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The health impacts of climate change in Asia-Pacific

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Abstract

Climate change threatens human health. A report from *The Lancet*, the world's leading general medical journal, declared climate change as "the biggest global health threat of the 21st century". While climate change affects the world over, the Asia-Pacific region stands particularly vulnerable to its adverse consequences where more than half (or 56%) of the world's estimated 7 billion population and nearly two-thirds of the world's poor live. In the 1990s, Asia-Pacific accounted for 32% of global extreme climatic events, 84% of deaths caused by such events and 88% of people affected worldwide. Women are "the most vulnerable to climate change" and its negative health consequences in developing countries. It is estimated that the mortality risk of women during disasters is 14 times higher than that of men. Poor women, who constitute the majority of the poor in the Asia-Pacific region, are particularly vulnerable to climate-sensitive health risks.

This paper explores available data on the observed and projected linkages between climate change and health in the Asia-Pacific region. It highlights key health risks and vulnerabilities due to climate change and extreme climatic events, including infectious diseases, injuries, and other morbidities. Particular health vulnerabilities of women and girls to climate change impacts, along with other vulnerable populations, are also examined.

Key words: Climate change, natural disasters, health impact, impact on women, Asia and the Pacific

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1. Introduction

Climate change threatens human health. A report from *The Lancet*, the world's leading general medical journal, declared climate change as "the biggest global health threat of the 21st century." ¹ While the health impact of climate change is still not fully understood,² an emerging body of scientific evidence and empirical data appear to indicate a strong association between climate change and human health.

The 2007 Fourth Assessment Report of the Intergovernmental Panel on Climate Change $(IPCC-4)^3$ noted that climate change was causing morbidity and premature mortality around the globe and its health impacts are expected to aggravate significantly over time. Due to its far-reaching impacts on human health and development, climate change is considered to be an impediment to achieving the Millennium Development Goals.⁴

WHO affirms that climate change affects human health by degrading the quality of air and water, food security, and shelter, all of which are indispensable to maintaining health.⁵ Weather events and diseases that are highly sensitive to changing climate are claiming nearly 10 million deaths across the world every year; from urban air pollution, diarrhoea, malnutrition and natural disasters combined.⁶

1-1. Vulnerability of the Asia-Pacific region

While climate change affects the world over, the Asia-Pacific region stands particularly vulnerable to its adverse consequences where more than half or 56% of the world's estimated 7 billion population⁷ and nearly two-thirds of the world's poor live. ⁸ Empirical data demonstrate the scale and magnitude of such vulnerability.

According to the 2010 Asia Pacific Disaster Report,⁹ people in Asia-Pacific are 4 and 25 times more vulnerable to natural disasters when compared with people in Africa and in North America/Europe, respectively. Asia accounted for 75% of more than 2 million deaths caused by 6,367 natural disasters recorded between 1974 and 2003.¹⁰ In 2008, Asian countries were listed in nine out of the top ten countries in the global statistics of deaths attributable to natural disasters.¹¹

The number of extreme climatic events such as floods, heat waves, droughts, intense storms and tidal surges in Asia and the Pacific grew from 617 in the 1980s to 667 in the

¹ Costello et al. 2009.

² Ibid.

³ IPCC 2007.

⁴ Staringa 2008; McMichael et al. 2008; IPCC 2001a.

⁵ WHO 2009b.

⁶₇ Ibid.

⁷ UNFPA 2011.

⁸ USAID 2008.

⁹ UNESCAP and UN International Strategies for Disaster Reduction 2010.

¹⁰ Guha-Sapir et al. 2004.

¹¹ Centre for Research on the Epidemiology of Disasters 2009.

1990s, ¹² or an 8% increase. During the same period, however, the number of deaths attributable to such events increased over 5-fold, from 90,000 to 500,000. The record implicates a growing intensity and expanding geographical coverage of extreme climatic events in the region. In the 1990s, the Asia-Pacific region accounted for 32% of global extreme climatic events, 84% of deaths caused by such events and 88% of people affected worldwide.¹³

Bangladesh experiences only 1% of all cyclones in the world. However, approximately 50% of global deaths due to cyclones are registered in Bangladesh,¹⁴ where over 70% of the country¹⁵ and 80 million people¹⁶ are flood-vulnerable.

Given a large number of people living in areas prone to flooding and other extreme climatic events in many parts of Asia, it is estimated that a 40cm rise in sea level by 2080 would cause the displacement of about 76 million people in South and Southeast Asia,¹⁷ with significant adverse health implications.

The low-lying nature of Pacific Island countries and territories are also highly vulnerable to climate change, particularly along coastal areas, due to rising sea levels, cyclones, and tidal surges. The highest points in Kiribati, Republic of the Marshall Islands, Tokelau and Tuvalu are just about 4 meters above sea level.¹⁸ Except for Papua New Guinea, Solomon Islands and Fiji, coastal areas are where the majority of the Pacific's 9.5 million people live. The Secretariat of the Pacific Community declares that "[C]limate change is among the most serious challenges facing Pacific Island countries and territories."¹⁹

In 2000, many LDCs and developing countries in Asia such as Bangladesh, Bhutan, India, Maldives, Myanmar and Nepal were already carrying the world's highest disease burden from diarrhoea and malnutrition, which are sensitive to climate change.²⁰ It is estimated that mortality risk from vector-borne diseases is almost 300 times greater in developing countries as compared with developed countries.²¹ Increasing frequency, intensity, and geographical range of extreme climatic events could reinforce, perpetuate and exacerbate enormous pre-existing public health challenges and further strain already fragile and overstretched health systems²² in Asia and the Pacific.

¹⁸ Rodgers 2009.

- ²⁰ UNFCCC 2007.
- ²¹ WHO 2009b.

¹² WHO 2003.

¹³ Based on WHO 2003.

¹⁴ Amadore et al. 1996, as cited in Woodward et al. 1998.

¹⁵ Mizra 2003.

¹⁶ UNESCAP 1995.

¹⁷ IPCC 2001a.

¹⁹ Ibid.

²² WHO 2006a.

2. Various health impacts of climate change

Climate change affects human health both directly and indirectly (e.g. by affecting disease vectors).²³ Deaths, injuries and disabilities can occur as direct consequences of extreme climatic events such as heat waves, floods, and storms. For example, a 2008 cyclone in Bangladesh killed 3,300 and affected over 8.5 million people.²⁴ Also in 2008, Cyclone Nargis killed 138,366 in Myanmar, resulting in the economic loss of nearly 30% of its GDP.²⁵

In India, 1,300 and 3,000 people died as a result of heat waves in 1988 and 2003, respectively.²⁶ The 2008 flood in the state of Bihar in India, attributable partly to glacial melting of the Himalayas due to global warming, affected 4.4 million people, inundated 290,000 hectares of land²⁷ and destroyed 225,000 houses.²⁸

The glacial melting in the Himalayas exacerbates the risk of floods, soil erosion, landslides and glacial lake outburst floods during the wet season in Nepal, Bangladesh, Pakistan and northern part of India.²⁹ It could undermine the water availability and quality and therefore elevate health risks of 1.3 billion people who rely on nine rivers originating from the Himalayan region.³⁰

WHO reports that floods triggered by a continuous sea level increase are projected to affect 94 million people in South Asia by 2100, as compared with the current estimate of 13 million.³¹ In addition to deaths, physical injuries and diseases, people who experience flooding may also be at risk of psychological disorders.³² Droughts in some semi-arid regions of India have been continuously associated with increased reporting of suicide among poor male farmers.³³

2-1. Infectious diseases

Climate change affects mortality and morbidity by creating favourable environments for, and altering the distribution of, climate-sensitive infectious diseases, particularly water-, food- and vector-borne diseases.³⁴ For example, warmer climate often increases the risk of mosquito-transmitted diseases such as dengue fever and malaria.³⁵ It does so by shortening disease incubation time and breeding cycle, and by increasing feeding frequency. In the case of dengue fever, disease transmission from mosquitoes to humans becomes more efficient in high temperature.³⁶

²³ IPCC 2001.

²⁴ WHO 2008d.

²⁵ Centre for Research on the Epidemiology of Disasters 2009.

²⁶ Confalonieri et al. 2007.

 $^{^{27}}$ Costello et al. 2009.

²⁸ WHO 2008f.

²⁹ UNFCCC 2007.

³⁰ Ibid.

³¹ Staringa 2008

³² Ahern et al. 2005; WHO 2008e, cited in Chand and Murthy 2008.

³³ Behere and Behere 2008, cited in WHO 2011a; Nagaraj 2008, cited in WHO 2011a.

³⁴ WHO 2008a.

³⁵ Ibid.

³⁶ Ibid.

Reduced availability of safe drinking water caused by droughts, floods, or intrusion of warmed salt water into fresh water due to sea level rise increases the risk of diarrhoeal diseases.³⁷ Lack of proper sanitation and hygiene systems and close gathering of people displaced by flooding³⁸ or storms further elevate the risk.

2-1-1. Dengue fever

An article from the journal of *Lancet Infectious Diseases* affirms that "[d]engue is perhaps the most important of the emerging infections that are likely to be affected by climate change."³⁹ According to WHO, ⁴⁰ dengue threatens health of 2.5 billion people with a global estimate of 50-100 million infections every year.

Epidemics of dengue haemorrhagic fever, which is a severe manifestation of dengue fever, were registered only in 9 countries prior to 1970, but then spread to more than 100 countries by 1995. The most affected regions in the world are Asia and the Pacific, where more than 1.8 billion people or over 70% of the global population at risk of dengue live.⁴¹ Dengue haemorrhagic fever accounts for the highest childhood mortality in some Asian countries.⁴²

While no concrete evidence seems to exist yet on the association between climate change and dengue outbreaks in the region,⁴³ existing data may indicate such possible connection. For example, Singapore observed an increase of 1.5 degree Celsius in the annual temperature between 1978 and 1999. During the same period, the annual number of dengue cases soared over 10-fold, from 384 to 5,285 cases.⁴⁴

Malaysia also experienced a dramatic rise of dengue fever cases over the past three decades, from less than 1,000 in 1973 to 46,000 in 2007.⁴⁵ In Bangladesh, no serious dengue epidemics were registered before the year 2000. However, the number of dengue cases between 1999 and 2005 reached nearly 20,000, with an annual average of 3,305 cases.⁴⁶ Bhutan, Timor-Leste, and Nepal reported dengue epidemics for the first time in 2004, 2005, and 2006, respectively.⁴⁷ In South Pacific, dengue epidemics between 1970 and 1995 were found to be associated with La Niña conditions, which brought warmer and wetter weather patterns.⁴⁸ Dengue outbreaks were observed in 14 Pacific Island Countries and territories in 2009.⁴⁹

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