

## Editorial

### Unravelling the health impact of climate change

On December 12, 2015, a total of 195 countries attending the global summit on climate change in Paris or COP21 decided on a historic deal to reduce carbon emissions<sup>1</sup>. The goal is to try and keep the rise in atmospheric temperature to well below 2°C from the pre-industrial era. The most discussions in the run up to, during and immediately after the climate meet have understandably focussed on the environmental, economic and political aspects of climate change or global warming. However, its health dimensions have not received adequate attention. There is enough evidence to suggest that health consequences of climate change are unequivocal and severe<sup>2,3</sup>. In fact, the impact will be dire, in particular, for countries of Asia and Africa. Ironically, these are also the countries which have contributed least to the climate change in the first place.

#### Health concerns

The climate change is broadly defined as a change in the distribution of weather patterns when that change lasts for an extended period of time such as decades to millions of years. Referred to as “global warming”, climate change basically means the extreme weather events. The scientific consensus is that climate is changing and that these changes are in large part caused by human activities and are largely irreversible. The primary contributor to climate change is the dramatic increase in fossil fuel emissions since the industrial revolution, contributed historically by the industrialised countries such as US, and Europe.

Climate change affects health directly and indirectly. The rise in temperature and heat waves can lead to increased incidence of heat stroke and to melting of glaciers, resulting thereby to formation of glacial lakes. Bursting of these lakes and flooding

downstream can spell disaster of unprecedented scale including death, injury and devastation, for the people living in Himalayan and sub-Himalayan region. The sea level rise on the other hand, is a matter of concern to island nations such as Maldives and Republic of Kiribati as well as to coastal regions of Bangladesh and India<sup>4</sup>. Climate change can also cause intensive drought conditions leading to crop failures, compromise food security, and contribute to malnutrition. Populations displaced or forced to migrate undergo stress, trauma and mental disorders. Air pollution associated with climate change is a major risk factor for increase in asthma and respiratory problems especially among children in urban areas<sup>5</sup>.

The changes in physical and biological conditions, and ecosystem associated with climate change create an environment conducive for transmission of diseases, in particular diarrhoeal diseases, vector-borne diseases and animal-associated diseases. For example, increasing temperatures may provide opportunities for disease vectors to change their geographic range or to replicate faster, or survive for longer periods of time, leading thereby to increased disease transmission or their emergence in newer areas, placing more people at risk of malaria and other vector-borne diseases<sup>6</sup>. Dengue and chikungunya are, therefore, expected not only to expand geographically but occur in explosive outbreaks. The supercyclone in Odisha (1999)<sup>7</sup> and floods in Mumbai (2005)<sup>8</sup> were followed by outbreaks of leptospirosis. The 1994 plague outbreak in Surat was preceded by intense heat wave followed by heavy rainfall<sup>9</sup>. Similarly, rise in sea surface temperature has been shown to increase proliferation of cholera bacilli followed by cholera outbreaks<sup>10</sup>. Climate change due to El Niño can lead to increase in hospital admissions for diarrhoeal diseases<sup>11</sup>.

The emergence and re-emergence of these climate sensitive diseases and their further spread are, therefore, an unprecedented challenge to public health. Many public health leaders and advocates including the Director-General of the World Health Organisation acknowledge that climate change is the defining public health issue in the 21<sup>st</sup> century that needs to be tackled without any delay<sup>12,13</sup>.

The extent to which health impacts occur will depend on many factors including the risk and vulnerability of the populations and the institutional capacity to detect emerging diseases early and respond rapidly. Geographically, populations most at risk are the rural poor, or those living in big cities, mountain areas such as foothills of Himalayas, and in water-stressed coastal areas. Paradoxically, these are also the populations least able to cope with the health effects. According to the UNICEF, as many as two billion children in the world are at risk of climate change<sup>14</sup> and it will push more than 100 million into poverty over the next 15 years. And the poorest regions of the world - Sub-Saharan Africa and South Asia - will be hit the hardest<sup>15</sup>.

### **Mitigation and adaptation strategies**

To tackle climate change and its impact on health, two main strategies are proposed. First, mitigation or reducing the green house emissions and secondly, adaptation or enhancing the capacity to cope with health consequences resulting from climate change. While climate change mitigation is every one's responsibility but to do more lies on those countries which were responsible historically for green house gas (GHG) emissions, now referred to as "Climate Justice". India is in the process of economic development and to do so, has no choice but to use coal as primary source of energy in order to lift the poor out of poverty. At the same time, it has committed to reduce its emission levels by 33-35 per cent (from the 2005 levels) by 2030<sup>16</sup>. It has also placed more emphasis on renewable energy such as solar, wind and hydropower, and nuclear power, which would constitute 40 per cent of its energy source by the target year of 2030. In addition, the citizens can contribute through lifestyle changes such as switching to efficient lighting, solar heating, and use of public transport. These mitigation

efforts can also bring direct health co-benefits such as by reducing the risk of heart diseases and other non-communicable diseases.

Adaptation on the other hand requires efforts to prepare for, and minimize health burden of climate change. Health sector can take a lead in these efforts specifically to carry out a comprehensive assessments of climate risks and vulnerabilities, establish an integrated environmental and health surveillance, and ensure mechanisms for efficient delivery of health interventions. Health system should be made climate resilient and ready to be able to anticipate ill effects and remain ready and prepared for an effective response. The national programmes on diarrhoeal disease control, vector control, and zoonosis must be strengthened and capacity to respond to disasters and emergencies ramped up.

To formulate policies and plan interventions, evidence is needed on the extent and type of health effects and how different sectors could contribute. Here, the research has an important role to play. Some of the priority areas for research in climate change and health include quantifying health risks and assessing vulnerability of local populations; formulating adaptation strategies and identifying social, cultural and policy barriers to their implementation; identifying innovative ways to ensure access to vaccines, life saving medicines to those who need it the most; and finally, to assess the role of social structures, institutions, and behaviours in responding to climate change.

The scientific data so generated can then be used to develop an evidence-based health and climate policy and a national multi-sectoral plan. This plan should include activities to be carried out by different sectors including health. To enlist their support, the awareness of the health impacts of climate variability and change needs to be raised among political, financial and community leaders, health practitioners, civil society, media and the general public.

In conclusion, while climate change is now recognized as a major global challenge for the 21<sup>st</sup> century, and its health relationship widely accepted, the depth of engagement and implementation remains tenuous. As noted above, health impacts are potentially huge and threaten public health security. The recognition of health impacts by the global leaders

is the first step which hopefully will lead to concrete actions at the ground level.

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