



## **PATHWAYS TO HEALTHY EQUITABLE CITIES**

### **Workshop on Climate Change, Health and Flooding**

8-11 November 2022, Gariba Lodge, Tamale

#### **Objectives**

The Workshop on Climate Change, Health and Flooding aimed to create a dialogue with a wide range of local officials, NGOs and activists to identify key development issues for Greater Tamale Metropolitan Area (GTMA), in the context of health and climate change, and to explore effective development options and interventions. In Ghana, the PATHWAYS project has previously focused its efforts in Accra, and the aim of this workshop was to develop relationships and an understanding of Tamale as a site for future research and engagement.

#### **Participants**

Participants at the workshop are listed in the table at the end of the report.

#### **Process**

Prior to the workshop, the Pathways team including both University of Ghana and UK academics visited the chief palace to meet and discuss with the chief elders (*Image 1*). The workshop was held over two days with short presentations, and focused and plenary open discussion sessions. Presentations on day one offered an historical context of the city and outlined the Structure Plan for Tamale, which aims at greater social, economic and environmental resilience in the context of rapid urbanisation and growth. Presentations on day two provided insight into climate change and flooding, and the links between housing and health. Focused open discussions were organised around four themes: flooding and health; heat and health; food and nutrition and health; and access to water and health. The open plenary session covered discussions about a range of issues affecting present-day Tamale, including land use and climate change, governance and land use, water resource and flood management across the GTMA and the need to explore new integrated approaches, and the need for better, more timely information and data, including hydrological and climate modelling as an input to future planning.

#### **Main discussion points**

##### *Flooding*

Flooding is a well-known risk in Tamale and other parts of the Northern Region. A persistent concern is the growing scale and damage caused by flash flooding, which many people now associate with changing patterns of rainfall during the rainy season (June-November). In common with many other parts of the world, a greater proportion of precipitation now occurs in as intensive rainstorms causing more frequent and dangerous flash floods and inundation. Rainy seasons are also regarded as being more irregular than in the past, starting and finishing at less predictable times.

The low relief of the city and its situation between two ridges exacerbates this flood risk. Urbanisation leading to more built-up and concrete/asphalt screened surfaces, as well as compaction of soils and deforestation in the GTMA, compounds the hydrological response to intense rainfall, leading to higher



flood risk. Rapid growth of the city, including urban sprawl, means that many lower-income households choose to locate in high flood risk areas, closer to work and services like water and education. A growing number of people are therefore exposed for flood risk and losses as an outcome of unplanned urbanisation. Flood and storm drains built in the city within the last decade may further aggravate the problem of flooding in lower-lying areas of the city, where flood water is moved without planning for retention and managed discharge.

The direct impacts of flooding in terms of lives and property losses are well understood, as are the risks associated with water-borne and infectious diseases linked to water bodies (malaria, dengue). Psychological health impacts of floods are less well understood.

Although there is growing awareness in Tamale, especially among urban planners and decision-makers of the changing patterns of rainfall and flooding, and of the potential to adapt urban plans and permitting, there has been limited adjustment/adaptation to take this into account.

### *Heat*

Tamale is a hot city, with average highs of 37°C in February and March, and record highs of 43°C. More extreme heat was not widely reported, but is seen as a feature of present-day climate, also aggravated by processes of urbanisation (urban heat island effect and the loss of shade trees).

Amongst health officials and practitioners there are views on the health effects of heat, including cerebrospinal meningitis (CSM) and heat stroke, and higher incidence of NCDs, respiratory disease and risks to maternal and neonatal health. Local health services see higher rates of these diseases during the hotter parts of the year.

Changing patterns of heat has not been well established for local people and practitioners and does significantly not influence health or planning practice. Zoning and building codes do set targets for green space and there is NGO pressure for enforceable standards for building development to encourage tree planting generating combined shade, permeability, air quality and biodiversity benefits. Adoption of building designs to provide thermal comfort minimising the use of active air conditioning and emphasising natural cooling, also through the use of local materials, would bring sustainability, quality and health benefits.

### *Food, nutrition and health*

Much economic activity and employment in Tamale is linked to agriculture (farming, processing, trading) and there is evidence of significant business, government and foreign aid support for agriculture in and around the city. Agriculture is predominantly rain-fed, although there is also river-based irrigation in and around flood plains. The main crops, rice, cassava and yam, are grown during the wet season, while vegetables and market gardening is done during the dry season. The key challenges to agriculture relates to soil fertility (growing need for fertilizers to raise productivity) and pests (growing use of pesticides).

Farmers also complain about the irregularity of rainfall, leading to uncertainty to planting and fertilisation strategies, and raising the risk of flooding (which is devastating to productivity). Productivity and nutritional value of food are both affected by this uncertainty, challenging food security in local markets. New stress-tolerant crop varieties are available and there has traditionally been widespread use of irrigation. Increased productivity and food security will require continued



adaptation and innovation in agriculture as farmers adjust to opportunities for new markets associated with growth in populations and changing diets. While there is awareness about climate change and its multiple potential impacts on agriculture, traditional strategies for managing risk remain predominant.

#### *Access to safe water and health*

Access to safe water for drinking and washing is a major challenge for many households in Tamale, with only 40% of dwellings having piped water. A range of provisions exists for drinking water, including bottled and sachet water, both of which have grown in use, offering affordable safe drinking water, but also contributing significantly to plastic waste. Seasonality continues to play a role in access to WASH services during the long dry season for poorer households, driving location decisions towards natural water bodies where flood risk is greater during the early rains, risks which are aggravated by plastic waste generated by safe water access. The issues of water, health equity and flooding appear to be systemically linked.

#### *Land use planning and climate change*

Urbanisation in Tamale since modern development of the city began around 1900 has seen successive periods of rapid growth. In the past decade the population, economy and spatial extent of the city have grown dramatically. The current Structure Plan employs a zoning approach with targets for developed and green spaces, as well as key infrastructure (transport, electricity, water and flood protection). This zoning approach is applied to building permits, although there is a persistent problem with enforcement of these processes. In 2021 just 40 building permits were handled by the GTMA planning department, suggesting that the great majority of development does not adhere to established processes. Increased buildings inspection has begun to raise the number of permits.

Continued rapid urbanisation and the objectives of social development, compounded by the pressure of climate change, may be influencing a reconsideration of planning and permitting in the city. One perspective may be to consider the hydrology of the city as a starting point ('Tamale as a wet city') for urban planning, building in more natural flood and water management approaches, including greater water retention within the city. Integrated Water Management approaches developed internationally could be fruitfully applied to land-use planning in Tamale.

#### *Governance of land use*

Given the role of traditional leaders (the Gulkpe Naa and other chiefs) in land ownership in Tamale, regulation and permitting of land use includes well-established cooperation between traditional and GTMA administrations. A range of formal and informal expertise exists across these administrations, and a spectrum of considerations are applied in decisions. Nevertheless, in adapting to the twin challenges of urban development and climate change, while reconciling the wide range of private and civil society interests, there would be benefit in deeper cooperation between traditional and Government authorities. The objective should be for all land use and development activities in the GTMA to be handled by the existing dual governance processes, but this would require a substantial enhancement of the capacities for planning and land use management. More systematic approaches to enforcement of planning and land use decisions would also benefit from greater coordination.

### *Information and data needs*

High level expertise relevant to urban development and health exists in a range of agencies and NGOs in Tamale and the Region. Local and national data exists (from the National Census for instance) as does the capacity to generate analysis using, for example, commonly-available flood risk maps powered by regional climate and hydrological models. But there appear to be significant gaps between the capacity to generate analysis that could be useful to local planners and practitioners and their awareness and application of these tools. Several internationally-funded projects are on-going – including a flood modelling project using HEC-RAS funded by the UK FCDO, meeting at Gariba Lodge while the PATHWAYS project was taking place – but these are not yet influencing local decision-making. In particular, the development of effective early-warning capabilities related to flooding, seasonal rainfall and extreme heat events would be very useful.

Prepared by Frans Berkhout, Samuel Agyei-Mensah, Cynthia Awuni, Ben Howard  
1st December 2022



*Image 1: Pathways team at Gulkpe Naa's Palace*



## Annexes

### A. Presentation:

**WELCOME ADDRESS BY THE METROPOLITAN CHIEF EXECUTIVE, HON. SULE SALIFU ON THE OCCASION OF PATHWAYS FOR EQUITABLE HEALTHY CITIES PROJECT ON CLIMATE CHANGE, HEALTH AND FLOODING IN THE TAMALE METROPOLITAN AREA HELD ON THURSDAY 10<sup>TH</sup> NOVEMBER, 2022 IN TAMALE**

I want to extend a very warm welcome to all of you here who have joined us to discuss issues on Climate Change and Health with a focus on flooding in the Tamale Metropolitan Area. I am indeed very pleased to be surrounded by so many dignitaries who have taken time off from their busy schedules to be with us today.

Ladies and Gentlemen, I am highly delighted and privileged to give a welcome address on this occasion and also to lend my full blessing and support for the project. Indeed, the importance of this workshop cannot be overemphasized since it provides us the opportunity to share information and to solicit your inputs on the issue of flooding in the Tamale Metropolitan area. There is no doubt, that the workshop will help us to identify the challenges associated with flooding in the Metropolis and propose solutions and considerations to overcome the challenges.

Ladies and Gentlemen, floods do occur annually in the Tamale Metropolis flood prone zones. The Metropolis flood prone zones are a home to various communities namely Dungu Sawaba, Bepila, Nalung, Koblimagu, Vittin, Kalariga, Nyanshegu, etc.

The causes of flooding in the Metropolis are both natural and artificial. Climate Change has contributed to the natural cause of flooding through rise in average temperatures and increase in annual and seasonal rainfall over the past two decades. Rise in temperature and increase in rainfall have led to increases in the discharge of the river with the excess overflowing to low land areas. The man-made causes of flooding in the Metropolis include poor land use, unplanned development of settlements and indiscriminate disposal of refuse into and on the banks of rivers.

Distinguished participants, ladies and gentlemen, it is important for me to note that, the Tamale Metropolitan Assembly in spite of the difficulties and challenges in managing flood in the Metropolis has over the years made some strides in dealing with the flooding situation in the Metropolis. The Assembly has constructed a number of drains in the following communities, Bupeila Nalung stretch, Dungu Sawaba stretch and Nyanshegu storm drain. This has indeed helped in minimizing the flooding situation of those area.

Additionally, the Assembly through its NADMO officers have always embarked on campaign to educate the general public on flooding especially communities in the low land areas. To a very large extend, the continuous desilting of gutters conducted by the Assembly has created communal awareness for environmental cleanliness and deepen public discourse on flooding.

Distinguished participants, Ladies and Gentlemen, let me indicate that, the Assembly is committed to this wonderful course and we will do all that it takes in our power to ensure that the flooding situation in the Metropolis is dealt with. I will therefore, entreat each and every one of you here to put in your best during group discussions and contribute meaningfully to provide useful solutions to the flooding challenges confronting the Metropolis.



I highly commend the organizers and all supporting partners for this participatory approach to harness stakeholders' inputs into developing the long term vision for the flooding situation in the Metropolis. May the God almighty give us a heart of change towards our environment. May you all have a wonderful stay throughout the days of the program and beyond.

Thank you and God bless us all.



## B. Participants list

**PARTICIPANTS FOR THE PATHWAYS CLIMATE CHANGE WORKSHOP, TAMALE  
10<sup>TH</sup> TO 11<sup>TH</sup> NOVEMBER 2022  
GARIBA LODGE**

Type of Stakeholders	Organisation	Name of Participant/email/phone
Government: Ministries/Departments/ Agencies	Tamale Metropolitan Assembly	1. Sadique Sadisu <a href="mailto:masdukgh@yahoo.com">masdukgh@yahoo.com</a>
		2. Abdulai Mohammed Kennedy <a href="mailto:alala6622@yahoo.com">alala6622@yahoo.com</a> Regional Coordinating Director
		3. Elijah Kombian Fant
	Environmental Protection Agency	4. Mr Abu Iddrisu <a href="mailto:abuiddrisu161@gmail.com">abuiddrisu161@gmail.com</a> 5. Eredia AnuekaToah
	Ghana Water Company	6. Mr. Nicholas H. Okyere <a href="mailto:nicholas.okyere@gwcl.com.gh">nicholas.okyere@gwcl.com.gh</a> 7. Sulemana Alhassan
	Forestry Commission	8. Mr. Nsiah Bempah <a href="mailto:nsiahbempah@yahoo.com">nsiahbempah@yahoo.com</a>
	Northern Development Authority	9. Akpeere Eunice 10. Hamidu Zalaihatu
	Savanna Agricultural Improvement Project	11. Felix Douri Darimaani <a href="mailto:f.darimani@sapip.org.gh">f.darimani@sapip.org.gh</a>
	CSIR: SARI	12. Alhassan Lansah Abdulai <a href="mailto:alabdulai@yahoo.co.uk">alabdulai@yahoo.co.uk</a>
	NADMO	13. Bawa Abdul Samed <a href="mailto:babasibob3@gmail.com">babasibob3@gmail.com</a> 14. Mr Iddrisu Mutawakilu <a href="mailto:mutawakiluidrisu@gmail.com">mutawakiluidrisu@gmail.com</a>
CSIR: Water Resources Commission	15. Dr Emmanuel Tetteh-Doku Mensah <a href="mailto:etdmensah@csir.org.gh">etdmensah@csir.org.gh</a>	



	Hydrological Services Department	16. Richard Abaare <a href="mailto:abaarerichard@yahoo.com">abaarerichard@yahoo.com</a>
	Ghana Meteorological Agency (GMet)	17. Paul Tawiah Stephens (I) <a href="mailto:paultees@yahoo.com">paultees@yahoo.com</a>
Academia	University for Development Studies	18. Prof Hamdiya Alhassan <a href="mailto:ahamdiyah@uds.edu.gh">ahamdiyah@uds.edu.gh</a> 19. Prof Samuel Donkor <a href="mailto:sdonkoh@uds.edu.gh">sdonkoh@uds.edu.gh</a> 20. Dr. Dennis Chirawurah <a href="mailto:afeyire@gmail.com">afeyire@gmail.com</a>
	Tamale Technical University	21. Mary Danse Tiah <a href="mailto:salifudanssem@gmail.com">salifudanssem@gmail.com</a>
	University of Ghana	22. Jacob Doku Tetteh <a href="mailto:jdtetteh@ug.edu.gh">jdtetteh@ug.edu.gh</a>
		23. Elvis Kyere-Gyeabour <a href="mailto:kyeregy@gmail.com">kyeregy@gmail.com</a>
		24. Charles Asabere <a href="mailto:caasabere@gmail.com">caasabere@gmail.com</a>
		25. Habiba Abu <a href="mailto:habiba2abu@gmail.com">habiba2abu@gmail.com</a>
		26. Prof Samuel Agyei- Mensah <a href="mailto:sagyei-mensah@ug.edu.gh">sagyei-mensah@ug.edu.gh</a>
		27. Prof George Owusu <a href="mailto:gowusu@ug.edu.gh">gowusu@ug.edu.gh</a>
		28. Prof Sandow Mark Yidana <a href="mailto:smyidana@ug.edu.gh">smyidana@ug.edu.gh</a>
		29. Dr Iris Fynn <a href="mailto:iemfynn@ug.edu.gh">iemfynn@ug.edu.gh</a>
		30. Fuseini Issahaku <a href="mailto:isfuseini@ug.edu.gh">isfuseini@ug.edu.gh</a>
	31. Cynthia Azochiman Awuni <a href="mailto:caawuni@st.ug.edu.gh">caawuni@st.ug.edu.gh</a>	
	Kings College London	32. Frans Berkhout <a href="mailto:frans.berkhout@kcl.ac.uk">frans.berkhout@kcl.ac.uk</a>
	Harvard University	33. Gary Adamkiewicz <a href="mailto:gadamkie@hsph.harvard.edu">gadamkie@hsph.harvard.edu</a>
34. Judith Rodriguiz (I) <a href="mailto:jirodrig@gsd.harvard.edu">jirodrig@gsd.harvard.edu</a>		



	Imperial College London	35. Ben Howard <a href="mailto:bch823@student.bham.ac.uk">bch823@student.bham.ac.uk</a>
		36. Prof Wouter Buytaert <a href="mailto:w.buytaert@imperial.ac.uk">w.buytaert@imperial.ac.uk</a>
		37. Mike Templeton <a href="mailto:m.templeton@imperial.ac.uk">m.templeton@imperial.ac.uk</a>
		38. Laure Sione <a href="mailto:laure.sione09@imperial.ac.uk">laure.sione09@imperial.ac.uk</a>
Civil Society	YARO Youth Advocacy on Rights Organisation	39. Mr Douri Bennin Hajei <a href="mailto:yaroghoffice@gmail.com">yaroghoffice@gmail.com</a>
	Savannah Women Integrated Development Agency (SWIDA)	40. Madam Alima Sagito <a href="mailto:alimasagito@yahoo.co.uk">alimasagito@yahoo.co.uk</a> 41. Abdallah Swaad
	Send Foundation	42. Mr. Bashiru Jumah <a href="mailto:jumah@sendwestafrica.com">jumah@sendwestafrica.com</a>
	Tree Aid West Africa	43. Jonathan Anecham Naaba <a href="mailto:jonathan.naaba@treeaid.org">jonathan.naaba@treeaid.org</a> 44. Tijani Ndanyenbah
	Community Water and Sanitation Agency	45. Abdallah Goro Iddrisu <a href="mailto:abdallahgoro12@yahoo.com">abdallahgoro12@yahoo.com</a>
Private Sector	Amazing Farms	46. Jakut James Moyom <a href="mailto:jakutjamesmoyom@gmail.com">jakutjamesmoyom@gmail.com</a>
Community	Chief	47. Gu-kpegu Naa