ON THE FRONTLINE OF CLIMATE CHANGE AND HEALTH

A HEALTH WORKER EYEWITNESS REPORT

THE GENEVA LEARNING FOUNDATION

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A HEALTH WORKER EYEWITNESS REPORT

Local communities in the poorest countries are already bearing the brunt of climate change effects on health.

Health workers are trusted advisors to the communities they serve. Local health workers are first to observe health consequences of climate change, before the global community is able to respond. They are already facing the immediate challenges of the health impacts experienced by their local communities.

Local solutions are needed. There is an urgent need to build the resilience of communities and health systems so that they can withstand the changes that are now inevitable – and already being felt.

From community to planet

In July 2023, 4700 health workers began learning from each other through the Geneva Learning Foundation's peer learning platform, community and network.

Thousands more are connecting with each other, because they want to learn from their peers and support one another.

Empowering local action

Health systems depend on the people who work within them. Health workers are committed to their communities, and can be the first to respond to limit damage to health.

We all have a duty to support them in these efforts.

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Executive summary

In 2023, 4700 health practitioners, primarily from districts and facilities in countries of Africa and Asia, came together for the first time to discuss **how climate change has been affecting the health and wellbeing of the local populations they serve**.

This report synthesizes their experiences and insights. It also presents the background of why and how they came to connect and learn from each other, how the Geneva Learning Foundation (TGLF) created this chance for health practitioners to communicate their observations to each other and the outside world, and how TGLF plans to provide additional opportunities for practitioners to share ideas on working with local communities to address climate-related health challenges.

While there is increasing scientific evidence of the health impacts of climate change, statistics in scientific publications give only a **partial picture of the profound changes that the world is going through**, and how the most disadvantaged populations are being affected. Embedded in their communities, health practitioners have a unique perspective on **how these global changes are playing out at a local level** – how is climate change being experienced within communities and, in particular, how is it affecting people's health, healthcare needs and access to services?

Two TGLF events, tailored for French and English speakers in low- and middle-income countries (LMICs), brought the numbers to life and gave them depth, by providing health workers who are experiencing first-hand how individuals and communities are being affected by climate change with an opportunity to tell their stories.

Climate change is seen as a major threat to health by practitioners in the Global South

Invitations to the climate events were disseminated to members of the existing TGLF community, predominantly health workers in LMICs, and via various social media platforms. When registering for the event, practitioners were invited to answer a series of questions relating to changes in their local climate and environment, and impacts on community health. More than 1200 practitioners, almost three-quarters of them from the sub-national level (facility, district or region level), shared information.

Overall, respondents were **highly concerned about climate change** (average of 4.5 on a scale of 0–5) and reported a strong sense that **climate change is a threat to health** (average of 4.2 on a scale of 0–5).

Health practitioners have noticed a wide range of health impacts

Health impacts linked to climate change were perceived to be very common. When presented with **a list of 17 possible impacts**, across the group as a whole (n=1193), the three most commonly reported were:

- **Malnutrition** or undernutrition (59.3% of respondents).
- Increased **water-borne diseases** (59.2% of respondents)
- Changes to the incidence or distribution of **vector-borne diseases** (51.1% of respondents)

Furthermore, a **wide variety of health impacts were reported**, with 13 of the 17 possible impacts being reported by at least 25% of respondents.

When data were broken down by groups, some variation was seen between countries. Most strikingly, **for 12 out of 17 health impact categories, scores from respondents in Kenya were above global averages**, suggesting a very strong concern among health workers in this country about the health impacts of climate change.

Although only minor differences were seen across different levels of the health system, health workers who had been **at their current location for longer periods of time** were more likely to report health impacts. Notably, for 13 out of 17 health impact categories, **women were more likely than men** to report health impacts.

Individual experiences bring to life the reality of climate change impacts

At the climate change events, and in their registration contributions, participants were invited to share stories of their experiences, providing **vivid insights into the realities of climate change and its effects on health and wellbeing**.

> *"There was also a pregnant woman in labour. Unfortunately, they couldn't get a strong boat or canoe that could stand the high current and waves coming from the seaside. In the process of searching for a better means of taking her to the nearest health centre, she got exhausted and died."*
> Iruoma Chinedu Ofortube
> Woman, District, NGO, Nigeria

Many participants had noticed changes to **weather patterns**, including changes to the length of dry and rainy seasons, and hotter temperatures. **Extreme weather events** were seen to be especially impactful, particularly flooding following storms.

In turn, changing weather was noted to have had significant impacts on the **local environment**, with drought leading to water shortages, and flooding to landslides and loss of property, livestock and agricultural land. Dust and air pollution were also highlighted as a growing problem.

These climatic and environmental shifts have often had a **profound impact on people's lives** – their livelihoods, health and wellbeing. Among the most frequent impacts were:

- Loss of crops or crop failure, and livestock loss, reducing food production and leading to widespread **hunger and malnutrition**.

> *"Because of climate change, farmers are not able to study the weather as before in order to know the rainy and dry seasons to prepare and produce a good yield."*
> Margaret Afriyie
> Woman, Health facility, MoH, Ghana

- Increased prevalence of **vector-borne diseases**, particularly malaria, and re-emergence of previously well-controlled diseases, for multiple reasons including the appearance of more places for mosquito breeding.

  "The degradation of the environment has created more breeding grounds for mosquitoes. During the rainy season, there is a noticeable exponential increase in mosquito populations, which in turn raises the number of malaria cases. This has far-reaching consequences on the health of both mothers and children."
  Yapoulouce Bamba
  Man, National, NGO, Guinea

- More **water-borne diseases**, including cholera and typhoid fever, as water becomes contaminated following flooding, water scarcity leads to the use of unsafe sources, and displaced people are forced into crowded or unsanitary living conditions.

  "Because of poor drainage, when it rains, sewage overflows and you find most of the places are in very bad condition. When children go out to play, pick things up, and put them into their mouths they get sick stomach aches."
  Taphurother Muhonja Mutange
  Woman, Health facility, MoH, Kenya

- Poor **air quality** leading to respiratory conditions such as asthma.

  "Additionally, respiratory diseases, including chronic coughs, are prevalent due to the abundance of dust in the prolonged dry season."
  Sali Ndjidda
  Man, Region, MoH, Cameroon

- **Disruption of and reduced access to healthcare services**, because facilities are damaged, roads are impassable, the supply of medicines is disrupted, or because of poverty.

  "During the rainy season, it is very difficult for people to seek care for their health needs. They wait for the condition to get worse before coming to the facility."
  Alhassan Kenneth Mohammed
  Man, Health facility, MoH, Ghana

- Multiple **social impacts**, including loss of livelihoods, poverty and displacement.

  "The weather pattern has changed so much in my community of Kajiado affecting pastoralists. Many animals have died and as animals were the main source of financial stability, many homes are now starving due to lack of rainfall."
  Angela Sation Kisoso
  Woman, International, Private industry, Kenya

- A rise in **mental health issues**, as living conditions become more difficult, livelihoods are lost, and homes and belongings are abandoned; this can manifest as anxiety, depression and other mental health conditions as well as an increased risk of alcoholism and substance abuse.

> *"There is despair and hopelessness as hunger bites harder due to crop failure and people lose their sources of livelihood without any foreseeable solution in sight."*
> Anonymous
> Woman, National, MoH, Nigeria

These issues are not new – floods and drought, for example, have always occurred – but the evidence indicates that they are becoming more common because of climate change. In addition, climate change is likely driving greater variability in weather and more extreme weather events – "wetter wets", "drier dries" and "hotter hots". Many communities, such as pastoralists and those engaged in subsistence farming, lack resilience, so even small changes in circumstances can have devastating impacts.

Furthermore, many respondents highlighted a range of **additional environmental issues** they felt were also posing a threat to health and wellbeing, such as deforestation, industrial pollution or other environmental damage. This illustrates how health practitioners are perceiving **climate impacts as interacting with other social and environmental factors, in a complex web of interdependencies that affect people's lives, livelihoods and health.**

For an individual disease such as **malaria**, a multitude of factors such as the impact of temperatures on parasite biology, changes to biting mosquito patterns, population migrations and even behaviours such as sleeping outside due to extreme heat will also interact to affect patterns of disease.

The experiences shared also often highlight that it is **the most vulnerable who are most at risk and suffer the most**. The **poor** are less able to adapt, to pay higher prices for food, or to pay for healthcare when needed. This is deepening **social inequities**, with the populations that have contributed least to climate change typically being the worse affected.

> *"Once it starts raining, it increases. In spite of its increase, community members are not able to access healthcare on time because they can't harvest much from their farm produce and do not have money to patronize health services."*
> Eunince Ametorwodufia
> Woman, Health facility, MoH, Ghana

Young children are especially at risk of diseases such as malaria, pneumonia and malnutrition, and vulnerable to the health impacts of air pollution. **Pregnant women** are particularly vulnerable to malaria and malnutrition, as well as to the health consequences of extreme heat.

Furthermore, several **gender-related issues** were raised. Women in general can face a wide set of challenges, including an increased risk of sexual exploitation and violence. Respondents also pointed out impacts in areas such as menstruation management and household management due to water scarcity.

> *"I just learned a young lady had to enter into sleeping with men for her needs due to the fact that farming within the area has been affected by climate change. This led to her contracting a sexually transmitted disease."*
> Adii Joycelyn
> Woman, Region, Ministry of Gender, Ghana

The complexity of these interactions means that, on the frontline, there are no easy answers or simple solutions. Nevertheless, respondents highlighted ways in which

their government authorities, at national or subnational levels, are **responding to climate challenges**, including their impacts on health. Several also highlighted actions they were taking at a local level, from simple advice on hydration to community-based projects to enhance resilience. While responses to climate change require action at national and global levels, **steps can also be taken at a local level to mitigate health impacts**.

What this tells us about climate change and health

The experiences shared here are not intended to prove that climate change is happening or that it is affecting human health. Many rigorous scientific studies have demonstrated these impacts beyond reasonable doubt. What they do is **bring to life the reality of this scientific evidence for health workers facing a changing climate and managing the impacts of climate change in LMICs**. They demonstrate the new reality for health workers, who are witnessing changes to the physical and mental health of the communities they are associated with, driven by climate change and its interactions with other environmental disruption.

Indeed, for communities, climate impacts are not experienced in isolation, but result from a complex set of interactions. Solutions will need to be similarly multifaceted. In particular, climate change is presenting additional challenges to often fragile health systems, emphasizing the need to strengthen their resilience and ability to withstand both extreme events and additional demand.

But the experiences shared are also **testament to the resolve of many to tackle these challenges and mitigate the impacts of climate change on the health of their communities**. Health workers have dedicated their lives to helping others and are coming up with ways to counter climate change and to help those affected. This reflects a critical but as yet under-valued set of local actors working to address climate change.

> *"My primary objective is to make a substantial contribution to curtailing desertification, which would necessitate a decrease in the excessive felling of trees. These trees play a pivotal role as a primary source of income for the local population. To achieve this, I am committed to creating alternative income-generating activities for the youth, thereby providing them with sustainable opportunities while also safeguarding the environment."*
> Moctar Traore
> Man, District, Mali

Why this matters

This unique project provided an opportunity for more than 1200 health workers to share eyewitness accounts of the changes they are seeing. It has helped to create a common understanding of climate change impacts and their health consequences among health practitioners from disadvantaged and developing settings. Although specific impacts are dependent on local context, it is clear that many aspects of climate change and their health consequences are shared across different settings. This suggests that such health practitioners have many common interests and concerns, arguing for the importance of providing opportunities for them to connect, share experience and learn from one another.

The work has also highlighted the potential to **harness the drive and commitment of health workers and their intimate and trusted relationships with local communities**. Several examples were provided of collaborative work with local communities to meet the challenges head on. As demonstrated in other areas of TGLF work, bringing people together to share experiences and learn from each other can be a highly effective way of disseminating knowledge – and also highly motivating for those involved.

The climate change discourse may sometimes be dominated by endless global discussions and protracted negotiations about emissions target-setting. While these difficult conversations are going on, **real change may also come from providing committed groups such as health workers in the Global South with the platforms to meet, share experiences and develop community-led and context-specific plans to protect health** in the face of climate and other environmental challenges.

Next steps for the Geneva Learning Foundation

Based on the high level of response from health workers and the evidence already generated, the Foundation plans to develop a new **climate health and change peer learning and action programme**. This will support the needs of community-oriented health workers in the Global South who are already dealing with the impacts of climate change on health in the communities they serve, as well as their colleagues working within primary healthcare (PHC) systems.

Our four objectives are to:

- **Accelerate sustainable local, community-led action and change**
  - Our approach helps frontline staff **understand local challenges and develop local projects** to address them.
  - We **empower health workers**, enabling them to develop and implement projects using locally available resources and drawing on the experience and expertise of thousands of peers.
  - We encourage a focus on **deep community engagement** to jointly identify the most important local challenges, informed by country priorities.
- **Leverage local insights to strengthen policy and advocacy**
  - **Local experience** can provide unique insights into the relationship between climate change and health, across the full range of impacts from the epidemiology of infectious disease to health system resilience.
  - The lived experience of health professionals observing changes first-hand **complements and brings to life more formal data** on climate impacts.
  - Through a range of quantitative, qualitative and participatory methodologies, we will **distill thousands of experiences shared into actionable insights**.
- **Amplify health worker voices to strengthen country and global advocacy**
  - TGLF programmes enable local health workers to articulate their individual experiences, and connect with peers, to ultimately build a **collective vision of the tangible, realistic and impactful actions that governments and the global community need to take**.

- **Achieve maximum impact at minimal cost**
  - We aim to **leverage the power of digital networks** to support and catalyse local action driven by the **intrinsic motivation** of health workers to protect the health of their local communities.
  - We focus on **building human knowledge networks** to turn knowledge into action, results, and impact using open-access, affordable technologies.

To achieve these objectives, we plan to:

1. Leverage our existing platform, community of health professionals, and analytical capabilities to collect data, generate insights and **advocate** for greater recognition of the challenges already being faced by frontline health workers and their potential to be agents for change at the local level.
2. Build **strategic partnerships** that connect global and national climate and health stakeholders with PHC partners, health workers and local communities.
3. Secure resources to launch a new programme in 2024 to establish a global platform and network – with the ambitious aim of mobilizing **one million frontline health workers** helping their communities prepare for, respond to, and adapt to climate change to protect health and wellbeing.

Introduction

The shift in language from "global warming" to "climate change" was driven at least in part by the recognition that increasing levels of greenhouse gases in the atmosphere, due to human activities, do more than just affect global temperatures. A complex web of environmental interactions and inter-dependencies has the potential to lead to a wider variety of impacts, disrupting the Earth's natural equilibrium. Recent years have seen alarming numbers of extreme weather events and, while it is difficult to attribute individual events to climate change, the scientific consensus is that the probability of these events occurring is increasing due to climate change[1].

A further significant shift in thinking has been the recasting of climate change solely as an environmental issue, which made the issue seem disconnected to everyday experience, to one that has fundamental implications for human health and wellbeing. While some of the impact on health is directly related to higher temperatures, over the longer term the most profound impacts are likely to be an indirect result of the environmental and social disruption caused by climate change – owing to the dependency of human societies on their environmental surroundings and critical importance of social determinants of health.

Health-related impacts of climate change have been highlighted by WHO[2] and the Lancet Countdown on Climate Change and Health[3]. The UK Academy of Medical Sciences and the US National Academy of Medicine have jointly urged for human health to be placed at the heart of global policy discussions relating to climate change[4]. The Intergovernmental Panel on Climate Change (IPCC) Working Group II has documented a wide range of impacts and vulnerabilities, most of which it attributes to climate change with "high confidence" or "very high confidence"[5].

The nature of health impacts

Climate-related health impacts are **diverse and follow potentially complex pathways of causation**. Direct impacts of high temperatures can include heat stroke and dehydration, but there are many more indirect ways in which climate change can affect health and wellbeing. These include:

- Shifts in the distribution and prevalence of **vector-borne infectious diseases** such as malaria and dengue.

1. American Meteorological Society. Explaining Extreme Events from a Climate Perspective: Bulletin of the American Meteorological Society Special Report. 2023. Available at https://www.ametsoc.org/index.cfm/ams/publications/bulletin-of-the-american-meteorological-society-bams/explaining-extreme-events-from-a-climate-perspective/.
2. https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health#:~:text=Key%20facts,malaria%2C%20diarrhoea%20and%20heat%20stress.
3. Romanello M, Napoli CD, Green C et al. The 2023 report of the Lancet Countdown on health and climate change: the imperative for a health-centred response in a world facing irreversible harms. *Lancet*. 2023:S0140-6736(23)01859-7. doi: 10.1016/S0140-6736(23)01859-7.
4. https://acmedsci.ac.uk/more/news/health-at-the-heart-of-climate-change-presidents-of-uk-and-us-national-academies-of-medicine-comment
5. https://www.ipcc.ch/report/ar6/wg2/

- Changing patterns in **water-borne diseases** such as cholera owing to water supply shortages and environmental contamination.
- **Malnutrition** due to impacts on food security (agriculture and aquaculture).
- **Injury and mortality** linked to extreme wealth events, flooding and wild fires.
- **Respiratory** and other conditions exacerbated by worsening air quality.
- Increasing risk of **zoonotic infections**, crossovers from animals to humans.
- Adverse effects on people managing **non-communicable diseases**.
- **Mental health impacts**, through a range of direct and indirect routes, including a worsening of social determinants of mental health.
- Health impacts relating to **disrupted access to healthcare services**.
- Health impacts associated with social disruption, including migration, social instability and conflict.

It is now also clear that the most severe impacts of climate change will be felt by those least able to respond. **Poor and disadvantaged communities**, particularly in LMICs, will likely bear the brunt of climate change, including its health impacts[6].

A further important point is that **climate change is not occurring in isolation**. Its full impact is also dependent on complex interactions and interdependencies with other non-sustainable practices affecting the environment, including resource extraction and agricultural practices, leading to potentially complex causative pathways for impacts on human health[7]. Furthermore, it is overlain with – and may be contributing to – other types of crisis, particularly conflict.

Bringing health workers into the conversation

Exhaustive efforts have been made by academic researchers and by bodies such as the IPCC to generate and collate evidence relating to the health impacts of climate change, or information about impacts on specific diseases such as malaria. Important though these efforts are, they do not convey a complete picture of the impacts as they are experienced by health workers, particularly those in LMICs. While evidence is being collected, it is these practitioners who are facing the growing challenge of dealing with the health impacts experienced by their local communities.

Similarly, community-oriented work often focuses on detailed assessments of knowledge, attitudes and behaviours at specific sites[8]. While also providing valuable insights, such studies inevitably focus on a restricted geography. **A major advantage of digitally based events and studies is their ability to draw in participation from multiple countries and settings**.

The prospect of achieving the Paris Agreement target, limiting global temperature rise to 1.5°C, seems increasingly unlikely[9]. In this context, frontline health workers will have to adapt to the reality of a hotter and more unpredictable world.

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6. Benevolenza MA, Derigne L. The impact of climate change and natural disasters on vulnerable populations: A systematic review of literature. J Human BehavSoc Env. 2018;29(2): 1–16. doi:10.1080/10911359.2018.1527739
7. Whitmee S, Haines A, Beyrer C, et al. Safeguarding human health in the Anthropocene epoch: report of the Rockefeller Foundation-Lancet Commission on planetary health. Lancet. 2015;386:1973-2028. doi: 10.1016/S0140-6736(15)60901-1
8. Greibe Andersen J, Kallestrup P, Karekezi C, Yonga G, Kraef C. Climate change and health risks in Mukuru informal settlement in Nairobi, Kenya - knowledge, attitudes and practices among residents. BMC Public Health. 2023;23(1):393. doi: 10.1186/s12889-023-15281-y.
9. https://public.wmo.int/en/media/press-release/global-temperatures-set-reach-new-records-next-five-years

TGLF – giving a voice to those on the frontline

Health workers are the trusted messengers of health and the link between communities and health systems. The Geneva Learning Foundation (TGLF) supports a peer learning digital platform for health practitioners from LMICs. This platform provides opportunities for practitioners to come together to share experiences, learn from each other, and gain guidance from global experts, while developing and implementing action plans targeting a specific local challenge.

TGLF programme participants are primarily community-based immunization and other health care government workers...	**...working in fragile contexts**
Around 75% of the participants work in immunization.	62% work in remote rural areas; 47% with the urban poor.
Most work in health facilities and districts.	36% support the needs of nomadic/migrant populations.
Around half work for government and half for civil society organizations.	25% work with refugees or internally displaced persons; 21% face armed conflict.
Half are francophones.	Deep experience in responding to epidemic outbreaks and other health and humanitarian crises.

Climate change and immunization

Immunization has been the main focus of TGLF's work in 2021–2023, and immunization practitioners formed the core of attendees at its climate change and health event. Concern has already been expressed about the potentially far-reaching implications of climate change for immunization[10]. Relevant impacts include:

- Greater spread of insect-borne diseases.
- Malnutrition affecting the strength of immune responses after vaccination.
- Lower air quality affecting susceptibility to respiratory disease.
- Migration and displacement affecting exposure to disease and access to vaccination services.
- An increased risk of mental health issues, a potential factor affecting vaccine-seeking behaviour[11].
- Disruption to infrastructure or power affecting vaccine supply, storage or the delivery of services.

For example, one notable recent study found that, in sub-Saharan countries, drought led to a significant decline in vaccine coverage[12]. However, research has focused to a much larger degree on the impact of climate change on infectious disease, rather than vaccination itself. This lack of information further emphasizes the

10. https://www.gavi.org/vaccineswork/five-key-links-between-climate-change-and-health
11. Suffel AM, Ojo-Aromokudu O, Carreira H et al. Exploring the impact of mental health conditions on vaccine uptake in high-income countries: a systematic review. BMC Psychiatry. 2023;23(1):15. doi: 10.1186/s12888-022-04512-y.
12. Nagata JM, Epstein A, Ganson KT, Benmarhnia T, Weiser SD. Drought and child vaccination coverage in 22 countries in sub-Saharan Africa: A retrospective analysis of national survey data from 2011 to 2019. PLoS Med. 2021;18(9):e1003678. doi: 10.1371/journal.pmed.1003678.

potential value of learning from large numbers of health practitioners with first-hand experience of such impacts, particualrly as vaccination is a key primary healthcare offering.

Health worker eyewitnesses

TGLF activities to date have mainly been focused on the field of immunization, with more than 15,000 practitioners having signed up for its "Movement for Immunization Agenda 2030 (IA2030)". However, it has been active in other areas of health, and its approach to digital learning is potentially applicable to any other domain.

Given the growing interest in the links between climate change and health, TGLF has sought to give a voice to those working in health systems in LMICs[13] and to explore the potential for an extended learning programme in this area.

The first step in the development of any peer learning programme is to gather inputs from the practitioner community on the current understanding of challenges, to compare contexts and develop a shared understanding of the current situation. In contrast to most other learning initiatives, this approach recognizes the importance of the "tacit knowledge" and experience held within practitioner communities, and is itself empowering for a group who are rarely given any opportunity to share their experience and perspectives.

To encourage reflection and participation, a range of activities were organized in advance of a special event in July 2023. These included:

- Publication of three "think piece" blog posts (**Annex 2**).
- Daily posting of stories based on experiences shared on social media.
- Collection of data on participants' background, local experience of climate change and perceived local health impacts during the registration process.
- Sharing of experiences at the event itself.
- Further exchanges at a follow-up event organized with the UCL Institute for Global Prosperity, UK, focusing on citizen science approaches.
- Publication of a special issue of TGLF's Double Loop digital newsletter (Annex 1), which included a selection of experiences and responses to them.

13. https://redasadki.me/2023/07/22/learning-from-front-line-health-workers-in-the-climate-change-era/

From community to planet climate events

In July 2023, health practitioners and other interested parties came together at two unique digital events, one in English and one in French, to share experiences and discuss local climatic and environmental changes and their impacts on the health and wellbeing of local communities.

At the events, held on 28 July 2023, a range of practitioners who had submitted experiences in a pre-event survey gave a brief account of their experiences. A total of 4700 health practitioners from 68 countries registered for this special event, and 1260 submitted experiences. At the event, results from the survey were briefly presented, but most of the session was devoted to experience sharing by practitioners.

Several contributors highlighted the **weather changes** that they had noticed locally, particularly more severe heat waves, drought, excessive rainfall and flooding. In particular, changes had been noticed to weather patterns, including wet and dry seasons.

> *"We are experiencing heat like never before. And there are a number of health-related issues coming up due to that extreme heat."*

> *"Earlier on, we used to have two seasons of rain. And now, if you go right now, we have one season of rain in a year."*

> *"Personally, I've also seen a drastic drop in the water level. This is a so-called national river which used to be permanent, but is now at a very low level, even dry. Burkina Faso is a Sahelian country, so the Harmattan wind is very well-known here, and it's becoming increasingly lively, very dusty, extremely dry."*

In terms of impacts on people, some risks associated with **increased temperatures** were noted.

> *"The heat affects both humans, animals and the environment. And once this happens, people are dehydrated. If they don't listen, this can lead to coma."*

Other contributors highlighted multiple and diverse **longer-term consequences of climate changes**. For example, both drought and flooding can lead to crop failures or loss of crops, increasing the risk of food insecurity and malnutrition.

> *"When there is a lot of drought, I've seen people living hungry, people having no food, people going to look for food in other areas."*

> *"We have realized a lot of erosion has been occurring that has washed away all the fertile soil, which compromises the production of foods, which results in malnutrition and other food insecurity."*

> *"Most of Yoruba State populace are farmers. The recent desert encroachment, and the recent flooding, is actually taking away the fertile land from people."*

In addition, it was pointed out that changes to the climate have many effects on the environment, creating **multiple stressors** on people's lives.

> *"The water level of Lake Kivou and Lake Tanganyika has risen, to such an extent that people are so threatened that it would have a negative impact on their health, but also on the environment. But another important factor is the increase in heat in the lake's waters, which is also having a negative impact on the aquatic animal ecosystem, with a negative impact on food supplies."*

> *"In the town of Bukavu, where we are currently experiencing repeated fires, more than 600 houses have been burnt down in the last six months. These are just some of the effects of climate change, which is having a negative impact on people's lives. This has the enormous consequence of increasing poverty among the population."*

Several practitioners had noted changes in the patterns of **infectious disease**, including **malaria**, as the mosquitoes that transmit it have more opportunities to

breed after heavy rainfall. Flooding can also overwhelm waste-water systems, contaminating drinking water and leading to more **gastro-intestinal infections**.

> *"Climate change has resulted in a lot of rainfall and serious flooding. Many streets are flooded, pools of water everywhere. And this breeds a lot of mosquitoes. So many people come to my pharmacy, coming down with malaria. They will get treated and within a few weeks they are back because they get bitten."*

Impacts on **non-communicable diseases** were also described. Those with existing conditions, such as **cardiovascular disease, diabetes or mental health problems**, may be particularly badly affected by stresses linked to higher temperatures. Increasingly arid conditions can lead to high levels of dust in the atmosphere which, in combination with other sources of pollution, can exacerbate asthma and other **respiratory conditions**.

> *"So climate change, such as heatwaves, has an impact on the sick, coronary patients such as hypertensives, the elderly with dehydration and infants. So we can see that during these hot spells, the health centres receive many more cases. That's just what we're recording, without knowing what's going on in the remote villages that we can't count.*

> *"This season is accompanied by major dust storms, and here too the impact of this season is that you'll see a lot more respiratory infection, especially in children, really it's the period of bronchiolitis."*

Impacts on people's **mental health** were also commented upon. Generally, these reflect the impacts a changing environment or extreme weather can have on livelihoods, especially farming, with the potential for displacement if living conditions become intolerable or farming impossible. But higher temperatures may even have effects on sleeping arrangements, creating an additional source of stress.

> *"When it comes to heat, nowadays people are no longer sleeping inside their houses, which is also very stressful on them."*

> *"We have been recording cases of morbidity and mortality due to the climate change and especially when in the cases of excess rainfall it caused damage to infrastructural development of the hospital and other households which causes collapse of building and other things that causes injury to humans and loss of life. it leads to also psychological problems of people who come with psychological trauma because when there's excessive rainfall, people will be thinking that their building will fall."*

Climate impacts can be **complex**, for example resulting from changes in behaviour driven by extreme heat or other changes to the weather.

> *"A lot of streets are flooded and the water is dirty. Some of them having growth like Spirogyra [green algae] and people have to dip their legs in this water to be able to come out. They come to pharmacy complaining, "I have these infections on my feet, it's very itchy". A lot of skin diseases are coming up."*

Climate change is also bringing into focus the vulnerability and **lack of resilience of health systems** in many LMICs. As many of the event's participants had a background in immunization, **impacts on vaccination** were commonly highlighted in this area. These examples are illustrative of wider impacts on primary healthcare services.

A common theme was the disruption of services, for example when **facilities** are damaged by flooding. **Outreach activities** may also be disrupted when roads become impassable.

"Last year, there was a very massive flood that disrupted virtually all services, including immunization. Most of the cold chain equipment was damaged, and the state had to disconnect most of the equipment they had. And during that period, most of the communities were living in IDP (internally displaced persons) camps, and immunization was not happening."

"Climate change sometimes disrupts the immunization activities we carry out in the field, with access roads that used to be passable at certain times of the year becoming increasingly difficult to access because of the weather conditions."

In addition, displacement can **break the connection with health infrastructure** previously visited. The struggles created by major disruption to lives can also mean that immunization is seen as a **lower priority** than the search for food and shelter.

"In Uganda, we recently have had many floods where people were displaced, landslides, and people had to be reallocated to different places. And in so doing, if the community has looked for immunization activities when the whole village and the whole community are disturbed ad dislodged, then there are no services."

"Pakistan in the last few months, we have been facing the floods that have disrupted almost 50% of the country. But the thing is, when we face these floods and calamities, so the disruption of immunization campaigns and the disruption of everything takes place."

Having lost their livelihoods, and with little or no social security nets, people can be forced into desperate measures by climate-related disruption, which again can lead to reduced use of immunization services.

"They are forced to scramble for the small land that we have, and they invade the land, the multinational farms, whereby they end up having conflict, injuries. Some children are missing their immunization because their fathers are hospitalized or their mothers are hospitalized."

Disruption of services, or deprioritization due to other challenges, can undermine the work carried out by health workers to build trust with communities, encourage behaviour change, and establish a culture of service-seeking.

All members of communities are affected by climate change, but some may be particularly vulnerable to climate impacts. Several contributors noted that **women and girls** could be especially affected, given that they may be **financially dependent on men**. Scarcity of water can also create major challenges for **menstrual hygiene**.

"We talked to and interviewed women who had eight children, nine children, and whose husbands, not knowing how to feed the family, had abandoned them to their own fate."

"[Because of hardship] girls even had to prostitute themselves to get something to eat."

"Water is becoming scarce, yet water is really a vital element in menstrual hygiene management."

Given the complexity of the relationship between the environment, ecosystems and humans, challenges to human health driven by climate can come from unexpected sources. For example, as well as humans, **other animals**, including those that can harm people, are affected by higher temperatures or environmental degradation.

"I've seen a lot of snake bites due to hot temperature, because they're looking for cool areas."

"Certain animals leave the forest because of the rise in temperature, but also move into the environment inhabited by humans, and as a result humans will become contaminated, but also when humans go hunting in the forest."

Although not specifically designed to elicit ideas on **how to address climate-related challenges**, several contributors spontaneously highlighted actions that could be taken locally. These include educating communities on actions that can help to prevent some of the worst consequences of a changing environment.

"It's something that all of us have to join hands to be able to do the most we can to educate our communities on what they can do."

"For instance, it's not disposing in the drain because that also helps to worsen the issues."

"I have to say that it is very important to note that it is our role as the frontliners to ensure that we sensitize the community, we tell them about what they are supposed to do in order to avoid them being faced with such challenges, especially where I work in Terako district, which is hosting over 20,000 refugees. There has been a lot of deforestation, but we have encouraged them to do more of the plantation of trees in order to avoid some of the bad impacts of climate, like flooding."

"We need to raise awareness, start by raising the awareness of our populations in the management of our waste and raise awareness of how to reform our healthcare providers in the face of resilience."

It was also recognized that more work needed to be done by communities and government authorities at different levels to **prepare for the impacts** of climate change.

"It was also noted that both communities and the health system need to work out how they can adapt to new climate realities. And they are not prepared. As a community, they are not prepared how to adapt to these situations. And also, our health system is not prepared how to actually address these situations."

"At district level, we always make some plans, keeping in view the climatic changes and upcoming pandemics or epidemics, which might break out as in case of the calamities."

Very **practical measures** were suggested, for example increasing the supply of drugs to health faculties to cope with the increased prevalence of disease, providing treated bed nets to prevent mosquito biting and malaria, and increasing green space in urban centres.

"We need to get a bigger supply of nets, that is, long-lasting insecticide-treated nets, to the community so that we can put away the mosquitoes which are the most source of malaria."

> *"Nature is absent in the city and the cool zones that plants create will make it possible to attenuate the temperature tests a little too much and allow people to live in a friendly environment."*

It was also noted that **communities were developing their own solutions to build climate and health resilience**, which could be nurtured and provide inspiration for responses elsewhere.

> *"In the course of my work, particularly in analysing the situation and working with communities on health issues, I've been able to observe a growing awareness in communities that are already using methods to build their own resilience. And I would like to see it supported, so that our traditional knowledge, which has enabled us to resist and remain resilient until now, can be used in the planning of our policies to curb the effects of climate change in the field of health."*

Two "guides on the side" provided a global perspective on climate and health and the experiences being shared. **Dr Alan Brooks** from Bridges to Development noted that, while curbing of emissions and mitigation of climate change impacts is most influenced by national and multinational decision-making, adaptation to new realities will depend on action at a local level:

> *"It's each of us individually in the communities within which we're working that are actually going to be on the front lines of this, that are going to be living with and supporting our communities to find our way through this incredible challenge."*

Dr Dirk Engels, former Director of Neglected Tropical Diseases at WHO**,** echoed this sentiment, noting that impacts will be comparatively mild in some high-income countries, but potentially catastrophic in vulnerable communities that have little resilience to social and environmental shocks:

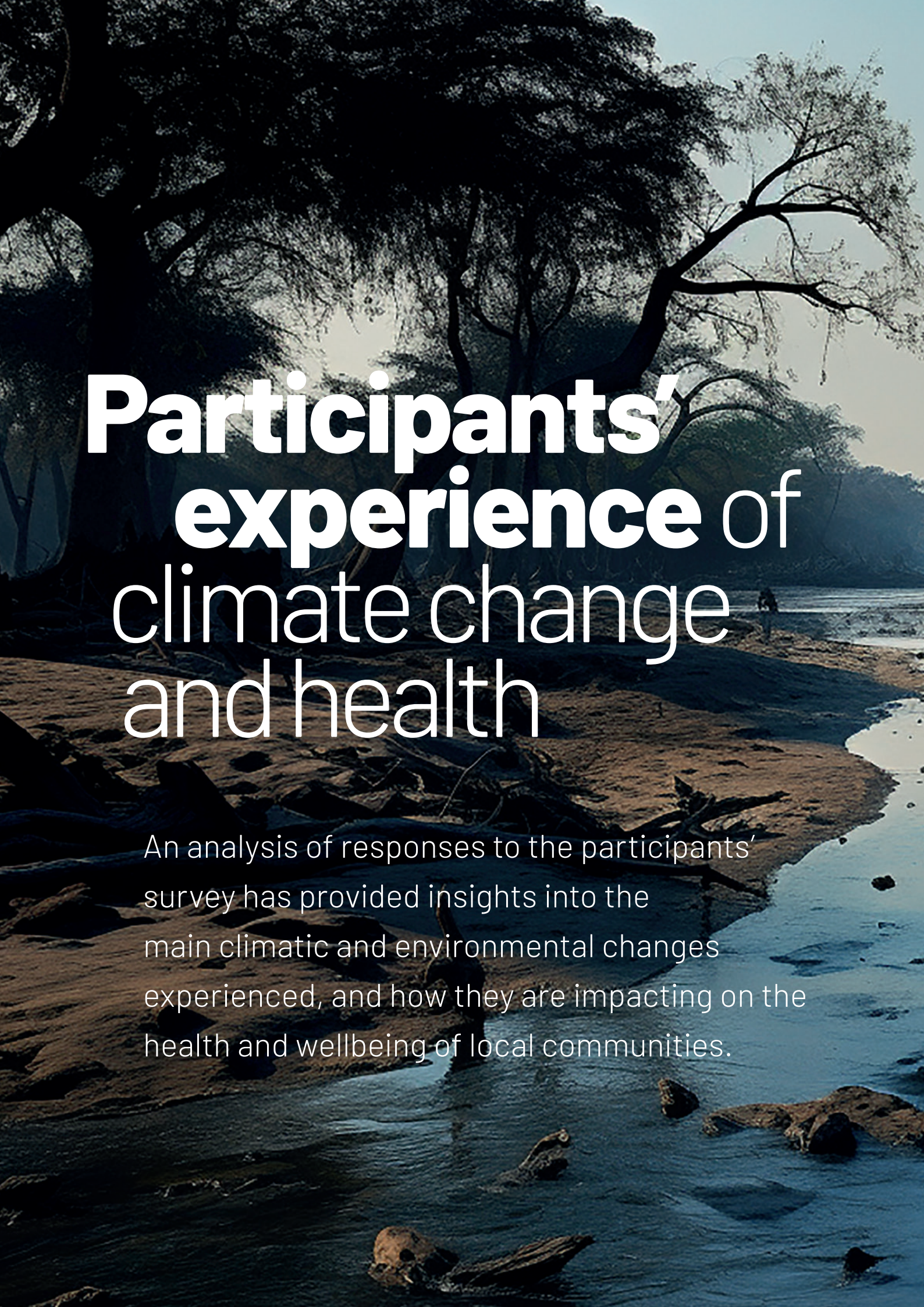
> *"And we should remember, hopefully, that climate change, although it's a global phenomenon, is affecting very, very locally people in very different ways."*

Follow-up event: Citizen science

Follow-up events (also in English and French) on 2 August 2023 were organized with the **UCL Institute for Global Prosperity**, focusing on citizen science approaches[14]. This event featured an introduction to the theory of citizen science, where members of communities are involved in developing and taking part in research studies, with a view to effecting local change.

At this event, **Dr Mayssa Jallad**, an expert on citizen science methodologies based at the PROCOL centre in Lebanon, summarized a project focused on a neighbourhood in Tripoli, which integrated local residents into studies aimed at mapping the current environment and ways it could be improved. Possible applications of this approach to understand and respond to local climate challenges were discussed, providing valuable food for thought for participants planning projects with local communities.

14. Mintchev N, Daher M, Jallad M et al. Sustained Citizen Science From Research to Solutions: A New Impact Model for the Social Sciences. Int J Qual Methods. 2022; 21: 1–16. https://doi.org/10.1177/16094069221133232



Participants' experience of climate change and health

An analysis of responses to the participants' survey has provided insights into the main climatic and environmental changes experienced, and how they are impacting on the health and wellbeing of local communities.

A total of **1260 registrants** contributed information, with representation particularly strong from **African countries** (Figure 1). Participants were drawn from all levels of health systems, with the **health facility level** particularly well represented (Figure 2).

Registrants indicated for **how many years they had been at their current location**. For ease of analysis, these were grouped into quintiles (20% of respondents in each grouping; Figure 3). Registrants were also asked about the **relationship with their local community**. The overwhelming majority reported that they were either "part of the family" or "trusted friend" (Figure 4), indicating strong ties to local communities.

Levels of concern about climate change were high, with responses across the sample as whole averaging 4.47 (maximum of 5). Scores were consistent across countries, ranging from 4.27 for Cameroon to 4.63 for Kenya. Scores were also very similar across levels of the health system and for men and women. Scores increased slightly according to how long respondents had been at their current location (from 4.39 for 0–3 years to 4.57 for ≥15 years).

Figure 1: Breakdown of location of respondents (n = 1260).

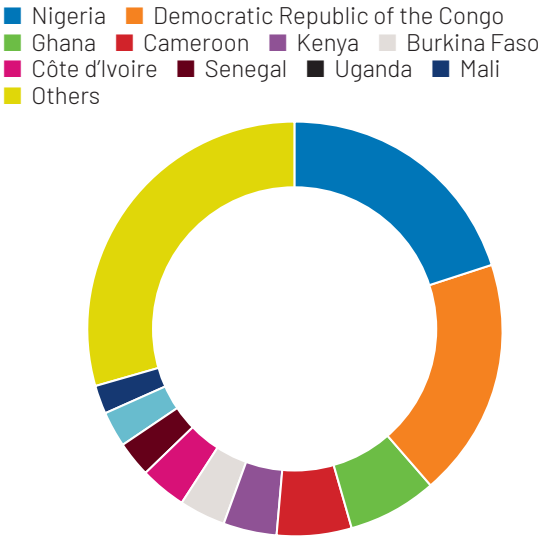


Figure 2: Level of respondents within the health system (n = 1260).

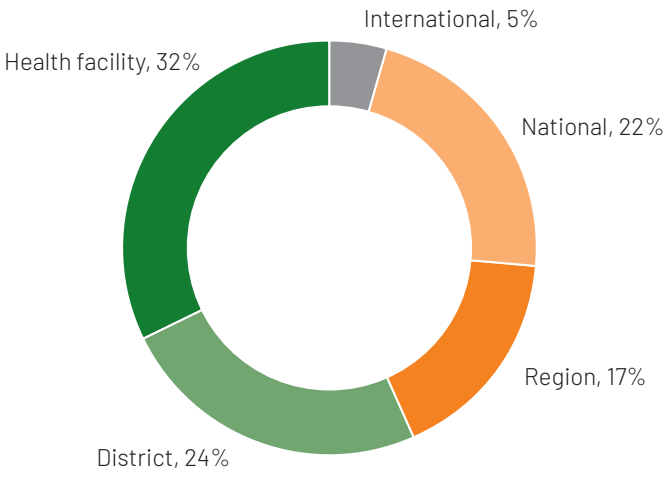


Figure 3: Number of years spent at current location (n = 1260).

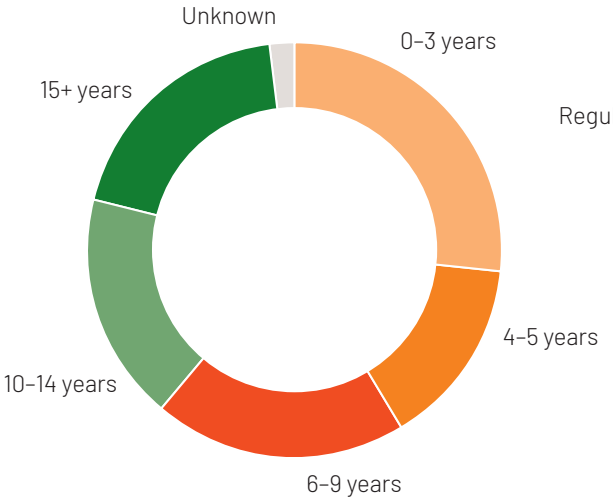
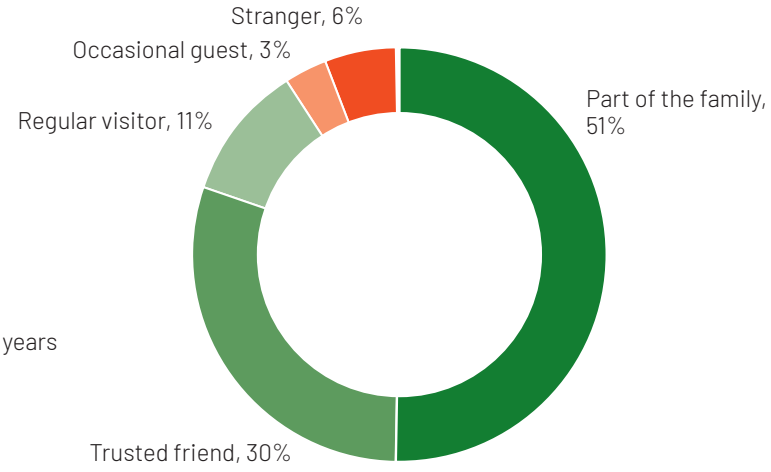


Figure 4: Relationship with local community (n = 1260).

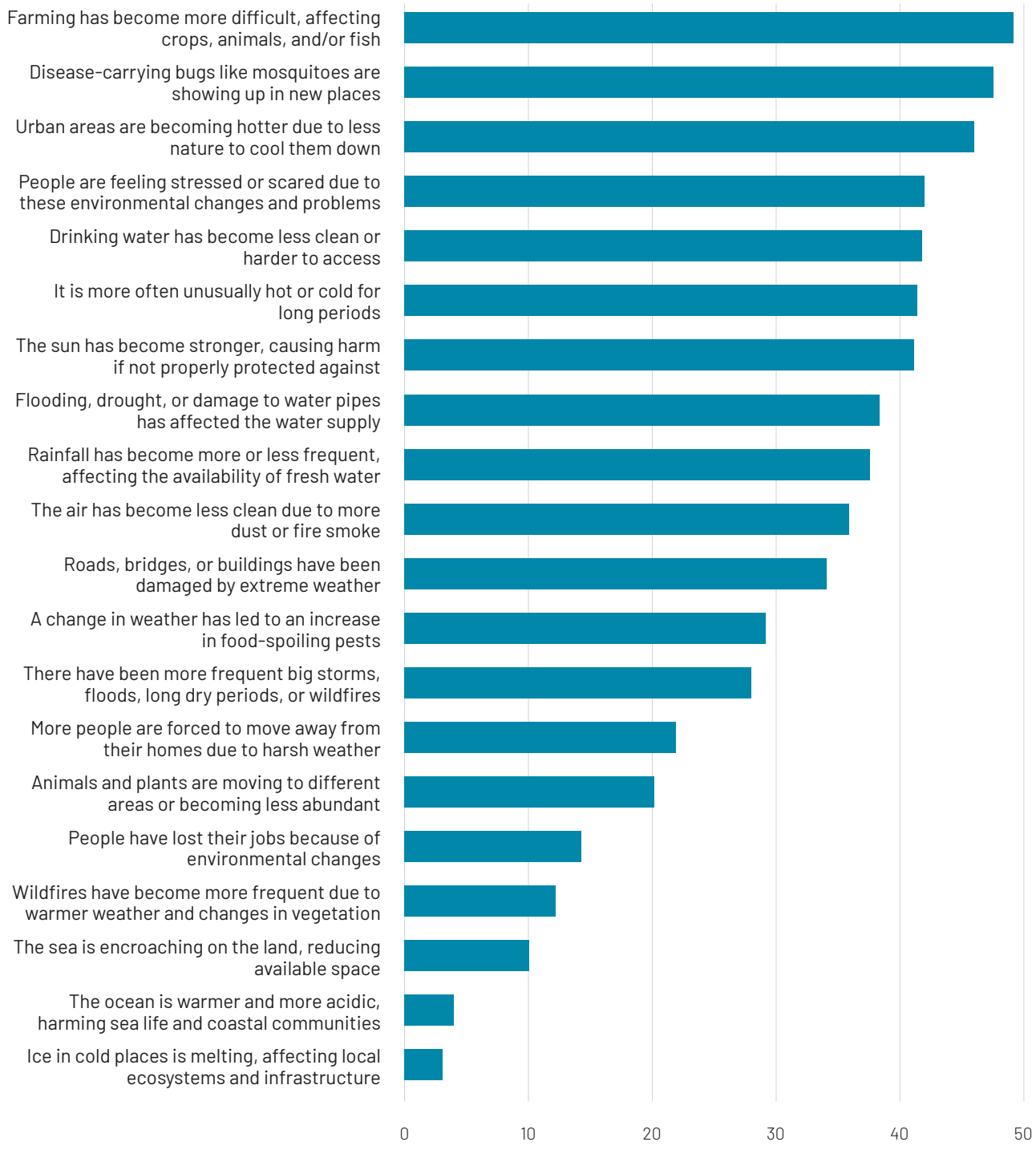


Climatic and environmental impacts

Respondents reported direct local experience of a **wide range of climatic and environmental impacts** (Figure 5). Respondents were provided with a list of 20 impacts and were asked to select those that they had had direct experience of. The three most common related to:

- Impacts on **farming** (land- or water-based) – 49.2% of respondents.
- Impacts on the distribution of **disease-carrying insects** – 47.6% of respondents.
- **Urban areas becoming hotter** – 46.0% of respondents

Figure 5: Climatic and environmental impacts.



Across this group, **13 out of 20 impacts were reported by at least 25% of respondents**, illustrating the wide range of effects linked to climate change being noticed.

When responses were disaggregated by time spent at a location, it was clear that **those who had been based at a site for longer periods were more likely to have experienced most of these impacts**. Experience of an increasing number of extreme weather events, for example, was reported by 23.2% of those in place for 0–3 years but by 38.2% of those who had been present for more than 15 years.

It might be expected that people who have been at the same site for a longer period would be more likely to have noticed changes. What may be more striking, therefore, is that **a significant proportion of people who have been in place for a relatively short period have noticed changes** (e.g. 44% had noticed changes to insect vector distributions).

Another notable feature is that **women were more likely than men to report climate and environmental changes**. This was most marked for air quality (40.1% of female respondents, 33.7% of males) and strength of the sun (45.2% of females, 39.1% of males). Reports were higher for women than men for all but five out of 20 impacts.

Small variations were also seen across levels of the health system. For many indicators, international respondents were most likely to report impacts, possibly indicative of wider exposure to global climate change narratives. For some impacts, **national-level** respondents also reported relatively high experience, including for **heatwaves** and **air quality**. This may reflect the fact that such individuals are likely to be living in **urban areas** and therefore experiencing urban heat island effects and issues with air pollution.

Perhaps surprisingly, those at the **health facility** level reported fewer extreme weather events. Less surprisingly, given that many will be working in rural areas, they were less likely to report that urban areas were becoming hotter due to loss of vegetation. Interestingly, they were slightly more likely to report changes in the distribution of insect vectors.

Some variation in reporting of impacts between countries was apparent. The most notable pattern was the relatively high reporting of impacts by respondents from **Kenya. In 17 out of 20 impacts, the average score from Kenyan respondents was higher than the global average** – in some cases markedly so (e.g. drinking water access: 67.3% vs 41.8%; loss of jobs: 34.6% vs 14.3%; rainfall changes: 71.2% vs 37.6%; people feeling scared or stressed: 63.5% vs 42%).

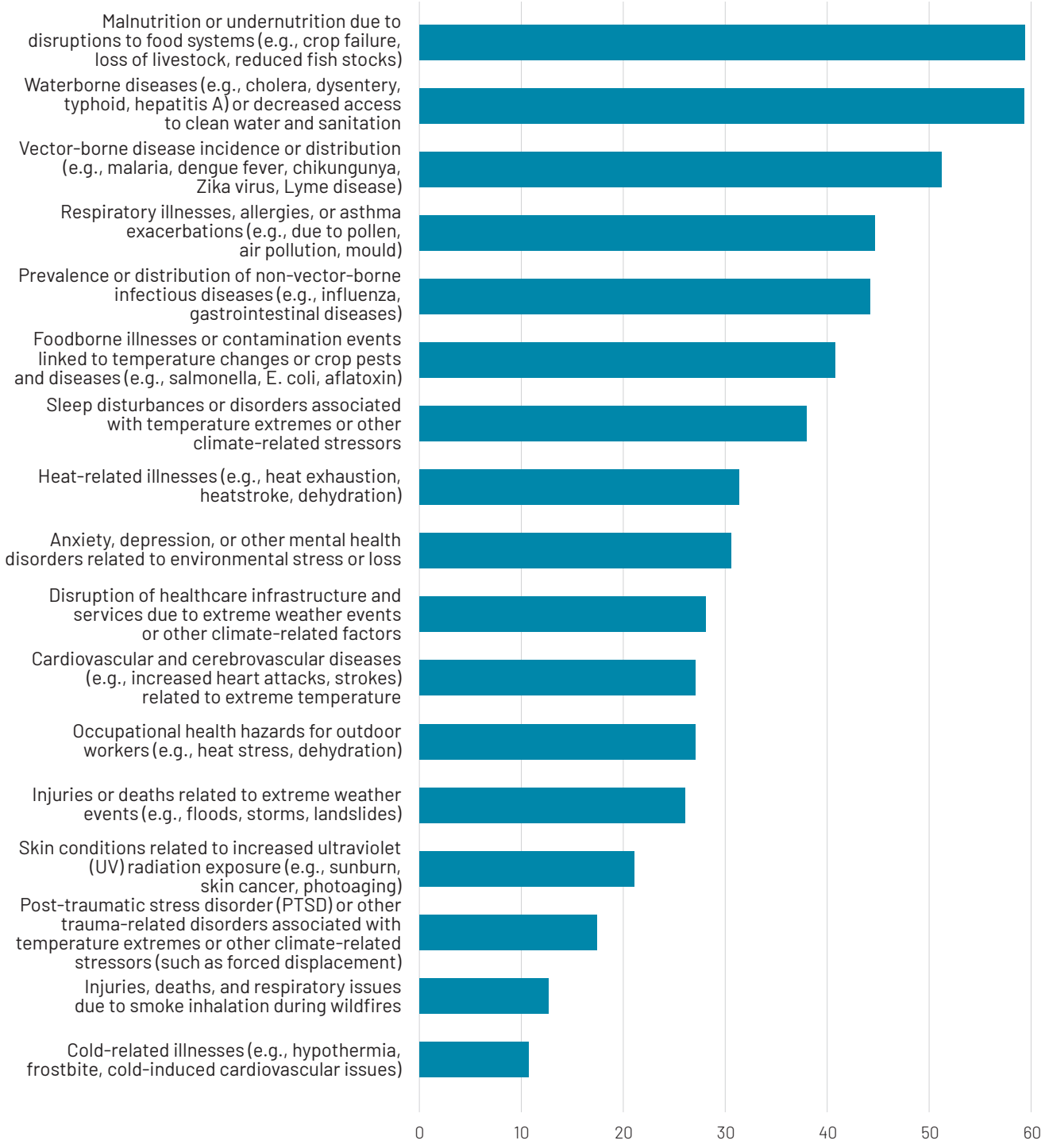
Health impacts

Health impacts were very commonly reported (Figure 6). Respondents were provided with a list of 17 health impacts and were asked to select those that they felt had become more common due to climate change. Across the group as a whole, the three most commonly reported were:

- **Malnutrition** or undernutrition (59.3%).
- Increased **water-borne diseases** (59.2%)
- Changes to the incidence or distribution of **vector-borne diseases** (51.1%)

Again, a wide variety of impacts were reported, with **13 out of 17 impacts being reported by at least 25% of respondents**.

Figure 6: Health impacts.



As with climatic and environmental impacts, those with the **longest tenure** at a site were more likely to report health impacts. For people present for more than 15 years, the proportion of positive respondents was higher than the global average for all but one category of harm. Again, it is striking that even those present at a site for short periods are noticing changes – for example, more than half had noticed changes to malnutrition, the distribution or prevalence of vector-borne disease and more water-borne disease.

Furthermore, as for climatic and environmental impacts, **women were in general more likely to report health impacts**. Reports were higher for women than for men

for 13 out of 17 categories. One of the biggest differences was reporting of increasing **mental health impacts** (anxiety, depression etc.) (35.9% of females, 27.8% of males).

While some health impacts were more commonly reported by international respondents, several were particularly likely to be reported by those working at the facility level. These included both heat-related and cold-related impacts (the latter reported rarely overall), respiratory illnesses (49.6% versus 44.6% global average) and foodborne illnesses (45.9% versus 40.7%).

Country-specific data revealed some variation in the most common impacts, presumably related to country-specific contexts:

- **Nigeria:** above-average scores for injuries or deaths related to extreme weather events, and mental health impacts, skin damage, and occupational health hazards
- **Democratic Republic of the Congo:** above-average scores for heat-related illness, waterborne diseases, foodborne illnesses, and non-vector-borne infectious diseases.
- **Ghana:** above-average scores for vector-borne disease
- **Cameroon:** above-average scores for waterborne diseases and non-vector-borne infectious diseases.

However, **the most striking pattern was again that for Kenya**, with above average responses for 12 out of 17 categories. Of particular concern was malnutrition, cited by 78.4% of respondents (average: 59.3%) and waterborne diseases (74.5% versus 59.2%) and foodborne illness (56.9% versus 40.7%). Kenya also had the highest proportion of respondents identifying mental health impacts (49% versus 30.5%).

Links between climate change and health

Among this group of health workers, **93% believed there was a link between climate change and health**, with 6% unsure and 1.2% believing they are not related.

They were also **fairly confident in this connection**, scoring on average 4.1 out of 5 when asked about how confident they were in their belief. Confidence varied slightly between countries, from 3.91 in Cameroon to 4.62 in Kenya. Marginal differences were seen between those working at different levels of the health system and between men and women. **Confidence increased with length of service at a site**, suggesting that those with more local experience were both more likely to have seen changes and had more confidence that health and climate effects were linked.

There was a similarly strong belief that **climate change is a threat to health** (average score 4.2 out of 5). Country scores ranged from 4.04 in Cameroon to 4.40 in Kenya. Perceptions of threat showed a slight decline from global to health facility levels (4.38 to 4.06) and a slight increase with length of service at a site. Gender differences were marginal.

Not surprisingly, those who had the greatest general concerns about climate change were also the most concerned about impacts on health.

Summary

Overall, the quantitative findings demonstrate high levels of concern about climate change and its effects on health, and a strong belief that the two are linked. Respondents have had experience of a wide range of climatic and environmental impacts, and of health impacts. These experiences are relatively consistent across countries, suggesting that, while local context is important, there are significant commonalities across settings.

Of particular note, climatic and health impacts were particularly commonly reported by (1) people with many years of service at a site, (2) women practitioners, and (3) respondents from Kenya.

Stories from the **health frontline**

The experiences reported by practitioners in the pre-event survey provide vivid insights into the nature of climate impacts on health, and in some cases on how climate challenges are being met.

When completing the climate event registration form, participants were invited to share experiences related to (1) the climatic and environmental challenges they have experienced and (2) local health impacts they believed were associated with climate change.

Responses were coded according to the impacts reported. Extracts from illustrative contributions are provided here, along with cross-references to relevant contributions grouped by country (using a three-letter country code) collated in Annex 1.

Weather and **environmental impacts**

Health practitioners identified a wide range of local climatic changes, with environmental consequences detrimental to human health and wellbeing.

The kinds of impacts reported by respondents are vivid illustrations of the consequences of climate change that have been widely predicted.

These include abnormally **high temperatures** and prolonged heatwaves CIV01 CIV05 CMR06 CMR08 DRC4 DRC12 DRC13 GIN02 HTI01 KEN09 LBR03 MLI02 NGA10 SEN01 SEN02 (although unusually cold weather was also reported occasionally).

Several respondents noted disruptions to traditional **weather patterns**, including the timing and duration of wet/dry seasons BFA01 BFA02 CIV01 CIV04 CMR04 CMR05 CMR08 DRC2 DRC6 DRC8 DRC16 DRC17 DRC18 DRC19 DRC20 GHA02 GHA06 GIN01 IND01 IND02 KEN03 KEN10 NGA01 NGA07 SSD01 TGO02 UGA03.

> *"In the past, during our college years, we were taught that the dry season typically began in mid-May and ended in mid-August. However, the climate patterns have shifted over time. Now, we experience rains that extend until mid-June, and the dry season persists until September."*
> Germain Kapour Kieng
> Man, National, MoH, Democratic Republic of the Congo

Extreme weather events such as severe storms were frequently reported, causing damage to people, property and infrastructure DRC4 GMB01 GMB03 LSO01 LBR03 NGA09. **Flooding** was often thought to be becoming more common, with multiple consequences – washing away houses, carrying away people, affecting roads and transportation, leading to erosion and landslides, and devastating crops TCD02 TCD03 CIV05 CMR01 DRC15 DRC17 DRC18 GAB01 GHA09 GMB03 KEN01 KEN04 KEN05 KEN08 KEN12 LBR01 LBR02 MDG01 MLI01 MLI03 NER03 NER04 NGA01 NGA03 NGA06 NGA08 NGA10 NGA15 PAK01 UGA02 UGA03 ZIM01.

> *"During the year I spent in Lubutu, I witnessed the first flood ever experienced according to the local population. This flood occurred due to the convergence of three rivers that flow through the town of Lubutu, resulting in loss of lives and displacement of several households."*
> Evariste Kalafulo
> Man, Region, MoH, Democratic Republic of the Congo

Examples were also provided where life in **coastal regions** has been affected by both sea level rise and storms BEN01 GHA10 SEN02.

Higher temperatures were also noted to be creating more arid conditions and droughts, with waterways drying up BFA02 CAR01 TCD04 TCD06 CIV05 CMR02 DRC3 DRC7 DRC10 GAB02 HTI01 KEN01 MDG01 MDG02 MLI02 NGA02 NGA15 SOM01 TUN01. This also multiple implications, affecting access to drinking water, agricultural practices, and the productivity of fishing.

> *"Going back home to the community where I grew up as a child, I was shocked to see that most of the rivers we used to swim and fish in have all dried up, and*

those that are still there have become very shallow so that you can easily walk through a river you required a boat to cross in years past."
Samuel Chukwuemeka Obasi
Man, National, MoH, Nigeria

Aridity also increases the risk of **wild fires** DRC6 DRC12, which also have multiple impacts – both immediately in terms of injuries but also longer term, for example due to declining air quality and loss of agricultural land. Increasing problems with **dust and sandstorms** were highlighted TCD06 DRC3 DRC12 GIN01.

In many cases, wider issues of **environmental damage or ecosystem disruption** were highlighted by respondents GMB01 MDG01 MLI02 MLI03 NER04 UGA04. This indicates that the kinds of impacts caused by climate change are not viewed independently but as part of a more **holistic set of inter-dependent challenges to the environment**, affecting multiple aspects of health and wellbeing.

Factors such as increasing industrial land use (such as mining) and **pollution** DRC2 DRC15 GHA04 GHA08 GHA11 GMB03 IND03 MDG02 were commonly reported, alongside climate change, which collectively have harmful and sometimes devastating impacts on individuals and communities. Felling of trees and **deforestation was often highlighted** as a highly damaging environmental practice CMR04 DRC2 DRC5 DRC12 DRC15 GHA01 GHA06 KEN09 MDG01 MLI02 SEN02 UGA04.

A common theme running through many contributions was that of **ecosystem disruption**. This also has consequences for animals, and some contributions highlighted how these impacts can also affect communities. For example, food shortages can lead animals such as elephants GAB02 UGA03 or hyaenas TCD04 TCD06 to enter agricultural land or come into greater contact with people when foraging. Displacement of rats was suggested as a possible reason for the increased spread of infectious disease MDG01.

"Prolonged periods of drought followed by heavy rainfall disrupt agricultural activities, leading to harvest failures. This sudden decline in food availability subsequently triggers malnutrition among populations heavily reliant on subsistence farming. Additionally, the movement of animals, such as elephants, searching for sustenance in fields contributes to human-wildlife conflicts, posing threats to both human health and safety."
Lukengu Muela Israel
Man, Health institution, Private Industry, Gabon

It is, of course, impossible to unequivocally attribute individual events to climate change. Heatwaves, extreme weather and flooding would still be happening even in the absence of climate change. However, what the examples and experiences shared can do is bring to life the kinds of impacts that have been shown in rigorous scientific studies to be linked to climate change. This graphically illustrates how such impacts affect individuals and communities, and what is likely to become more common and severe as the climate crisis worsens.

The big dry

"The city of Bambari is intersected by the "Boukako" stream, which used to flow into the main river "Ouaka" and gave its name to the Ouaka Prefecture. About 5 to 10 years ago, the Boukako stream was broad and teeming with fish, allowing some people to engage in fishing activities there. However, at present, the river has nearly dried up, making fishing activities and sand collection for construction more challenging.

This change in the climate has led to job losses for some individuals and a subsequent decline in income for many families. The impact of climate change on health in our region is evident through the scarcity of urban water sources and the drying of household wells. This scarcity has made it difficult for local gardeners to access water for irrigating their vegetable beds.

As a result, the prices of these food crops have increased in the market, posing difficulties for some families to afford sufficient food. This has led to the emergence of cases of malnutrition, primarily affecting children aged 6 to 59 months.

An example I have recently observed on the ground is in Grimari, a town situated 80 km away from Bambari along the Bambari-Bangui axis. In response to this situation, the NGO COOPI conducted food distributions in Grimari during May and June 2023. Children aged 6 to 59 months who accompanied their parents during these distributions were screened using the Mid-Upper Arm Circumference (MUAC) method to identify moderate or acute malnutrition cases. The Grimari District Hospital collaborated in providing treatment for these cases. The reported numbers are as follows: (i) March = 6 cases, (ii) April = 18 cases, (iii) May = 24 cases, and (iv) June = 30 cases."

Dr Ganda-Te-Grembombo François-Désiré
Man, Region, UNICEF, Central African Republic

Impacts in South Kivu

“In recent times, our region has been witnessing a series of concerning events. Landslides, house fires, floods, and prolonged heavy rains have become distressingly frequent occurrences. One particularly tragic incident took place in the Province of South Kivu, with its main city Bukavu, where over 400 lives were lost in the Kalehe territory due to severe flooding. Additionally, there has been an alarming increase in insect pests that are causing substantial damage to plants across all territories.

The Province of South Kivu experiences two main seasons: a rainy period lasting nine months and a dry season lasting three months. However, these days it’s becoming increasingly difficult to differentiate between these two seasons. For instance, in the past, July was considered part of the dry season, but now we’re witnessing continuous rain in Bukavu and throughout the entire province. This prolonged wetness is reshaping our understanding of the seasons.

These climatic changes have led to several challenges. Unplanned power cuts have become common, often due to reduced water levels or increased monitoring of flooding at the Ruzizi hydroelectric power plant. Such monitoring efforts sometimes inadvertently lead to blockages in various water conduits.

Public health is also severely impacted. Diseases linked to poor sanitation, contaminated water, and unhygienic practices, such as those related to dirty hands, have become more prevalent. The scarcity of safe drinking water further exacerbates health issues. Unfortunately, effective waste management policies are lacking, contributing to environmental degradation and health risks.

It is evident that these issues require a comprehensive and multifaceted approach to address the complex interactions between climate change, infrastructure, public health, and demography.”

Munganga Barhasima Antoine
Man, District, NGO, Democratic Republic of the Congo

Direct impacts on health

Some impacts of climate change are direct – a consequence of abnormally high temperatures or prolonged heatwaves, extreme weather events, or the natural disasters (such as storms, wild fires and floods) affected by a changing planetary environment.

Excessive heat is a well-known risk factor, and an increase in the numbers of people affected by **sunstroke/heatstroke** CIV01 DRC1 HTI01 IND02 MLI02 and **dehydration** HTI01 MLI02 MLI03 NER03 SEN01 was noted by multiple respondents. Particular groups were seen to be especially vulnerable, such as those who have to work outside NER03 and **older people** MLI02 MLI03 NER03.

> *"My years of engagement with the community have given me insights into numerous climate-related challenges.* ***From the intensifying heat to the dwindling rainfall, the scarcity of potable water, and the extensive loss of wildlife, the impacts are broad-reaching****. We're witnessing an uptick in* ***heat-related illnesses like strokes****, accompanied by increased expenses for cooling, dehydration issues, malnutrition cases, reduced household incomes, and sadly, even the passing of the elderly."*
> Moctar Traore
> Man, District, Mali

Among the most commonly referenced consequences of climate change was injury or loss of life caused by **flooding**, with people being swept away by flood waters while outside, travelling or in their own homes CIV05 CMR01 DRC15 DRC17 DRC18 GAB01 GMB03 HTI01 KEN01 MLI03 NER03 NGA03 NGA04.

> *"Where I live in Buea, the flood from Mount Cameroon took away all belongings of people in my neighborhood and killed a secondary school student who was playing football with his friends."*
> Bie Lilian Mbando
> Woman, Region, Education or research organization, Cameroon

Again, groups such as **women, children and older people** may be particularly vulnerable, for example because of increased exposure to indoor air pollution through their household responsibilities. They may also have fewer resources and less capacity to deal with forces of nature.

> *"There was also a pregnant woman in labour. Unfortunately, they couldn't get a strong boat or canoe that could stand the high current and waves coming from the seaside. In the process of searching for a better means of taking her to the nearest health centre, she got exhausted and died."*
> Iruoma Chinedu Ofortube
> Woman, District, NGO, Nigeria

One special population thought to be at particular risk of direct effects, particularly related to sun exposure, were people with **albinism** CMR03 DRC01.

Impacts on **food security**

The changing climate is affecting food production, of particular significance where agriculture is the main way of life. A growing incidence of malnutrition was one of the most commonly noted health consequences.

Changes in **rainfall patterns** were noted to be having a profound impact on farming. Challenges include too little rain and **drought**, leading to crop failure BFA01 TCD06 CMR04 CMR06 CMR07 DRC6 KEN01 MDG02, or too much rain and **flooding**, which can wash crops away TCD01 GAB02 GHA02 GHA03 LBR01 NER01 NER03. Changing weather patterns may also require modifications to farming routines, affecting the timing of food production DRC20 GHA06.

It was also suggested that the **unpredictability** of weather had impacted on farmers' ability to manage their crops effectively BFA02 DRC19:

> *"Because of climate change, farmers are not able to study the weather as before in order to know the rainy and dry seasons to prepare and produce a good yield."*
> Margaret Afriyie
> Woman, Health facility, MoH, Ghana

Shortages of water were seen to be a significant issue, both for agriculture and in ensuring adequate access to drinking water BFA01 DRC1 DRC3 DRC8 DRC17. Other reported impacts relevant to agriculture included an increased risk of infestation with insect pests DRC17 KEN06. Reduced access to water was also seen to be a challenge at the individual household level KEN02.

> *"Some years back, kitchen gardening was not an issue. It was cheap and easy. Water, the main requirement for plants, was really available–both rain and tap water. Even on the fourth floor, you could tap rainwater for irrigation. Nowadays, tap water is scarce and hardly enough for drinking and cooking. With the long sun season, even mulching cannot help. The only option is to cut the number of plants and to work with kitchen recycled water."*
> Alice Nyaboke
> Woman, Region, MoH, Kenya

In a further illustration of interdependencies, many respondents referred to other **damaging activities** linked to agriculture, sometimes as a response to the challenges being created or exacerbated by climate change GHA03. A common example cited was clearing of wooded land for agriculture, seen to be damaging to the environment.

> *"The rampant felling of trees for fuel (charcoal) and indiscriminate brush burning, coupled with other climatic conditions, are contributory factors to this problem."*
> Castro Fogembong
> Man, District, MoH, Ghana

Water shortages can lead to water rationing. For cities, food supply from surrounding areas can be affected, one consequence of which can be **higher food prices**, affecting the cost of living CAR01 GHA11 GIN02 KEN01 KEN03.

As well as crop growing, climate change was suggested to be having an impact on **livestock**, critical to the wellbeing of many communities in LMICs TCD04 DRC16 DRC20 GHA05 KEN10 MLI01 NER03 SSD01 UGA03. Reported consequences included an increasing risk of infectious diseases such as East Coast fever SSD01 and anthrax GHA05.

> *"The early rains do not continue to allow the grasses to grow above the soil level for animals to graze without touching the soil and they contract the anthrax spore."*
> Augustine Paterson Agamba Azembah
> Man, Region, MoH, Ghana

As well as agriculture, impacts were also reported on **fish stocks** and the ability to secure sufficient food through aquaculture TCD06 DRC4 GHA10 GHA11.

In addition to crop growing, climate disruption was also reported to be interfering with the transportation of food as roads become impassable DRC5 DRC9. This can interfere with the ability of farmers to earn a living from their produce, and also reduce food supplies at population centres reliant on growing areas. Several repondents noted the reduced availaility of fresh fruit and vegetables DRC7 DRC9 GIN02 NGA05 NGA09.

The consequences of food shortages due to reduced agricultural productivity can be profound for individuals and households. But **healthcare facilities** can also be affected.

> *"My facility is a referral centre that receives patients from five neighbouring states. Hospitals are always full to capacity and the shortage of food and fruits increases hardship and suffering."*
> Gambo Isa Muhammad
> Man, Health facility, MoH, Nigeria

Other unexpected consequences of lack of food include effects on individuals' adherence to medication SWZ01:

> *"I have observed people who are farming not getting enough food. The farming inputs are very expensive, and farming is now like win or lose. People who are taking ARV [antiretroviral] and NCD [non-communicable disease] medicine want to stop because there is no food."*
> Adelaide Mthombo Dlamini
> Woman, Region, Private industry, eSwatini

However, the most commonly reported concern was **malnutrition** due to inadequate food intake AFG01 BFA01 BFA04 CAR01 TCD04 TCD05 CMR06 CMR07 DRC5 DRC6 DRC8 DRC18 DRC20 GHA06 GHA11 GIN01 KEN01 MDG02 MLI02 NER04 NGA09 SOM01 TGO03 UGA03.

> *"Climate change has had a significant impact on agricultural production in terms of food products. The traditional patterns of dry and rainy seasons are no longer followed due to factors like uncontrolled forest fires. This disruption has led to a decrease in the production of food items. Additionally, there's a concerning trend of inadequate utilization of staple foods like corn and cassava, which are often used in the production or distillation of indigenous alcohol. As a result, the community is facing a surge in cases of malnutrition,*

highlighting the urgency to address the challenges posed by climate change on both agricultural practices and food security."
Faithful Tshibanda Mulangu
Man, District, MoH, Democratic Republic of the Congo

This was often felt to be affecting vulnerable groups such as children and **pregnant women** AFG01 BFA01 BFA04 CAR01 TCD04 CMR07 DRC5 GHA06 KEN01 TGO03, with the latter at particular risk of anaemia.

*"**The rainy season is short-lived, resulting in meagre harvests by its end**. In terms of health, the area has a high rate of chronic malnutrition among young children, as well as cases of anaemia. Nouna is categorized as part of the regions known as the "Granary" or Agro-Pastoral Zone. These areas traditionally provide food during the lean season to other regions and even neighbouring countries. In recent years, nutritional surveys have highlighted a serious issue of malnutrition among young children."*
Anonymous
Woman, National, MoH, Burkina Faso

*"As a result of the disruption in the seasonal shifts, **a modest family reliant solely on agriculture experienced the tragic death of their young son within their community**. The critical factors involved were as follows: their crop yield plummeted to zero due to their inability to manage the erratic changes in the seasons, and malnutrition, likely compounded by other illnesses, afflicted the family. **Faced with financial constraints stemming from the complete failure of their agricultural efforts, they resorted to providing home-based care for their family**. Tragically, their youngest son paid the ultimate price with his life. In summary, the ever-changing climate dynamics have left us disoriented and uncertain about the future."*
Kalongo Bomongo Emmanuel
Man, Health institution, MoH, Democratic Republic of the Congo

Infectious diseases

Globally, there is growing evidence that infectious diseases are being affected by climate change. There are multiple routes by which a changing climate can alter the distribution or risk of a range of infections. Practitioners are observing a resurgence of existing diseases and the appearance of new infections as a consequence of climate change.

Among the most frequently cited impacts of climate change was a resurgence in infectious diseases transmitted by insect vectors such as mosquitoes, particularly **malaria** TCD04 CIV01 CMR01 CMR05 CMR07 CMR08 DRC3 DRC7 DRC9 DRC10 DRC11 DRC13 DRC18 GHA07 GHA09 GMB02 GIN02 KEN04 MLI03 NGA01 NGA06 NGA07 NGA13 SEN01 TGO02 UGA01 UGA03. In some cases, this was felt to be linked to bigger mosquito populations TCD05 GIN02 TGO01.

In part this may reflect the changing **distribution of the mosquito species** that transmit malaria (and other infections) due to global warming. However, other factors may also be at work, including mosquitoes' changing **biting patterns** CIV01 TGO02 or changes in human behaviour that lead to higher exposure to mosquito bites. For example, it was noted that people are increasingly sleeping outside because of unbearably high temperatures inside dwellings, increasing the risk of being bitten NGA07 SEN01.

> *"I have observed sleep disturbance due to heat in a community without an electricity supply.* ***They are forced to sleep outside their houses leading to mosquito bites*** *which have increased the incidence of malaria fever in the community."*
> Anonymous
> Woman, National, MoH, Nigeria

One of the most significant factors is likely to be **changes in the local environment that favour mosquito breeding** DRC9 DRC10 DRC13 GHA09 NGA12 SSD01 UGA03. More frequent or powerful storms and flooding may create pools of water that provide opportunities for growth of mosquito larvae. Changes to water collection and use, in response to water shortages, may also create environments favouring breeding.

> *"In my community in Mbaagwa Clan of Ikurav-Ya District of Kwande LGA, there was heavy rainfall one certain night. The community members woke up the following day to see water flooding their environment. Without any help, they have to wait for nature to take its course. After a few days, the water disappeared. Not long ago that small children and adults started getting sick. Their major complaint was fever, loss of appetite, vomiting, and general weakness of the body. A careful microscopic and laboratory analysis showed malaria parasites."*
> Uzendah Philip Iorchivir
> Man, District, Ministry of Environment, Nigeria

Environmental disruption can have other **ecological consequences** that favour the transmission of disease.

> *"Previously, the district of Fandriana was covered with forests. However, now there are no forests left due to frequent exploitation. Many individuals exploited*

> *the forests to obtain square wood, which they sold to carpenters for various purposes. They also harvested wood to make charcoal, which they sold to meet their needs like food, etc.... **The absence of forests has caused rats to invade the village, leading to outbreaks of plague**."*
> Anonymous
> Woman, District, MoH, Madagascar

Impacts such as flooding have other consequences for infectious disease. One of the most commonly referenced impacts was on **diarrhoeal disease**, including cholera AFG01. Flooding can overwhelm rudimentary waste disposal systems, leading to environmental contamination with gastrointestinal pathogens TCD02 CMR02 CMR04 CMR05 CMR06 CMR07 DRC4 DRC9 DRC11 DRC17 DRC18 GHA07 GHA10 KEN01 KEN04 KEN05 KEN08 KEN09 NGA01 NGA08 SOM01 SSD01. A consequence of growing water scarcity is the greater use of alternative sources of water, which may be unsafe DRC3 HTI01 KEN03 MLI03 TUN01.

> *"Because of poor drainage, when it rains, sewage overflows and you find most of the places are in very bad condition. **When children go out to play, pick things up, and put them into their mouths they get sick stomach aches**."*
> Taphurother Muhonja Mutange
> Woman, Health facility, MoH, Kenya

Again, however, impacts may be more subtle and indirect. For remote communities, heavy rains may affect the ability to travel to collect fresh water, leading to more use of potentially contaminated water collected locally CMR02.

In addition, the disruptions caused by changing environments can affect the safety of water sources. Changes to water courses or displacement can lead to contamination of water with human waste if sanitary facilities are inadequate SSD01.

> *"In Lake Chad, during the rainy season, the various arms of the lake expand, causing flooding that affects the villages situated along its shores. This flooding often forces the inhabitants to relocate to higher ground. However, **a significant portion of the population around the lake lacks proper sanitation facilities**, leading to open defecation near the water's edge. As the water levels rise, this practice contributes to the spread of diseases, particularly when access to healthcare facilities becomes challenging."*
> Dieudonne Tanasngar
> Man, Health institution, MoH, Chad

Access to safe drinking water and effective waste disposal systems are existing priorities for many countries. The effects of climate change reinforce the need to invest in such public health measures, and in approaches to limit the spread of malaria (such as insecticide-treated bed nets to prevent mosquito biting).

As several respondents pointed out, community engagement and education is an important aspect of these responses, to ensure that their benefits are realized UGA01:

> *"We have an upsurge in malaria cases. The government is providing mosquito nets to help us control malaria, but the clients misuse the net as fish nets, wedding gowns, and chicken safety nets."*
> Byenume Fredrick
> Man, District, District local government, Uganda

A recurring theme in this area is the **vulnerability of certain groups**, particularly young children and pregnant women DRC11 DRC18 GIN02 KEN04 NER04. Also highlighted

was compounding impacts – malnutrition and anaemia, for example, will increase the risk of severe malaria outcomes.

> *"The degradation of the environment has created more breeding grounds for mosquitoes.* ***During the rainy season, there is a noticeable exponential increase in mosquito populations, which in turn raises the number of malaria cases****. This has far-reaching consequences on the health of both mothers and children."*
> Yapoulouce Bamba
> Male, National, NGO, Guinea

Respondents also noted the resurgence of infections that had been thought to be under control, including parasitic infections such as **schistosomiasis** (transmitted via water-dwelling snails) **GMB02** and **lymphatic filariasis** (transmitted by mosquitoes) **GHA01**. Increasing numbers of viral infections, such as dengue **TG001** and Ebola **DRC19**, were also noted.

In addition, climate change was also felt to be leading to an increased risk of **zoonotic infections**, "spillovers" of pathogens from other animals to humans **NER02**. Communities were seen to be dealing with infectious diseases they had not encountered before or conditions of unknown origin **DRC10**.

> *"The region's architecture is outdated, and the city has transformed into a migratory hub where diverse behaviors converge. New diseases emerge, and* ***the indigenous population is grappling with illnesses that were previously unknown to them****."*
> Assoumane Mahamadou Issifou
> Man, Region, NGO, Niger

Insect pests

"A drought, characterized by a drop in rainfall during recent rainy seasons, has affected the City Province of Kinshasa, particularly in the Makelele District (located in the Bandalungwa commune) where I live.

This area is bordered by two rivers, Mâkelele 1 and 2. The scarcity of rain in the region during the past rainy seasons has led to a significant reduction in water flow within these two rivers. Consequently, rubbish and debris have accumulated along the riverbanks.

This situation has resulted in the proliferation of mosquitoes and other unidentified insects. This increase in insect activity has not only led to a rise in malaria cases but has also given rise to a newly emerging form of dermatosis, the exact nature of which is yet to be determined. It is suspected that these skin lesions develop due to scratching after insect bites.

Disturbingly, over 10% of the population within the municipality has been affected by this condition. The nuisance posed by these insects is prevalent even during the daytime. Health authorities in the Kintambo Health Zone have initiated investigations into this matter."

Woman, National, MoH, Democratic Republic of the Congo

Asthma, allergies and other non-communicable diseases

Among the more indirect effects of climate change are impacts on a wide range of non-communicable diseases. These may arise due to changing environmental risk factors triggered by climate change, such as air quality, or due to behavioural changes secondary to climate effects.

Non-communicable diseases are the most common cause of death globally and are becoming more prevalent in LMICs, mostly due to lifestyle changes. By driving changes in exposures to **environmental risk factors** and altering human behaviours, climate change was thought by respondents to be having an impact on a range of important NCDs.

A major concern was felt to be **air quality**. Poor air quality is associated with a range of **respiratory conditions** (and other NCDs, including cardiovascular disease, deaths from which have been found to spike after wildfires). It was suggested that cases of asthma and other respiratory conditions could be linked to poor air quality, with causes including wildfires or pollution from vehicles or industry **GHA08 KEN06 SEN02**.

> *"There is a huge dumping site in Korle-Bu which always burns tyres and rubbish, making the air around the community very polluted. Lots of people living in the community go to health facilities with respiratory tract infections, asthma attacks, and many other respiratory infections. The burning site is posing a lot of health implications for the indigenous people living in the community.*
> Godwin Asabire Akazee
> Man, National, MoH, Ghana

As in other areas, these kinds of issues are, on the face of it, not directly related to climate change. However, they illustrate that issues such as air quality have a wide range of causes, which interact in complex ways.

> *"Additionally, respiratory diseases, including chronic coughs, are prevalent due to the abundance of dust in the prolonged dry season."*
> Sali Ndjidda
> Man, Region, MoH, Cameroon

For example, air quality is particularly problematic in **urban areas**, which are growing in many settings because of displacement from rural areas – driven in part by the detrimental impacts of climate change. Cramped living conditions without adequate ventilation lead to poor quality, often exacerbated by indoor burning of fuel for cooking and heating. Hotter, less hospitable urban environments may also encourage greater use of motor vehicles – further worsening air quality. No solutions to NCD challenges can therefore omit consideration of the impacts of climate change.

> *"The use of motor vehicles (cars, bicycles, and autos) has significantly increased. The usage of vehicles has also led to an increase in air pollution*

and we see respiratory problems and skin diseases, which have an impact on health. After 25 to 30 years, if things stay this way, temperatures will be very high. The government should implement one vehicle per family, more plantations, a monthly once-no-motor vehicle usage policy, and incentives for employers to use bicycles."
Dr Kumbha Gopi
Man, National, NGO, India

Respondents noted several other ways in which NCDs could be affected by climate change. These included the adoption of less healthy diets, for example because of reduced access to fresh produce **BFA02**. It was also suggested that heat stress or social or economic disruption would have greater effect on those with pre-existing chronic conditions **DRC1 GIN01 TCD01 GIN01 MDG01 NGA10 NER03**.

"Conditions such as hypertension, diabetes, and obesity are on the rise. This can be linked to the shift towards consuming industrially processed foods that are low in nutritional value and high in chemical additives."
Coulibaly Seydou
Man, District, MoH, Burkina Faso

Mental health impacts

A potentially underappreciated impact of climate change is on the mental health of individuals and communities affected. A hotter world will be more stressful for many, but some of the most profound mental health impacts of climate change are likely to be secondary to the social disruption it is already triggering.

Impacts on physical health have been at the centre of most discussions of the impact of climate change and health. In part, this may be because they are easier to measure. Nevertheless, respondents highlighted a range of ways in which climate change can have a detrimental impact on mental well-being.

A particularly frequent issue raised was the effect of higher temperatures on **sleep patterns** CMR08 DRC1 DRC9 GIN02 LBR03 MLI01. Loss of property or displacement, or unbearable temperatures inside housing, may also lead to a need to **sleep outside**, potentially affecting the quality of sleep NGA07. There is a well-established correlation between sleep disturbance and mental health difficulties, emphasizing the potentially serious implications of chronic sleep deprivation.

> *"A lot of heat at night causes profuse sweating and disturbs sleep."*
> Eselem Clovis Enyopeh
> Man, District, NGO, Cameroon

> *"Residents of Lubumbashi, for example, experience shorter and less restful sleep due to the difficulty in cooling the body down, exacerbated by a decrease in tap water availability."*
> Kiongo Yambayamba François
> Man, Health institution, NGO, Democratic Republic of the Congo

For households with **young children**, their difficulties in sleeping at night could be a further source of significant stress.

> *"**The amount of sun has increased making it too hot inside the bedroom at night. This is affecting newborn babies who cry at night**. Because there is no light, no fans, the poor people are really suffering as a result of the impact of climate change."*
> Levi Ogundu
> Man, Health facility, Private industry, Nigeria

Many respondents highlighted how climate change was making everyday life more difficult, leading to increased levels of **stress, worry and anxiety** BFA02 CIV01 CIV04 DRC2 DRC12 DRC15 GHA09 LBR02 MLI01 NGA12 SOM01 TGO03 UGA02. This may be a reflection of a harsher environment in a hotter world NGA09:

> *"People who could afford air-conditioned houses enjoyed life while others who could not did continue to adjust to endure the heat. People were not looking healthy. **Poverty and stress were written on people's faces**."*
> Dr Martina Ezeama
> Woman, District, NGO, Nigeria

However, more commonly, it can be seen as a consequence of the hardships being endured because of climate-related impacts on **lives and livelihoods** NGA07.

> *"**There is despair and hopelessness as hunger bites harder** due to crop failure and people lose their sources of livelihood without any foreseeable solution in sight."*
> Anonymous
> Woman, National, MoH, Nigeria

> *"When it comes to the impact of climate change on mental health, we can observe a significant disturbance in the well-being of farmers. **Even just a couple of days without rainfall can trigger a sense of sadness among them**. Instances of minor depression have been noted among household heads who helplessly witness their crops withering due to inadequate moisture."*
> Coulibaly Seydou
> Man, District, MoH, Burkina Faso

A number of respondents suggested that mental health impacts included depression **NGA11 TG003**. In many LMIC settings, mental health services are patchy or non-existent, so very few are likely to receive a clinical diagnosis or gain access to treatment.

As several responses noted, climate change is but one contributory factor affecting mental health, and mental health issues are unlikely to be the sole health issue that people are facing.

> *"A total of 4.2 million people out of the total population of 16 million are living in IDP [internally displaced persons] camps due to prolonged drought. **People leaving their houses and living in IDP camps have mental health issues**, and children have issues of malnourishment and cholera along with vaccine-preventable diseases."*
> Dr Muhammad Taimoor
> Man, International, WHO, Somalia

Increased levels of stress and anxiety can have many consequences. One factor highlighted was an increased risk of **substance abuse** **KEN07 TG002**. Others highlighted the potential of affected individuals to adopt **risky lifestyles** due to adversity **NGA03**.

> *"Due to climate and weather changes, food production has declined. There has been job loss, low income, and depression. Also, men became alcoholics, which is now a national menace the government is trying to fight."*
> Joseph Mbari Ngugi
> Man, Health facility, MoH, Kenya

> *"Notably, cases of nervousness and increased consumption of local alcoholic drinks during periods of intense heat have been observed, leading to physical violence, accidents, and incidents on public highways."*
> Ouro-Djeri Atcha-Gani
> Man, Health institution, MoH, Togo

The experiences shared indicate widespread concern about the mental health impacts of climate change, particularly driven by social disruption. They illustrate the need to consider a **broad concept of health** when considering the health impacts of climate change and when developing appropriate responses.

Escaping the heat

“The vaccination programme in India happens at health sub-centres or socially acceptable government or private buildings near the communities. With the rising temperatures, it became increasingly difficult for parents to bring their small children to vaccination sites. The relentless heat made it unbearable to venture outside, leaving them worried about their children's health and well-being.

Realizing the urgency of the situation, we decided to act. Together, the parents and authorities brainstormed possible solutions to ensure that the children received their vaccinations while taking the extreme climate conditions into account. After careful consideration, they came up with a plan to adjust the session timings. The sessions were rescheduled to early mornings or late evenings when the temperatures were relatively cooler. This adjustment allowed the parents and their children to attend the vaccination sessions without suffering from the scorching heat.

The new schedule proved to be a tremendous success. Parents found it more convenient and comfortable to bring their children during these cooler hours. It also supported the parents who are involved in Jhoom cultivation for which they used to leave to field early and come back late. The health authorities were delighted to witness such a positive outcome, as their responsiveness to the parents' concerns had effectively improved the vaccination rate among young children.

The changing climate patterns demanded more proactive measures to acclimatize and adapt to the evolving conditions. We initiated discussions and awareness campaigns to educate the community about climate change and its impact on their daily lives. The parents' struggle to bring their children to vaccination sessions under the scorching sun had served as a wake-up call for the entire community. It was a reminder that climate change affects everyone and that adapting to changing conditions required collective action and forward-thinking solutions.”

Anonymous, Man, Region, WHO, India

Social impacts

Climate change is leading to profound disruptions to ways of life, with long-term consequences for multiple aspects of health and wellbeing.

Changes in weather patterns, extreme weather events, environmental disruption and the other consequences of climate change threaten existing ways of life. Respondents provided examples where pressures on livelihoods and ways of living have become so great that they have had to be abandoned.

A commonly referenced consequence was **forced migration and displacement**, for example because of loss of agricultural land or the ability to make a living from farming, or because areas have become uninhabitable BEN01 BFA04 TCD02 TCD04 TCD05 CMR06 DRC5 DRC16 DRC18 GHA09 KEN04 KEN08 LBR01 LBR02 MLI01 MLI03 NER04 NGA03 NGA07 NGA10 NGA15 SOM01 TGO02 UGA02 ZIM01.

> *"In the lowlands of Kasese district where I come from, people have become homeless due to melting ice causing floods even in areas where floods previously did not happen."*
> Mugabekazi Jastine
> Woman, Health facility, MoH, Uganda

This creates new problems, with major population movements typically occurring to **urban centres**. Living conditions are frequently overcrowded, encouraging the spread of disease, and buildings often hurriedly and poorly constructed to cope with newcomers.

The disruption caused by displacement can place **strains on relationships** between those displaced and host communities CIV05.

> *"The imbalanced climate also strains human relationships within cities. People find it challenging to accommodate others in their homes due to the discomfort caused by the climatic conditions. **This can lead to tension and strained interactions among residents**."*
> Mamoudou Ouattara
> Man, District, NGO, Côte d'Ivoire

Such effects are not seen only in cities. In rural areas, **competition for land**, for example between herders and farmers, can be a source of tension TCD06.

> *"The effects of climate change are evident in the region through frequent and intense winds accompanied by dust from November to May, spanning about seven months. The vegetation cover, including trees, firewood, and green grasses, has become scarce, leaving only sand and stunted thorny shrubs. The region's fauna has also been affected. **Ongoing conflicts between herders and farmers over grazing grounds persist, exacerbating food insecurity**."*
> Rayam Ringar Théophile
> Man, Region, MoH, Chad

In **coastal regions**, sea-level rise and more frequent and severe storms are also making some livelihoods more difficult, leading to unemployment and/or displacement.

> *"In recent years, tidal waves and coastal windstorms have pounded the shores of Fuveme and its environment with very little protection ... **the once vibrant***

fishing community is also gradually being lost due to increased coastal erosion and flooding."
Forgive Awo Norvivor
Woman, District, Education or research organization, Ghana

Mobile/nomadic populations may be at particular risk in some countries, threatening their traditional way of life **BFA04 TCD04 KEN10**.

"The weather pattern has changed so much in my community of Kajiado affecting pastoralists. ***Many animals have died and as animals were the main source of financial stability, many homes are now starving due to lack of rainfall.***"
Angela Sation Kisoso
Woman, International, Private industry, Kenya

Communities that rely on fishing may also face a precarious existence that is threatened by climate change **CAR01 GHA10**.

The reported social consequences linked to climate change commonly included **unemployment and poverty** **CAR01 TCD01 CIV01 DRC8 GHA10 KEN07 KEN10 MLI02 MLI03 NGA07 NGA11 TGO02 ZIM01**. With no social safety nets, people may be forced into environmentally damaging and/or illegal activities in order to obtain money to support themselves. Respondents highlighted examples where people had been forced into **illegal activities** **KEN11**, and some linked increased crime rates to climate-driven impacts on people **NGA11 UGA04**.

"Water channels have been interfered with and changed. Swamps have been replaced with farming, and a lot of deforestation has taken place. National Parks have been encroached. The community has been left alone to do what they want."
Collins Davis Mwesigwa
Man, District, Uganda

A particular challenge is that many of the people affected are **highly vulnerable**. For example, subsistence farming is typically at best a precarious existence. Even minor changes in weather patterns can make it impossible for families to survive. Households and communities may have insufficient resources to make the adaptation necessary to maintain their existing ways of life.

Furthermore, particular groups may face specific challenges. **Women**, for example, may be affected in unique ways by climate changes. Among the examples given were additional challenges related to menstrual hygiene when water is in short supply. It was suggested that these issues can be so debilitating that women may choose to become pregnant **NGA15**.

"Prolonged drought dries up the dirty community stream that serves both livestock and residents. This makes it difficult for community members to access water and much harder for menstrual hygiene management for teenage girls leading to an increase in infections in the unbearable heat. Due to the difficulty in managing the monthly menstrual cycle due to limited access to water sanitation hygiene and period poverty, many teenage girls prefer to get pregnant to save them the worry of menstruating monthly for 9 months."
Linda Raji
Woman, District, NGO, Nigeria

As primary care-givers in many communities, women may also be impacted by **higher levels of childhood disease** NGA13, adding to their domestic workload and reducing the time they have for other activities. Other gender-related issues highlighted included additional challenges with household tasks requiring water (often the responsibility of women) GIN02, an increased risk of **gender-based violence** UGA02, and **dropping out of school** ZIM01.

Another respondent highlighted that loss of livelihoods may even force women into sex work in order to make ends meet GHA12.

> *"In the process of carrying out my research on gendered responses to climate change in the Sunyani municipality, I just learned a young lady had to enter into sleeping with men for her needs due to the fact that farming within the area has been affected by climate change. This led to her contracting a sexually transmitted disease that she is now suffering to cure."*
> Adii Joycelyn
> Woman, Region, Ministry of Gender, Ghana

A team response

"In the fight against global warming, we work as a team by forming environmental circles. Regarding the changes we encounter, we highlight disasters, erosions, and fires that occur from time to time, air pollution caused by dust, the overwhelming sun, floods, and many other environmental problems mainly related to deforestation and poor waste management in our environment. These issues expose us to various health problems.

With a total of 50 people, which forms 10 circles of 5 people each, we have organized ourselves to raise awareness in the community and explain to them the dangers we face due to the behaviours of environmental disrespect that we engage in through our daily actions. Our goal is to raise awareness and foster a sense of climate justice. We point out diseases that arise from psychological stress related to disasters, and others fall ill due to an unhealthy environment. Additionally, we highlight infectious and parasitic diseases, allergies, and general systemic diseases, all with their multiple complications. This serves as a lesson in environmental citizenship."

Mapenzi Ndagonywa Philemon
Man, Region, NGO, Democratic Republic of the Congo

Healthcare access/quality

Environmental disruption linked to climate change can interfere with the delivery of healthcare services or prevent people from gaining access to these services. Facilities may be destroyed or damaged, and roads may be impassable. The quality of services may also be affected, for example because of the absence of health workers or inadequate supplies of medicines.

An issue frequently mentioned by respondents was the **loss of healthcare facilities** following extreme weather events, particularly due to flooding or landslides following heavy rain or storms TCD04 PAK01 UGA03.

> *"Kohistan is a remote district in the northeast of Khyber Pakhtunkhwa. Last year **flash floods destroyed many health facilities** and markets and people had to travel a long distance to get medical facilities."*
> Dr Akhtar Hussain
> Man, Region, Other global health partner, Pakistan

Even if not completely lost, events such as floods can mean that inundated facilities are **out of action** for several days KEN12.

> *"In the facility where I work, **floods always enter in when it rains**. This affects services for two to three days to allow for the facility to be cleaned up. People are sick and suffer very much."*
> Taphurother Muhonja Mutange
> Woman, Health facility, MoH, Kenya

Extreme weather events can prevent health workers from getting to facilities to work, or cause illness that prevents them from working. Vital **equipment** can also be lost, including that needed for immunization NGA15.

> *"In 2022, there was a massive flood in most states in Nigeria and Bayelsa state, a mostly riverine state, was affected. It was so bad that **even cold chain equipment for immunization was destroyed** and some was disconnected to avoid damage. This has a bad effect on immunization sessions and coverage for most antigens dropped to an all-time low."*
> Dr Avuwa Joseph Oteri
> an, National, NGO, Nigeria

Respondents also highlighted how extreme weather events can be an obstacle **preventing attendance** at healthcare facilities, for example due to disrupted transport or water obstacles TCD02 TCD03 CIV03 GHA10 GMB03 SSD01. A multitude of additional challenges can lead to **delays in help-seeking** for health conditions CIV04 GHA14.

> *"During the rainy season, it is very difficult for people to seek care for their health needs. **They wait for the condition to get worse before coming to the facility**."*
> Alhassan Kenneth Mohammed
> Man, Health facility, MoH, Ghana

"During the rainy periods, populations in landlocked areas faced challenges in accessing healthcare. They were often cut off from rural areas due to flooding, fallen trees obstructing pathways, or impassable roads caused by mud, making it difficult for vehicles to travel."
Ziketo Beugre Arnaud
Man, National, MoH, Côte d'Ivoire

In addition, it was noted that loss of livelihoods and income can mean people are **no longer able to afford health services** TCD01 DRC8 GHA13 KEN06.

"Once it starts raining, it increases. In spite of its increase, ***community members are not able to access healthcare on time because they can't harvest much from their farm produce and do not have money to patronize health services****."*
Eunince Ametorwodufia
Woman, Health facility, MoH, Ghana

Furthermore, **migration** inevitably leads to loss of contact with previously used health facilities. It can have a particular impact on **immunization**, which requires multiple contacts with health services in early years.

"It has come to our attention that certain villages, particularly those in the Guiditi area, have been abandoned by residents who are in search of more fertile land. This has led them to move away from health facilities, which in turn affects the vaccination of their children."
Ali Orchei Halliky
Man, District, WHO, Chad

Gender-related issues can also affect access to health services. For example, **pregnant women** may find it difficult to access antenatal care and to travel to facilities to give birth GIN01 NGA04.

"There was also ***a pregnant woman in labour****. Unfortunately, they couldn't get a strong boat or canoe that could stand the high current and waves coming from the seaside. In the process of searching for a better means of taking her to the nearest health centre, she got exhausted and died."*
Iruoma Chinedu Ofortube
Woman, District, NGO, Nigeria

Other consequences identified for healthcare delivery included disruptions to the distribution of **medical supplies**, leaving facilities short of medicines LSO01. Increased levels of illness due to climate change effects was also reported to be a factor leading to **increased demand for medicines and shortages** KEN05 KEN06. An increased prevalence of anaemia may also lead to less **blood donation** and reduced supply of blood products BFA04.

In addition, higher temperatures may have consequences for the storage and properties of medicines. Disruptions to power supplies can make it difficult to main medicines under specified conditions NGA14.

"We are presently faced with the challenge of change in physical characteristics of some drugs such as acetylsalicylic acid, change in color of metformin, metronidazole, etc. Although we try to meet the standard storage condition at all times by charting the temperature log forms, ensuring the air conditioners are on when there is a power supply and other storage

requirements, ***the increase in temperature these days and poor electricity supply is a challenge to the medicine storage system at the local level****."*
Halimat Adedeji- Adenola
Woman, District, MoH, Nigeria

Delivery challenges have led to innovative solutions, including distribution of medicines by air transport.

"Given the recent climate change and the effects we are experiencing in Maeru Lesotho, we also have considered the use of drones to maximize transport reliability and avoid shortages of life-saving commodities for the people."
Moroke Motuba
Man, National, Other global health partner, Lesotho

Responses and adaptations

Several respondents discussed approaches that are being taken in response to climate-related impacts and to protect the health and wellbeing of people.

Responses were highlighted at a range of levels, from national strategies to address climate change through to local actions driven by local contexts. Although there was some discussion of mitigation actions (such as tree planting), mostly responses focused on adaptations required because of the changing climate and the resulting environmental and social disruption.

Government initiatives have included initiatives to encourage tree planting BFA03 and new environmental protection laws MDG02. Others have attempted to improve water management.

> *"The government of Ghana came out with a policy called Green Ghana. It is a special day in Ghana purposely used for tree planting to regain Ghana's vegetation. The Municipal Assembly in collaboration with the Forestry Commission enacted by-laws to regulate lumbering and charcoal burning within the municipality."*
> Kingsley Kofi Nignere
> Man, District, NGO, Ghana

In some settings, a One Health approach is being adopted, recognizing the links between human, animal and environmental health. One goal of these approaches is to improve surveillance of emerging zoonotic infections NER02.

> *"In response to these challenges, a comprehensive One-Health project has been implemented. As part of this project, a Community Early Warning and Emergency Response System has been established to enhance the monitoring of climate-related impacts and facilitate a swift response to emerging health issues. The implementation of this system has proven effective in addressing various alerts and crises in a timely manner."*
> Bachir Oumarou
> Man, District, NGO, Niger

Government authorities are also having to consider how to adapt national infrastructure, such as roads, to improve climate resilience, and in some cases also relocation of communities BFA03. Early warning systems are also being developed to enhance preparedness for extreme weather events and their aftermath PAK01.

At a more local level, respondents also reported initiatives they were taking with **local communities**. These had a range of goals, including raising community awareness of climate challenge issues DRC12, identifying ways to enhance climate resilience CIV03, encouraging tree planting, promoting good water, sanitation and hygiene practices CIV01 CMR06 and other **disease prevention initiatives** CIV01 NGA13.

> *"My primary objective is to make a substantial contribution to curtailing desertification, which would necessitate a decrease in the excessive felling of*

trees. These trees play a pivotal role as a primary source of income for the local population. To achieve this, I am committed to creating alternative income-generating activities for the youth, thereby providing them with sustainable opportunities while also safeguarding the environment."
Moctar Traore
Man, District, Mali

As was also pointed out, everybody can contribute, sometimes by offering simple advice **NER03**.

"During such hot weather, I have been actively advising people on all occasions to stay hydrated, particularly emphasizing the importance for infants and the elderly. I have gone to the extent of calling relatives and acquaintances in other localities to ensure they are aware of the need for hydration. This outreach has been successful, and I've managed to reach a significant number of individuals without even realizing it."
Djibo Aichatou
Woman, National, MoH, Niger

Several adaptations related to healthcare services were also mentioned, including the use of **drones** to deliver medical supplies when road transportation is difficult and rescheduling immunization sessions to avoid high temperatures during the day **LSO01**.

Extreme weather events can have immediate consequences that require a **shift in health priorities**. In one example, a polio outbreak response team, confronted by a community badly affected by flooding and an outbreak of water-borne disease, postponed its vaccination activities and instead supported recovery efforts **NGA17**.

"In October 2022, I went for polio outbreak support to a state where over six LGAs experienced flooding. Most of their houses, farms, and businesses were destroyed. Many of the people were affected by cholera due to water contamination and poor hygiene. The polio vaccination team and their supervisors were not to administer the vaccines but to be empathetic to the plight of the people by advocating for sandbags and food to the people rather than presenting them with polio vaccines in their time of need. Polio vaccination in such communities had to be postponed to later days when the situation has subsided, and the people were receptive to the teams due to their support at the time of their crisis."
Ismaila Edego
Man, Region, Nigeria

At the personal level, respondents even reported changes they had made to their own growing of fruit and vegetables, because of concerns about increasing contamination **KEN13**.

"We have been used to buying vegetables from vendors. Of late, due to climate change, the harvests have not been good and therefore people resorted to growing vegetables along sewerage areas. I remember my grandchild, one time arriving from boarding school, and after eating, he was writhing in severe painful stomach ache and vomiting. I was so afraid he had cholera. Of course, diseases such as cholera were on the rise. Since then, I resolved to grow my own vegetables in bags to ensure the source. I water the vegetables and get them fresh from my small space."
Wandera Cecilia Nabwirwa
Woman, National, MoH, Kenya

Multiple crises in Uganda

"In the lowlands of Kasese district where I come from, people have become homeless due to melting ice causing floods even in areas where floods previously did not happen. Grass has been contaminated by floods, so many animals die of diseases due to eating contaminated grass. Wild animals like elephants have invaded the local communities in search of food due to prolonged droughts, affecting vegetation cover in the national parks.

In addition, people's farms and gardens have turned into swamps and bushes due to frequent floods and they no longer have land to cultivate for food. The bushes and stagnant water have become breeding grounds for mosquitoes, increasing cases of malaria in areas where it was not a problem initially.

Also, prolonged hot/dry periods of weather and short rainfall seasons have led to poor harvests and thus poverty and malnutrition, especially in Isingiro. There has been an abnormally high incidence of vector-borne diseases like malaria and trypanosomiasis and outbreaks like cholera and Rift Valley fever.

Also, the health infrastructure has been destroyed or affected by floods. Water reservoir tanks burst due to extreme heat experienced during the prolonged dry seasons. Mothers who come to deliver at health facilities lacked water to wash after delivery and even the midwives failed to get water to use for cleaning or scrubbing blood off the floor and delivery beds after delivering the mothers.

In the communities, wells dry up and lack of water to bathe and wash has led to increased cases of diseases such as scabies."

Mugabekazi Jastine
Woman, Health facility, MoH, Uganda

Other respondents described how they hoped to make a difference, for example by planting trees – and setting an example for others **CMR07 DRC13**.

"To combat these challenges, I've created a green environment within my compound by planting trees that act as windbreaks and ensure the safety of my family. While neighboring homes are affected by destructive winds, my house remains secure. Additionally, I've cultivated fruit trees that enable me to provide sustenance for my family throughout the year."
Boubakari Hamadou
Man, Region, NGO, Cameroon

"Personally, recognizing the gravity of climate change, I've committed to dedicating a day to environmental protection. I've allocated two hectares solely for tree planting to contribute to environmental preservation. I earnestly encourage fellow colleagues globally to undertake similar initiatives."
Dr Mitume Mutumwa
Man, National, NGO, Democratic Republic of the Congo

Gender impacts

"The changing climate has brought about an increase in the prevalence of vector-borne diseases. Mosquitoes are now breeding and transmitting diseases like malaria more intensely. The community lacked proper healthcare facilities and resources to effectively combat these diseases, leading to a rise in illness and mortality rates. Mothers' means of livelihood were usually disrupted due to the time and effort spent in caring for their sick children, with a significant impact on household welfare.

Recognizing the urgent need to address these climate-related health challenges, we engaged in community-led initiatives that included comprehensive health awareness campaigns to provide education on sanitation and hygiene practices, and education of residents about preventive measures against vector-borne diseases. By engaging our community health extension workers, we were able to organize regular health check-ups in the communities, focusing on early detection and treatment of illnesses.

Over time, these collective efforts began to yield positive results. The mothers in the communities witnessed improvements in income as they progressively began to spend less time pursuing children's healthcare challenges due to the adoption of preventive measures, thereby becoming more resilient to the changing climate.

This experience highlights the challenges faced by rural communities in Nigeria due to climate change. It demonstrates the importance of community engagement, sustainable practices, and support from relevant stakeholders in addressing the climate-health nexus and building resilience in the face of a changing climate."

Dr Chinedu Anthony Iwu
Man, Health facility, Ministry of Health, Nigeria

Conclusions

This initiative provided an opportunity for more than 1200 health workers from low- and middle-income countries to describe their local experience of the impacts of climate change, and how it is affecting the health and wellbeing of their local communities.

The experiences they share are not intended to "prove" that climate change is happening, or that it is impacting on health. Plenty of rigorous scientific studies have already done that. Instead, they serve an illustrative purpose, highlighting the human impacts of climate change, and the harmful consequences that can be expected as global temperatures rise and the climate becomes more volatile.

The experiences shared highlight how, in the eyes of those affected, seasons are changing, weather is becoming unpredictable and extreme weather events more common. These are leading to a whole host of health consequences.

None of the impacts discussed can be conclusively linked to climate change. But the **experiences reported are consistent with the global trends being rigorously documented**. They illustrate what is likely to become more common in the coming years, with further rises in temperature already guaranteed. **The stories bring out the interlinkages in the whole human-animal-environmental ecosystem -** how one small change in one family causes another problem, which in turn affects someone else and so on**.**

It is also noteworthy that some impacts discussed actually have minimal connection to climate change. Local tree felling probably has no significant impact on local climate. But what these examples illustrate is that **climate impacts are experienced alongside, and intertwined with, those associated with other types of environmental damage**. This, it was noted, has important implications for responses.

> *"It is evident that these issues require a comprehensive and multifaceted approach to address the complex interactions between climate change, infrastructure, public health, and demography."*
> Munganga Barhasima Antoine
> Man, District, NGO, Democratic Republic of the Congo

> *"These challenges highlight the interconnectedness of environmental factors and public health, underscoring the importance of addressing both to ensure the well-being of our community."*
> Arnold-Smith Kawanga Mweni
> Man, International, University/School of Public Health, Democratic Republic of the Congo

Another important theme to emerge from the contributions is that of **vulnerability**. At one level that can apply to whole countries, with the alarm felt by respondents from Kenya mirroring its status as a "climate-vulnerable country". Within countries, those living in particular areas, or with particularly precarious lifestyles (such as pastoralists), are at high risk of impacts. Within these groups, concern was expressed particularly for young children, pregnant women and older people. Wherever they

Protecting the seas

“Several communes in the Toliara 2 district have been grappling with arid soil due to insufficient rainfall for nearly seven years. This has rendered agriculture nearly impossible and triggered a severe famine in the area. Moreover, air pollution is contributing to the prevalence of acute respiratory infections, such as flu or unexplained colds.

Malnutrition has emerged as a major concern, prompting the inclusion of this issue in the weekly epidemiological surveillance reports. The number of children requiring care for malnutrition is steadily increasing. Additionally, influenza remains a dominant diagnosis in outpatient clinics, compounding the health challenges.

The health sector in Tsandamba has taken proactive measures to address these issues. A project focused on marine protection has been initiated, involving a multidisciplinary committee comprising representatives from tourism, environment, law enforcement, health and the prefecture. Unlike other sectors that face challenges with depleting fishery resources and lack of reserves, the Tsandamba sector stands out as a model for human and animal health, marine protection, safety, and the cultivation of seaweed. This initiative has created a favourable and attractive environment that benefits both the local community and marine ecosystems.”

Anonymous
Woman, District, MoH, Madagascar

live, those affected by poverty are likely to have least capacity to respond to climate-related challenges

However, it is also noticeable that respondents are not passive victims. Many are acting, doing their best to hold back climate change within their local realm of action, setting an example for others, and advocating for greater attention to the needs of communities.

> *"It is imperative that decision-makers, leaders, scientists, and other key figures take proactive measures to equip the population with the awareness and readiness to confront potential changes at global, continental, national, and local levels. By fostering an understanding of the shifts and challenges associated with the evolving environment, we can better prepare communities to adapt and respond effectively."*
> Katabuka Baguma Grandpa
> Man, Region, MoH, Democratic Republic of the Congo

Given their strong connections to **communities**, it is no surprise that many respondents see communities at their heart of the climate challenge. A common theme was the need both to raise awareness and to give communities the means to adapt.

> *"Unfortunately, the community lacks awareness about how to address these challenges in a comprehensive manner. It's crucial to initiate a process of mindset change to empower individuals to take meaningful action against the adverse consequences of climatic disruptions."*
> Cimpaka Kabeya Pascal
> Man, Region, Democratic Republic of the Congo

> *"This experience highlights the challenges faced by rural communities in Nigeria due to climate change. It demonstrates the importance of community engagement, sustainable practices, and support from relevant stakeholders in addressing the climate-health nexus and building resilience in the face of a changing climate."*
> Dr Chinedu Anthony Iwu
> Man, Health facility, MoH, Nigeria

Furthermore, respondents described projects in which they had worked with communities on projects to protect health and build resilience to climate impacts.

As seen repeatedly in TGLF immunization-based programmes, these examples again illustrate how **health workers, committed to the health and wellbeing of their local communities, are dedicating themselves to working with communities to find locally appropriate solutions that safeguard health and wellbeing**.

TGLF's goal is to provide a digital learning platform that empowers health workers, by connecting them to both global experts and committed peers with relevant experience and ideas, by applying the latest thinking in learning theory to support their personal development, and by boosting motivation by connecting practitioners to inspiring leaders.

Climate change is a new area for TGLF, and these first events were an initial attempt to see if there is an appetite for peer-based learning within the field of climate change and health, and whether there is potential for a ground-up "movement", like the Movement for IA2030, to develop and apply solutions to climate-related health challenges.

The positive feedback from the event suggests that **connecting climate-committed and community-focused health practitioners could be a driver of action to protect the health and wellbeing of communities**. TGLF now plans to do its utmost to connect, strengthen capacities and inspire health workers addressing climate-related health impacts.

Annex 1
Honouring Contributors

Honouring health professionals as leaders of change

We honour everyone who is joining the Special Event "From community to planet: Health professionals on the frontlines of climate change": health staff from immunization and other areas of health – environmental health and One Health, but also those who fight neglected tropical diseases (NTDs), HIV, and other ailments. We also honour allies, including human rights advocates, those working to decolonize global health, fighting for gender and racial equity as well as economic justice.

Since 2016, the Geneva Learning Foundation (TGLF) has supported a global peer learning network and platform, built by and for immunization staff from all over the world. This is because we believe that practitioner-led peer education is a powerful philosophy for change in the Digital Age.

In 2020, when the COVID-19 pandemic, at least 80 million children under one were placed at risk of vaccine-preventable diseases such as diphtheria, measles and polio as COVID-19 disrupted immunization service as worldwide. Over 6,000 immunization staff from TGLF's immunization network worked together to build the COVID-19 Peer Hub, collaborating on early-learning recovery plans and then preparing strategies to engage communities ahead of the introduction of the COVID-19 vaccines.

In March 2022, this network and platform helped launch the Movement for Immunization Agenda 2030 (IA2030), transforming the world's strategy into local action. IA2030 Movement Leaders are accelerating progress by learning from each other, sharing successes, lessons learned, and challenges, forging together new ways of thinking, learning, and doing to meet the complex challenges ahead. Learn more about the Movement...

We honour these IA2030 Leaders, primarily government workers from districts and facilities, who were the first to respond to the Call to Action of the Special Event "From community to planet: Health professionals on the frontlines of climate change".

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List of the 1028 contributors who shared their experience ahead of "From community to planet" events in July 2023.

Before, during, and after a Special Event, we ask participants to share their experience. We want to recognize and honour everyone who contributes an idea, story or experience, whether or not their story is shared publicly.

We do this after each Special Event to understand what participants are learning, so that we can share lessons learned and insights with everyone.

We do this primarily because it may help colleagues facing similar challenges. It may also help the Foundation and its partners better understand your situation, challenges, and needs.

We ask questions about who participants are and what they do, as well as questions to to understand their level of participation in the Special Event.

For each contribution, we may share the details (such as gender, job category, professional affiliation, country, health system level) that help others better situate a story.

Participants confirm that they understand their contribution, or an edited version of it, may be selected for publication. If so, it will be available online for everyone.

We ask participants to choose whether or not they wish for their name to be shared publicly.

In addition to sharing your contributions publicly, the Geneva Learning Foundation may use experiences shared by participants for research, learning, evaluation, communication and advocacy, or any other purpose consistent with the Foundation's mission. We also use the information to keep in touch with participants.

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Niyonkuru Fabrice (Hopital de District Muramvya, District, ministère de la Santé, Burundi)

Nkosi Lubanza Neville (Kenge, District, ministère de la Santé, République Démocratique du Congo)

Nkunda Mutekete Honoré (Mbujimayi, établissement de santé, ministère de la Santé, République Démocratique du Congo)

Nkurunziza Georges (ASPD, District, ONG, Burundi)

Nsengumuremyi Sébastien (Bujumbura., établissement de santé, Travail À L'hôpital Tanganyika, Burundi)

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Nyakpo Yaovi Emmanuel (District de Lomé, établissement de santé, ministère de la Santé, Togo)

Nzengu Musangu Djo (Aire de santé Tango Hapi, établissement de santé, ministère de la Santé, République Démocratique du Congo)

Nziama Adis Lukas L. Jean-Luc Raymond (Province du Kasaï Central, Région, ministère de la Santé, République Démocratique du Congo)

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Ouedraogo Lassane (Ouagadougou, National, ministère de la Santé, Burkina Faso)

Ouedraogo Ouindbedma Micheline (Ouagadougou, National, ONG, Burkina Faso)

Ouedraogo Salif (Ouagadougou, District sanitaire de Baskuy, District, ministère de la Santé, Burkina Faso)

Ouedraogo W. Hermann (District de Kongoussi, établissement de santé, ministère de la Santé, Burkina Faso)

Oulé Minka Lucie (Abidjan, National, ministère de la Santé, Côte D'ivoire)

Oumar Diallo (Matam, District, ministère de la Santé, Sénégal)

Oumar Magassouba (Centre hospitalier Universitaire (CHU) de Point G, établissement de santé, ministère de la Santé, Mali)

Oumarou Kimba Zenabou (Zinder(District sanitaire de Zinder), établissement de santé, Industrie privée, Niger)

Oumarou Sanda (Ngaoundéré, Région, ministère de la Santé, Cameroun)

Ouro-Djeri Atcha-Gani (Région Des Savanes, établissement de santé, ministère de la Santé, Togo)

Ousmane Traoré (Wemtenga, établissement de santé, Industrie privée, Burkina Faso)

Pafadnam Halidou (Tougan, National, ONG, Burkina Faso)

Pankwa Kitshane Tania (Kinshasa/ Commune de Masina, établissement de santé, ministère de la Santé, République Démocratique du Congo)

Panu Mukala David (Bureau Central, établissement de santé, autre partenaire de santé globale, République Démocratique du Congo)

Patient Kawaya Lubusu (Kinshasa, établissement de santé, actuellement au chômage, République Démocratique du Congo)

Patrick Madjadingar Godoum (District D'adré, District, OMS, Tchad)

Patrick Mutamba (Kinshasa, National, ministère de la Santé, République Démocratique du Congo)

Paul Bialua (Kinshasa, établissement de santé, ministère de la Santé, République Démocratique du Congo)

Paulin Mulogoto Rushanika (hôpital général de référence de Ruzizi/ Sud-Kivu, établissement de santé, ministère de la Santé, République Démocratique du Congo)

Pay Pay Mampasi (Boma, Kongo Central, établissement de santé, organisme d'enseignement ou de recherche, République Démocratique du Congo)

Pinda Yengue Francis Michel (Yaoundé: District de santé de Biyem Assi, établissement de santé, ministère de la Santé, Cameroun)

Rabialahy Zafindravola Célestine (District de Vatomandry, District, autre agence des Nations Unies, Madagascar)

Rachel Lukadi Musoko (secrétariat technique de riposte contre la Covid-19, National, ministère de la Santé, République Démocratique du Congo)

Rachel Ngalula Mulumba (Kinshasa, National, non affilié à une organisation, République Démocratique du Congo)

Rachel Tshiala Ngalula (Division provinciale de la santé du Kasaï Oriental, District, ministère de la Santé, République Démocratique du Congo)

Rachida Soidihane Madi (Moheli, Région, ministère de la Santé, Comores)

Raharimalala Tahiana Herimino (Région Bongolava, Région, ministère de la Santé, Madagascar)

Raharimalalaeliarisoa Joelyne (Antsiranana, Région, ministère de la Santé, Madagascar)

Rakotovao Mamisoa Anicet (Fianarantsoa, établissement de santé, ministère de la Santé, Madagascar)

Ralaizanaka Hery Andriamampiadana (Tulear, Région, Unicef, Madagascar)

Randriamamahatra Sahondra (Tamatave, Région, ministère de la Santé, Madagascar)

Randrianantoandro Harisoa Haingo (Antananarivo ville, National, ministère de la Santé, Madagascar)

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Rasoarivony Siza Sophie (District de Fandriana, District, ministère de la Santé, Madagascar)

Rassidatou Diallo (District sanitaire Sanitaire de Birkelane, District, ministère de la Santé, Sénégal)

Raveloson Vololomboahangy Laingotiana (District de Mananjary - Région Vatovavy, Région, ONG, Madagascar)

Rayam Ringar Théophile (Délégation Sanitaire Provinciale du Lac, Région, ministère de la Santé, Tchad)

Rémy Kasonga (Kasaï Oriental/ Mbujimayi, établissement de santé, ministère de la Santé, République Démocratique du Congo)

Rene Biar (SBC, National, ministère de la Santé, République Démocratique du Congo)

Ridier Mulolo (Province du Kasaï Oriental, Région, autre partenaire de santé globale, République Démocratique du Congo)

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Saidou Modibo (Yaoundé, National, ministère de la Santé, Cameroun)

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Sali Ndjidda (délégation régionale de la santé publique du centre à Yaoundé., Région, ministère de la Santé, Cameroun)

Saliou Thiam (Poste de santé de Malika, établissement de santé, ministère de la Santé, Sénégal)

Sandy Bazelais (Départements Ouest et Sud, National, ONG, Haïti)

Sanli Yentchabré (District d'Agoe-Nyive, District, ONG, Togo)

Sanogo Issouf (Abidjan 2, International, ministère de la Santé, Côte D'ivoire)

Satognon Bertrand (ministère de la Santé Cotonou, National, ministère de la Santé, Bénin)

Sawadogo Ouedraogo Céline Marie Yvonne (Centre médical urbain, District, ministère de la Santé, Burkina Faso)

Sebahire Feza Christelle (Province du Sud Kivu/Bukavu, Région, ONG, République Démocratique du Congo)

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Semde Abdoul Salam Fiacre (Région du Centre-Nord Kaya, Région, ministère de la Santé, Burkina Faso)

Seumbote Emmanuel (Inspection générale de la santé, National, ministère de la Santé, République Démocratique du Congo)

Seydou Mohamed Ouedraogo (International, Freelance Consultant, Burkina Faso)

Seynabou Diagne (dans toutes les régions médicales du pays, National, OMS, Sénégal)

Shaddy Lumanga Kayombo (Lubumbashi, National, non affilié à une organisation, République Démocratique du Congo)

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Sidi Gado Akikatou (Programme national de lutte contre le paludisme, National, ministère de la Santé, Bénin)

Sidiki Keita (Faranah~Tiro, établissement de santé, Mouvement de la Croix-Rouge et du Croissant-Rouge, Guinée)

Sidy Seck (Saint-Louis, Région, OMS, Sénégal)

Sira Jackson (PEV Cameroun, National, ministère de la Santé, Cameroun)

Siribié Mafama (Unité de recherche clinique de Banfora, Région, ministère de la Santé, Burkina Faso)

Sita Mounkaila (Bujumbura, National, Unicef, Burundi)

Sitor Ndour (District de Khombole/ Thiès, District, ministère de la Santé, Sénégal)

Souad Yahyaoui (Gabes, Région, ministère de la Santé, Tunisie)

Soukeyna Fall (Poste de santé, District, ministère de la Santé, Sénégal)

Souleymane Traore (Fosa de Tesserela/District de Baroueli/ Ségou, établissement de santé, ministère de la Santé, Mali)

Soumaïla Traore (District Bamako, National, organisme d'enseignement ou de recherche, Mali)

Sylvain Lumami Kasongo (Inspection générale de la Santé, National, ministère de la Santé, République Démocratique du Congo)

Sylvain P. Mizeka (Ottawa, établissement de santé, Industrie privée, Canada)

Sylvie Nkulu Lenge (Haut-Katanga, Région, ministère de la Santé, République Démocratique du Congo)

Symphorien Edoungatso (Direction de L'hygiène et de La Promotion de La Santé, National, ministère de la Santé, République du Congo)

Tamba Daniel Tenkiano (Direction Prefectorale de La Santé, District, ministère de la Santé, Guinée)

Tamba Gaston Kambadouno (Conakry, National, ONG, Guinée)

Tassembedo Issa (Crts de Tenkodogo Drs-Ce, établissement de santé, ministère de la Santé, Burkina Faso)

Teiggy Birhula Mongane (Kalemie et Bukavu, Région, ONG, République Démocratique du Congo)

Tena Kanma Nanah (Lomé, National, ministère de la Santé, Togo)

Théophile Cibamba Kasanda (Mbujimayi, District, ONG, République Démocratique du Congo)

Théopiste Maloko Litombe (Zone de santé Yakusu, District, ministère de la Santé, République Démocratique du Congo)

Thiam Fatoumata (Conakry, National, ONG, Guinée)

Thierno Aminata Sow (Csa Maferinyah, établissement de santé, ministère de la Santé, Guinée)

Thom's Muti Kalem (Antenne PEV Kikwit, National, ministère de la Santé, République Démocratique du Congo)

Tiaba Kane (District de Vavoua, District, ONG, Côte D'ivoire)

Tiédjougou Nouhoum Coulibaly (Bamako, établissement de santé, Industrie privée, Canada)

Tientcheu Cyrille (District de Mifi, établissement de santé, ministère de la Santé, Cameroun)

Tonguino Tamba Kallas (Conakry, National, ONG, Guinée)

Tounkara Kabinet (Conakry, National, Industrie privée, Ghana)

Traore Brahima (Ouagadougou, National, ONG, Burkina Faso)

Traore Nassoumatan Barakissa (Protection maternelle et infantile de Daoukro, établissement de santé, ministère de la Santé, Côte D'ivoire)

Tsakam Guebou Léa Sandrine Helena (Centre de vaccination international de Bafoussam, Région, ministère de la Santé, Cameroun)

Tshimanga Kabengele Papy (Zone de santé de Miabi, Région, ministère de la Santé, République Démocratique du Congo)

Tshimwanga Songo Augustin (Kolwezi, Région, non affilié à une organisation, République Démocratique du Congo)

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Ugirashebuja Safari (District sanitaire de Giteranyi, District, ministère de la Santé, Burundi)

Ushindi Manegababe Rachel (Zone de santé de Miti Murhesa, établissement de santé, actuellement au chômage, République Démocratique du Congo)

Victoire Odia Kazadi (Mbuji Mayi, Province du Kasai Oriental, Région, ministère de la Santé, République Démocratique du Congo)

Vimbu Oscardo (Kinshasa, établissement de santé, ministère de la Santé, République Démocratique du Congo)

Vivuya Sivahera Christevie (établissement de santé, actuellement au chômage, Kenya)

Watanga Kisongo Patrick (Goma, établissement de santé, actuellement au chômage, République Démocratique du Congo)

Watukwa Nlandu Venale (Kinshasa, National, ministère de la Santé, République Démocratique du Congo)

Yacouba Dembele (District de Bamako, District, ONG, Mali)

Yahdi Hadanama, Infirmier Supérieur, (Région de l'extrême Nord, Mokolo, établissement de santé, ministère de la Santé, Cameroun)

Yala Kiusi (Matadi, Région, OMS, République Démocratique du Congo)

Yamdi Kanou (Lomé, établissement de santé, ministère de la Santé, Togo)

Yamregma Kabore (Ouagadougou, National, ministère de la Santé, Burkina Faso)

Yannet Issac (Ngouri, établissement de santé, actuellement au chômage, Tchad)

Yapouloucé Bamba (Conakry, National, ONG, Guinée)

Yibokou Akouvi (District d'Agoè Nyivé, établissement de Santé, Industrie privée, Togo)

Yoboue Marie Laure (Adiaké, établissement de Santé, ministère de la Santé, Côte D'ivoire)

Youssouf Sawadogo (ministère de la Santé, Burkina Faso, International, OMS, Burkina Faso)

Yumba Kazumba Jean (Kalemie, Région, ministère de la Santé, République Démocratique du Congo)

Yvlouse Innocent (Gonaïves, établissement de Santé, ONG, Haïti)

Zakari Yaou Tahirou Insa (Régionaux Dosso, Maradi, Tillabery et Zinder, National, ONG, Niger)

Zeinebou Sidi Abdoullah (Nouakchott, National, ONG, Mauritanie)

Ziketo Beugre Arnaud (Programme national de promotion de la santé bucco-dentaire, National, ministère de la Santé, Côte D'ivoire)

Zongo Larba (CHU Bogodogo, National, ministère de la Santé, Burkina Faso)

Zoumana Traore (Centre de santé de référence de Bandiagara, établissement de Santé, ministère de la Santé, Mali)

Annex 2
The **Double Loop** on health professional insights from the **frontlines of climate change**

***The Double Loop* is the Geneva Learning Foundation's global health insights newsletter. It shares selected experiences shared by health professionals and encourages recipients to respond with their insights and related experiences.**

Learn more and subscribe: www.learning.foundation/loop

What's in this issue of The Double Loop?

The escalating threats of climate change cast long shadows over global health, including increases in disease epidemics, profound impacts on mental health, disruptions to health infrastructure, and alterations in the severity and geographical distribution of diseases. Mitigating the impact of such shadows on communities will test the resilience of health infrastructure in low- and middle-income countries (LMICs) and especially challenge front line health workers.

For health workers on the frontlines of global health, these shadows touch on their professional and personal lives. Many health workers get to know and be accepted by individual communities over multiple years. While they are not climate scientists, they do observe changes in the environments and health profiles of the communities in which they and their fellow community members live and work.

This issue of The Double Loop includes five experiences of climate change and health shared by contributors to the Foundation's Special Event: From Community to Planet: Health Professionals on the Frontlines of Climate Change.

Short articles based on some of these observations were shared with all event participants, prompting further comment. Under some of the experiences, we include selected responses to the stories.

Sharing your experience and insights

Your experience and insights help other members of the Movement for IA2030. Follow the link at the end of each section to share your comments and feedback.

You choose if you wish to share anonymously or if you want your contribution be named.

You can also share a challenge that you need help with, make a comment or a suggestion for improvement. We may add your comments, stories, and shared learning to the current issue.

You can read feedback from colleagues via the Insights on Insights page.

If you are a **donor**, **partner**, or **researcher** interested in these insights, we encourage you to share your thoughts or write directly to Ian Steed, Insights Unit Editor.

What is your experience of how climate change is affecting community health?

Do you worry about climate change? Tell us about any changes in climate and weather that you have observed. Tell us more about any changes in health that you have observed. Do you believe that the changes in climate and health are related? Why do you believe this? Would you like to share your experience in relation to climate and health?

Jonas Agboko observes linkages between changing climate and physical and mental health in communities in Bénin

Jonas Agboko works as a Community Health Worker for an NGO at District level in Bénin. He has worked in this region for 9 years.

"In the heart of Benin, among the 15 health districts he has served for nearly a decade, Jonas Agboko highlights the ways in which climate change impacts on the health and wellbeing of populations.

"I've observed the emergence of new infectious diseases within the community," Jonas says, "alongside a proliferation of both psychological disorders and malnutrition."

His words hint at a complex relationship between climate and health that goes beyond physical symptoms, suggesting that climate change may have mental health impacts. But why does Jonas believe these shifts in health and climate are related? "The scarcity of rain and flooding psychologically affect the farmers and cause malnutrition and waterborne diseases in the community," he reflects.

Jonas is keen to develop his skills to address this emerging challenge: "Public health is a priority for me, given the urgency of supporting the health system against climate change and infectious diseases today. I really want to continue my studies in public health to be a key player in prevention and social and behavioural.

Guissou K Sylvain from Burkina Faso responds to Jonas' experience, questioning whether there could be a link between deforestation in his community, and an increase in malaria in his own community.

Guissou K Sylvain is a Community Health Worker with the Ministry of Health at District level in Burkina Faso

"Thanks to my Beninese colleague for sharing his story I'd also like to tell you about a phenomenon we've been observing at home. With population growth over the last 5 years, we've noticed a doubling in malaria cases. Demographic pressure has led to clandestine deforestation. Could there be a link with this increase in malaria cases? A question for environmental specialists?"

Mariane Ndesa Ndeb Sarr is a midwife for the Ministry of Health in Sénégal.

Mariane Ndesa Ndeb Sarr also sees a connection between climatic change in her region and scarcity of food.

"Following mention of the climatic change linked to malnutrition, I note that my region of Matam where the temperature is sometimes 45 to 47 degrees is part of the areas most confronted with malnutrition. In the months of April to June people drink more water than they eat."

Zeceña Alarcon works at national level for the Guatemalan Ministry of Health as a Public Health Specialist. She has worked in Guatemala City for 20 years.

Zeceña Alarcon shares her concern for Guatemala City's elderly population during extreme heat periods

"For two decades, Delmy Walesska Zeceña Alarcon has worked for health in Guatemala City."

"There's a noticeable variability in the climate," she says. Guatemala City has experienced more frequent extreme weather disturbances, she says. Extended dry spells, intensified storms, floods, and wildfires have punctuated its recent history. Furthermore, the urban pockets are notably warmer due to dwindling natural spaces, while the sun's intensified rays now demand more caution than before.

She has also observed a surge in various health issues: vector-borne diseases like dengue and Zika, escalating respiratory illnesses, increasing cases of malnutrition due to disruptions in food systems, and heat-induced ailments. She notes a particular concern for the city's elderly population during extreme heat periods. During periods of extreme heat, certain diseases, particularly among the elderly, have seen an uptick. "The morbidity and mortality rates have risen", she sums up.

"I firmly believe these shifts in health and climate are related" says Zeceña Alarcon.

Nicolas Kashama is a public health nutritionist in a health facility in Democratic Republic of Congo

Nicolas Kashama sees parallels between Zeceña Alarcon's experience in Guatemala, and the challenges of poor planning and a changing climate in Democratic Republic of Congo

"Yes, it's true that Zecena Alorcon's experience of climate change and health in Latin America can be almost the same all over the world, because what I've seen here in the Democratic Republic of the Congo is that population density, especially in large cities, has led to a reduction in space, houses are too tightly packed, and there's even a lack of order in the way they're built, with construction on inappropriate sites such as slopes or mountains, lack of drainage in some streets, which leads to odors in the city causing diseases such as cholera, dysentery, and house collapses, fires with repercussions, land disputes, and other forms of killing. With meteorological change, we're even seeing the outbreak of certain diseases that attack even plants, the disappearance of certain basic plants such as banyan trees, which are on the verge of extinction with bacterial houlte, and soil that has become infertile, which is at the root of the various forms of malnutrition that humanity is currently experiencing."

Dr. Satabdi Mitra describes why she sees climate change as a substantial threat to the health of the people in West Bengal

Dr Satabdi Mitra has worked at health facility level for an education and / or research organisation in West Bengal, India for the last ten years

"Natural disasters have increased, rainfall has been irregular and low, the temperature has been hotter," says Dr. Satabdi Mitra, reflecting on the climatic changes she has noticed in her decade of work across West Bengal, India. These also include more frequent extreme weather events, shifts in animal and plant distribution, and the damaging impacts of stronger sunlight.

But it's not just the climate that's changing. Over the years, Dr. Mitra has noted an increase in several health conditions in West Bengal, ranging from waterborne diseases and skin conditions related to increased ultraviolet radiation exposure, to mental health disorders linked to environmental stress. "Increase in skin diseases, heat stress have increased," she elaborates.

When asked about the connection between the shifts in climate and health, Dr. Mitra indicates a strong level of confidence in their relationship, citing as an example an increase in hospital admissions due to heat stress. Of course, she also acknowledges the inherent uncertainty and complexity of definitively proving such a connection.

Nonetheless, Dr. Mitra sees climate change as a substantial threat to the health of the people in West Bengal. From her perspective, the negative impacts are tangible. "Because of climate change, disasters have increased. The government has taken initiatives for need assessment and readiness. Still, they are insufficient," she says.

Caroline Akosile relates Dr Satabdi's experience to her own in Nigeria.

Caroline Akosile is a public health specialist working for an NGO at regional level in Nigeria.

"I can relate to Dr. Satabdi's story on climate change - the decrease in rainfall and its effect on the population. According to her, there is an increase in hospital admission which one can attribute to the heat and diseases that thrive because of the increase in temperature. Also in Nigeria, when there is a change in climate, children react and get sick, especially with a sudden rise in temperature on dry winds carrying pathogens. I understand what Dr. Satabdi went through. But the good aspect of her experience is that her government is taking action using AI. Hopefully, there will be a respite and the response will be worth it there will be more preparedness for climate change henceforth.

Nicolas Kashama compares Dr Satabdi's experience with his own in Democratic Republic of Congo, and describes the effects of changing patterns in the rainy seasons

"Yes, it's true that Dr. Mitra's experience of climate change, especially the decrease in rainfall, would be similar to what we're experiencing here in the Republic of Congo. Here at home, what I've noticed in relation to climate change is that we have two seasons, the dry season and the rainy season. But what we often see, especially in the Ruzizi plain located 90 km from the city of Bukavu in the eastern part of the Democratic Republic of the Congo, is that the dry season often lasts for at least three

months, June, July and August, but sometimes the dry season is extended to 6 to 8 months, and sometimes to a whole year, which leads to transhumance or seasonal migration of herds, disruption of the cropping season, and consequently higher food prices, the disappearance of water sources, and consequently the outbreak of certain diseases such as cholera and so on."

Muneyi Madimutsa is a midwife with the Ministry of Health in Zimbabwe.

Muneyi Madimutsa highlights the need for more planning and investment in health systems to cope with the increased admissions [to health care] resulting from climate change.

"Due to climate change there is a need to have emergency plan in place and provision of adequate resources to all health institutions since admissions are increasing."

For the past ten years, Clara, a public health specialist affiliated with an international organization, has been an integral part of this community.

A health specialist in Peru's Tarapoto district notes worrying trends in diseases and conditions that she sees as related to climate change.

"We have seen tourism decline because of the scorching weather," Clara[1] notes. The sun's intensity seems more aggressive now, making even short outings risky without protection. But the transformations are not just about uncomfortable heatwaves or the reticence of tourists." Urban areas are getting hotter with fewer natural resources to act as a buffer. The very environment seems to be reacting," Clara observes.

Clara notes a worrying trend: "Dengue cases have surged in the recent months." But it doesn't stop there. The district has also witnessed a spike in heat-related illnesses, UV radiation-induced skin conditions, sleep disturbances due to temperature extremes, and disruptions in healthcare infrastructure. The vector-borne diseases—not just dengue, but chikungunya, Zika, and others—are on the rise.

Clara believes there is "at least an empirical and observational relationship in my region between climate change and the emergence or increase of certain diseases."

Wandera Cecilia Nabwirwa, a health worker for more than 25 years, works at the national level for the Ministry of Health in Nairobi County, Kenya.

Wandera Cecilia Nabwirwa describes environmental changes in Nairobi County, Kenya, linking them to the resurgence of cholera in the region

"Wandera Cecilia Nabwirwa has worked for 29 years as a health worker serving an estimated population of 5.3 million inhabitants in Nairobi county.

Wandera's observations paint a vivid picture of a community wrestling with the domino effects of climatic shifts. There are increased occurrences of flooding, drought, and extreme temperatures. "The ban on logging of trees was lifted, exposing the country to more harsh climate and weather changes," she believes.

Equally significant are the health implications of these changes. The repercussions range from malnutrition resulting from disrupted food systems, to the resurgence of waterborne diseases like cholera. "We are experiencing re-emerging health conditions such as cholera, due to water shortage and poor hygiene conditions especially in non-formal settlements," says Wandera.

1. Clara is a pseudonym for a health worker who did not want to be identified

Informal settlements on the river banks were swept away during heavy rains and floods. Soon, we started getting increased reports of cholera outbreaks, a disease which had been controlled," she explains.

Wandera also shares a very personal story. She recounts how reduced harvests, likely tied to changing climate conditions, led to a local practice of growing vegetables along sewage areas. This, in turn, precipitated health issues within her own family.

"I remember my grand-child, one time arriving from boarding school and after eating, he was writhing in severe pain with stomach ache and vomiting. I was so afraid he had cholera. Since then, I resolved to growing my own vegetables in bags to ensure that I eat from a source I am sure of."

Djah Olivier Raphaël asks what steps have been taken to protect other people in Wandera's area against cholera.

"Wandera's personal story about her grandson is a moving one, and I'd just like to know what action has been taken in this locality to protect a large number of people. Faced with this disease, cholera linked to climate change."

Djah Olivier Raphaël is a Ministry of Health Doctor in Côte d'Ivoire at District level.

About this issue of the Double Loop

Sample description

Sample and content: 4700 contributors for the Special Event were invited to share their experiences and concerns relating to Climate Change and Health through an online questionnaire containing structured questions in July 2023.

1362 responses have been received (667 in French, 695 in English) as of 23 August 2023.

Generative AI was used to produce a first draft of a consolidated story for selected questionnaire responses. The draft was then edited by humans from The Geneva Learning Foundation.

These drafts (the lead stories in the text above) were then shared via social media and email to registered participants for the Special Event. Recipients were invited to share reactions to this content through an online questionnaire containing structured questions. 78 reactions were received from event participants (40 in French, 38 in English); selected reactions are included as comments in the newsletter above.

All French submissions were translated through an online translation tool, before being reviewed by humans from The Geneva Learning Foundation.

Original languages: English and French.

Formats available: Qualitative narratives with structured demographic data and consent information (Excel).

Known limitations: Participant case studies and stories are self-reported and are not verified by TGLF.

Additional considerations about the data presented

The Double Loop shares data from self-selecting immunization professionals committed to supporting their peers through experience-sharing. Data are self-reported and are not verified by TGLF. Some datasets are peer-reviewed and this peer feedback has been used by contributors to improve quality.

The Double Loop contents are vetted by academics and practitioners with significant sectoral experience for technical accuracy and credibility prior to sharing. However, inclusion of experiences and comments in TGLF Insights does not imply a recommendation on the part of the Foundation or its partners. The Foundation does not endorse any particular strategy, approach, or reflection shared by participants, and explicitly advises against inferring conclusions from context-specific cases that may not be generalizable. Users are solely responsible for assessing the ethical, legal and practical implications of using material shared by peers, and in particular the need to adapt practice between contexts.

All submissions have the author's permission to be used by TGLF for purposes of communication, advocacy, capacity building, and research.

Credits

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Note: The opinions and statements expressed in The Double Loop are those of the individual contributors and do not necessarily reflect the official stance of their respective Ministries of Health or other employers. While contributors share their affiliations, they are participating in a personal capacity, and their contributions should not be considered as representing the views or endorsements of their affiliated organizations.

Annex 3 **Global insights** into the rationale for **listening to health professionals** to understand the health impacts of climate change

In advance of the July 2023 learning event, TGLF published three global perspectives to encourage reflection on climate change impacts and the rationale for ensuring that health workers have a voice in global dialogue.

- **Learning from frontline health workers in the climate change era:** Julie Jacobson (Bridges to Development), Alan Brooks (Bridges to Development), Charlotte Mbuh (TGLF) and Reda Sadki (TGLF)
- **What does immunization have to do with climate change?** Reda Sadki (TGLF)

These think pieces are included below.

Learning from frontline health workers in the climate change era

Julie Jacobson (Bridges to Development), Alan Brooks (Bridges to Development), Charlotte Mbuh (TGLF) and Reda Sadki (TGLF)

The escalating threats of climate change cast long shadows over global health, including increases in disease epidemics, profound impacts on mental health, disruptions to health infrastructure, and alterations in the severity and geographical distribution of diseases.

Mitigating the impact of such shadows on communities will test the resilience of health infrastructure in low- and middle-income countries (LMICs) and especially challenge frontline health workers. The need for effective and cost-efficient public health interventions, such as immunization, will evolve and grow.

Health workers, approximately 70% of which are women, that provide immunization and other health services will be trusted local resources to the communities they serve, further amplifying their centrality in resilient health systems.

Listening to and building upon the experiences and insights of frontline health workers as they live with and increasingly work to address the manifestations of climate change on health is pivotal to the collective, global response today and in the years to come.

We imagine a future of health workers connected to each other, learning directly from the successes and challenges of others by choosing to engage in digital, peer-supported, peer-learning networks regardless of the remoteness or location of their communities. Success will lie in a nimbleness and ability to quickly see new emerging patterns and respond to evolving needs of individuals and communities.

Such a future shines a light on the importance of new ways of thinking about global health, leadership, who should have a "voice", starting from a position of equity not hierarchy, and the value that peers ascribe to each other. The hyperlocal impact of climate change on health cannot be mitigated only through global pronouncements and national policies. It requires local knowledge and understanding.

Recognizing this unique position of health workers, Bridges to Development and The Geneva Learning Foundation, two Swiss non-profits, are supporting this first-ever, large peer-learning event for frontline health workers to share their experiences and insights on climate change and health.

More than 1,100 health workers have already shared their observations of changes in climate and health affecting the communities they serve in over 60 countries. They will be sharing their stories and insights at the Special Event: From community to planet: Health professionals on the frontlines of climate change, but you can already read short summaries from Guatemala; India and Mongolia; Bénin, Gambia, and Kenya.

Starting from a Call to Action shared through the Movement for Immunization Agenda (IA2030), the call has "gone viral" through local communities and districts: over 4,500 people – most of them government workers involved in primary health care services in LMICs – registered to participate and contribute.

Almost every health worker responding says that they are very worried about climate change, and that, for them, it is already a grave threat to the health of the communities they serve.

Taken together, their observations, while imperfect, paint a daunting picture. This picture, consistent with global statistics and other data, helps to bring to life global pronouncements of the dire implications of climate change for health in LMICs.

Amid this immense and dire challenge lies an opportunity to shift from a rigid, academically-dominated approach to a decentralized, democratized recognition and learning about the health impacts of climate change. This shift underscores the importance of amplifying insights from those who are bearing the brunt of the consequences of climate change, and recognizing the special role of health service workers as bridges between their communities and those working elsewhere to address similar challenges.

This perspective requires those of us working at the global level to critically evaluate and challenge our biases and assumptions. The notion that only climate or health specialists can offer meaningful insights or credible solutions should be questioned. The understanding of climate change's impact on epidemiology of disease, mental health and other manifestations – and the strategies employed to mitigate them – can be substantially enriched and sharpened by welcoming the voices of those on the frontlines. By doing so, we can foster a more comprehensive, inclusive, equitable and effective response to the challenges posed by climate change.

The thousands of members of the Movement for the Immunization Agenda 2030 (IA2030) and others who have initiated this global dialogue around climate and health may be forging a new path, showing the feasibility and value of the global health community listening to and supporting the potential of frontline health workers to shine the brightest of lights into the shadow cast worldwide by climate change.

What does immunization have to do with climate change?

Reda Sadki (TGLF)

With climate-driven shifts in disease patterns and emerging health threats, the need for a robust immunization infrastructure is more obvious than ever. As the demand for both existing and novel vaccines rises in response to an expanding disease burden and new health threats, immunization staff will inevitably play a key role.

Immunization staff, trusted health advisors to communities, already stand as sometimes-overburdened but always critical actors in resilient health systems.

These professionals, entrusted with administering vaccines, contribute to preventing disease outbreaks and maintaining population health. Furthermore, their direct engagement with local communities, their intimate understanding of community health concerns, and their role as trusted advisors position them to recognize and respond to emerging health needs.

The role of immunization and other primary health care (PHC) staff as health educators becomes increasingly pertinent in a changing climate. By leveraging their experience in working with communities to understand and accept health interventions, immunization staff can help those they serve to make sense of the complex relationships between climate and health – and develop appropriate responses.

Through digital networks, we see health professionals connected to each other, learning from each other's successes, lessons learned, and challenges. We imagine that these networks, if properly nurtured and sustained, will become increasingly important as health workers face the interconnected consequences of climate change on health within the local communities where they work for health. This also require new ways of thinking and new leadership, in addition to a new kind of digital health infrastructure to support turning learning into action.

As we step into a world facing escalating health threats from a changing climate, the crucial role of immunization staff in protecting communities will become more pronounced.

Existing approaches – even the ones that so impressively moved the needle of vaccination coverage and health in the past – may now need to be reconsidered and adapted to face new challenges and new threats that we know are coming.

By supporting the will and commitment of immunization staff who are concerned about the consequences of climate on health, and then expanding to include other health professionals, we may find that immunization can serve as a pathfinder to strengthen health systems and promote health equity. We may even find practical, meaningful ways for frontline health professionals and communities to forge together a new leadership for global health.

Annex 4
Selected **Contributions**

Afghanistan

AFG01 *"In Afghanistan climate change is a big problem, especially in the Urozgan province where more than 80% of people use natural water sources. Due to climate change,* ***they don't have access to safe and clean/healthy water and secure foods****. It's affecting whole communities, especially children, as* ***we are seeing increases in diseases, diarrhoea, malnutrition and abortions****, which increase the mortality of young children and pregnant mothers."*

Mohammad Zarif "Nizafat"
Man, Region, Afghanistan

Benin

BEN01 *"The primary concern revolves around* ***the forced displacement of the population into highly unsanitary environments****. This situation arises from the pressing threat of* ***encroaching seas****, compelling people to leave their homes unexpectedly. Our efforts have involved reaching out to the displaced communities in their places of refuge, providing essential services such as vaccinations and distributing long-lasting insecticidal nets (LLINs) to protect them from vector-borne diseases."*

Anonymous
Women, District, MoH, Benin

Burkina Faso

BFA01 *"****Access to drinking water*** *has become a scarce commodity, and during the dry season, we often experience periods of three to four days without water. The rainy season is short-lived, resulting in* ***meagre harvests*** *by its end. In terms of health, the area has a* ***high rate of chronic malnutrition among young children****, as well as cases of anaemia. Nouna is categorized as part of the region known as the "Granary" or Agro-Pastoral Zone. These areas traditionally provide food during the lean season to other regions and even neighbouring countries. In recent years,* ***nutritional surveys have highlighted a serious issue of malnutrition among young children****."*

Anonymous
Woman, National, MoH, Burkina Faso

BFA02: *"For several years, the **pattern of rainfall** has been becoming increasingly irregular. **The duration of the rainy season is progressively getting shorter, interspersed with periods of drought**. This unpredictability makes it challenging for farmers to adjust their crop choices according to the rainfall pattern, leading to growing concerns. Discussions about the upcoming rainy season can induce anxiety and worry among rural communities. When it comes to the impact of climate change on mental health, we can observe a **significant disturbance in the well-being of farmers**. Even just a couple of days without rainfall can trigger a sense of sadness among them. Instances of minor depression have been noted among household heads who helplessly witness their crops withering due to inadequate moisture. In terms of physical health, there has been **an uptick in the prevalence of diseases and conditions that can be attributed to changes in dietary habits**. Conditions such as hypertension, diabetes and obesity are on the rise. This can be linked to the shift towards consuming industrially processed foods that are low in nutritional value and high in chemical additives."*

Coulibaly Seydou
Man, District, MoH, Burkina Faso

BFA03: *"To address climate change and its consequences in Burkina Faso, several strategies have been implemented: **1. Environmental Initiatives:** Every August is designated as "Tree Month" with reforestation campaigns aimed at increasing forest cover. There is also a policy in place to reclaim degraded lands and combat bushfires. **2. Health Measures:** The Ministry has adopted a multi-risk emergency preparedness and response plan that incorporates the management of natural disasters, including floods. This plan is designed to mitigate the health impacts of climate-related events. These efforts reflect the country's commitment to tackling the challenges posed by climate change and its effects on both the environment and public health."*

Youssouf Sawadogo
Man, International, WHO, Burkina Faso

BFA04: *"The Centre-East Region was previously one of the wettest areas in the country. However, climate change has led to the **displacement of pastoral communities** to neighbouring Ghana. The Sablogo Forest has been occupied by farmers, and with the support of the state, the IUCN cleared out these populations. As a result, there has been a **rise in starvation and acute malnutrition, especially among children**. The filling of the Bagre Dam poses a threat of breaking, which could lead to flooding of the fields. Health centres are receiving cases of acute malnutrition due to insufficient food availability. **Blood donors are becoming less motivated due to the increasing prevalence of anaemia**. The consequences of climate change have had enormous impacts on the local population."*

Tassembedo Issa
Male, Health institution, MoH, Burkina Faso

Cameroon

CMR01 *"Heavy rains are causing floods along the roads, there is an increase in malaria in the community, and too many people have the flu or get ill now. Where I live in Buea, **the flood from Mount Cameroon took away all belongings of people in my***

***neighbourhood and killed a secondary school student who was playing football with his friends**."*
Bie Lilian Mbando
Woman, Region, Education or research organization, Cameroon

CMR02: *"In the Bamusso subdivision, **those who do not have access to drinking water are forced to go long distances to access water** which is still not very portable. However, due to the rainfalls, they can't move and are forced to drink rainwater and store it for later consumption. Rainwater is not potable, and this puts them at risk of contracting diseases of potential outbreaks such as cholera."*
Souvat Dohsen Margaret
Woman, Region, NGO, Cameroon

CMR03: *"There is a determination to address the challenges **albinos** face due to climate change. A listening centre will be established with awareness and support materials to combat early-age skin cancer."*
Etoua Ekabe Carine Elisabeth
Women, Health institution, Private Industry, Cameroon

CMR04: *"In recent years that I have spent in Yaoundé, I've noticed that the **frequency of rains is not as regular** as it was in the years prior to 1995. Nowadays, even heavy clothes dry quickly after washing. During the dry seasons, numerous **insects invade houses**, causing panic and fear among the population. Plantain production is suffering, and the harvests of coffee and cocoa have also declined. There has been a recent **surge in cholera epidemics** due to the lack of rain to drain the gullies. Cholera outbreaks are becoming more common as rainfall decreases. Additionally, **respiratory diseases, including chronic coughs, are prevalent due to the abundance of dust in the prolonged dry season**. The unchecked felling of trees in the forest, without proper transplantation, makes the protection of nature difficult and results in various adverse weather conditions."*
Sali Ndjidda
Man, Region, MOH, Cameroon

CMR05: *"When we relocated to our house in 2010, the area was sparsely inhabited. The air was clean, and a small stream flowed beneath our dwelling. Back then, we disposed of our household waste into this stream, which naturally carried it away. However, due to the decreasing rainfall during dry seasons, the once-flowing stream dried up. Now, when we dispose of garbage there, it accumulates and becomes a breeding ground for mosquitoes. Consequently, malaria has become more prevalent in our area. Yaoundé, also known as the "City with Seven Hills", possesses numerous low-lying areas. **These lowlands tend to harbour stagnant and contaminated water**. This has led to a cholera epidemic in the population of Yaoundé, which we are working to combat. Addressing the challenges in our area, where haphazard construction disregards urbanization plans and the terrain facilitates the drainage of waste and wastewater from the hills to the lowlands, is crucial."*
Kengne Mangoua Chanceline
Women, Health institution, MOH, Cameroon

CMR06: *"**The temperature has notably risen during both daytime and nighttime**. As a result, **water sources are drying up**, which poses challenges for farming and contributes to the growing issues of hunger and malnutrition. There's a noticeable trend of the **population migrating away from the village** due to these adverse conditions. Interestingly, the occurrences of typhoid fever cases have decreased, but unfortunately, **we are currently grappling with a cholera epidemic**. To address the water scarcity problem, we initially considered creating an irrigation system from Sanaga to Bafia. However, this endeavour proved to be quite costly. In response, we have explored an alternative approach of constructing wells equipped with pulley systems to facilitate water access for the population. Additionally, **we plan to educate households on water purification methods** to ensure the safety of the available water sources."*

Anonymous
Women, Health institution, MOH, Cameroon

CMR07: *"There are too many **waterborne diseases, a high prevalence of malaria, and child malnutrition** due to precarious food conditions resulting from low crop productivity. The occurrence of numerous diseases persists throughout all seasons, be it dry or rainy. To combat these challenges, **I've created a green environment within my compound** by planting trees that act as windbreaks and ensure the safety of my family. While neighbouring homes are affected by destructive winds, my house remains secure. Additionally, **I've cultivated fruit trees** that enable me to provide sustenance for my family throughout the year. Despite the challenging climate of the Sahel, I successfully cultivate grapes and plantains."*

Boubakari Hamadou
Man, Region, NGO, Cameroon

CMR08: *"The climate has become unusually hotter than normal. The rainy season has become shorter. Some crops don't produce well due to these changes. People suffer more from malaria. A lot of **heat at night causes profuse sweating and disturbs sleep**."*

Eselem Clovis Enyopeh
Man, District, NGO, Cameroon

Central African Republic

CAR01 *"The city of Bambari is intersected by the Boukako stream, which used to flow into the main Ouaka river and gave its name to the Ouaka Prefecture. About 5 to 10 years ago, the Boukako stream was broad and teeming with fish, allowing some people to engage in fishing activities there. However, at present, the **river has nearly dried up**, making fishing activities and sand collection for construction more challenging. This change in the climate has led to **job losses** for some individuals and a subsequent **decline in income** for many families. The impact of climate change on health in our region is evident through the **scarcity of urban water sources and the drying of household wells**. This scarcity has made it difficult for local gardeners to access water for irrigating their vegetable beds. As a result, **the prices of these food crops have increased in the market, posing difficulties for some families to afford sufficient food**. This has led to the emergence of cases of malnutrition, primarily affecting children aged 6 to 59 months.*

An example I have recently observed on the ground is in Grimari, a town situated 80 km away from Bambari along the Bambari-Bangui axis. In response to this situation, the COOPI NGO conducted food distributions in Grimari during May and June 2023. Children aged 6 to 59 months who accompanied their parents during these distributions were ***screened using the mid-upper arm circumference (MUAC) method to identify moderate or acute malnutrition cases****. The Grimari District Hospital collaborated in providing treatment for these cases. The reported numbers are as follows: (i) March = 6 cases, (ii) April = 18 cases, (iii) May = 24 cases, and (iv) June = 30 cases."*

Dr Ganda-Te-Grembombo François-Désiré
Man, Region, UNICEF, Central African Republic

Chad

TCD01 *"Over the last 2 years, we have observed a* ***decrease in the attendance of the population at the health service, primarily attributed to poverty*** *exacerbated by floods, challenges in agriculture, and a decline in job opportunities for recent graduates. In Ndjamena, during the same period,* ***there has been a noticeable rise in cases of non-communicable diseases like hypertension and diabetes within the consultation service****."*

Dr Djoissenanbaye Elysee
Man, Health institution, MoH, Chad

TCD02: *"In Lake Chad, during the rainy season, the various arms of the lake expand, causing flooding that affects the villages situated along its shores. This flooding often forces the inhabitants to relocate to higher ground. However, a* ***significant portion of the population around the lake lacks proper sanitation facilities, leading to open defecation near the water's edge****. As the water levels rise, this practice contributes to the spread of diseases, particularly when access to healthcare facilities becomes challenging.* ***Access to healthcare centres is hindered by the need to cross one or two bodies of water*** *before reaching the nearest facility. This geographical challenge adds to the difficulties faced by the affected population. Consequently, a range of diseases can emerge and afflict the community due to these conditions.* ***The combination of poor sanitation practices, flooding, and limited access to healthcare facilities creates a complex situation that requires concerted efforts to improve living conditions, sanitation infrastructure, and healthcare access for the people living around Lake Chad****."*

Dieudonne Tanasngar
Man, Health institution, MoH, Chad

TCD03: *"In Tandjile, the* ***roads are in poor condition****. The period from July to October sees abundant rainfall leading to flooding.* ***During this rainy season, tracks are washed out, making movement almost impossible****. Access roads are also cut off, exacerbating the situation with floods.* ***The population of Tandjile faces significant challenges in accessing health services due to these conditions****. Health workers are also* ***unable to reach the population to provide essential services such as vaccination****. The main challenge is to ensure the continuation of supervision activities at health centres during the July to October period. It is crucial that health centres are able to provide the population with proper curative, preventive,*

and promotional care. This is necessary to address the difficulties caused by the flooding and to ensure the well-being of the population."
Birba Paul
Man, International, WHO, Chad

TCD04: *"Batha is the first pastoral province, often experiencing **prolonged droughts followed by irregular and sometimes excessive rainfall**. These climatic variations lead to **challenges in cattle herding, house collapses, and difficulties in sustaining pastoralism**, which typically lasts only 2 to 3 months. Pastoralists often migrate southward with women and children following them. Consequently, malnutrition prevails, affecting over 14% of the population, with women and children being the most vulnerable. Women who remain in the villages demonstrate resilience by engaging in limited market gardening and gathering wild oilseeds to produce sweet syrup for porridge. **A significant issue is the death of animals between March and June due to inadequate pasture and water**. This impacts the most vulnerable, particularly women and children. Batha Province, once renowned for its diverse flora and fauna, has seen the disappearance of most animals except for birds. **Hyena attacks have become frequent as they search for food in communities, often targeting domestic pets**. Health infrastructures bear the brunt of tornadoes annually, with solar fridge installations in health centres occasionally transferred from other areas. A low prevalence of malaria was once observed, leading to chemoprophylaxis campaigns. Since 2020, frequent floods have disrupted road communication, impacting the supply of health facilities. Challenges persist in disease surveillance, the One Health approach, and health service management, emphasizing the complexity of the health situation in the region."*
Fokzia Elijah
Man, Region, MoH, Chad

TCD05: *"Goundi used to be free from mosquitoes, but recently there has been a **significant increase in mosquito populations, and as a result, malaria has become the primary reason for medical consultations and deaths**. It has come to our attention that certain villages, particularly those in the Guiditi area, have been abandoned by residents who are in search of more fertile land. This has led them to move away from health facilities, which in turn affects the vaccination of their children. Additionally, **the scarcity of food products has resulted in malnutrition**, giving rise to conditions such as marasmus, kwashiorkor, anaemia and scurvy."*
Ali Orchei Halliky
Man, District, WHO, Chad

TCD06: *"The Lake Chad region is characterized by a population engaged in agro-pastoral and fishing activities. However, herders struggle due to the **scarcity of grazing areas**, necessitating long-distance migration. Cultivators face challenges in finding sufficient arable land due to **desert encroachment**. Fishermen also encounter difficulties in locating fish as the **water level of Lake Chad has been reduced by drought**. The effects of climate change are evident in the region through **frequent and intense winds accompanied by dust** from November to May, spanning about seven months. The vegetation cover, including trees, firewood, and green grasses, has become scarce, leaving only sand and stunted thorny shrubs. The region's fauna has also been affected. **Ongoing conflicts between herders and farmers over grazing grounds persist**, exacerbating food insecurity. The primary challenge lies*

in the capacity of both the population and the government to address the consequences of climate change."
Rayam Ringar Théophile
Man, Region, MoH, Chad

Côte d'Ivoire

CIV01 *"Climate change is having a detrimental impact on the health of our community. Over the past three consecutive years, the **rainfall patterns have shifted**, affecting sowing periods and making it challenging for the community to distinguish between seasons. The **unusual and intense heat is severely affecting health**, with nights becoming progressively hotter and causing heatstroke, particularly among the youngest (0-5 years). Another concerning consequence is the **appearance of harmful insects**, which start biting populations from as early as 6 p.m. (local time). Additionally, due to persistent drought, **wells are drying up year-round**, posing a significant challenge in accessing clean drinking water. The month of March 2023 marked the beginning of the rainy season, yet paradoxically, this is when we observed the drying up of wells. It's a perplexing situation. Just 28 days ago, a gentleman who had undergone hernia surgery suffered a mental breakdown. The **prevalence of malaria has seen a significant increase**. In fact, for the past three years, malaria alone has accounted for 98% of the reasons for medical consultations. This burden is compounded by cases of abdominal syndromes and dermatological issues."*
Kouakou N'Guessan Antoine
Man, Health institution, MoH, Côte d'Ivoire

CIV02: *"The population is facing **increasing poverty, leading to reduced access to healthcare services**. In response, we have conducted **awareness sessions** during meetings organized by administrative and prefectural authorities. These sessions aim to promote awareness campaigns among water distribution companies to enhance the quality of their service delivery. Additionally, we have encouraged the population to **increase the number of boreholes**, which provide access to clean drinking water. We have also emphasized the importance of **using impregnated mosquito nets** and taking measures to eliminate breeding sites, which can help reduce the incidence of malaria. These initiatives are crucial for improving public health and mitigating the impacts of changing environmental and climate conditions."*
Kouadio Raphael N'Guessan
Man, District, MoH, Côte d'Ivoire

CIV03: *"Numerous projects are being initiated at the regulatory level, focusing on infrastructure, equipment, drugs and human resources. There is extensive sensitization taking place in various regions of the country, aiming for behaviour change communication. In my capacity as a dental surgeon in the Department of Fresco, I served a population of over 180,000 inhabitants. Despite being the sole dental surgeon, I was responsible for the oral health of this entire population. **During the rainy periods, populations in landlocked areas faced challenges in accessing healthcare**. They were often cut off from rural areas due to flooding, fallen trees obstructing pathways, or impassable roads caused by mud, making it difficult for vehicles to travel."*
Ziketo Beugre Arnaud
Man, National, MoH, Côte d'Ivoire

CIV04: *"Climate change has modified the programmes of cultural practices.* ***The dry seasons have become longer, and the rains are more unpredictable****, leading to a* ***permanent state of stress in the communities****. At the start of the rainy season,* ***cases of disease are neglected and not immediately taken to the health centre****. Vaccination and other promotional activities are no longer priorities for the populations. Patients come to us directly from the fields, and promotional activities are carried out in the households. The populations, given the scarcity and modification of rainfall, care more about securing their culture. This brings care closer to the requesting populations through the use of community health workers."*

Fofie Kouakou Yacouba
Man, Health institution, MoH, Côte d'Ivoire

CIV05: *"****Arable land is becoming increasingly scarce*** *as a result of factors such as water scarcity during droughts.* ***Floods wreak havoc on crops, devastate homes, and even lead to the destruction of entire villages****. The intensifying urban heat exacerbates the situation, prompting many to invest in air conditioners and fans. However, these amenities are not accessible to everyone due to their cost. The imbalanced climate also* ***strains human relationships within cities****. People find it challenging to accommodate others in their homes due to the discomfort caused by the climatic conditions. This can lead to tension and strained interactions among residents."*

Mamoudou Ouattara
Man, District, NGO, Côte d'Ivoire

Democratic Republic of the Congo

DRC1 *"In the south-central region of the Democratic Republic of Congo, specifically in Lubumbashi, Haut-Katanga Province, where I reside, climate change presents significant public health challenges. This is especially true as we live in a* ***mining area****, experiencing a rise in temperature between the months of August, September and November. These temperature increases pose risks to individuals with heart conditions, as there is a higher likelihood of heart failure or heat stroke during particularly hot weather. In response to these heatwave episodes, our health organization emphasizes the* ***importance of regular water consumption****, advocating for a minimum of 3 litres of water per day per person to prevent dehydration. Severe dehydration can potentially harm the kidneys and even lead to kidney failure in extreme cases. The kidneys, responsible for filtering blood, may not perform as efficiently under these conditions. Furthermore, this climate-related situation also brings about* ***sleep disturbances****. People find it challenging to sleep properly, particularly when the temperatures are high at night.* ***Residents of Lubumbashi, for example, experience shorter and less restful sleep due to the difficulty in cooling the body down, exacerbated by a decrease in tap water availability****. This trend is projected to intensify over the next five years. Amidst these challenges, we seek greater financial support to enhance our commitment to aiding individuals with albinism in my province."*

Kiongo Yambayamba François
Man, Health institution, NGO, Democratic Republic of the Congo

DRC2: *"Climate change remains a significant threat to the health of the people in Kinshasa. To illustrate, let's consider the city of Kinshasa where the effects of climate*

change have become increasingly evident over a specific period. In recent years, ***Kinshasa has experienced unpredictable patterns of sunshine and temperature increases****. This has led to the multiplication of erosion occurrences, resulting in the destruction of homes, and unfortunately, loss of human lives and property. Additionally, these climatic shifts have caused road closures, disrupting traffic flow and causing shortages of essential fuels and necessities. In some instances, these conditions have contributed to reduced production in companies. While I'm not an environmental specialist, there seems to be a plausible cause-and-effect relationship between the observed global warming and specific factors within the city. Moreover, beyond the temperature increase, Kinshasa grapples with erosion concerns.* ***Once adorned with trees, the city has lost its forests due to deforestation****, without any subsequent reforestation efforts as part of the global warming mitigation strategy. Further compounding the problem,* ***plastic waste improperly managed by the population blankets the ground****, making it difficult for the soil to effectively absorb rainwater. Additionally, clogged gutters in various locations contribute to flooding, which in turn triggers erosion, leading to loss of life and other unfortunate events. Another observation in Kinshasa is the presence of specific skin diseases attributed to sunburn and daily exposure to ultraviolet rays. Conditions such as hyperpigmentation of the facial skin have been observed in individuals who have previously used hydroquinone-based cosmetic products. Additionally, stress related to traffic congestion poses a health problem.* ***The city's extensive number of vehicles and motorcycles, combined with limited passable roads for efficient private and public transportation, result in stress and anxiety for commuters****. This situation often leads to heightened stress levels and even a sense of unease, especially for those who need to navigate the city swiftly. A driver told me, 'In the morning, my main concern isn't just arriving at work on time; I'm more focused on planning the route to avoid traffic jams.'"*

Charles Nday Mwadiavita
Man, District, MOH, Democratic Republic of the Congo

DRC3: *"Drought and dust are common in Lubumbashi, which is situated in a mining area. Many people in the region suffer from diseases linked to mineral exposure due to a lack of protection, insufficient water, and a diet with spoiled products.* ***These environmental changes contribute to the persistence of diseases such as malaria and typhoid fever****, leading to the development of resistance to common drugs. As a result, the population needs to resort to more expensive products for treatment, which negatively impacts their household budgets. Climate change also leads to water scarcity, forcing the population to use impure water sources. This, in turn, causes diseases such as cholera, contributing to a high mortality rate, particularly among children."*

Anonymous
Man, Health institution, MOH, Democratic Republic of the Congo

DRC4: *"Over the past 5 years, Kalemie has experienced a* ***significant rise in temperatures****. Even during what used to be the cold dry season, the heat has become intense. Alongside this, there has been a* ***noticeable scarcity of fish in the lake****, coupled with* ***episodes of strong winds*** *that inflict substantial damage to homes and infrastructure. The heightened temperatures have led to an* ***increase in cases of dehydration due to heat exposure****. Additionally, despite efforts, cholera continues to be endemic in the region. The prevalence of respiratory diseases has also*

risen, likely due to a combination of environmental factors influenced by climate change. ***These challenges underscore the urgent need for comprehensive strategies to address the health impacts of changing climatic conditions in Kalemie****."*
Eric Lugunda Nyembo
Man, Region, MOH, Democratic Republic of the Congo

DRC5: *"The construction of fired brick houses necessitates* ***deforestation****, and the cities in Central Kasai are currently densely populated due to rural migration. This overcrowding, coupled with underemployment and poverty, contributes to* ***a range of diseases resulting from environmental degradation****. Moreover, the deterioration of the environment has caused damage to the national road in cities such as Kananga, Benaleka, and Demba.* ***This obstruction hinders the transportation of food and essential supplies****, leading to malnutrition-related illnesses, particularly affecting children and pregnant women."*
Anonymous
Man, Region, MOH, Democratic Republic of the Congo

DRC6: *"Climate change has had a* ***significant impact on agricultural production*** *in terms of food products. The traditional patterns of dry and rainy seasons are no longer followed due to factors like uncontrolled forest fires. This disruption has led to a decrease in the production of food items. Additionally, there's a concerning trend of* ***inadequate utilization of staple foods like corn and cassava, which are often used in the production or distillation of indigenous alcohol****. As a result, the community is facing a surge in cases of malnutrition, highlighting the urgency to address the challenges posed by climate change on both agricultural practices and food security."*
Faithful Tshibanda Mulangu
Man, District, MOH, Democratic Republic of the Congo

DRC7: *"Lately, here in Kinshasa, we've observed a concerning trend during the dry season. The absence of rain has led to the disappearance of small streams, which has in turn resulted in a significant increase in the presence of mosquitoes within households. This extended period of exposure to anophelines is contributing to* ***a surge in malaria cases reported in local health centres****. Furthermore, the dry spell has also impacted the availability of fresh produce. With limited water for small gardens, the markets are lacking in vegetables. As a consequence,* ***the population is facing a deficiency of essential vitamins*** *from the plant kingdom, leading to potential health issues.* ***These challenges highlight the interconnectedness of environmental factors and public health, underscoring the importance of addressing both to ensure the well-being of our community****."*
Arnold-Smith Kawanga Mweni
Man, International, University/School of Public Health, Democratic Republic of the Congo

DRC8: *"As a result of the disruption in the seasonal shifts,* ***a modest family reliant solely on agriculture experienced the tragic death of their young son within their community****. The critical factors involved were as follows:* ***their crop yield plummeted to zero due to their inability to manage the erratic changes in the seasons****, and malnutrition, likely compounded by other illnesses, afflicted the family.* ***Faced with financial constraints stemming from the complete failure of their agricultural efforts, they***

resorted to providing home-based care for their family. *Tragically, their youngest son paid the ultimate price with his life. In summary, the ever-changing climate dynamics have left us disoriented and uncertain about the future."*

Kalongo Bomongo Emmanuel
Man, Health institution, MOH, Democratic Republic of the Congo

DRC9: *"Climate change in our province is explained by the fact that there are more hardships in the supply of goods such as food, clothing, pharmaceutical products, and others. This is due to* ***bad roads that become impassable due to the rains, causing erosion***. *When we decide to travel by road, fear sets in as we are unsure if we can reach our destination. Additionally, we notice the* ***scarcity of other products in the markets due to delays caused by road conditions***. *Sometimes, products even reach their expiration dates during transportation. Furthermore, this situation is especially prevalent in the territory of Bukama, where the population living near the Congo River is forced to navigate by boat since their houses are in the water. This water-based existence characterizes our province due to the lack of clean drinking water. It's truly a sad state of affairs. As a result of these climate changes, disturbances arise in the health of the population.* ***Diarrhoea*** *affects both children and adults, especially during periods of high heat.* ***Malaria*** *becomes prevalent during the rainy season as mosquitoes multiply due to stagnant water and unsanitary conditions.* ***Typhoid*** *is another concern, primarily caused by the use of contaminated water from sources like rivers, manual wells, and rainwater. Skin-related diseases are also prevalent. Acute respiratory infections (ARIs) affect children, and anaemia becomes more pronounced, particularly during periods of high heat. Our province grapples with three major difficulties: water, electricity and roads. Proper sleep is compromised due to electricity problems, especially during the rainy season when untimely power cuts are frequent. This greatly affects our ability to work effectively, particularly with devices like X-ray machines, scanners, and other equipment requiring continuous power. Unclean water is a significant factor in the spread of waterborne diseases. Moreover, the impassable roads pose a significant challenge, especially for villages such as Kabongo, Kizanga, Linda, Kaniama, Bukama, and Kinkonja.* ***These villages possess abundant agricultural products but struggle to transport them due to their limited access***. *Our situation is truly emblematic of being landlocked and the struggles it entails."*

Maloba Nkulu Annie
Women, Health institution, MOH, Democratic Republic of the Congo

DRC10: *"A drought, characterized by a drop in rainfall during recent rainy seasons, has affected the City Province of Kinshasa, particularly in the Makelele District (located in the Bandalungwa commune) where I reside. This area is bordered by two rivers, Mâkelele 1 and 2. The scarcity of rain in the region during the past rainy seasons has led to a* ***significant reduction in water flow within these two rivers***. *Consequently,* ***rubbish and debris have accumulated along the riverbanks***. *This situation has resulted in the* ***proliferation of mosquitoes and other unidentified insects***. *This increase in insect activity has not only led to a rise in malaria cases but has also given rise to a newly emerging form of* ***dermatosis***, *the exact nature of which is yet to be determined. It is suspected that these skin lesions develop due to scratching after insect bites. Disturbingly, over 10% of the population within the municipality has been affected by this condition. The nuisance posed by these*

insects is prevalent even during the daytime. Health authorities in the Kintambo Health Zone have initiated investigations into this matter."
Kaningini Missanzila Diana-Joana
Woman, National, MOH, Democratic Republic of the Congo

DRC11: *"We are witnessing the encroachment of epidemics within households, particularly **severe malaria**. This disease claims the lives of many children aged 0 to 5 years and also contributes to premature deliveries, abortions, and stillbirths in pregnant women. Two years ago, we promoted the use of certain plants in the form of tea to address this issue. Furthermore, we regularly assist women in forming water committees for the purpose of cleaning and developing water sources before the conclusion of the rainy season. The **heavy rains** during this time lead to excessive water in the streets, the creation of ravines, and the proliferation of insects. Water wells become damaged and filled with waste and sludge, and the consumption of contaminated water leads to cases of diarrhoea among the population. At the Hospital Center Espérance and in all hospitals, we frequently witness cases of severe malaria during this period. What troubles me is that many people fail to grasp the connection between these phenomena and climate change. **The most vulnerable individuals, including children, pregnant women, the elderly, and workers, bear the brunt of these effects**, leading to absenteeism, increased healthcare costs, and disruptions within households. Unfortunately, the authorities have not taken the initiative to sensitize the population about prevention or provide accurate information. This is where our struggle lies, and it **emphasizes the need for collective action and cooperation**."*
Kasekw Kambonji Eudoxie
Woman, National, MOH, Democratic Republic of the Congo

DRC12: *"In the fight against global warming, **we work as a team by forming environmental circles**. Regarding the changes we encounter, we highlight disasters, erosions and fires that occur from time to time, air pollution caused by dust, the overwhelming sun, floods, and many other environmental problems mainly related to deforestation and poor waste management in our environment. These issues expose us to various health problems. With a total of 50 people, which forms 10 circles of 5 people each, **we have organized ourselves to raise awareness in the community and explain to them the dangers we face due to the behaviours of environmental incivility that we engage in through our daily actions**. Our goal is to raise awareness and foster a sense of climate justice. Among the health problems encountered, we can observe psychosomatic issues. We point out diseases that arise from psychological stress related to disasters, and others fall ill due to an unhealthy environment. Additionally, we highlight infectious and parasitic diseases, allergies, and general systemic diseases, all with their multiple complications. **This serves as a lesson in environmental citizenship**."*
Mapenzi Ndagonywa Philemon
Man, Region, NGO, Democratic Republic of the Congo

DRC13: *"Climate change has exerted significant impacts on the general population of my region. One critical issue is the **lack of education regarding proper waste management**. People in my community often dispose of household waste in public areas, creating breeding grounds for mosquitoes and becoming a source of deadly diseases like malaria. Moreover, despite efforts by the central government to distribute Long-Lasting Insecticide-Impregnated Mosquito Nets (LLINs) for free, **many of***

these nets are misused, either repurposed for trade or used in ways not intended due to their shape and quality. *Overall, the local population lacks the understanding and initiative to effectively combat the effects of climate change. The elevated temperatures resulting from climate change have exposed the people in my region to numerous hardships and health issues. Unfortunately,* ***the community lacks awareness about how to address these challenges in a comprehensive manner***. *It's crucial to initiate a* ***process of mindset change to empower individuals to take meaningful action against the adverse consequences of climatic disruptions***."

Cimpaka Kabeya Pascal
Man, Region, Democratic Republic of the Congo

DRC14: *"Personally, recognizing the gravity of climate change,* ***I've committed to dedicating a day to environmental protection***. *I've allocated two hectares solely for tree planting to contribute to environmental preservation. I earnestly encourage fellow colleagues globally to undertake similar initiatives."*

Dr Mitume Mutumwa
Man, National, NGO, Democratic Republic of the Congo

DRC15: *"Over the past four years in the city of Bukavu, we have observed* ***recurrent floods*** *that result in deaths and injuries. In the current year alone, there have been more than four incidents of dangerous floods, along with at least four episodes of fires in Bukavu. In a nearby territory called Kalehe,* ***erosion has tragically led to multiple fatalities*** *(https://www.vaticannews.va/fr/monde/news/2023-05/rdc-desolation-a-kalehe-apres-des-inondations-devastatrices.html).* ***While floods have been observed in previous years, the severity of the floods witnessed in recent times is unprecedented***. *The climate-health situation in Bukavu is deeply concerning. After floods, families lose their homes, children's education is disrupted, and many adults and young individuals are left distressed and stressed after losing everything. In response to these challenges, it is worth highlighting the commendable* ***initiatives undertaken by young artists and students*** *who are channelling their talents to combat environmental pollution and factors contributing to climate change. One of the notable initiatives involves the ecological recycling of plastic waste to enhance the beauty of the South Kivu region. Young people are taking the lead in* ***transforming plastic waste into creative and practical works***. *Architecture and polytechnic students from the Official University of Bukavu and the Catholic University of Bukavu are addressing the consequences of climate change by focusing on the* ***fight against unplanned construction*** *that exposes the city's population to risks associated with climate change. Additionally, maths/physics students and the technology company Bantu Code have initiated a programme to* ***promote the use of photovoltaic energy***, *aiming to reduce the reliance on firewood obtained from deforested trees. The various ongoing programmes aimed at combating climate change are a testament to the collaborative efforts of researchers, environmental agents, community leaders, and socio-cultural figures. Despite the challenges, there is confidence in the positive outcomes these initiatives can achieve."*

Daniel Kakusu
Man, District, Teaching/Research Organization, Democratic Republic of the Congo

DRC16: *"The prevailing insecurity has triggered a significant* ***migration of the population toward more secure regions***. *In the Nyankunde Health Zone, for instance, the escalation of insecurity has compelled people to seek refuge in other safer health*

zones. This upheaval has further exacerbated by the ***scarcity of grazing areas for livestock****, which in turn has spurred greater insecurity. The migration of herders to different localities, coupled with the challenges faced by farmers in cultivating certain crops due to unpredictable and disrupted seasons attributed to climate change, has contributed to this* ***sense of vulnerability****. It is imperative that decision-makers, leaders, scientists, and other key figures take proactive measures to equip the population with the awareness and readiness to confront potential changes at global, continental, national, and local levels.* ***By fostering an understanding of the shifts and challenges associated with the evolving environment, we can better prepare communities to adapt and respond effectively****."*

Katabuka Baguma Grandpa
Man, Region, MOH, Democratic Republic of the Congo

DRC17: *"In recent times, our region has been witnessing a series of concerning events.* ***Landslides, house fires, floods, and prolonged heavy rains have become distressingly frequent occurrences****. One particularly tragic incident took place in the Province of South Kivu, with its main city Bukavu, where* ***over 400 lives were lost in the Kalehe territory due to severe flooding****. Additionally, there has been an alarming increase in insect pests that are causing substantial damage to plants across all territories. The Province of South Kivu experiences two main seasons: a rainy period lasting nine months and a dry season lasting three months. However, these days* ***it's becoming increasingly difficult to differentiate between these two seasons****. For instance, in the past, July was considered part of the dry season, but now we're witnessing continuous rain in Bukavu and throughout the entire province.* ***This prolonged wetness is reshaping our understanding of the seasons****. These climatic changes have led to several challenges. Unplanned power cuts have become common, often due to reduced water levels or increased monitoring of flooding at the Ruzizi hydroelectric power plant. Such monitoring efforts sometimes inadvertently lead to blockages in various water conduits. Public health is also severely impacted.* ***Diseases linked to poor sanitation, contaminated water, and unhygienic practices, such as those related to dirty hands, have become more prevalent****. The scarcity of safe drinking water further exacerbates health issues. Unfortunately,* ***effective waste management policies are lacking, contributing to environmental degradation and health risks****. A crucial factor intertwined with these challenges is overpopulation. The rapid growth of our population adds additional pressure on already strained resources and infrastructure.* ***It is evident that these issues require a comprehensive and multifaceted approach to address the complex interactions between climate change, infrastructure, public health, and demography****."*

Munganga Barhasima Antoine
Man, District, NGO, Democratic Republic of the Congo

DRC18: *"During the year I spent in Lubutu, I witnessed* ***the first flood ever experienced according to the local population****. This flood occurred due to the convergence of three rivers that flow through the town of Lubutu, resulting in loss of lives and displacement of several households.* ***The distinction between the dry and rainy seasons has become challenging due to these changes****. Consequently, there has been a significant increase in cases of* ***diarrhoea, malnutrition among children under five, and malaria among children and pregnant women. It's crucial to educate this community about the importance of respecting the environment****."*

Evariste Kalafulo
Man, Region, MOH, Democratic Republic of the Congo

DRC19: *"In the past, during our college years, we were taught that the dry season typically began in mid-May and ended in mid-August. However,* ***the climate patterns have shifted over time****. Now, we experience rains that extend until mid-June, and the dry season persists until September.* ***This alteration affects agricultural activities, including the cultivation of groundnuts and other crops****. Furthermore, we've noticed a reduction in the duration of inter-epidemic periods, particularly concerning the Ebola Virus Disease in our country."*
Germain Kapour Kieng
Man, National, MOH, Democratic Republic of the Congo

DRC20: *"We in Bibanga experience two seasons, including 9 months of rain and 3 months of drought. At times, there is an extension of the dry season that lasts about 5 months.* ***This delay in the rainy season means that sowing is postponed, affecting food production****. This leads to food insufficiency and results in a multitude of cases of malnutrition in the communities. Conversely,* ***heavy rains sometimes occur during harvest periods****, when the sun is no longer needed to dry food products. This leads to the deterioration of large quantities of these products. As a result,* ***production does not meet the needs of the population, resulting in an increase in the prevalence of malnutrition****. This situation is experienced on a fairly regular basis in this zone, where people primarily rely on agriculture. Between August and September every year, fog appears, and during this period, there is a significant* ***death of goats****. This situation weakens the economic standing of goat breeders' families, as these animals, which die en masse, have minimal value. I would like to know how we can address this problem given these events in order to meet the food needs of our population."*
Kalobo Luabeya Jean Pierre
Man, District, NGO, Democratic Republic of the Congo

Gabon

GAB01 *"****Floods are becoming more frequent****, with instances where the equivalent of two days' worth of rain can fall within a few hours.* ***These intense downpours result in significant damage and even loss of human lives****. Certain areas of the city experience landslides that demolish homes and, tragically, can lead to fatalities. People are sometimes found buried in mud, and there are cases of individuals being swept away by the rushing waters. In a district of Libreville, within the span of a month, two families endured the loss of multiple family members due to landslides triggered by rainy nights. These tragic events claimed the lives of over eight people."*
Marjolaine Motocka Dingai
Woman, National, MOH, Gabon

GAB02: *"****Prolonged periods of drought followed by heavy rainfall disrupt agricultural activities****, leading to harvest failures. This sudden decline in food availability subsequently triggers malnutrition among populations heavily reliant on subsistence farming. Additionally, the movement of animals, such as elephants, searching for*

*sustenance in fields, contributes to **human-wildlife conflicts**, posing threats to both human health and safety."*
Lukengu Muela Israel
Man, Health institution, Private Industry, Gabon

Ghana

GHA01 *"More trees have been cut down and the town is becoming like a **desert zone**. Some sicknesses that were extinct are resurfacing (e.g lymphatic filariasis)."*
Juliet Abu
Woman, Health facility, MOH, Ghana

GHA02: *"Here, in the Tamale Metropolis, the **rainfall pattern has changed** becoming more scant and not predictable. This affects **farming practices**. When the rain falls, it sometimes becomes so heavy and leads to the destruction of roads and bridges affecting mobility. Sometimes, torrential rains destroy crops and also lead to the collapse of some buildings."*
Dr Mahama Ibrahim Baba
Man, Health facility, MOH, Ghana

GHA03: *"The climate and weather change have become a major canker in the community. Too much rain leads to the destruction of some crops and also brings about some infectious diseases in the community. And also, because of climate change, **farmers are not able to study the weather as before in order to know the rainy and dry seasons to prepare and produce a good yield**. When I was posted to Ahwerewam I realized that the food poisoning cases were very high and through my investigation, I saw farmers were not wearing protective clothing when applying agrochemicals and also were throwing containers into the water bodies, which is very dangerous."*
Margaret Afriyie
Woman, Health facility, MOH, Ghana

GHA04: *"**Most of the farmlands which used to be the source of livelihood for farmers have been turned into mining**. We have an increase in the number of cases of respiratory illnesses from some communities who were drinking from a common river. We investigated and later found out that their conditions were a result of polluted water from these illegal mining sites."*
Alan Kwasi Blaychie Annan
Man, District, MOH, Ghana

GHA05: *"The early rains do not continue to allow the grasses to grow above the soil level for animals to graze without touching the soil and they contract the **anthrax spore**. Education/sensitization of our farmers is needed to vaccinate the animals against animal anthrax before the early rains."*
Augustine Paterson Agamba Azembah
Man, Region, MOH, Ghana

GHA06: *"The Lambussie District where I have worked as a Disease Control Officer for the past nine years, has only two seasons: the rainy and dry seasons, with the dry*

season being longer than the rainy season. Even though the rainy season is short, there have been ***drastic changes in the rain patterns*** *with sustainable rain for farming starting in July and ending in late September. The Lambussie District is also characterized by rural subsistence farming with little agricultural input and technology.* ***Subsistence farmers rely heavily on rainfall for agricultural production for their survival, financial income, and family nutrition****. Thus, if agricultural yields decline or fail, food stocks will get empty before the next harvest, and food prices will rise, causing families to adapt their food sources and diets. As a result,* ***the district is battling acute malnutrition in children and a high prevalence of anaemia in pregnancy****. The district has implemented lots of interventions to curb the situation yet to no avail. The rampant felling of trees for fuel (charcoal) and indiscriminate brush burning, coupled with other climatic conditions, are contributory factors to this problem."*

Castro Fogembong
Man, District, MOH, Ghana

GHA07: *"The Akwapim South weather is naturally cold but it's colder now during the rainy season. It rains heavily and, almost always, this creates a lot of breeding spaces for mosquitoes, resulting in malaria cases during the rainy season. The rain also washes away rubbish, feces, etc. into the water bodies causing typhoid fever. If drastic measures are taken, it will curb the situation. Sanitation agencies will play a vital role in restoring a clean environment and health promotion units, in giving education on safe rainwater harvest."*

Jacob Bobie Osei Tutu
Man, District, MOH, Ghana

GHA08: *"There is a huge* ***dumping site*** *in Korle-Bu which always burns tyres and rubbish, making the air around the community very polluted. Lots of people living in the community go to health facilities with* ***respiratory tract infections, asthma attacks, and many other respiratory infections****. The burning site is posing a lot of health implications for the indigenous people living in the community."*

Godwin Asabire Akazee
Man, National, MOH, Ghana

GHA09: *"Ablekuma South is one of the sub-metropolitans of Accra. People from other regions have moved to the capital town to find a way to earn a living. Although some landlords/landladies have managed to put up manageable structures because of high demands, there are poor drainage systems, and the air does not circulate well because it is crowded. Especially during the rainy season in these* ***crowded areas****, everyone becomes alert as there is a possibility of minor and major flooding leading to property destruction as water enters people's rooms from walls because of the lack of quality materials used to build structures. At a point in time, people were cautious to know if there are any leaks in a house before renting due to psychological distress on tenants during the rainy season. Also, the crowded areas have become a conducive* ***breeding ground for mosquitos*** *during the rainy season and a high number of malaria cases are recorded in the country. With this, the Ghana health service and its partners have begun an intervention called seasonal malaria chemoprevention – an antimalarial medicine given to children under 5 years which is done annually during the rainy season in some selected areas in the country; however, it is yet to be extended to other parts."*

Gladys Abena Owusua
Woman, Health facility, MOH, Ghana

GHA10: *"In recent years,* ***tidal waves and coastal windstorms*** *have pounded the shores of Fuveme and its environment with very little protection. This has left lots of homes submerged with extensive damage to property, rendering residents homeless, and sometimes, cutting the inhabitants off from the rest of the district and limiting their access to primary healthcare and WASH facilities. As a result, there are increased water-associated infections such as gastritis, cholera, typhoid, and enteric fever, particularly following flooding events. Additionally,* ***the once vibrant fishing community is also gradually being lost due to increased coastal erosion and flooding****."*
Forgive Awo Norvivor
Woman, District, Education or research organization, Ghana

GHA11: *"****Fishing has declined*** *with poor harvest due to pollution of water bodies through human activities. Fish stocks have moved to remote areas where there is no threat of pollution. This has caused the Government to rationalize fish farming with a ban on fish harvesting for a few months so fish stock can be replenished. During this period, people are not permitted to get close to the water. The decline in fish farming is increasing the price of fish on the market, thereby denying the population its protein requirement. Issues of malnutrition are therefore on the rise in these areas."*
Eric Aborgah
Man, National, MOH, Ghana

GHA12: *"In the process of carrying out my research on gendered responses to climate change in the Sunyani municipality, I just learned a young lady had to enter into sleeping with men for her needs due to the fact that farming within the area has been affected by climate change. This led to her contracting a sexually transmitted disease that she is now suffering to cure."*
Adii Joycelyn
Woman, Region, Ministry of Gender, Ghana

GHA13: *"Once it starts raining, it increases. In spite of its increase,* ***community members are not able to access healthcare on time because they can't harvest much from their farm produce and do not have money to patronize health services****. My dad was engaged in farming on a very large land. On one particular day, the community experienced some amount of rain (not heavy). Three days after the rainfall, all the crops burnt on the farm. My dad didn't get anything from the farm and to today, we don't know what the rain contained that was able to burn the entire crop."*
Eunince Ametorwodufia
Woman, Health facility, MOH, Ghana

GHA14: *"During the rainy season, it is very difficult for people to seek care for their health needs.* ***They wait for the condition to get worse before coming to the facility****."*
Alhassan Kenneth Mohammed
Man, Health facility, MOH, Ghana

GHA15: *"The government of Ghana came out with a policy called Green Ghana. It is a special day in Ghana purposely used for tree planting to regain Ghana's vegetation. The Municipal Assembly in collaboration with the Forestry Commission enacted bye-laws to regulate lumbering and charcoal burning within the municipality."*
Kingsley Kofi Nignere
Man, District, NGO, Ghana

The Gambia

GMB01 *"In 2021, many homes were destroyed, people and animals were displaced, and some people lost their lives as a result of* ***storms****. The area is desertified and we have few trees as wind breakers. For the last two months, skin infection has been the most observed health problem in Lower Badibou."*
Abdullah Jallow
Man, District, MOH, Gambia

GMB02: *"In CRR, a region I came from,* ***the re-emergence of vector-borne diseases such as schistosomiasis*** *has been observed. In all the regions I worked in (North Bank and Western), I observed a high prevalence of malaria, which had declined in 2017 (90% decline from 4% prevalence rate in 2011)."*
Omar Darboe
Man, Region, MOH, Gambia

GMB03: *"I have seen* ***wind storms*** *that cause major destruction to our homes and* ***floods*** *which claim some lives and hinder normal activities of life.* ***Healthcare-seeking behaviour*** *is affected whenever there's continuous rain as most people will not have access to health facilities due to lack of transport, poor road infrastructure, and flooding. The water quality is affected due to some leakages in the supply system and when there is a flood, so many contaminants are gathered in these waters putting the lives of many at stake. It's challenging to serve people when the weather change is intolerable."*
Abdoulie Bah
Man, Health facility, Education or research organization, Gambia

Guinea

GIN01 *"The town serves as a hub for* ***mining activities*** *and is home to the first alumina factory in West Africa. However, alongside these developments, there has been a noticeable* ***surge in respiratory, cardiac, parasitic, and dermatological ailments****. The disruption of regular rainfall patterns has directly contributed to a decline in agricultural yields for local farmers.* ***The rural road infrastructure becomes virtually impassable during heavy downpours****, posing challenges for health interventions in areas with restricted access. During the dry season, the* ***city becomes enveloped in a pall of white smoke****, which significantly hampers breathing conditions. The prevalence of family poverty, malnutrition, various dermatological conditions (such as skin irritations and chickenpox), respiratory illnesses (including asthma and flu), heart diseases (such as hypertension and diabetes), as well as maternal and neonatal fatalities, is evident. The heightened incidence of*

respiratory issues, particularly exacerbated during the dry season due to atmospheric pollution, adds to the public health concerns. Complicating the matter is the inadequate oversight of maternal and neonatal deaths within the district. The Prefectural Audit Committee's ineffective operation remains a critical challenge to be addressed, as it impedes the timely evacuation of pregnant women facing complications to appropriate healthcare facilities. Addressing these issues and ensuring efficient evacuation mechanisms for pregnant women in need of medical attention constitute crucial goals to be achieved."

Anonymous
Male, District, MOH, Guinea

GIN02: *"Global warming has had a significant impact on the deteriorating living conditions of populations. The months of March and April have become excessively hot, causing increased stress and hindering people's ability to sleep well.* ***Some watercourses that used to be visible during the dry season now exist solely during the rainy season. This has a negative effect on the activities of women who engage in marsh-swamp activities along these watercourses, leading to decreased productivity****. Consequently, there is a* ***scarcity of fruits and vegetables, and the cost of these foods is on the rise****. The degradation of the environment has created more breeding grounds for mosquitoes. During the rainy season, there is a noticeable exponential increase in mosquito populations, which in turn raises the number of malaria cases. This has far-reaching consequences on the health of both mothers and children."*

Yapoulouce Bamba
Man, National, NGO, Guinea

Haiti

HTI01 *"Haiti, located in the Caribbean, experiences natural disasters like cyclones, floods, and earthquakes that inflict significant damage and affect its population.* ***Due to its vulnerable status, climate change has a profound impact on its communities****. The country faces heightened droughts, rising temperatures, environmental degradation, and water scarcity. Consequently, heat strokes, dehydration, the resurgence of vector-borne diseases, and water-related illnesses have become prevalent challenges. Effective water management poses the most significant obstacle. Presently, many regions in Port-au-Prince rely on rainwater for their needs. However, this approach is not without consequences, as there is an uptick in new cases of cholera following rainfalls in these areas."*

Daphnee Michel
Women, National, NGO, Haiti

India

IND01 *"The patterns of rain have become erratic. More landslides are occurring. There are high rates of premature mortality in the population."*

Dr Ankur Nair
Man, National, NGO, India

IND02: *"Summers and winters are longer and harsher with temperatures rising ever than before. Unseasonal rainfall is seen frequently affecting agriculture. This summer we have witnessed a greater number of people affected by sunstrokes including hospitalization."*
David Raj Damara
Man, National, Other global health partner, India

IND03: *"The use of motor vehicles (cars, bicycles, and autos) has significantly increased. The usage of vehicles has also led to an increase in **air pollution** and we see respiratory problems and skin diseases, which have an impact on health. After 25 to 30 years, if things stay this way, temperatures will be very high. The government should implement one vehicle per family, more plantations, a monthly once-no-motor vehicle usage policy, and incentives for employers to use bicycles."*
Dr Kumbha Gopi
Man, National, NGO, India

Kenya

KEN01 *"I remember from the middle of last year to early this year, we experienced a **prolonged drought**. It really affected the whole population. **The agricultural land became unproductive**. We were not able to do farming; all the crops dried up and people suffered a lot. There was no food. The little food found was too expensive. People died, and others starved. Children suffered from malnutrition. We experienced disease outbreaks like cholera and trachoma due to poor sanitation. We also experienced flooding. Lives were lost due to drowning. Many families were displaced."*
Aquirinah Deborah
Woman, Health facility, MOH, Kenya

KEN02: *"Some years back, kitchen gardening was not an issue. It was cheap and easy. Water, the main requirement for plants, was really available – both rain and tap water. Even on the fourth floor, you could tap rainwater for irrigation. Nowadays, **tap water is scarce** and hardly enough for drinking and cooking. With the long sun season, even mulching cannot help. The only option is to cut the number of plants and to work with kitchen recycled water."*
Alice Nyaboke
Woman, Region, MOH, Kenya

KEN03: *"Nairobi city has been famously known as the **green city under the sun**. The city has traditionally been a cool place with neither too hot nor too cold temperatures. However, climate change has shifted the autoregulation and turned into extremes of too-cold or too-hot temperatures depending on the seasons and unpredictable weather. For Nairobi city to face such changes in the weather, it means that the **neighbouring counties are affected as well**. These counties being the food baskets for the Nairobi city dwellers and **food availability has decreased and the water supply reduced**. In a city where the residents solely rely on piped county government supply, recently even the middle-income residential estates that used to have a continuous supply of water are rationed to have 3-4 days of water per week supply and this is even worse for the low-income residential estates with 1*

or 2 days of water per week. To get more water, one has to buy from water vendors and this is expensive. ***The lack of water is devastating and immediately leads to a spike in communicable diseases including typhoid, and cholera, especially in the slum regions of the city****. Also, reduced food supply from the neighbouring counties* ***immediately translated to more expensive food in the city and ultimately a spike in every other commodity****."*

Melanie Abongo
Woman, National, Education or research organization, Kenya

KEN04: *"During the months of April and May 2023 when we had the long rains, there was a* ***cholera outbreak*** *in the sub-county. The health management team (HMT) identified the index cases in the community and samples were taken for confirmation which was later positive. The HMT swung into action on contact tracing and community sensitization and prophylaxis of household members. Temporary wards were established, and patients were treated within the community. During this period, a disaster of floods hit the same areas and another outbreak of malaria started in the community especially in children under five years old. My team successfully managed to contain the cholera outbreak through intense intervention, treatment, and contact tracing. The displaced population was settled in schools and nearby churches and interventions to treat and prevent malaria were put in place. To date, we are advocating for a malaria vaccine uptake for children under five and the use of ITN for children and pregnant women."*

Anonymous
Woman, District, MOH, Kenya

KEN05: *"Last year in my community when there was too much rain, many people had problems. Water entered into houses and spoiled so many belongings. As people were sleeping,* ***one twelve-year-old girl was carried away and has not been found****. Because of poor drainage, when it rains,* ***sewage overflows*** *and you find most of the places are in very bad condition.* ***When children go out to play, pick things up, and put them into their mouths they get sick stomach aches****. There were so many airborne diseases* ***and because nearly everybody was sick, there was not enough medicine in the public facilities****."*

Taphurother Muhonja Mutange
Woman, Health facility, MOH, Kenya

KEN06: *"Farming is becoming difficult with* ***poor harvests due to increased pests, or heavy storms/extreme short rains****. This has led to an increased number of patients in hospital paediatrics departments. Most patients under five years old are being diagnosed with respiratory illnesses (e.g. pneumonia, ARDS) during floods and cold seasons. In both cold and drought seasons,* ***hospitals are getting crowded*** *with an increased number of patients, straining an already thin stock of non-pharmaceutical supplies. A grandmother has been living with her grandchildren. She's a peasant farmer solely depending on her harvests for finances. She is on asthmatic care and two of her grandchildren are asthmatics, too. Travelling to and from her home to the hospital, she spends approximately 300ksh on a motorbike for 1 passenger, which varies with the time of day and weather, depending on if it's raining or it's dry. During extreme cold, she would visit the hospital at least three times a week with asthma attacks. Salbutamol inhalers are always recommended but she's always low on finances and would prefer to buy salbutamol tablets over the*

counter as they are much cheaper. As a result, she has more frequent asthma attacks and is spending more time and money at the hospital."
Charles Watila Namonyo
Man, District, MOH, Kenya

KEN07: *"When Murang'a County used to produce the best coffee, tea and milk most parents educated their children and built permanent homes and commercial buildings. Due to climate and weather changes, food production has declined.* ***There has been job loss, low income, and depression. Also, men became alcoholics, which is now a national menace*** *the government is trying to fight led by the deputy president of the republic."*
Joseph Mbari Ngugi
Man, Health facility, MOH, Kenya

KEN08: *"We've been experiencing* ***floods*** *in some counties, which have displaced people and exposed them to diseases like cholera. With the floods, families that are staying in the flood-prone areas are permanent residents. They are evacuated, moved to the highlands, and supported with food, shelter, clothing, and healthcare. However, their* ***displacement causes overcrowding and the spreading of disease because hygiene is compromised****. The government has taken precautions like the construction of dykes."*
Annet Itinot
Woman, District, MOH, Kenya

KEN09: *"It has become so hot. There is no rainfall, especially in Suba where most* ***jobless people cut down trees to make charcoal to generate income****. Two months ago, there was a cholera outbreak in Suba and a lot of people were infected."*
Irene Akinyi Ouma
Woman, Health facility, MOH, Kenya

KEN10: *"The* ***weather pattern*** *has changed so much in my community of Kajiado affecting* ***pastoralists. Many animals have died and as animals were the main source of financial stability, many homes are now starving due to lack of rainfall****."*
Angela Sation Kisoso
Woman, International, Private industry, Kenya

KEN11: *"Inadequate rains have created a* ***shortage and an erratic supply of water*** *in Nairobi. In urban settings, this is leading to* ***illegal water connections*** *and drawing water that is unprotected/untreated for household use."*
Lillyan Mutua
Woman, District, MOH, Kenya

KEN12: *"****In the facility where I work, floods always enter in when it rains****. This affects services for two to three days to allow for the facility to be cleaned up. People are sick and suffer very much."*
Taphurother Muhonja Mutange
Woman, Health facility, MOH, Kenya

Ken13 *"We have been used to buying vegetables from vendors. Of late, due to climate change, the harvests have not been good and therefore people resorted to growing vegetables along sewerage areas. I remember my grandchild, one time arriving from boarding school, and after eating, he was writhing in severe painful stomach ache and vomiting. I was so afraid he had cholera. Of course, diseases such as cholera were on the rise. Since then, I resolved to grow my own vegetables in bags to ensure the source. I water the vegetables and get them fresh from my small space."*

Wandera Cecilia Nabwirwa
Woman, National, MOH, Kenya

Lesotho

LS001 *"There have been heavy rains and heavy snow that damaged bridges and blocked roads in the mountains,* ***hampering delivery of health commodities to health facilities including lifesaving vaccines****. During these trying times, a new strategy was developed, using helicopters to improve public health coverage across the country. Given the recent climate change and the effects we are experiencing in Maeru Lesotho, we also have considered the use of drones to maximize transport reliability and avoid shortages of life-saving commodities for the people."*

Moroke Motuba
Man, National, Other global health partner, Lesotho

Liberia

LBR01 *"For four years sequentially (2015 -2018),* ***floods*** *occurred in my region, the West African Country of Liberia, causing massive destruction of homes, farm fields, crops, and displacement. In fact, according to official reports from the Ministry of Internal Affairs, a total of 15,431 people in 49 communities were affected by the flooding (reliefweb.int> report > liberia-margibi-floods-emergency). The regional health system embarked vigorously with emergency response activities. During these troubling periods, we worked with the national emergency response team, WHO, and other aid organizations. We also crafted mitigation methods for future implementation."*

Joseph A S Saah
Man, Region, MOH, Liberia

LBR02: *"Harsh climate changes have also been observed during the rainy season where heavy downpour of rain has caused flooding in some communities and destroyed human homes and shelters. This has led to inhabitants being displaced from their living places and seeking refuge with relatives and friends while others sleep in open places, which exposes them to further hardships and psychological trauma."*

Matirankie M Kanneh
Woman, National, MOH, Liberia

LBR03: *"Rainfall has become more torrential whilst sunshine has become more intense.* ***Exhaustion and sleep disturbance/disorder due to intense heat at night are also on the increase****. Generally, residents are resolved that something 'strange' is*

occurring or has occurred to their environment. They are not pointed to climate change as the root cause; however, it is a general consensus that changes in their environment have taken place."

Kaa Boon Williams
Man, National, Education or research organization, Liberia

Madagascar

MDG01 *"Previously, the district of Fandriana was covered with forests. However,* ***now there are no forests left due to frequent exploitation****. Many individuals exploited the forests to obtain wood, which they sold to carpenters for various purposes. They also harvested wood to make charcoal, which they sold to meet their needs like food, etc. As a result of the disappearing forests, there have been significant climatic changes. Floods now devastate agriculture, leading to famines.* ***The absence of forests has caused rats to invade the village, leading to outbreaks of plague. Droughts have also become more frequent, resulting in insufficient water sources*** *for household use and irrigation of crops. Throughout the 11 years that I have lived here, I have witnessed numerous changes. Common health issues include flu, respiratory infections in children, hypertension, stroke, typhoid, schistosomiasis, and malnutrition. These health problems have become more prevalent over the last 4 years."*

Anonymous
Women, District, MOH, Madagascar

MDG02: *"Several communes in the Toliara 2 district have been grappling with* ***arid soil*** *due to insufficient rainfall for nearly seven years.* ***This has rendered agriculture nearly impossible and triggered a severe famine in the area****. Moreover,* ***air pollution is contributing to the prevalence of acute respiratory infections****, such as flu or unexplained colds.* ***Malnutrition has emerged as a major concern, prompting the inclusion of this issue in the weekly epidemiological surveillance reports****. The number of children requiring care for malnutrition is steadily increasing. Additionally, influenza remains a dominant diagnosis in outpatient clinics, compounding the health challenges. The health sector in Tsandamba has taken proactive measures to address these issues.* ***A project focused on marine protection has been initiated****, involving a multidisciplinary committee comprised of representatives from tourism, environment, law enforcement, health, and the prefecture. Unlike other sectors that face challenges with depleting fishery resources and lack of reserves, the Tsandamba sector stands out as a model for human and animal health, marine protection, safety, and the cultivation of seaweed.* ***This initiative has created a favorable and attractive environment that benefits both the local community and marine ecosystems****."*

Anonymous
Women, District, MOH, Madagascar

Mali

MLI01 ***"The significant increase in the river's water level resulted in the displacement of two villages and the subsequent relocation of two Community Health Centres***

***(CSCOM) from these affected areas**. The floods had severe consequences, including the displacement of these health centres, which added stress and sleeplessness to the people who lost their homes, food, and livestock due to the flooding."*
Boubacar Doumbia
Man, District, MOH, Mali

MLI02: *"My years of engagement with the community have given me insights into numerous climate-related challenges. **From the intensifying heat to the dwindling rainfall, the scarcity of potable water, and the extensive loss of wildlife, the impacts are broad-reaching**. We're witnessing an uptick in **heat-related illnesses like strokes**, accompanied by increased expenses for cooling, dehydration issues, malnutrition cases, reduced household incomes, and sadly, even the passing of the elderly. My primary objective is to make a substantial contribution to **curtailing desertification**, which would necessitate a decrease in the excessive felling of trees. These trees play a pivotal role as a primary source of income for the local population. To achieve this, **I am committed to creating alternative income-generating activities for the youth, thereby providing them with sustainable opportunities while also safeguarding the environment**."*
Moctar Traore
Man, District, Mali

MLI03: *"**Floods** observed during the rainy season frequently result in damage to housing, infrastructure, and even loss of human lives. These floods also contribute to an increase in the prevalence of diseases such as malaria and diarrhoeal illnesses. During periods of high temperatures, we note a **rise in elderly patients being admitted due to dehydration**. Environmental degradation further exacerbates these issues, and it has led to forced population displacements. The limited purchasing power of the population makes it challenging to access necessary treatments, and it hampers efforts to undertake solid construction projects."*
Anonymous
Man, Health institution, MOH, Mali

Niger

NER01 *"A poignant example I came across is the story **of a farmer who once possessed a substantial and highly productive field**. For years, he reaped abundant harvests from his land, benefiting greatly from its fertility. However, in recent years, **unfavorable weather conditions have caused substantial damage to his field**. Consequently, his once thriving land has been transformed into a water passage, symbolizing the profound impact of these environmental challenges on individual livelihoods."*
Barmini Kaboye El Bachirir
Man, National, NGO, Niger

NER02: *"The region of Tillaberi, specifically in the commune of Sakoira, has been experiencing a frequent emergence of **zoonotic diseases and epidemics**. This has led to an increase in the rate of medical consultations and the prevalence of chronic diseases in the area. In response to these challenges, **a comprehensive One-Health project has been implemented**. As part of this project, a Community Early Warning and*

Emergency Response System has been established to enhance the monitoring of climate-related impacts and facilitate a swift response to emerging health issues. The implementation of this system has proven effective in addressing various alerts and crises in a timely manner. Additionally, regular simulation exercises are conducted to ensure that response teams are well-prepared and proactive during emergency situations. This integrated approach that considers both human and animal health, along with the impacts of climate change, demonstrates a comprehensive effort to mitigate the health risks and challenges faced by the community in Tillaberi."

Bachir Oumarou
Man, District, NGO, Niger

NER03: *"Poorly distributed **heavy rains** over time lead to the flooding of crop fields and houses, resulting in collapses. This situation contributes to **poor harvests and a food shortage**. Additionally, high temperatures have a significant impact on work as they are exhausting. **The chronically ill individuals such as diabetics and hypertensives, as well as the elderly and infants, struggle to manage this period effectively**, thereby increasing pressure on health services compared to other periods. The following cases are commonly observed: exhaustion, heat stroke, and dehydration, often resulting in unfortunate outcomes like deaths caused by flooding or structural collapses. Furthermore, **areas with poor harvests experience malnutrition and undernourishment, while livestock can also be lost due to lack of adequate feed. During such hot weather, I have been actively advising people on all occasions to stay hydrated, particularly emphasizing the importance for infants and the elderly**. I have gone to the extent of **calling relatives and acquaintances in other localities to ensure they are aware of the need for hydration**. This outreach has been successful, and I've managed to reach a significant number of individuals without even realizing it."*

Djibo Aichatou
Women, National, MOH, Niger

NER04: *"During the five years that I served in the health service in the Agadez region, I observed significant changes, particularly in the occurrence of **heavy rains**, which were uncommon in the past. These heavy rains have led to flooding and the displacement of populations, often forcing them to settle wherever they can. Due to their vulnerability during these challenging times, **children and women suffer greatly**. This situation, especially prevalent among newborns and children under five, contributes to malnutrition. The challenges persist because the Agadez region is situated in a desert area with very low rainfall. However, even with minimal rain, the region faces immense difficulties. Nutritional foods are insufficient, and environmental degradation compounds the issue. As a result, the population struggles to access daily sustenance. **Pregnant women and children lack foods rich in vitamins, leading to undernourishment and subsequent diseases such as malnutrition and anaemia**. Historically, Agadez was known for its scarcity of rain. With the recent climate change-induced increase in rainfall, few people have come to accept and understand this phenomenon. The region's architecture is outdated, and the city has transformed into a migratory hub where diverse behaviours converge. **New diseases emerge, and the indigenous population is grappling with illnesses that were previously unknown to them**."*

Assoumane Mahamadou Issifou
Man, Region, NGO, Niger

Nigeria

NGA01 *"In my earlier years in Rivers State, the rainy season had more regular timing. One could say the month the rain would begin for that year. These times it is not so, when the rain eventually comes, it comes with* ***flooding****. In some areas, the streets, markets, and homes get flooded. This, of course, results in* ***contamination of the groundwater sources*** *like water boreholes and wells mixing with runoffs from sewage and refuse dumps. Vegetable gardens are not left out.* ***The treatment of typhoid fever and malaria has become rampant among people in my vicinity****. I have every reason to assume this is related to climate and environmental impact."*
Gold Ezienyi David-Suberu
Woman, Health facility, Private industry, Nigeria

NGA02: *"Going back home to the community where I grew up as a child,* ***I was shocked to see that most of the rivers we used to swim and fish in have all dried up****, and those that are still there have become very shallow so that you can easily walk through a river you required a boat to cross in years past."*
Samuel Chukwuemeka Obasi.
Man, National, MOH, Nigeria

NGA03: *"****Floods submerged a complete community in the FCT****. The occupants of the houses situated in the flooded area were evacuated by the rescue teams of the National Emergency Management Agency (NEMA). However, some victims of the floods, in particular,* ***the vulnerable groups – women, children, and the elderly – suffered the most catastrophes****, which led to recorded cases of death due to drowning and other related conditions. Victims were displaced which led to additional Internally Displaced Persons in the FCT. The victims who sought shelter were so terrified.* ***Due to disrupted health services and economic activities, a risky lifestyle was circumstantially adopted by the young people just to survive****. The State and non-State actors were overwhelmed."*
Prof. Abubakar Jafar Usman
Man, National, National Government, Nigeria

NGA04: *"A family embarked on a journey without potentially expecting any danger. Sadly, on their way, heavy rainfall started. The family was oblivious to the reality that the rain started ahead of them while they were en route to their destination. Unfortunately, they ran into a massive flood near a river.* ***The force and the current from the flood swept their vehicle down the river, and before help could come for them, they drowned helplessly alongside other victims of the same circumstances****. There was also a pregnant woman in labour. Unfortunately, they couldn't get a strong boat or canoe that could stand the high current waves coming from the seaside.* ***In the process of searching for a better means of taking her to the nearest health centre, she got exhausted and died****."*
Iruoma Chinedu Ofortube
Woman, District, NGO, Nigeria

NGA05: *"My facility is a referral centre that receives patients from five neighbouring states.* ***Hospitals are always full to capacity and the shortage of food and fruits increases hardship and suffering****. Stakeholders and government agencies made*

strategies to lessen the problem, which has little or no effect, due to our large population."

Gambo Isa Muhammad
Man, Health facility, MOH, Nigeria

NGA06: *"In my community in Mbaagwa Clan of Ikurav-Ya District of Kwande LGA, there was heavy rainfall one certain night. The community members woke up the following day to see water flooding their environment. Without any help, they have to wait for nature to take its course. After a few days, the water disappeared. Not long ago that small children and adults started getting sick. Their major complaint was fever, loss of appetite, vomiting, and general weakness of the body. A careful microscopic and laboratory analysis showed malaria parasites."*

Uzendah Philip Iorchivir
Man, District, Ministry of Environment, Nigeria

NGA07: *"Climate change has brought about a* ***prolonged dry season*** *as the rains have become more or less frequent which has affected produce in quantity and quality.* ***Disease-carrying bugs like mosquitoes are adopting new measures and biting patterns in the community. This has negatively affected the impact of seasonal antimalarial prophylaxis intervention in the community****. There is* ***despair and hopelessness as hunger bites harder due to crop failure and people lose their sources of livelihood*** *without any foreseeable solution in sight. Recently, there have been cases of sudden deaths within the community, the causes are yet to be ascertained.* ***Some farmers are migrating to other places in quest of water*** *as the community is far from any natural source of water. I have* ***observed sleep disturbance due to heat in a community without an electricity supply. They are forced to sleep outside their houses leading to mosquito bites which have increased the incidence of malaria fever in the community****. There are associated skin conditions such as rashes and itchy sensations that can be stressful.:*

Anonymous
Woman, National, MOH, Nigeria

NGA08: *"During* ***flooding*** *in the Makera settlement of Birnin Kebbi LGA, a lot of houses were affected, and stored food and farmland were damaged. People in the community were infected with gastroenteritis. I organized community sensitization through community dialogues and compound meetings in camps where people are living temporarily."*

Musa Bala Mohammed
Man, District, UNICEF, Nigeria

NGA09: *"There was* ***heavy rainfall****. Some roofs were damaged and blown off. Existing* ***erosion sites*** *were deepened and expanded with adverse effects on agricultural products and the health of the people, especially children experiencing respiratory problems (pneumonia, cold, diarrhoea, flu), malnutrition, and anaemia due to scarcity of food. In the extreme heat, there was also a* ***scarcity of food, especially fruits and vegetables****. People who could afford air-conditioned houses enjoyed life while others who could not did continue to adjust to endure the heat. People were not looking healthy.* ***Poverty and stress were written on people's faces****. Cases of malnutrition and anaemia increased.* ***The high cost of living, and scarcity of food in the markets, led to general insecurity****. The communities have now learned*

how to live with the situation. As each season is approaching, they have already made repairs to some damaged infrastructure, roads, and roofs. They have a good communication system and adhere strongly to their administrative rules and regulations."

Dr Martina Ezeama
Woman, District, NGO, Nigeria

NGA10: *"The **heavy rainfall** is too much, causing serious flooding within my area. **Also, the amount of sun has increased making it too hot inside the bedroom at night**. This is affecting newborn babies who cry at night. Because there is no light, no fans, the poor people are really suffering as a result of the impact of climate change. This is also affecting family activities because of too much flooding within some parts of the Niger Delta region. More diseases are spreading without more control, like water-related diseases due to a lack of good water to drink. **Flooding has affected my house. I need to move from my present location to another upland area**."*

Levi Ogundu
Man, Health facility, Private industry, Nigeria

NGA11: *"There has been **flooding in hitherto dry locations** in Abuja, Nigeria. Some estates are flooded recently and are at risk of demolition by government agencies. This will lead to the **displacement of a community** with its attendant economic hardship, chronic disease progression, inaccessibility to healthcare facilities, etc. **There are increasing numbers of mental health problems and incidences of crimes are on the increase**. Depression associated with the loss of jobs due to climate change abound."*

Ikenna Anthony Mgbedimma
Man, International, Nigeria

NGA12: *"There is an increase in **vectors and flies** due to environmental policy negligence. People are also undergoing a lot of stress, anxiety, and depression due to government policies in their workplaces."*

Auwal Ahmad
Man, National, Ministry of Environment, Nigeria

NGA13: *"The changing climate has brought about an increase in the **prevalence of vector-borne diseases**. Mosquitoes are now breeding and transmitting diseases like malaria more intensely. The community lacked proper healthcare facilities and resources to effectively combat these diseases, leading to a rise in illness and mortality rates. **Mothers' means of livelihood were usually disrupted due to the time and effort spent in caring for their sick children with a significant impact on household welfare**. Recognizing the urgent need to address these climate-related health challenges, we engaged in **community-led initiatives that included comprehensive health awareness campaigns to provide education on sanitation and hygiene practices, and education of residents about preventive measures against vector-borne diseases**. By engaging our community health extension workers, we were able to organize regular health check-ups in the communities, focusing on early detection and treatment of illnesses. Over time, these collective efforts began to yield positive results. The mothers in the communities witnessed improvements in income as they progressively began to spend less time pursu-*

ing children's healthcare challenges due to the adoption of preventive measures, thereby, becoming more resilient to the changing climate. This experience highlights the challenges faced by rural communities in Nigeria due to climate change. ***It demonstrates the importance of community engagement, sustainable practices, and support from relevant stakeholders in addressing the climate-health nexus and building resilience in the face of a changing climate****."*
Dr Chinedu Anthony Iwu
Man, Health facility, MOH, Nigeria

NGA14: *"It has been reported that the changed climate associated with the enhanced greenhouse effect may lead to health deterioration as a result of* ***medication-storage issues*** *due to increased heat thereby influencing the pharmacokinetics of medicines and therapeutic outcomes. As a drug manager of health facilities of a Local Government in Lagos State, we are presently faced with the challenge of* ***change in physical characteristics of some drugs*** *such as acetylsalicylic acid, change in color of metformin, metronidazole, etc. Although we try to meet the standard storage condition at all times by charting the temperature log forms, ensuring the air conditioners are on when there is a power supply and other storage requirements, the increase in temperature these days and poor electricity supply is a challenge to the medicine storage system at the local level. When we notice changes in the drugs, we had to further ensure a must for well-ventilated areas for drug storage, especially in facilities that do not have an alternative electricity supply that can power the air conditioners of the drug stores."*
Halimat Adedeji- Adenola
Woman, District, MOH, Nigeria

NGA15: *"In 2022, there was a massive* ***flood*** *in most states in Nigeria and Bayelsa state, a mostly riverine state, was affected. It was so bad that even* ***cold chain equipment for immunization was destroyed*** *and some were disconnected to avoid damage. This has a bad effect on immunization sessions and their* ***coverage for most antigens dropped to an all-time low****. This obviously affected the health of children and women. In the same vein, the displacement of people into internally displaced people camps had their fair share of health challenges."*
Dr Avuwa Joseph Oteri
Man, National, NGO, Nigeria

NGA15: *"****Prolonged drought dries up the dirty community stream that serves both livestock and residents****. This makes it difficult for community members to access water and much* ***harder for menstrual hygiene management for teenage girls leading to an increase in infections in the unbearable heat****. Due to the difficulty in managing the monthly menstrual cycle due to limited access to water sanitation hygiene and period poverty,* ***many teenage girls prefer to get pregnant to save them the worry of menstruating monthly for 9 months****."*
Linda Raji
Woman, District, NGO, Nigeria

NGA17 *"In October 2022, I went for polio outbreak support to a state where over six LGAs experienced flooding. Most of their houses, farms, and businesses were destroyed. Many of the people were affected by cholera due to water contamination and poor hygiene. The polio vaccination team and their supervisors were not to administer*

the vaccines but to be empathetic to the plight of the people by advocating for sandbags and food to the people rather than presenting them with polio vaccines in their time of need. Polio vaccination in such communities had to be postponed to later days when the situation has subsided, and the people were receptive to the teams due to their support at the time of their crisis."

Ismaila Edego
Man, Region, Nigeria

Pakistan

PAK01 *"Kohistan is a remote district in the northeast of Khyber Pakhtunkhwa, last year **flash floods** destroyed many health facilities and markets and people had to travel a long distance to get medical facilities. The health department arranged a mobile hospital for the population and now with the coordination of line departments such as NDMA, PDMA, and remote sensing, an early warning system is in place for the local population, and travel advisory is issued for the travellers."*

Dr Akhtar Hussain
Man, Region, Other global health partner, Pakistan

Senegal

SEN01 *I"In the Makacolibantang area, the climate has become **extremely hot** throughout both the dry and rainy seasons. This disruption affects agriculture, particularly market gardening, with several consequences for the economy and health. **The intense heat during both the day and night hinders sleeping under mosquito nets, making it easier for mosquitoes to bite and transmit diseases such as malaria and dengue fever**. These changes have resulted in issues like dehydration, anaemia, and increased cases of malaria."*

Daouda Ndao
Male, District, MOH, Senegal

SEN02: *"The **intensity of the heat wave** is increasing to an unbearable level. **The presence of trees is diminishing**, particularly with the local authorities cutting down Casuarina trees. The **encroachment of the sea** is also progressing. As a consequence, there has been a rise in cases of allergies, asthma attacks, and various respiratory conditions, particularly among children, during paediatric consultations."*

Aissata Diallo
Women, Health institution, MOH, Senegal

Somalia

SOM01 *"Somalia has faced **drought** for a very long time. Along with civil war, climate change is badly affecting the country where a total of 4.2 million people out of the total population of 16 million are living in **IDP camps** due to prolonged drought. People leaving their houses and living in IDP camps have **mental health issues**, and **children have issues of malnourishment and cholera along with vaccine-preventable diseases. Medical teams were prepared for the field, to fight malnourishment, enhance** routine immunization, and provide deworming medi-*

cine to the communities affected by drought through the WHO country office in Somalia along with a cholera response and vaccination in outbreak areas. This all helped to reduce morbidity and mortality in the population."
Dr Muhammad Taimoor
Man, International, WHO, Somalia

South Sudan

SSD01 *"Climate change has caused health problems to increase, both in humans and animals.* ***Seasonal diseases have increased in my area****, while cattle are the major source of all life.* ***East Coast fever became a major factor in killing animals due to climate change****; the rainy season and dry season became unpredictable. When the rain fell, there was no more grass for animals to eat due to drought and flooding, but there were no specific seasons to control it.* ***The malaria-infected season has changed, not only the rainy season, due to the presence of water everywhere on the ground****. The Sudd Wetland became the only source of food due to fishing opportunities. In the islands, this causes inaccessibility to health services and a lot of outbreaks of cholera and measles. Due to overcrowding that has been caused by drought and flooding, the island's sanitation level is not favorable at all."*
Akechbuuroh Kuol Akech Kur
Man, Region, MOH, South Sudan

Eswatini

SWZ01 *"I have observed people who are farming not getting enough food. The farming inputs are very expensive, and farming is now like win or lose.* ***People who are taking antiretrovirals and non-communicable disease medicine want to stop because there is no food****."*
Adelaide Mthombo Dlamini
Woman, Region, Private industry, eSwatini

Togo

TG001 *"Togo is experiencing an increase in* ***Aedes mosquitoes*** *both in cities and in protected areas.* ***Dengue*** *has become a reality in Togo. This is due to the invasion or colonization of cultivable land inside the Protected Areas."*
Ali Napo
Man, National, Ministry of Environment, Togo

TG002: *"The Savannah Region, situated in the north of Togo and influenced by the Sahelian climate and the spillover of the Sahel crisis, is experiencing changes. The* ***rainy season has become increasingly scarce****, accompanied by* ***winds that damage habitats and agriculture****. This situation not only introduces new species of mosquitoes but also promotes their proliferation.* ***Previously held beliefs that Anopheles mosquitoes only bite late at night are no longer valid****. As arable land becomes scarce, people turn to urban cultivation or settle in close proximity to concessions. These tall crops such as corn and millet become breeding grounds for mosquitoes, as they breed in clear water rather than waste water.* ***The changing***

behaviour of mosquitoes is leading to a shift in the peak period of malaria cases *at the Dapaong Hospital Centre (CHR-D).* ***Poverty resulting from drought complicates access to healthcare despite government efforts****. The displacement and resettlement of populations due to drought lead to the proliferation of diseases like diarrhoea, hepatitis, and typhoid fever, which can result in child fatalities. Notably, cases of nervousness and* ***increased consumption of local alcoholic drinks during periods of intense heat have been observed****, leading to physical violence, accidents, and incidents on public highways. A striking example from the Savannah Region illustrates the gravity of the situation. A family lost two children in one week, with one of them admitted to the CHR. Investigation revealed that a local drink was possibly responsible, prompting measures like water testing, awareness campaigns, radio broadcasts, and chlorine distribution. The challenge remains in influencing local populations to modify their behaviour and address this complex health situation."*

Ouro-Djeri Atcha-Gani
Male, Health institution, MOH, Togo

TG003: *"**More and more people are seeking consultations for stress and depression**, as well as cases of pneumonia. There has been a noticeable increase in diseases related to poor hand hygiene, and child malnutrition is also on the rise."*

Gmakouba Wankpaouyare
Male, National, MOH, Togo

Tunisia

TUN01 *"The **drought**, which has affected many countries around the world, has also impacted the availability of drinking water, particularly in our city of Gabés. In recent years, we have experienced frequent disruptions in the supply of drinking water, controlled by the state.* ***This situation has compelled the population to seek alternative sources of unregulated water****. These changes have resulted in the emergence of periodic epidemics, including hepatitis A, typhoid fever, and shigellosis. Waterborne diseases have been consistently documented during these years, particularly in districts with inadequate infrastructure and living conditions. The communities in these areas have participated in response efforts aimed at combating these epidemics. Notable instances of these outbreaks occurred in our region, such as the typhoid fever epidemic in 2016 and the hepatitis A epidemic in 2020."*

Anonymous
Women, Region, MOH, Tunisia

Uganda

UGA01 *"We have an upsurge in **malaria cases**. The government is providing mosquito nets to help us control malaria, but the clients misuse the net as fish nets, wedding gowns, and chicken safety nets."*

Byenume Fredrick
Man, District, District local government, Uganda

UGA02: *"**Landslides** are occurring in my home district, Bududa, Uganda, where families where fear death, displacement, no school, no health, lost property, gender-based violence, famine, insecurity, and above all trauma."*
Nakasala Hamuza
Man, Health facility, MOH, Uganda

UGA03: *"In the lowlands of Kasese district where I come from, people have become homeless due to melting ice causing **floods even in areas where floods previously did not happen**. Grass has been contaminated by floods, thus many animals die of diseases due to eating contaminated grass. **Wild animals like elephants have invaded the local communities in search for food due to prolonged droughts**, affecting vegetation cover in the national parks. In addition, people's farms and gardens have turned into swamps and bushes due to frequent floods and they no longer have land to cultivate for food. The bushes and stagnant water have become breeding grounds for mosquitoes, thus **increasing cases of malaria in areas where it was not a problem initially**. Also, prolonged hot/dry periods of weather and short rainfall seasons have led to poor harvests thus poverty and malnutrition, especially in Isingiro. There has been an abnormally high incidence of vector-borne diseases like malaria and trypanosomiasis and outbreaks like cholera and Rift Valley fever. Also, the **health infrastructure has been destroyed or affected by floods**. Water reservoir tanks burst due to extreme heat experienced during the prolonged dry seasons. Mothers who come to deliver at health facilities lacked water to wash after delivery and even the midwives failed to get water to use for cleaning or scrubbing blood off the floor and delivery beds after delivering the mothers even for cleaning the instruments. In the communities, wells dry up and thus, lack of water to bathe and wash has led to increased cases of water-washed diseases such as scabies."*
Mugabekazi Jastine
Woman, health facility, Uganda

UGA04: *"Water channels have been interfered with and changed. Swamps have been replaced with farming, and a lot of deforestation has taken place. National Parks have been encroached. The community has been left alone to do what they want. Law enforcement has failed due to the high level of corruption due to low wages and lack of living wage. Public health services are compromised where departments in health care systems are like competing instead of pulling together for one goal. Much funding is put into curative instead of preventive."*
Collins Davis Mwesigwa
Man, District, Uganda

Zimbabwe

ZIM01 *"**Droughts** have been increasing resulting in poor to no harvests. Many people in the Masvingo province depend on **subsistence farming** for survival. **Poor harvests led to children dropping out of school, especially girls**. People have moved to neighbouring provinces to do part-time jobs for food."*
Elshaddai Mahuda
Man, Region, NGO, Zimbabwe

Local knowledge you can use: Movement for Immunization Agenda 2030 (IA2030)

The Geneva Learning Foundation (TGLF) has produced multiple case studies and "listening and learning reports" based on the experiences shared by members of the Movement for Immunization Agenda 2030 (IA2030).

These outputs share and analyze the perspectives of a diverse group of health practitioners working to deliver or manage immunization services in low- and middle-income countries.

Each report offers a unique opportunity to discover unfiltered experiences and insights from thousands of people whose daily lives revolve around delivering immunization services, contributing to consultative engagement between international and local levels.

These IA2030 publications can be found in the IA2030 Movement repository:

https://zenodo.org/communities/ia2030/

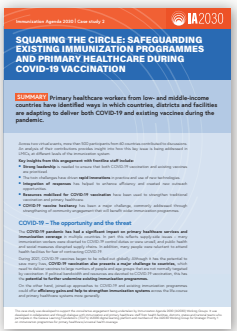
The IA2030 Movement Knowledge to Action Hub is sharing this knowledge with members of the Movement for IA2030, tracking and measuring its adaptation and application
https://www.learning.foundation/ia2030-knowledge-action-hub

Learn more about the Hub
https://redasadki.me/2022/10/12/reinventing-the-path-from-knowledge-to-action-in-global-health/

2021

IA2030 Listening and learning report 1. Working groups consultative engagement through a peer learning platform
https://doi.org/10.5281/zenodo.7010140

IA2030 Case study 1. A digital health platform for immunization and primary health care (PHC) engagement
https://doi.org/10.5281/zenodo.6982953



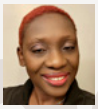
IA2030 Case study 2. Squaring the circle: safeguarding existing immunization programmes and primary healthcare during COVID-19 vaccination
https://doi.org/10.5281/zenodo.7004191

Narratives of change by IA2030 Movement Leaders

IA2030 Case study 3. Kuotong Nongho Rogers. View from the frontline: microplanning for equity
https://doi.org/10.5281/zenodo.7004235

IA2030 Case study 4. Njoh Andreas Ateke. View from the frontline: working with communities to strengthen immunization programmes
https://doi.org/10.5281/zenodo.7004263

IA2030 Case study 5. Paul Hilarius Asiwome Kosi Abiwu. View from the frontline: building stronger systems
https://doi.org/10.5281/zenodo.7004284



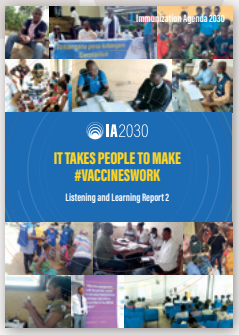
IA2030 Case study 6. Zainab Ferrah Conteh. View from the frontline: Strenghtening the immunization programme backbone
https://doi.org/10.5281/zenodo.6982953

IA2030 Case study 12. Boureima Kaboré. Delivering services in conflict-affected areas
https://doi.org/10.5281/zenodo.7010188

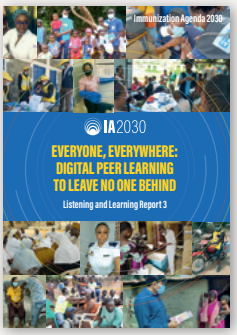
IA2030 Case study 13. Pharm. Daniel Kwesi Ekwam. Covering all the bases. ummary: A systematic approach to COVID-19 vaccination
https://doi.org/10.5281/zenodo.7010227

IA2030 Case study 14. Ndaeyo Iwot. Building the capacities of communities
https://doi.org/10.5281/zenodo.7010211

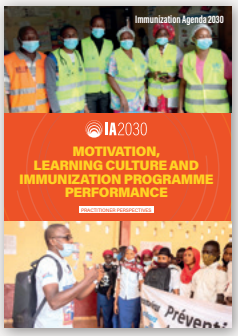
IA2030 Case study 15. Penina Oketch. Planning, people and performance
https://doi.org/10.5281/zenodo.7010242



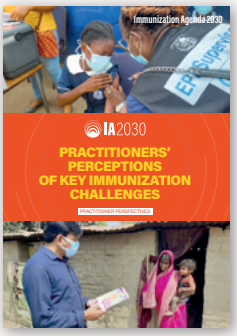
IA2030 Listening and learning report 2.
It takes people to make #VaccinesWork
The power of visual storytelling to engage audiences – a photobook of pictures of daily life submitted to mark World Immunization Week 2022.
https://doi.org/10.5281/zenodo.7010196



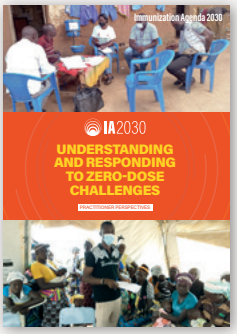
IA2030 Listening and learning report 3.
Everyone, everywhere: digital peer learning to leave no one behind
Lessons learned about vaccine confidence, gender barriers and other immunization challenges from Teach to Reach 6 event.
https://doi.org/10.5281/zenodo.7010209



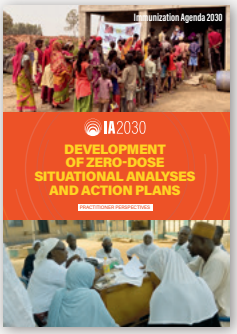
IA2030 Case Study 7. Motivation, learning culture and programme performance
An analysis of application form data and information (>6000 contributors) on motivation, organizational learning culture and perceived programme performance. Key finding: In this group, learning culture but not motivation showed a strong correlation with programme performance
https://doi.org/10.5281/zenodo.7004191



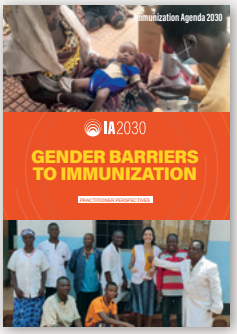
IA2030 Case Study 8. Practitioners' perceptions of key immunization challenges
A quantitative and qualitative analysis of 2000 responses to key challenge prompts in application form. Key finding: Hesitation/demand was seen as the most significant immunization challenge, particularly lack of community awareness of the benefits of immunization.
https://doi.org/10.5281/zenodo.7005241



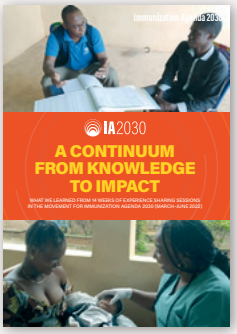
IA2030 Case Study 9. Understanding and responding to zero-dose challenges
A mostly qualitative analysis of 110 responses to a targeted survey on zero-dose challenges. Key finding: Description of methods effective in practice to reach under-immunized populations, tackling multiple supply- and demand-side barriers
https://doi.org/10.5281/zenodo.7010171



IA2030 Case Study 10. Development of zero dose situational analyses and action plans
A quantitative analysis of the guidance and resources used to analyse local contexts and develop action plans. Key finding: Although reasonably well used, there is scope to increase the use of global guidance.
https://doi.org/10.5281/zenodo.7010177



IA2030 Case Study 11. Gender barriers to immunization
Qualitative analysis of gender barriers discussed in experience-sharing sessions. Key finding: Gender barriers and a diverse range of solutions adopted to overcome them.
https://doi.org/10.5281/zenodo.7010184



IA2030 Case study 16. Continuum from knowledge to impact
What we learned from 14 weeks of experience sharing sessions
in the Movement for Immunization Agenda 2030 (March–June 2022)
https://doi.org/10.5281/zenodo.7014392

IA2030 Listening and learning report 4

Listening and learning at Teach to Reach 7. On 14 October 2022, the Geneva Learning Foundation (TGLF) organized its seventh "Teach to Reach: Connect" even in less than two years. This one-day online event brought together more than 14,000 immunization professionals from low- and middle-income countries (LMICs) and members of the international immunization community to share experience.

https://doi.org/10.5281/zenodo.7766585

IA2030 Listening and learning report 5 – The many faces of immunization

Our annual gallery of photographs shared by global immunization practitioners celebrates their diversity of roles and challenges faced in their daily lives, and celebrates their commitment to the goals of the Immunization Agenda 2030.

https://doi.org/10.5281/zenodo.8166653

Narratives of change by IA2030 Movement Leaders

IA2030 Case study 17. Maria Fernanda Monzon: Speaking up for frontline staff

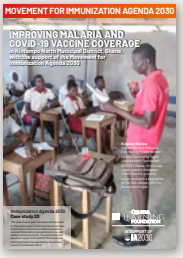
https://doi.org/10.5281/zenodo.7785024

IA2030 Case study 18 Wasnan Faye: Vaccine angels – Give us the opportunity and we can perform miracles

https://doi.org/10.5281/zenodo.7785244

IA2030 Case study 19.–Franck Monga: Building a movement for IA2030 in the Democratic Republic of Congo

https://doi.org/10.5281/zenodo.7794726



IA2030 Case study 20.– Kingsley Nigere:.Improving malaria and COVID-19 vaccine coverage in Kintampo North Municipal District

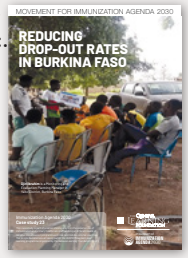
https://doi.org/10.5281/zenodo.8318796

IA2030 Case study 21.– Maryam Idris:. Improving immunization in Zango Ward, Kano State, Nigeria

https://doi.org/10.5281/zenodo.8319119

IA2030 Case study 22. –Beckie Tagbo:. From hesitancy to advocacy- Transforming health worker COVID-19 vaccine uptake in Nigeria

https://doi.org/10.5281/zenodo.8398622



IA2030 Case study 23.– Djiri Ibrahim:. Reducing drop-out rates in Burkina Faso

https://doi.org/10.5281/zenodo.8398631

IA2030 Case study 24. Felix Adipare. A tailored approach - Multiple innovations in service delivery to improve coverage in Ghana

https://doi.org/10.5281/zenodo.8398637

IA2030 Case study 25. – Samuel Bourgou:. Reaching vulnerable displaced populations in Burkina Faso

https://doi.org/10.5281/zenodo.8398641

IA2030 Case study 26 –. Alain Dakam:. Negotiating access in disputed and volatile areas

https://doi.org/10.5281/zenodo.8402839

IA2030 Case study 27. –Bihle Mbinkar:. Data for action - Boosting district-level MR2 coverage in Cameroon

https://doi.org/10.5281/zenodo.8402849

IA2030 Case study 28.– Fanny Ogwu:. Building bridges - Ensuring inaccessible communities are reached in rural Nigeria

https://doi.org/10.5281/zenodo.10039145

IA2030 Case study 29.– Aboubakar Kone:. Brokering immunization partnerships

https://doi.org/10.5281/zenodo.10039207

IA2030 Case study 30.– Mathieu Nguessan:. Transforming second-dose measles vaccine coverage in Côte d'Ivoire

https://doi.org/10.5281/zenodo.10039276

On 16 June 2023, the Geneva Learning Foundation (TGLF) organized its eighth "Teach to Reach: Connect" online event (Teach to Reach 8). Uniquely, these events provide a platform for healthcare practitioners from low- and middle-income countries (LMICs) to network, share experiences and engage in discussion with global experts.

This report highlights some of the key insights shared in three specific areas – community acceptance of human papillomavirus (HPV) vaccination, use of oral cholera vaccine (OCV) and vaccination in humanitarian settings. It also explores practioners' perceptions of the value of the event and associated activities, and their impact on professional development and practice.

A total of 16,835 health professionals participated in activities either before, during or after the event, receiving and responding to event resources such as slide decks, stories and guidance. As well as the experiences shared before and during the event itself, further information was gathered in post-event feedback, which was provided by 1039 participants, with 625 of them additionally sharing a success story, lesson learned or challenge. The full set of contributions in French and in English has already been shared on an open access platform.

Participants continue to report high levels of positive feedback with respect to these events, which are reflected in the growing numbers of registrants (up 19.1% over Teach to Reach 7). The rich diversity of material shared highlights the huge amounts of "tacit knowledge" and experience held by immunization practitioners that can be shared for the common good in pursuit of IA2030 objectives.

IA2030 Listening and Learning Report 6 Making connections at Teach to Reach 8
https://doi.org/10.5281/zenodo.8398550

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