Cameroon-climate.html#ixzz55vFPGwjb](http://www.nationsencyclopedia.com/Africa/Cameroon-climate.html#ixzz55vFPGwjb) (accessed October 15, 2017).

Ndaley, Y.F. (2014), “Heavy rains beat Limbe, floods put residents in distress”, available at: [www.edennewspaper.net/heavy-rains-beat-limbe-floods-put-residents-in-distress/](http://www.edennewspaper.net/heavy-rains-beat-limbe-floods-put-residents-in-distress/) (accessed June 21, 2018).

Rees-Gildea, P. and Geleta, B. (2001), “Cameroon: floods and landslides in Limbe Cameroon”, *International Federation of Red Cross and Red Crescent Societies (IFRC) Information Bulletin No. 1*, available at: [www.ifrc.org/docs/appeals/rpts01/cmflaib1.pdf](http://www.ifrc.org/docs/appeals/rpts01/cmflaib1.pdf) (accessed June 21, 2018).

---

### **Corresponding author**

Gaston Buh Wung can be contacted at: [buhgaston@yahoo.com](mailto:buhgaston@yahoo.com)