

# 2023 Intramural Emory Global Health Case Competition

## Preparation for Climate Change Impact on Human Health: Development of Climate Resilient Plans for Vulnerable Countries



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## INTRODUCTION

Human health is inextricably linked to climate, and now climate change, as environmental changes have both indirect and direct impacts on the livelihoods of individuals and communities. Climate change directly impacts human health with increased morbidity and mortality due to thermal extremes and increased rates of diarrhea, cholera, malnutrition, infection spread, and cardiovascular and respiratory illnesses. There are also significant indirect effects, including increased frequency and severity of natural disasters, shortage of fresh water supplies, reduction in agricultural yields leading to decreased food security, the impairment of animal health by the spread of vector-borne diseases and threat to their environment, forced migration and dislocation of peoples, and the resulting stress and psychological issues from these changes.

As a result of these severe consequences, many countries have committed to climate action with greater urgency. In 2022, the Intergovernmental Panel on Climate Change (IPCC), composed of 195 member countries, released a report outlining how “human-induced climate change...has led to some irreversible impacts as natural and human systems are pushed beyond their ability to adapt.” The IPCC has defined “vulnerability” as “the propensity or predisposition to be adversely affected” and a concept that “encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.”<sup>1</sup> IPCC has recognized that “across sectors and regions, the most vulnerable people and systems are observed to be disproportionately affected.”<sup>1</sup> The vulnerability of ecosystems and communities differs drastically due to region, socio-economic development, unsustainable agricultural practices, inequity, marginalization, and historical and ongoing colonialism. There are approximately 3.3 to 3.6 billion people estimated to be living in highly vulnerable areas due to climate change.

For purposes of this case competition, “vulnerability” will be defined as the susceptibility of a country to face harmful consequences of climate change with limited capacity to adapt to those consequences. While immediate and long-term actions will help to reduce the projected detrimental effects of climate change, certain highly vulnerable groups and ecosystems have been affected greater than their limits of adaptability, for example with some warm water coral reefs, rainforests, coastal wetlands, and some polar and mountain ecosystems. Thus, there must also be a focus on climate resilient development, which emphasizes both prevention of climate change and adaption to its consequences. This case will focus on the development of climate resilient plans to support the health of four vulnerable countries amidst the climate change crisis.

## CASE PROMPT

In response to IPCC's report, the United Nations (UN) has decided to provide funding opportunities for climate resilience action plans for nations highly vulnerable to the impacts of climate change. Case competition teams will serve as multidisciplinary representatives of **Haiti, India, Afghanistan, or Mozambique** (countries determined as highly vulnerable in the IPCC report). Each team must select its country between 5:00 pm EST Friday, January 27 to 5:00 pm EST Saturday, January 28 (via the link provided in their email). Teams will select their host country on a first come, first-selected basis. To that end, the earlier that teams make their country selection, the more likely they will obtain their first choice. According to the UN, your climate resilience plan proposal must:

- 1. Analyze the short and long-term impacts of climate change on human health within your respective country.**

While climate change affects all countries, different regions and communities will be impacted to greater extents depending on environmental, socioeconomic, political, and other factors. The IPCC has reported that while near-term actions that limit climate change will reduce projected losses, they cannot avoid all consequences. Describe what makes the selected country vulnerable to the impacts of climate change in the near term (2021-2040, as determined by the IPCC) and long term (2041-2100). Brief backgrounds on each country have been included in this case; however, teams are not limited to this information and encouraged to do more extensive research.

- 2. Present a 5- and 10-year climate resilient development plan to both mitigate direct and indirect impacts on health.**

According to the IPCC, climate resilient development (CRD) is the “process of implementing greenhouse gas mitigation and adaptation options to support sustainable development for all. CRD is possible when this interdependence [between climate action and sustainable development] is leveraged.” Both greenhouse gas mitigation and the development of sustainable adaptation methods are crucial to improve the human health of vulnerable populations and to increase resilience to adverse effects of climate change. Teams should focus on both processes

of CRD in their plan, addressing short- and long-term impacts. CRD plans must have specific measurable milestones at each time point; plans can either be a singular overarching plan with various components implemented at these time points or two separate plans that can be implemented within these time points. Teams should also be mindful that often countries that contribute least to greenhouse gases are the most at risk for the impact of climate change and should address this in their proposal. Current policies, stakeholders, and societal narratives around climate change and climate science should be thoroughly researched. Relevant partners and potential collaborators in the CRD plan should be highlighted.

**3. Contain a budget of estimated costs. The funding amount from the UN will be \$10 million USD per year, for a total of \$100 million USD for 10 years.**

Teams may allocate \$50 million for their 5-year plan and \$50 million for their 10-year plan.

From Friday, January 27, 5:00 PM EST until Friday, February 3 at 1:00 PM EST, teams are welcome to contact the Case Competition Planning Team to ask questions or seek clarifications about the content of the case. Questions will not be accepted after 1:00 PM on Friday, February 3<sup>rd</sup>. Through Thursday, February 2, the Case Competition Planning Team will respond within 12 hours of receipt of your email. Starting Friday, February 3<sup>rd</sup>, responses to team questions will be sent within 3 hours from the time they are submitted. No questions will be answered if they are received after 1:00 PM on February 3<sup>rd</sup>. To ensure that teams have similar knowledge about the case, a copy of the response to any question will be shared with all the Team Captains.

Lastly, we would like to acknowledge IPCC's determination of vulnerable countries has its limitations. The IPCC considers factors such as access to basic infrastructure and healthcare, poverty levels, nutrition, and governance but does not consider projected risks and exposure to sea levels, heat stresses, storms, or other natural disasters. Additionally, the IPCC definition does not include vulnerable groups not limited to specific nations.

## CONSIDERATIONS FOR A CLIMATE RESILIENT DEVELOPMENT PLAN

For an effective CRD plan, the following components are necessary to consider:

- Specific country: Each country has unique environmental, social, economic, political, and communication environments that may impact the feasibility of different action plans. Teams could thoroughly research Haiti and the current environmental and sustainability programs and policies in place, along with their limitations.
- Key stakeholders and sector: Teams should focus on sustainable action plan development methods by working primarily with local stakeholders and sectors. While the UN is providing this funding opportunity, teams should allocate these resources to working with groups present in Haiti, rather than other external international organizations. Include a plan for communication with stakeholders.
- Timeframe: The 5 and 10-year plans should involve initiatives that can be completed within those time frames.
- Assessment: Teams should determine an assessment method and measures as to determine the success and potential impact of their action plan at each time point. Teams should consider alternative plans or adjustments that may be required if assessment measures are not adequate at a certain time point (for example, if at the 5-year mark, the 5 -year plan has not been successful, how will this be addressed?).

The following factors (from the 2022 Emory Morningside Global Health Case Competition) may be helpful to consider as you begin brainstorming ideas for your CRD plan. This is not an exhaustive list of potential ideas, and teams are not required to incorporate all of these factors.

- [Policy](#): a law, regulation, procedure, administrative action, incentive, or voluntary practice of governments and other institutions
- [Program creation and implementation](#): the design and execution of a program addressing climate change impacts on health
- [Infrastructure](#): a set of fundamental facilities and systems that support the sustainable functionality of households and firms, necessary for the economy to function. Examples include transportation systems, communication networks, sewage, water, and electric systems
- [Research](#): a process of systematic inquiry that entails collection of data; documentation of critical information; and analysis and interpretation of that data/information
- [Surveillance](#): the systematic collection and analysis of data that allows public health departments to protect their local communities. Can be of infectious diseases, noninfectious health conditions, and risk factors and exposures
- [Education](#): helps individuals acquire functional knowledge and strengthens attitudes, beliefs, and practice skills needed to adopt and maintain healthy behaviors throughout their lives

### What is Climate Change?

Climate change refers to shifts in temperatures and weather patterns in the long-term.<sup>2</sup> According to the UN, some of these shifts may be natural, such as through variations in the solar cycle. However, in the last couple of decades, the main driver of climate change has been human activities. This is mainly mediated by emissions due to use of fossil fuels which raise greenhouse gas concentrations, thus increasing the temperature of our planet. In fact, the last decade (2011-2022) was recorded as the warmest in earth's history. The environmental consequences of climate change include: droughts, water scarcity, wildfires, flooding due to rising sea levels and melting polar ice, storms, and a sharp decline in biodiversity, and many more.

### International Organizations & What has been done so far?

Climate change is a global emergency, so nations have come together to find solutions together. It is again important to note that the most impacted countries are often not the ones that contribute the most to climate change, further emphasizing the need for global collaboration. International organizations have had several conventions and major climate agreements in the recent decades to combat climate change. The UN has identified the three broad categories of action: cutting emissions, adapting to the impacts of climate change, and budgeting of required adaptations. The major global frameworks for achieving those three categories are:

- Sustainable Development Goals<sup>3</sup>
  - The SDGs are a “call for action” for all countries across the globe to “promote prosperity and protect the planet” by 2030, and they include actions regarding poverty, education, health access, etc. Number 7 and 13 are affordable clean energy and climate action respectively.

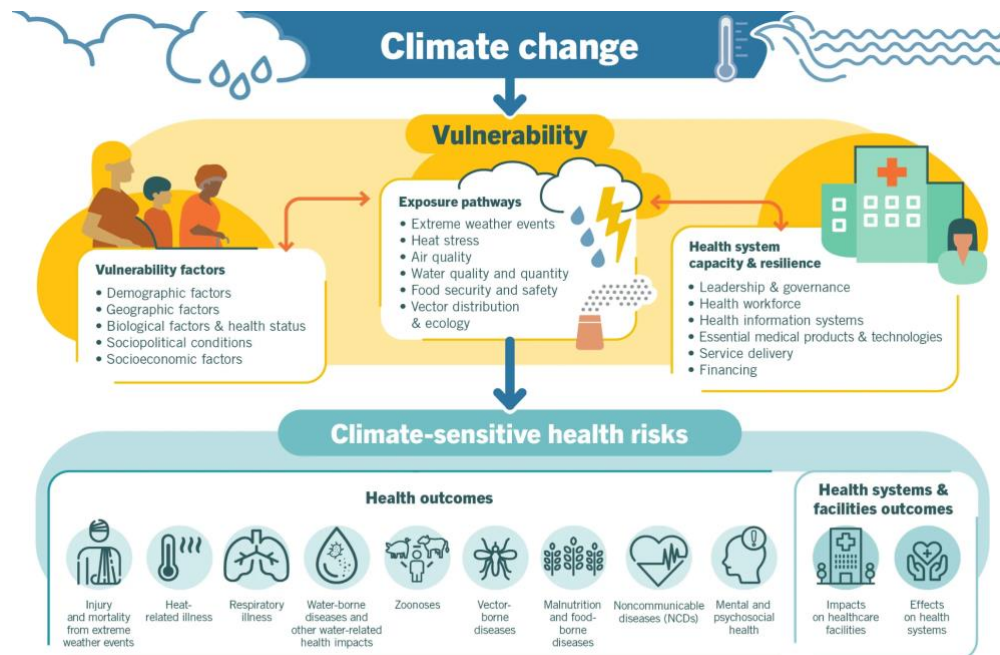


- UN Framework Convention on Climate Change (UNFCCC)<sup>4</sup>
  - UNFCCC is the United Nations entity tasked with supporting the global response to the threat of climate change. It is the parent treaty of the 2015 Paris Agreement as well as the 1997 Kyoto Protocol.
- The Paris Agreement<sup>5</sup>
  - The Paris Agreement was signed in December 2015 at the COP21 (UN Climate Change Conference). It is a legally binding international treaty for climate change, joined by 194 parties. It is “a landmark in the multilateral climate change process” as it brings all nations together for a common cause.
  - The document essentially acknowledges “that climate change is a common concern of humankind, Parties should, when taking action to address climate change, respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity.”<sup>6</sup>
  - 3 key elements<sup>7</sup> of the Paris Agreement are:
    - Limit temperature rise to 1.5 C
    - Review countries’ commitment to cutting emissions every five years
    - Provide climate finance to developing countries
  - It also provides a framework for financial, technical and capacity building support for countries.

## **Climate Change and Health**

All of these changes bring unique health concerns, health care challenges, and considerations. As mentioned in the introduction, climate change is detrimental to human health in many aspects and is closely interlinked to social and environmental

determinants. With the impacts of climate change, access to clean air, safe drinking water, food, shelter, and trusted information can become increasingly challenging. It is also important to emphasize that these challenges will disproportionately affect vulnerable communities. The COP26 estimates “between 2030 and 2050, climate change is expected to cause approximately 250,000 additional deaths per year, from malnutrition, malaria, diarrhea and heat stress.”<sup>8</sup> Fig. 1 below summaries some of the key facts regarding the health impacts of climate change.



**Figure 1 Source: <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>**

COP26 Health Programme under the UN is committed for transformational action to protect the health of people and the planet in response to the effects of climate change. The COP26 Programme has two commitments: climate resilient health systems and sustainable low carbon health systems.

The initiatives of COP26 Health Programme<sup>9</sup> include:

- Building climate resilient health systems
- Developing low carbon sustainable health systems
- Adaptation Research for Health
- The inclusion of health priorities in Nationally Determined Contributions
- Raising the voice of health professionals as advocates for stronger ambition on climate change

Overall, the health impacts of climate change are undeniable. This understanding based on the existing data on health impacts, and the current initiatives by the COP26 and many other international organizations, will help make careful considerations and build long-term strategies.

### **Policy Work & Climate Resilient Development**

The Intergovernmental Panel on Climate Change (IPCC) is the UN body dedicated to assessing climate change from a science perspective. IPCC was created in 1988 jointly by the UN Environment Programme and the World Meteorological Organization (WMO) and has 195 Member countries.<sup>10</sup> They prepare annual comprehensive assessment reports that include the state of knowledge on climate change, its impacts, future risks, and potential options to reduce the rate of climate change. They also create region or country specific policy suggestions.

While the IPCC was established in 1988, this was the first time that it recognized the risk of climate change and global warming denial, as well as the importance of

understanding societal narratives and trust in credible, clear, and actionable sources of information.<sup>49</sup> The report (2022 IPCC Summary for Policymakers) is based on 34,000 studies and written by more than 1,000 scientists. Despite this scientific certainty around human-caused climate change, the report states that ‘vested economic and political interests’ were delaying efforts to address it. The report warns of the impact of mis- and disinformation in reducing public consensus on recommended actions to save and improve lives.

The IPCC Summary for Policymakers report provides a framework around climate resilient development. The report “recognizes the interdependence of climate, ecosystems and biodiversity, and human societies”<sup>1</sup> and strives to integrate scientific findings from across multiple dimensions including natural, ecological, social and economic sciences to reach a comprehensive understanding. It also considers the non-climate related global trends such as “biodiversity loss, rapid urbanization, human demographic shifts, social and economic inequalities, and a pandemic”<sup>1</sup> that might impact and be impacted by climate change.

The framework of the report has been built around understanding the risks and hazards, identifying the exposure and vulnerability of affected humans and ecosystems, and approaching policy from an adaptation and resiliency standpoint. The report defines “adaptation” as adjustments through ecological and evolutionary processes. Resiliency is then built within adaptation, but it is “not just the ability to maintain essential function, identity and structure, but also the capacity for transformation.”<sup>1</sup>

Based on these definitions, the climate resilient development model aims for finding strategies that help people, communities, and other organizations cope with the present and future impacts of climate change, preserving the present and minimizing the future damages. It is not only adapting to changes, but also building resiliency in order to continue with creative and transformative changes to minimize the negative

consequences of climate impacts. Fig. 2 summarizes model of climate resilient development:

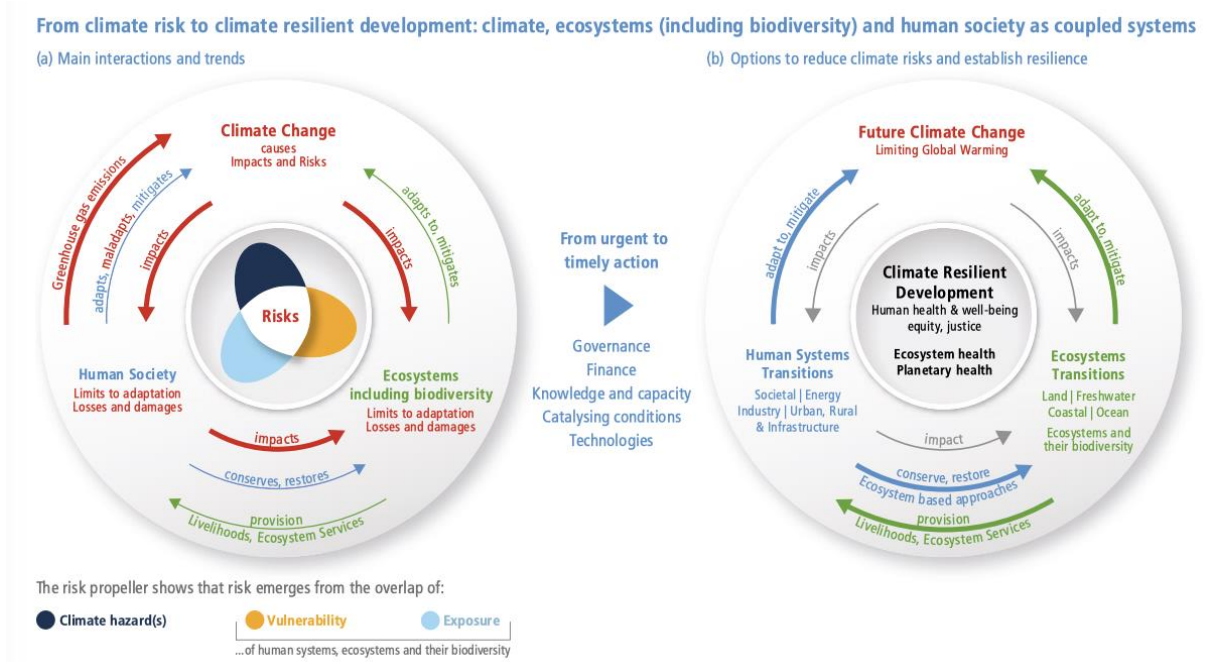


Figure 2 Source:

[https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC\\_AR6\\_WGII\\_SummaryForPolicymakers.pdf](https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf)

### Addressing Disparities in Climate Impact

While climate change is a global phenomenon, its negative impacts are felt more severely by the world’s poorest populations. Developing countries are more vulnerable to the effects of climate change due to high dependence on natural resources and limited capacity to cope with climate variability and extreme events.<sup>11</sup> Twenty of the 36 highest emitting countries are among the least vulnerable to negative impacts of future climate change, while 11 of the 17 lowest emitting countries are acutely vulnerable.<sup>12</sup> Accordingly, greater attention is being given to the climate responsibility of individual nations based on their relative level of carbon emissions.

There have even been calls for “climate reparations,” where the world’s largest emitters (China, United States, India) provide monetary compensation to low emitting countries facing climate crises. Calls for reparations have grown louder following the devastating floods in Pakistan this year that killed over 1,700 people, displaced millions, and created billions of dollars in damage.<sup>13</sup> While this ethical framework has been proposed by members of the international community, its implementation presents many challenges. Other strategies may include debt relief or favorable financing for low income countries needing to rebuild infrastructure or invest in greater security from climate events.<sup>14</sup> Of greatest importance is the need to galvanize international awareness and action towards addressing climate change impacts on the world’s most vulnerable people, with creative solutions, collaborative investments, and a rigorous scientific approach.

## BACKGROUND ON COUNTRIES

A brief background on all four of the countries has been provided. Additionally, **one** aspect of the intersection on climate change and human health has been expanded on per country. **These examples are for the purpose of providing an example on how climate change and health are related; teams are not limited to these examples and should not focus solely on the examples provided.** The aspect may not be the main issue for the specific country and may be applicable for other countries as well. For example, the relationship between sea level rise and human health is expanded upon for Haiti; however, this is an issue for India<sup>15</sup> and other countries as well. Teams are encouraged to do further research to identify what are the main issues that should be addressed in their plans.

### Haiti: Background

Haiti is a tropical island-nation in the Caribbean with a population of 11.5 million people.<sup>16</sup> Haiti is the poorest country in the Western Hemisphere by GDP, with over 52% of the population living below the poverty line of \$2.41 USD per day, and more than 21% below the extreme poverty line of \$1.12 USD per day.<sup>16</sup> Roughly one-third of the country is younger than 15 years old and only 5% are over the age of 65.<sup>17</sup> Further, recent demographic health surveys estimate one in every 10 children will die before reaching five years old.<sup>16</sup> These statistics reflect the levels of poverty and inadequate access to healthcare, education, and security. This widespread poverty makes it especially susceptible to the impacts of climate change.

Environmental changes such as deforestation, sea level rise, soil erosion and extreme poverty make Haiti increasingly vulnerable to climate change. There is already overwhelming evidence of climate change in Haiti, including well documented increases in mean temperatures, altered rainfall patterns, and epidemiologic shifts in vector-borne disease rates. Without urgent measures to adapt, climate changes are likely to magnify the already staggering levels of poverty across the Haitian.

## **Haiti: Health effects of sea level rise**

Future sea level rise poses serious threats to the viability of coastal communities including along Haiti's 1,100 miles of coastline. Recent scientific models project an over 2m sea level rise globally in the 21st century with ominous consequences.<sup>18</sup> The sea level rise in Haiti and the surrounding Caribbean region over the last 60 years was similar to the global average of approximately 1.8 mm/yr.<sup>19</sup> Current models suggest sea levels in Haiti will rise between 0.13 to 0.4 meters (5 to 16 inches) by 2030.<sup>20</sup> In addition to rising sea levels, increases in storm surges are expected in Haiti, which will exacerbate the existing flooding and erosion challenges along coastal departments, especially in the south of the country. With over 52,000 Haitian families relying on fishing for their livelihoods and much of the national population occupying low lying coastal floodplains, the impact of sea level rise on coastal communities could be catastrophic.<sup>21</sup> This impact could extend to inland agricultural regions, as the UN warns of rising sea levels permeating farmland and freshwater aquifers that are crucial for the nation's agricultural sector.<sup>22</sup>

## **India: Background**

Of the countries in this case competition, India is the only one that is both one of the major greenhouse gas emitters and one of the most vulnerable countries subject to climate change. India's large population is growing, increasing greenhouse gas emissions, and the country will be impacted by various climate change consequences: sea level rise, changes in monsoon, increased flooding, etc. This has cause for great concern as 17.5% of the gross domestic product and more than 60% of the labor force is dependent on agriculture for food and livelihood. IPCC has stated India as one of the countries to be most "economically harmed" by climate change.<sup>23</sup> In addition to economic impacts, the Climate Vulnerability Index by the Council on Energy, Environment and Water has determined that more than 80 percent of individuals in the country live in districts vulnerable to climate risks, such as floods, droughts, and cyclones,<sup>24</sup> while only 63 percent of districts have a management plan for disasters.<sup>25</sup> The need for greater infrastructure for climate change prevention and mitigation is crucial.



## **India: Health effects of air pollution**

Air pollution, from sources such as burning of fuel in motor vehicles, is a major driver of climate change, and has several public health impacts for India. In megacities, including those in India, air pollution is a significant concern as pollution levels exceed limits in place and have associated health risks for residents in metropolitan areas. With rapid and ongoing urbanization in different areas of India, increased air pollution issues occur due to lack of adequate transportation management and suitable roads that reduce average vehicular speed, which leads to higher vehicular emissions. Additionally certain cities in India also have increased air pollution from natural sources, such as long-range transport of dust influx from surrounding regions.<sup>26</sup>

Air pollution has both direct and indirect impacts on human health. Direct impacts include short-term consequences, such as increased rates of respiratory infections and asthma, and long-term impacts, such as increased rates of chronic respiratory diseases, cardiovascular disease, and cancer. With increasing levels of pollution, premature mortality and hospitalization rates can also burden current health systems.

Air pollution also indirectly impacts health through its contribution to increased frequency of hot days and multiple-day heat waves. The IPCC reports that between 1980 and 1998, 18 heat waves occurred; one in 1988 caused 1,300 deaths. Heat waves in the state of Orissa between 1998-2000 period caused 2,120 deaths, and in Andhra Pradesh in 2003, a heat wave caused more than 3,000 deaths.<sup>27</sup> Heat wave exposure in India is expected to continue increasing by 8 times between 2021-2050 and by 300% by the end of the century.<sup>28</sup> Andhra Pradesh is developing a Heat Wave Action Plan, and other states have been encouraged by the government to do the same.

## **Afghanistan: Background**

Afghanistan is a landlocked country at the crossroads between Central Asia and South Asia with an estimated population of 41.1 million people.<sup>29</sup> Afghanistan has been plagued with extensive warfare, including coups, insurgencies, civil war, and invasion. The effects of war have left the country plagued with poverty, malnutrition, terrorism and human rights violations.

Afghanistan is rich in natural resources, including lithium, iron, zinc, copper, and gemstones<sup>30,31</sup>; the country is estimated to have \$1 trillion dollars of untapped natural resources.<sup>32</sup> It is also one of the largest producers of opium, cannabis, saffron and cashmere. Afghanistan has a slow growing economy with a GDP per capita of \$368.8; although its economy has seen a massive decline since 2021 as a result of ongoing political crisis.<sup>33</sup> According to 2016 data, an estimated 24.30% of its population lives at or below national poverty lines.<sup>33</sup> However, a 2022 survey of a representative portion of the Afghan population conducted by the World Bank showed that two-thirds of households struggle to meet basic needs.

### **Afghanistan: Health effects of increase in drought**

Afghanistan is ranked eighth in 170 countries for vulnerability to climate change. The country is predicted to see a greater increase in temperature compared to the global average with climate change, leading to increased droughts throughout the country,<sup>34</sup> with an estimated 80-85% of the population being severely affected.<sup>35</sup> In the past twenty years, over ten percent of the country's glaciers have melted, and the frequency of droughts have doubled.<sup>35</sup> Studies have shown that recent droughts have significantly contributed to severe food and living crises; a third of children under 5 years old after underweight, and two-third of children have stunted growth.<sup>36</sup> The World Food Program has stated in 2021, 40% of crops in the country were lost and that the price of wheat had increased 25%. Drought also leaves communities and the agricultural industry without access to water; Afghanistan has ten times less than the amount of water reservoirs than surrounding countries.

Drought exacerbates health issues by worsening displacement. In 2018, 4 million Afghans were experienced food insecurity and almost 400,000 people were forced to leave their homes.<sup>37</sup> While individuals that were displaced due to flooding, most of those displaced due to the drought have been unable to return home.<sup>38</sup> By the end of 2019, over one million people had been displaced internally as a result of disasters, which is more than any other country.<sup>39</sup> The Afghanistan government receives support through the Global Environment Facility and the Least Developed Countries Fund and have recently developed plans to address climate-induced migration and displacement, such as the 2019 Comprehensive Migration Policy, there are is still a large need for support for the growing numbers of individuals displaced from increasing droughts from climate change.<sup>39</sup>

## **Mozambique: Background**

Mozambique is a southeast African country with an estimated population of 33 million people.<sup>40</sup> Mozambique is a young country with 44% of its population under the age of 15 and only 3% of its population aged 65 and older. Mozambique has arable lands for agriculture, minerals and natural gas.<sup>41</sup> It is bordered by the Indian ocean to the east, Tanzania to the north, Malawi and Zambia to the northwest, Zimbabwe to the west, Eswatini and South Africa to the southwest. Its border with the Indian ocean allows for access to three seaports which is important for trade. Despite its resources, Mozambique remains one of the poorest countries in the world.

Mozambique experienced high per capita growth rates in 2001 and 2015 that translated to an overall poverty reduction. However, due a combination of the hidden debt crisis, the 2019 tropical cyclones, COVID-19 pandemic and the Russia-Ukraine conflict, Mozambique experienced a significant slowing of economic growth with its annual GDP growth rate settling at 3.6 in 2022.<sup>42</sup> Its current GDI per capita sits at \$1,310 (US is \$70,480 for comparison)<sup>43</sup>, with an estimated 46.10% of its population living at or below the national poverty line, and 64.6% of its population living at or below the international poverty line.<sup>44</sup>

## **Mozambique: Health effects of increased tropical storms**

Mozambique's extensive coastline makes it one of the most vulnerable countries to climate change with an estimated Climate Risk Index Score of 2.67 (low score indicates high vulnerability to extreme weather events; regional climate risk index score is 72.47 for comparison). In 2019, Mozambique was struck by Cyclone Idai and Cyclone Kenneth. An estimated 250,000 people were displaced and 650 lost their lives. In 2022, five tropical storms and cyclones, including Tropical Storm Ana and Cyclone Gombe made landfall in Mozambique. Cyclone Gombe alone impacted 736,000 people.<sup>45</sup> The tropical storms, cyclones and subsequent flooding also further exacerbate already existing food insecurity issues within the country from resulting destruction of crops, loss of livestock, and damage to infrastructure. Severe flooding also impacts the transmission of waterborne diseases. In 2017, severe flooding was linked to cholera outbreaks in two provinces in the country.<sup>46</sup>

In addition to tropical storms and cyclones, Mozambique is also affected by increased frequency and intensity of droughts brought on by increasing temperatures particularly in Southern Mozambique which also contributes to food insecurity in the region. Rising temperatures and increased flooding have the potential to increase the incidence of vector borne and waterborne diseases in the country.<sup>46</sup>

The government of Mozambique currently relies heavily on international aid and development organizations for funding and climate resilience and invests in early warning systems and building more climate resilience infrastructure to reduce the impact of climate change on its population.<sup>47</sup>

## CASE STUDY EXAMPLE

Below we have included an example of a climate resilient development plan implemented in Cambodia.<sup>48</sup>

### Background

The impacts of climate change, including the intensity and frequency of extreme weather events, have posed further health consequences for the country of Cambodia, such as vector-borne diseases, malnutrition, and respiratory tract infection. These consequences have begun to strain the country's current health system. Since 2019, Cambodia has aimed to increase its climate resilience by strengthening its health system capacity to ensure hospitals, and the communities they serve, are prepared for climate-sensitive illnesses. Below is a quote from Dr. Nargiza Khodjaeva from the Cambodia WHO Country Office.

*"Strengthening the resilience of the health system to climate change is a country priority for Cambodia, particularly as it is vulnerable to both flood and drought. Changing rainfall patterns - including shorter wet seasons and longer dry seasons - are already changing the locations and magnitude of climate-sensitive diseases (e.g. water- and vector-borne diseases). Through improved early warning systems, monitoring and faster diagnoses of climate-sensitive disease incidence, the health system can better protect and improve community health for the future."*

### Climate Resilient Development Plan

In 2019, Cambodia, along with five other Asian least-developed countries, began the project **Building Resilience of Health Systems in Asian LDCs to Climate Change**. The four-year project was funded by the Global Environment Facility and implemented by the United Nations Development Programme and WHO. The project consisted of the following four goals:

- Strengthened institutional capacity to integrate climate risks and adaptation options

- Effective decision-making for health interventions through generation of information and improved surveillance
- Climate-resilient health service delivery
- Improved regional cooperation and knowledge exchange and the integration of a Health National Adaptation Plan

## Progress

This project is ongoing, and Cambodia has made the following progress for each of the project goals:

- Strengthening institutional capacity: Cambodia has established a national Technical Working Group for Climate Change and Health to coordinate stakeholders and improve collaboration for climate-informed health surveillance.
- Improved decision-making for health interventions and surveillance: Cambodia has implemented training on diarrhea surveillance for health workers, developed guidelines for dengue rapid diagnostic tests, and developed a rapid response plan and improved surveillance for dengue outbreaks.
- Climate-resilience health service delivery: Cambodia has developed tools for assessing water, sanitation, and hygiene in 25 health centers and communities, which found 44% of centers had been affected by extreme weather events from 2015-2019. Water safety plans were then piloted to ensure drinking-water for 10 health centers and 15 villages. Water treatment equipment has also been installed in 20 health centers, which will strengthen the resilience of health systems for future extreme weather events.

This project has included lessons learned from project stakeholders, experts and community members, which can be found [here](#) and may be beneficial to consider as teams develop their own plan for Haiti.

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