CASE STUDY 4A

A VULNERABILITY AND ADAPTATION ASSESSMENT: IDENTIFYING CLIMATE INFORMATION AND DECISION NEEDS IN BHUTAN

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Research

CONTEXT

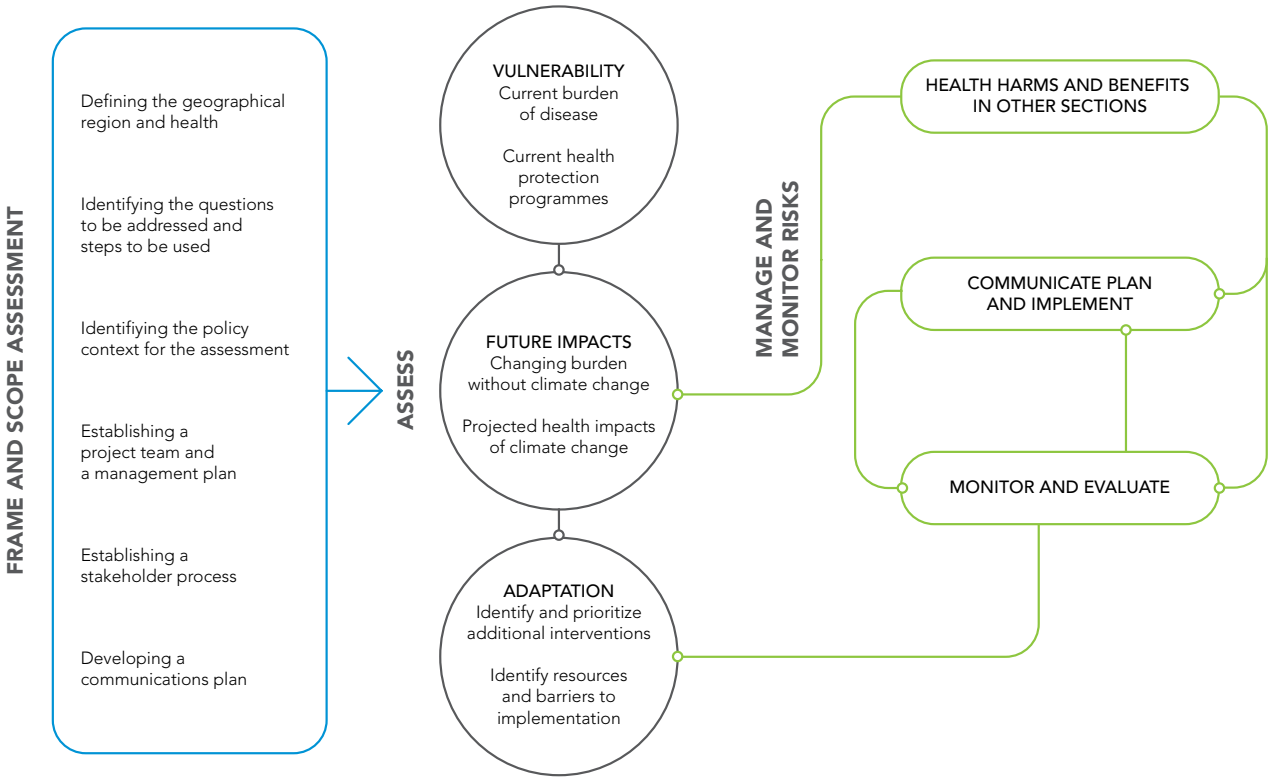
In Bhutan, climate change is expected to lead to an average temperature increase of ~ 0.8°C - 1.0°C by 2010-2039, and ~ 2.0°C - 2.4°C by 2040 - 2069, as well as a progressive and steady increase in precipitation, which has been on the rise since 1980. Higher precipitation increases are expected during the monsoon season compared to the winter season. These changes will exert pressure on five fundamental environmental health determinants in Bhutan: forests and biodiversity; air quality; food and water security; mountain snowpack; and disasters. However, due to its geographical location and its diverse topographical conditions, climatic changes are expected to differ across the wide range of Bhutan's microclimates. Understanding how such heterogeneous environmental changes could influence future local health conditions required further research.

In 2012, a systematic climate and health vulnerability and adaptation (V&A) assessment was conducted in Bhutan using the WHO methodology *(1)* (Figure 4.1), in order to provide national level evidence of climate and health connections, improve understanding of local and specific health vulnerabilities, identify knowledge and information gaps and needs, provide the opportunity for capacity-building in applied research, and to monitor how health risks may be influenced by a changing climate over time. The assessment informed efforts of the ministry of health to further develop adaptation programming, including defining needs for climate-informed decision tools such as integrated surveillance and early warning systems.

NEW APPROACHES

The study was led by the department of public health, ministry of health, and supported by national and international consultants. It particularly examined the influence of climate on current and future diarrhoeal and vector-borne diseases, and the vulnerability of health and the health system to extreme weather and glacial lake outburst floods. The importance of other climate-sensitive health conditions such as nutrition, food security and safety, mental health, respiratory disease, cardiovascular disease and cancer were also considered.

Figure 4.2 WHO Climate and Health Vulnerability and Adaptation Assessment Framework.



In Bhutan, diarrhoea is one of the top ten causes of morbidity and is highly climate sensitive. Analysing diarrhoeal disease vulnerability highlighted the importance of using multiple perspectives across time, space, and information sources to understand current and future risks. Temporal considerations included understanding seasonal disease incidence trends during 2003 - 2011 and extrapolating disease trends for the periods of 2010 - 2039 and 2040 - 2069, using two diverse sets of future climate projections. Geographic considerations clustered disease data by health facilities and districts in three diverse climatic zones: 1) the northern Alpine regions; 2) central inner valleys; and 3) southern lowlands, which due to their specific microclimates will each experience a diverse range of climate change impacts. Furthermore, multiple sources of information were used to complement official statistics, such as national and district scale statistics, firsthand observations of risk factors, and interviews with health workers and communities.

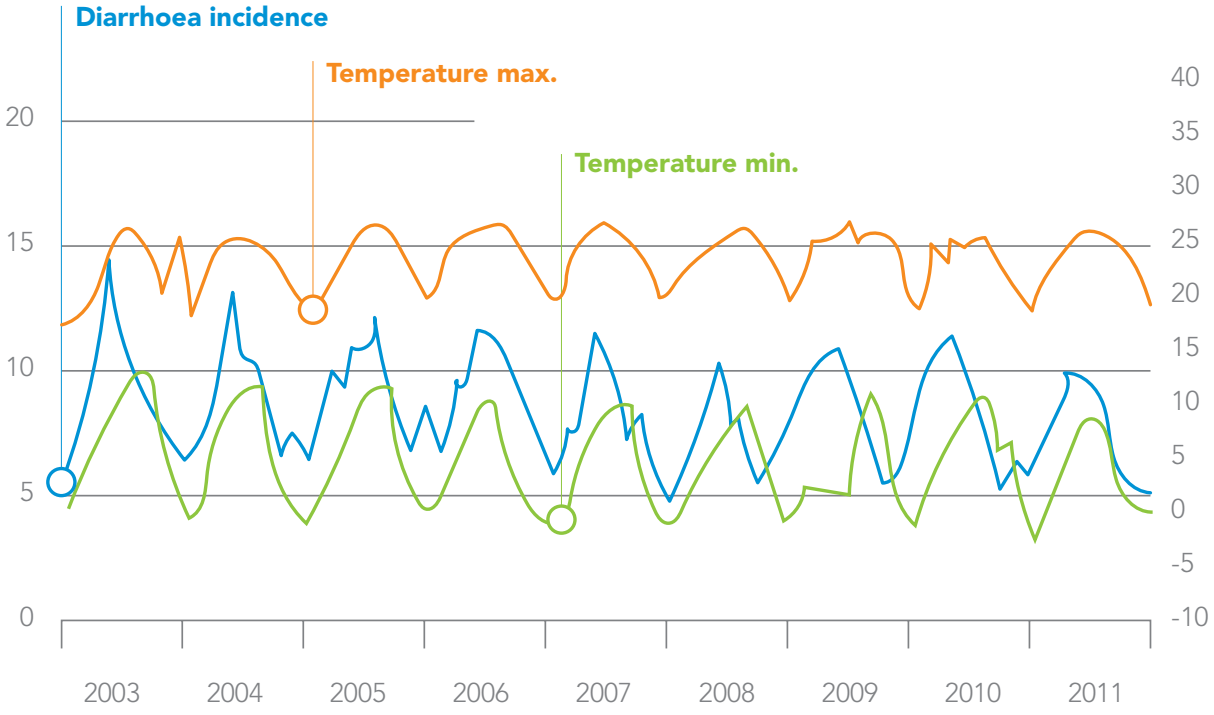
The assessment explored the climate influence on risk factors for diarrhoea, such as levels of access to improved water and sanitation infrastructure. Since 1997, the coverage of water and sanitation has been over 70%, reaching 96% in 2011, with 55% of households having access to improved latrines. However, this high level of access to safe drinking water and sanitation has been insufficient to reduce diarrhoeal disease incidence in parts of Bhutan. Furthermore, seasonal analysis reveals a strong seasonal pattern of diarrhoeal cases (Fig. 4.2), with 53% of total cases being reported between April and August. Understanding the temporal disease pattern highlighted the opportunity to particularly focus control measures before and during the high risk period.

CASE STUDY 4A

Research

The outcomes from community-based surveys showed that in some areas, the true vulnerability conditions differ significantly from the analyses derived only from official estimates. For example, in Lingzhi (a village block in Thimphu District) despite official statistics citing 74% of the population having access to improved piped water, the field survey revealed a reality of only 6%, as many water points exist but are not functional (Figure 4.3). Furthermore, although 80% of houses have a latrine, the majority were not usable, some had never been used and most of the villagers still used open defecation. In the context of climate change, poor reporting leads to inaccurate risk identification. When reality and reporting do not align, the vulnerability of both communities and the health system can increase, resulting in a range of deteriorating conditions that can lead to disease outbreaks.

Figure 4.3 Trends of total diarrhoeal incidence and temperature (degree C) 2003 to 2011.



ACKNOWLEDGEMENTS

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BENEFITS AND LESSONS

The assessment provided improved evidence about the sensitivity of underlying health determinants to climate conditions, across the varied microclimates of the country. This evidence served to inform recommendations and actions for the health sector to protect populations from climate-related risks. The assessment also highlighted the need for integrating climate information with disease surveillance to develop disease early warning systems that can inform multisectoral disease control and preparedness activities. It showed the importance of complementing national statistics with qualitative studies at the community level in order to identify local realities and propose realistic disease prevention and control strategies.

The study recommended that public health and health care delivery systems be strengthened in specific ways, such as the need for enhanced preparedness for emergencies and extreme weather events. Public advisories and warnings were identified as needed to announce the start of the monsoon season, when transmission risk of diarrhoeal diseases increases as a result of warmer temperatures and water sources becoming contaminated with surface run-off and sediments. Vector-borne disease control strategies should be extended to incorporate changing population dynamics such as the rapid rural-to-urban migration, and influx of migrant workers from malaria-endemic areas that accompany the mushrooming industrial and power projects across the country. Minimum standards for health, hygiene and sanitation conditions should be developed and promoted for particularly vulnerable migrant labour settlements, such as those established around hydro-electric project sites, industrial areas, private construction companies, and low-income and informal settlements in urban areas. The assessment also calls for additional actions to reduce transmission of waterborne diseases in identified water-stressed areas by exploring alternate water sources. In Bhutan, vector prevention and control measures are focused mostly in the seven southern endemic districts of the country. Therefore, strengthening vector surveillance, diagnostic and treatment capacity of the health professionals from the non-endemic areas were considered priorities. Finally, disease surveillance systems should be strengthened (including on-going data collection, validation, databases, analysis and reporting).

Figure 4.4 Unimproved community latrine.