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Climate Change: A Threat to Human Health

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Climate change will have a wide range of implications to human health. These include thermal-related morbidity and mortality due to extreme temperatures, effects associated with air pollution, impacts of extreme weather events, malnutrition, water-borne (e.g. diarrhea, cholera, typhoid) and vector-borne diseases (e.g. malaria, dengue). Much of the health risk posed by climate change is preventable or curable through the scale-up of existing health programmes and interventions. Intensive action to strengthen public health systems and to promote sustainable and healthy development choices can enhance current health conditions as well as reduce vulnerability to future climate change.

Key words: Climate change, MDG, Health

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1. Introduction

The threat to human health is a more fundamental kind than the threat to the world's economic system. The World Health Organization estimates that a quarter of the world's disease burden is due to the contamination of air, water, soil and food—particularly from respiratory infections and diarrhoeal diseases. Human Development Report 2007 suggests that climate change poses major obstacles to progress in meeting MDGs and maintaining progress raising the HDI. “There is a clear and present danger that climate change will roll back human development for a large section of humanity, undermining international cooperation aimed at achieving the Millennium Development Goals (MDGs) in the process.”

Climate change may pose a threat to food security through erratic rainfall patterns and decreasing crop yields, contributing to increased hunger. Furthermore, adverse climate change impacts on natural systems and resources, infrastructure, and labour productivity may lead to reduced economic growth and increasing poverty. These effects threaten the achievement of MDG 1. Loss of livelihood assets, displacement and migration may lead to reduced access to education opportunities, thus hampering the realization of MDG 2. Depletion of natural resources and decreasing agricultural productivity may place additional burdens on women's health and reduce time for decision-making processes and income-generating activities, worsening gender equality and women's empowerment (MDG 3). Increased incidence of vector-borne diseases, increases in heat-related mortality, and declining quantity and quality of drinking water will lead to adverse health effects threatening the achievement of MDGs 4, 5, 6 and 7. In general terms, the realization of MDG 7 may be approached through climate change negatively impacting quality and productivity of natural resources and ecosystems, possibly irreversibly, threatening environmental sustainability. Climate change, a global phenomenon, calls for a collective response in the form of global partnerships (MDG 8).

Table 1 Climate change and the Millennium Development Goals

Millennium Development Goal	Linkage to Climate change
Goal 1: Eradicate extreme poverty and hunger	<ul style="list-style-type: none"> • Climate change is projected to reduce poor people’s livelihood assets, for example, health, access to water, homes and infrastructure. • Climate change is expected to alter the path and rate of economic growth due to changes in natural systems and resources, infrastructure and labour productivity. • A reduction in economic growth directly impacts poverty through reduced income opportunities. • In India food security is expected to worsen.
Goal 2: Achieve universal primary education	<ul style="list-style-type: none"> • Links to climate change are less direct, but loss of livelihood assets (social, natural, physical, human and financial capital) may reduce opportunities for full-time education in numerous ways. Natural disasters reduce children’s available time, while displacement and migration can reduce access to education.
Goal 3: Promote gender equality and empower women	<ul style="list-style-type: none"> • Climate change is expected to exacerbate current gender inequalities. Depletion of natural resources and decreasing agricultural productivity may place additional burdens on women and girls’ health and reduce time available to participate in decision-making processes and income generating activities. • Climate-related disasters have been found to impact more severely on female-headed households.
Goal 4: Reduce child mortality	<ul style="list-style-type: none"> • Direct effects of climate change include increases in heat related mortality and illness associated with heat waves. • Climate change will likely result in declining quantity and quality of drinking water, which is a prerequisite for good health, and exacerbate undernutrition – by reducing natural resource productivity and threatening food security.
Goal 5: Improve maternal health	<p>Children and pregnant women are particularly susceptible to vector- and waterborne diseases.</p>
Goal 6: Combat HIV/AIDS, malaria and other diseases	<ul style="list-style-type: none"> • Climate change may increase the prevalence of some vector-borne diseases and vulnerability to water or food-borne diseases, or diseases transmitted from person-to-person.
Goal 7: Ensure environmental sustainability	<ul style="list-style-type: none"> • Climate change will alter the quality and productivity of natural resources and ecosystems, some of which may be irreversibly damaged, and these changes may also decrease biological diversity and compound existing environmental degradation.
Goal 8: Develop a global partnership for development	<ul style="list-style-type: none"> • Climate change is a global issue and the response requires cooperation from all countries, especially to help developing countries adapt to the adverse impacts of climate change.

Source: Adapted and expanded from UNDP, UNEP, World Bank, Asian Development Bank (ADB).

2. Health Impacts of Climate Change

Climate change will have a wide range of implications to human health. These include thermal-related morbidity and mortality due to extreme temperatures, effects associated with air pollution, impacts of extreme weather events, malnutrition, water-borne (e.g. diarrhea, cholera, typhoid) and vector-borne diseases (e.g. malaria, dengue). The increase in the frequency and intensity of extreme temperatures will have both direct and indirect effects on health. Direct effects include thermal stresses (cardio-vascular and respiratory diseases, heat exhaustion, heat cramps and dehydration), while indirect effects are related to the impact of heat extremes on urban air pollution and humidity (which can aggravate pre-existing morbidity). The risk of heat-related morbidity and mortality would increase mainly in the elderly, children, those with pre-existing cardio-vascular and respiratory diseases, and among the urban poor.

However, potentially hundreds of millions of people could be at risk from increased morbidity or mortality resulting from climate change. Infectious diseases may become more prevalent as their reach increases and seasonality expands; the frequency and intensity of heat waves and natural hazards such as droughts, floods, and cyclones may increase, causing adverse health effects; and levels of air pollution may increase. Small changes in climate can result in substantial changes in risk. The increased health risks are likely to be most acute in developing countries especially in India. This is because many climate-related infectious and vector-borne diseases are associated with warm or hot weather conditions.

Extreme temperatures may also increase the exposure to urban air pollution, with the potential to aggravate pre-existing respiratory and cardio-vascular diseases. Direct impacts of extreme weather events include increased incidence of deaths, physical injuries and psychological stresses, while indirect impacts are related to increased risk of exposure to water-borne diseases due to water contamination, and impacts on malnutrition due to loss in agricultural production. Unsafe water and sanitation conditions and decrease water accessibility would further increase the transmission of infectious diseases. Higher temperatures can lead to increased exposure to food-borne diseases due to contamination of food, which can cause various gastrointestinal diseases.

Table 2 Health Impacts of Climate Change

Climate impacts	Direct	Indirect
Temperature extremes (heat or cold waves).	Heat-and cold- related stresses	<ul style="list-style-type: none"> • Respiratory and cardio-vascular diseases due to the combined effect of exposure to high temperature and air pollutants
Extreme weather events		
Floods, landslides, storms, cyclones	Deaths and injuries	<ul style="list-style-type: none"> • Water-borne diseases caused by water contamination and poor sanitation conditions • Psychological morbidity
Droughts	---	<ul style="list-style-type: none"> • Malnutrition and under-nutrition, due to loss of agricultural production • Water-borne diseases caused by decreased water access and malnutrition • Vector-borne diseases due to changes in vector transmission and stagnation/contamination of small rivers and drainage canals • Respiratory diseases due to increased air-borne particulate matter and increased vulnerability caused by malnutrition and other diseases
Increased temperature	---	<ul style="list-style-type: none"> • Vector-borne diseases due to higher risk of transmission and changes in the geographical and seasonal distribution • Food-borne diseases due to food contamination

Source: Anil Markandaya and Aline Chiabai (2009)

The important health effects of climate change are

1. Weather has a profound effect on human health and well-being. It has been demonstrated that weather is associated with changes in birth rates, and sperm counts, with outbreaks of pneumonia, influenza and bronchitis, and is related to other morbidity effects linked to pollen concentrations and high pollution levels.
2. Humidity has an important impact on mortality since it contributes to the body's ability to cool itself by evaporation of perspiration.
3. Large increases in mortality have occurred during previous heat and cold waves.
4. Hot weather extremes appear to have a more substantial impact on mortality than cold wave episodes.
5. Threshold temperatures for cities, which represent maximum and minimum temperatures associated with increases in total mortality, have been determined.

6. Precipitation in the form of rainfall and snow is also associated with changes in mortality.
7. If future global warming induced by increased concentrations of trace gases does occur, it has the potential to significantly affect human mortality.

Two areas of important future research include investigation of morbidity impacts and the costs to society of indirect impacts in particular costs associated with modifying living and working areas, decreases productivity, and other climate/stress-induced impacts. In the next decades these health impacts are likely to increase considerably in developing countries especially India. Hence climate change is threatening the capacity of the country like India to attain the Millennium Development Goals by 2015. A key factor in reducing future risks in developing countries is the strengthening of public health systems, including monitoring and surveillance, public health infrastructure, and the development of effective adaptation measures.

3. The way forward

The issue of climate change cannot however be taken up without linking to developmental needs such as poverty reduction, health, energy access and education. India has adopted a very comprehensive framework of legal and institutional mechanisms to respond to the tremendous challenges to the environment, owing to population growth, poverty and illiteracy augmented by urbanization and industrial development. India is one of the leading developing countries incorporated into its Constitution to the specific provisions for environmental protection. Much of the health risk posed by climate change is preventable or curable through the scale-up of existing health programmes and interventions. The health concern that climate change poses is at this stage not thought to be primarily a question of new diseases; instead, climate change will alter the incidence, range, intensity, or seasonality of many of the existing health disorders. Intensive action to strengthen public health systems and to promote sustainable and healthy development choices can enhance current health conditions as well as reduce vulnerability to future climate change.

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