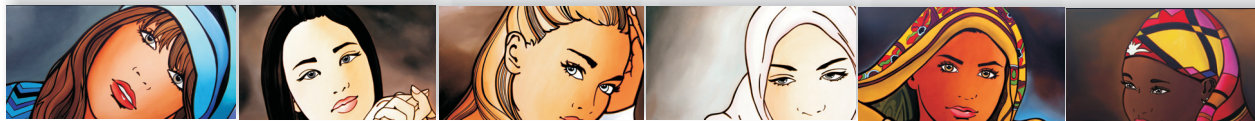


**CLIMATE CHANGE
IS AFFECTING OUR HEALTH**
Something should be done now



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Organization**

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Preface

Climate change is one of the defining challenges of the century and increasingly recognized as a public health priority.

The new agreement on climate change which will be negotiated in Copenhagen in December 2009 will be a pivotal decision determining global public health in the 21st century. As stated in the first lines of the United Nations Framework Convention on Climate Change, the aim of the convention is to avoid adverse impacts of climate change and specifically harm to health on equal basis alongside the natural environment and economic development. Indeed the ultimate impact of all climate change threats to environment, economy and security will be on human health.

Notwithstanding these facts, policy-makers in all sectors are not giving enough attention to health impacts in their current discussions on curbing climate change. Inaction on climate change would result in far reaching and devastating health consequences, particularly for the poor; on the other hand, a strong and equitably distributed cap on greenhouse gas emissions (GHG) would bring major and lasting global health improvements and reduce the global disease burden by more than 25%. Making energy consumption and transport systems more sustainable, for example, would have the added benefit of addressing some major public health issues, including outdoor air pollution (800000 annual global deaths); traffic accidents (1.2 million annual deaths); physical inactivity (1.9 million annual deaths); and indoor air pollution (1.5 million annual deaths).

On the other hand even if greenhouse gas emissions were to stop today, the consequences of the change in climate which have already occurred will be felt throughout this century and beyond. To adapt to these threats health systems will need to be strengthened. Countries with robust and inclusive health systems will be best able to respond to the added shocks and stresses of climate change and enhance population resilience. Activities that strengthen health capacities in fundamental ways become especially important at a time of global financial crisis and economic downturn. They signal the need to step up health protection, rather than cut it back, as the smartest possible response.

This brochure presents six paintings commissioned by WHO as part of an art project aiming to support awareness-raising about the health consequences of climate change. It underlines the global impact making use of images of women from different regions speaking the six World

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Health Organization (WHO) official languages. It stresses the common agenda while underlining diversity of vulnerability. It points out that women are one of the groups vulnerable to the health consequences of climate change while recognizing their role as actors of change.

As stated by *The Lancet* in a recent report, "Climate change is the biggest global health threat of the 21st century".

Climate scientists once again emphasized at a recent meeting in Copenhagen that the longer we delay in addressing climate change, the greater the risks become: If we delay too long, we risk progressive and unstoppable climate instability that will affect humanity for millennia.

The time to act is now!



Dr Maria Neira
Director
Public Health and Environment
World Health Organization

¹ The Lancet Commission, Managing the health effects of climate change. *The Lancet* 2009, 373,1693-1733.

² *Climate Change: Global risks, challenges and decisions*. Copenhagen, International Alliance of Research Universities, 2009.





Human health and global climate change*

The core concern is succinctly stated: Climate change endangers health in fundamental ways. The warming of the planet will be gradual, but the effects of extreme weather events - more storms, floods, droughts and heatwaves - will be abrupt and acutely felt. Both trends can affect some of the most fundamental determinants of health: air, water, food, shelter, and freedom from disease.

Although climate change is a global phenomenon, its consequences will not be evenly distributed. Scientists agree that developing countries and small island nations will be the first and hardest hit.

Climate change can no longer be considered simply an environmental or developmental issue. More importantly, it puts at risk the protection and improvement of human health and well-being. A greater appreciation of the human health dimensions of climate change is necessary for both the development of effective policy and the mobilization of public engagement.

Climate trends

Global climate change has accelerated in recent years. The world warmed by approximately 0.75°C in the last 100 years (0.075°C per decade). The rate of increase in the last 25 years, however, is much higher, at over 0.18°C per decade. This temperature increase is widespread over the globe, with land regions warming faster than the oceans.

Sea levels are rising, glaciers are melting and precipitation patterns are changing. Sea levels have risen faster in the last decade than in the previous 30 years. On average, there has been a global reduction in mountain glaciers and snow cover. From 1900 to 2005, precipitation increased significantly in eastern parts of North and South America, northern Europe and northern and central Asia, but declined in the Sahel, the Mediterranean, southern Africa and parts of southern Asia. Globally, it is likely that the area affected by drought has increased since the 1970s.

Extreme weather events are changing in frequency and intensity. It is thought that heatwaves have become more frequent over most land areas, the frequency of heavy precipitation events has increased and, since 1975, sea level has risen worldwide. There is also some evidence that intense tropical cyclone activity has increased since 1970.

Human activities are now thought to be the main cause of the changing climate. Most of the observed increase in temperatures since the mid-20th century is very likely to be attributable to the increase in concentrations of greenhouse gases released by human activities, mainly carbon dioxide (CO₂) emitted by burning of fossil fuels. Levels of carbon dioxide have increased from pre-industrial levels of 280 parts per million to 379 parts per million.

Continued warming could lead to abrupt or irreversible impacts. Melting of ice sheets on polar land could cause a significant rise in sea levels, with major inundation of low-lying areas. Drying and burning of the Amazon basin, and warming of peat bogs, could release large amounts of greenhouse gases, further accelerating climate change.

* Extract from *Protecting health from climate change*, World Health Day 2008, WHO Geneva

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Human-induced climate change will continue for at least the next few decades. Even if emissions of greenhouse gases were to halt immediately, temperatures would be expected to rise by an average of 0.6° C over this century. The development paths that the world chooses will have a strong influence on this increase. In a world that places high priority on sustainable energy policies, average temperatures are expected to rise by 1.8° C (likely range: 1.1° C - 2.9° C) by the year 2100. If societies place a lower emphasis on sustainability, temperatures are expected to rise by 4.0° C (2.4° C -6.4° C), with a greater probability of abrupt and potentially irreversible impacts.

Health consequences of climate change

Climate change will affect population health in profoundly adverse ways with negative implications for the achievement of the health-related Millennium Development Goals and for health equity.

Extreme air temperatures and air pollution are hazardous to health. Heatwaves are a direct contributor to deaths from cardiovascular and respiratory diseases, particularly among elderly people. High temperatures can also raise the levels of ozone and other air pollutants that exacerbate cardiovascular and respiratory diseases, as well as pollen and other aeroallergens that trigger asthma.

Floods, droughts and contaminated water raise disease risk. More variable precipitation patterns are occurring, with an increase in the frequency and intensity of both floods and droughts. At the same time, higher temperatures are hastening rates of evaporation of surface waters and melting the glaciers that provide fresh water for many populations. Lack of fresh water compromises hygiene, thus increasing rates of diarrhoeal disease. In extreme cases, water scarcity results in drought and famine. Too much water, in the form of floods, causes contamination of freshwater supplies and also creates opportunities for breeding of disease carrying insects such as mosquitoes.

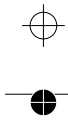
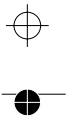
Climatic effects on agriculture threaten increasing malnutrition. Rising temperatures and changing patterns of rainfall are projected to decrease crop yields in many developing countries, stressing food supplies. For populations that depend on subsistence farming, or do not have sufficient income to buy food, this situation is expected to translate directly into wider prevalence of malnutrition. In turn, malnutrition and undernutrition increase the severity of many infectious diseases, particularly among children.

A more extreme and variable climate can destroy homes, communities and lives. Expected increases in the frequency and severity of flooding and storms will result in the destruction of homes, medical facilities and other essential services, impacting particularly on people in slums and other marginal living conditions. A gradual rise in sea levels, particularly coupled with stronger storm surges, will tend to lead to more frequent and more severe coastal flooding. The consequent destruction of homes and communities will eventually force populations to seek safer grounds, often increasing environmental and social pressures in their new locations.

Climate change brings new challenges to the control of infectious diseases. Many of the major killer diseases transmitted by water and contaminated food, and by insect vectors are highly sensitive to climatic conditions and weather extremes. Climate change threatens to slow, halt or reverse current progress against many of these infections.

Not all of the effects of climate change will be harmful, but on balance health damages are projected to outweigh the benefits. A warmer climate is expected to bring benefits to some populations, including reduced mortality and morbidity in winter and greater local food production, particularly in northern high latitudes. However, projections by the World Health





Organization (WHO) and the Intergovernmental Panel on Climate Change (IPCC) suggest that the negative effects of climate change on health are greater than are the possible benefits.

All populations will be affected by a changing climate, but the initial health risks vary greatly, depending on where and how people live. People living in small island developing states and other coastal regions, megacities, and mountainous and polar regions are all particularly vulnerable in different ways. The negative effects are concentrated on poor populations that already have compromised health prospects, thus widening the inequality gap between the most and the least privileged.

Health effects are expected to be more severe for elderly people and people with infirmities or pre-existing medical conditions. Children and the poor will bear most of the disease burden. The major diseases that are most sensitive to climate change - diarrhoea, vector-borne diseases like malaria, and infections associated with undernutrition - are most serious in children living in poverty.

Responses

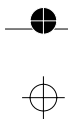
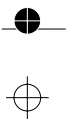
Carefully planned climate change mitigation policies bring direct health benefits. For example, well-designed urban transport systems can reduce greenhouse gas emissions, while simultaneously reducing the major health impacts of urban air pollution and physical inactivity, which kill millions each year. Housing with efficient insulation can cut energy consumption and associated greenhouse gas emissions, reduce deaths from both cold and heat, and in poor countries, reduce the need for burning of biomass fuels and the impacts of indoor air pollution. WHO is stepping up its efforts to support healthy development, which reduces current environmental risks to health, and at the same time helps to reduce our impact on the global climate.

It is also recognized that, given past emissions of greenhouse gases, the world will continue to be faced with a warming and more variable climate for many decades.

WHO's work in supporting programmes to combat infectious diseases, improve water and sanitation services and respond to natural disasters already helps to reduce health vulnerability to future climate change.

Strengthening of public health services needs to be a central component of adaptation to climate change. The international health community already has a wealth of experience in protecting people from climate-sensitive hazards, and proven, cost-effective health interventions are already available to counter the most urgent of these. Broadening the coverage of available interventions would greatly improve health now. Coupled with forward planning, it would also reduce vulnerability to climate changes as they unfold in the future.

The diverse, widespread, long-term and inequitable distribution of health risks makes climate change a truly global challenge, calling for an unprecedented degree of partnership. An effective response will require actions from across society: from individuals, the health sector, and community and political leaders. A fair and effective response will require a sharing of responsibilities between the populations that make the greatest contribution to climate change and those that are most vulnerable to its effects, in order to safeguard and enhance global public health security.



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A look at the health impacts of climate change in the African region

Changing climate hazards to health in Africa

The African continent has been warming at a rate similar to the global average. Rainfall patterns have also changed, with a tendency to more variable and extreme rainfall, along with drying trends in key areas, such as southern Africa, and the Sahel. Projections from the IPCC indicate it is very likely that the African continent will experience greater warming than the global mean, particularly in the drier subtropical regions. East Africa and the northern Indian Ocean are likely to see an increase in annual mean precipitations, but southern Africa is likely to see decreases in many regions. Trends elsewhere are highly uncertain, but it is expected that there will be a general increase in variability, with more floods and droughts.

Health vulnerabilities to climate change

Africa already suffers a very high burden of climate sensitive diseases, with the highest per capita burden of malnutrition and diarrhoea, and approximately 90% of the global burden of malaria. Public health within the African region is already negatively affected by climate variability. The major health effects include changes in the transmission of malaria, diarrhoea and other vector- water- and air-borne diseases, and negative health impacts from water scarcity and natural disasters such as floods and droughts. In addition, variability in agricultural production and food availability may lead to increased risk of malnutrition.

Vulnerability factors include weaknesses in provision of preventive and curative health services, low coverage of water and sanitation services, and high dependence on rain-fed agriculture. Climate change will translate more quickly and severely into health impacts in Africa than in other regions. There will be an increase in the health risks of extreme weather events, reductions in the availability of food and freshwater, and more unpredictable, and generally more favourable, conditions for the transmission of many infectious diseases. African populations have many strategies for coping with climate variability, but these may be stretched or exceeded by stresses imposed by long-term climate change.

Responses to protect health

The difference between the possible and actual health impacts of climate change in Africa depends largely on actions taken today within health and in other sectors. Existing health systems already provide protection against risks arising from climate variability and change. However, they often have major existing weaknesses, and are likely to be further strained by the anticipated impacts of climate change on fundamental health determinants in Africa such as polluted air, contaminated water, increased disease vectors and food insecurity, among others. There is an urgent need to improve the capacity of health systems to cope with additional burdens of climate-sensitive health problems, and to strengthen the most critical current policies and health protection measures in Africa.

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A look at the health impacts of climate change in the region of the Americas

Changing climate hazards to health in the Americas

Globally and within the region of the Americas, temperature increases are occurring more rapidly towards the poles, and at higher altitudes. Rainfall patterns are highly variable and uncertain, with an observed tendency to increased rainfall in areas such as southern South America, and western North America, and drying in areas such as north-east Brazil, and the west of the Andes. There is some evidence of an increase in frequency of the most severe hurricanes in the last three decades, and projections of more powerful events in the future.

Health vulnerabilities to climate change

All populations in the Americas are vulnerable in some way to health impacts of climate change. Some determinants of vulnerability, such as a tendency towards urbanization and an ageing population, are common to all countries, but most vary from place to place and community to community.

Many of the small island states of the Caribbean, currently suffer severe health burdens from climate-sensitive diseases. Additional health threats posed by climate change and extreme weather events in the Caribbean include insect and rodent-borne diseases, such as dengue, leptospirosis, malaria and yellow fever; water-borne diseases, including schistosomiasis, cryptosporidium and cholera; food-borne diseases, including diarrhoeal diseases, food poisoning, salmonellosis and typhoid; respiratory diseases, including asthma, bronchitis and respiratory allergies and infections; and malnutrition resulting from disturbances in food production or distribution. The rates of many of these diseases are increasing in small island states for a number of reasons, including inadequate infrastructure, poor waste management practices, increasing global travel and changing climatic conditions. Rising temperatures, changes in sea level, and any increases in the magnitude and frequency of storm events, are likely to have serious consequences for these populations.

In Latin America, populations already suffer from malaria, dengue, cholera and other water-borne diseases, and in some areas from the effects of water and food insecurity. It is projected that climate change may alter the distributions of several vectors and vector-borne diseases, with projections of substantial increases in the number of people at risk of dengue, particular in Brazil, Ecuador, Mexico and Peru. Heatwaves, in conjunction with high levels of ozone and other air pollutants, are a major concern in the megacities, while flooding is a particular concern for populations living in poor quality housing on exposed slopes. The most important risks may be from gradual processes such as further drying of the semi-arid and poor region of north-east Brazil, and retreat of the Andean glaciers that supply freshwater to cities such as Lima.

In North America, the main concerns are the intensification of heatwaves (in association with air pollution), the potential for more frequent and intense windstorms, increasing levels of aeroallergens, and some vector-borne diseases, such as Lyme disease. While high levels of socioeconomic development give protection against many risks, some are expected to be exacerbated by the increase in the elderly population, and rising rates of conditions such as cardiovascular disease, which may increase vulnerability to heatwaves. Populations in the Arctic regions, where warming is greatest, are expected to experience a range of changes in their social and cultural systems, such as decline in traditional food sources, which in turn is likely to impact on both mental and physical health.

Responses to protect health

Ministries of Health have endorsed a World Health Assembly Resolution and developed a Regional Plan of Action, aiming to raise awareness and place public health at the centre of the response to climate change; to improve evidence on health implications of climate change; to implement adaptive strategies at local, national, and regional levels to minimize the health impacts of climate change; and to work across sectoral and national boundaries to avoid further dramatic and potentially disastrous impacts on health.



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A look at the health impacts of climate change in the eastern Mediterranean region

Changing climate hazards to health in the eastern Mediterranean

Climate change has led to increased temperatures, and changing rainfall patterns, combined with an increase of the areas affected by droughts in the Mediterranean, Sahel and Maghreb regions, over the last 30 years. The IPCC 4th assessment report projects that the average temperature within the region will increase by 1-2 °C by 2030-2050, with an increasing frequency of very hot days and heatwaves. Although there may be some slight increases in rainfall in the Southern Arabian Peninsula, the region is generally expected to become drier.

Health vulnerabilities to climate change

The eastern Mediterranean is the most water-scarce region in the world, and has a heavy reliance on rain-fed food production. Intermittent water supplies are a common phenomenon in most countries resulting in decreased household water security and compromised drinking water quality. Large populations and economic activities are concentrated in urbanized and flood-prone coastal areas. Many of the large cities, such as Cairo, Karachi and Tehran, suffer from high levels of air pollution, with particularly high levels of ozone at higher temperatures.

The combination of higher temperatures and reduced precipitation will increase the occurrence of droughts, and of dust storms. Freshwater availability will further decline, leaving an estimated additional 80-100 million people exposed to water stress by 2025 in the Middle East and North Africa, and for communities dependent on rain-fed agriculture, reductions of crop yield of up to 50% by 2020.

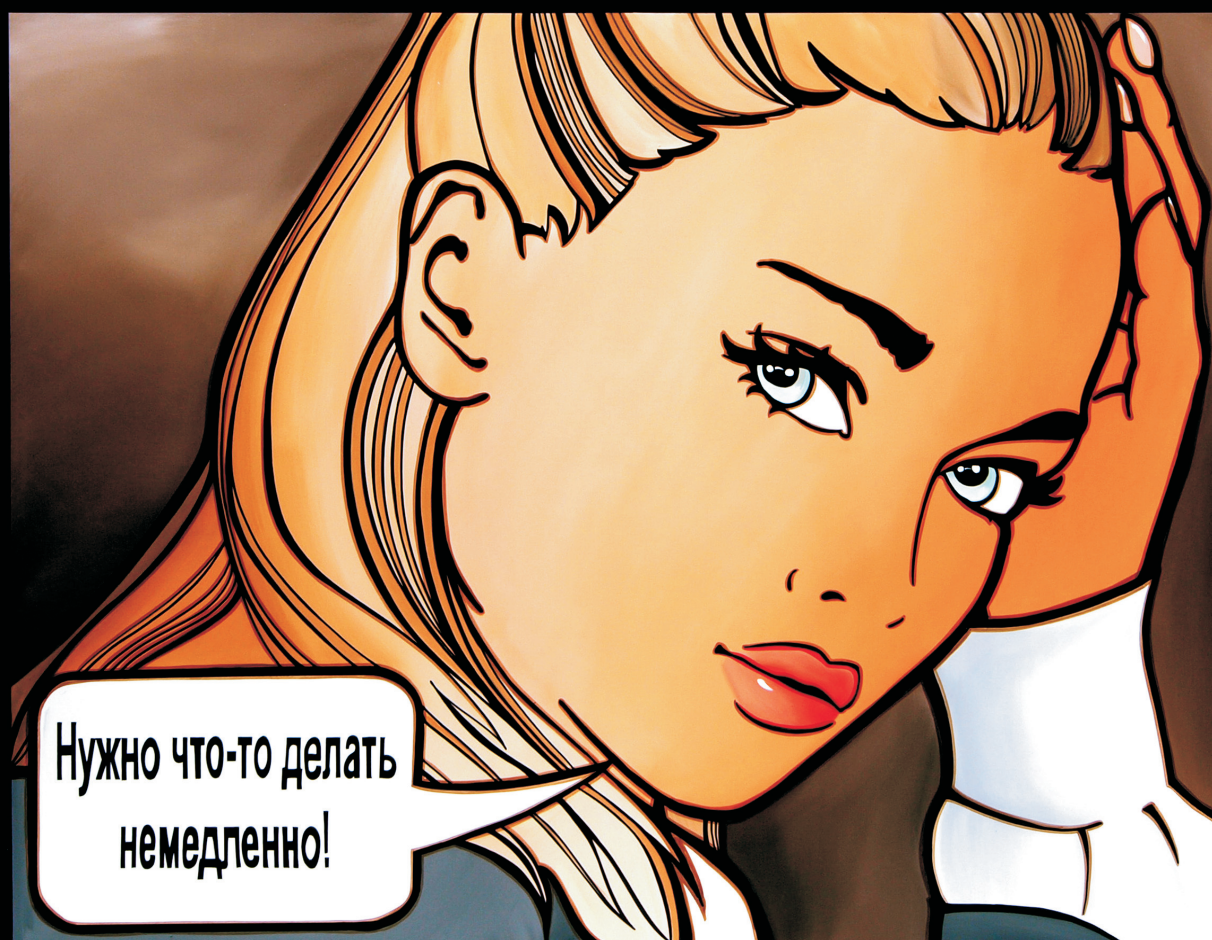
The dominant health concerns are associated with the enhanced water stress, leading to increases in water-borne and water-washed diseases, and threats to food security. Other sources of concern include geographic and seasonal expansion of vector-borne diseases, such as leishmaniasis, and potentially malaria and dengue. Ongoing sea-level rise will bring increased risk of flooding to coastal settlements, particularly in Egypt. Increasing temperatures and aridity raise the threat of heatwaves and dust storms, as well as worsening air quality. There is also concern that adaptations to climate change such as increasing use of wastewater to respond to water-stress, may bring new health risks unless properly managed.

Responses to protect health

The region already has extensive experience in coping with high temperatures and water stress. It is, however, necessary to consider how these existing protective systems can be further enhanced to control the more extreme stresses that are expected under climate change. Ministries of health have committed to the development of a regional action plan to protect health by minimizing the adverse health impacts of climate change. Health sector action includes: (a) placing concerns about public health security at the centre of the national and global response to climate change; (b) implementing adaptive strategies at local and national levels in order to minimize impacts of climate change on health; and (c) supporting strong actions to promote health in development and mitigation of climate change.



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A look at the health impacts of climate change in the European region

Changing climate hazards to health

In recent years, wide ranging impacts of climate change have been documented in Europe. Over 1000 extreme weather events have hit the region in the last three decades. Climate change increases the frequency and severity of these events leading to deaths and human suffering, social disruption and a substantial burden to health systems.

According to the latest projections, temperature will increase by 2.3°C by mid century. Extreme weather events are likely to become more frequent, widespread and intense. Mean precipitation is projected to increase in winter, and to decline in summer in central Europe, the Mediterranean and central Asia; while more droughts are likely to happen in the latter two areas. Sea levels are expected to further rise and put 3 million people at risk in the European Union. European populations are directly exposed to climate change through changing weather patterns and indirectly through changes in water, air, food quality and quantity, ecosystems, agriculture, livelihoods and infrastructure.

Health vulnerabilities to climate change

There is a clear understanding that climate change is not just a possibility, it is already happening and is having an impact on health. The 70 000 deaths due to the heat wave which hit Europe in the summer 2003, changes in the distribution of some infectious disease vectors and anticipated pollen seasonality are the first alarming examples.

Several health-impact assessments of climate change have been conducted at a subregional and national level. These studies point at a wide range of estimated effects including increased mortality, disability and morbidity from extreme weather events; further changes in the range of vector- and rodent-borne diseases; an increased risk of water- and food-borne diseases; raising rates of cardio-respiratory disease in urban areas during summer; growing undernutrition and micronutrient deficiencies from frequent droughts and prolonged dry periods; loss of livelihoods and transitional population displacement.

Health effects will be unevenly experienced between and within countries. Whether and how they will occur will depend on a number of factors including geography, health status, age, social class, health-system preparedness and access to services. The rural poor, people who are very young, elderly and/or infirm, and workers exposed to extreme weather events will be most at risk. Climate change can significantly worsen health inequities and put additional stress on poorer groups. Failure to respond now could be very costly in terms of disease, health-care expenditures and lost productivity.

Responses to protect health

Health systems can play a pivotal role in protecting health from climate change. While their responsive capacities can vary greatly across the European region, all systems can take a number of common actions to reinforce the response: put health concerns high on the climate-change agenda, implement strategies to limit health effects, advocate action by other sectors that will benefit health and lead by example. Several European countries have health adaptation strategies including for example health impact assessment, disease surveillance, disaster preparedness, and primary health care. Some western European countries have recently introduced heat health action plans and others, like the United Kingdom, have developed targets for reducing emissions in the health sector. The effectiveness of any measure and action will need to be further evaluated under potentially more frequent and intense events, or more rapid climate change.

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CLIMATE CHANGE AFFECTS OUR HEALTH



SOMETHING SHOULD
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A look at the health impacts of climate change in the South-East Asia region

Changing climate hazards to health in South-East Asia

Recent changes in climate in the South-East Asia region have had diverse impacts on health. Eighteen heatwaves were reported in India between 1980 and 1998. A heatwave in 1988 caused 1 300 deaths, while another one in 2003 caused more than 3 000 deaths. Heatwaves in South-East Asia cause high mortality in rural populations, and among the elderly and outdoor workers. Vivid examples are the reported cases of heatstroke in metal workers and in rickshaw pullers in Bangladesh.

In 2006, Bhutan reported increased loss of life from frequent flash floods, glacier lake outburst floods and landslides. Rises in flood-related diarrhoeal disease have been reported in India and Bangladesh. In 2007, four monsoon depressions -double the normal number- caused severe floods in Bangladesh, India and Nepal, and also in the Democratic People's Republic of Korea causing death, loss of livelihood and displacement of millions. In November 2008, tropical cyclone Sidr made landfall in Bangladesh, generating winds of up to 240 km/h and torrential rains. More than 8.5 million people were affected and over 3 300 died. Nearly 4.7 million people saw their houses damaged or destroyed, most of them belonging to the poorest of the poor.

Health vulnerabilities to climate change

Human-induced climate change amplifies the risk of heatwaves increasing the possibility of heat strokes, cardiovascular and respiratory disorders. In South Asia, endemic morbidity and mortality due to diarrhoeal disease is linked to poverty and hygiene behaviour compounded by the effect of high temperatures on bacterial proliferation. Diarrhoeal diseases and outbreaks of other infectious diseases (e.g. cholera, hepatitis, malaria, dengue fever) have been reported to be influenced by climate-related factors such as severe floods, droughts, sea-surface temperatures and rainfall in association with non-climatic factors such as poverty, lack of access to safe drinking water and poor sewerage systems. Increases in endemic morbidity and mortality due to diarrhoeal disease associated with climate change are expected in South and South-East Asia. Increases in coastal water temperature would exacerbate the abundance and/or toxicity of cholera in South Asia. Rising temperatures and water scarcity are likely to decrease the production of staple foods in many of the poorest regions, increasing the risk of malnutrition.

The surge in frequency and intensity of extreme weather events will translate into loss of life, injuries and disability. Changes in climate are likely to lengthen the transmission season of important vector-borne diseases (like dengue and malaria) and to alter their geographic range, potentially reaching regions that lack either population immunity or a strong public health infrastructure.

Rising sea levels will increase the risk of coastal flooding and population displacement. The most vulnerable areas in South-East Asia are the Ganges-Brahmaputra delta in Bangladesh, and small islands - for example in the Maldives and in Indonesia - as well as the entire coastline of the Indian Ocean. Loss of livelihood will increase psychosocial stress in the affected populations.

Responses to protect health

Many South-East Asian countries have a high burden of climate-sensitive diseases but public health capability to respond is not always optimal. The effects of climate change on socioeconomic development have the potential to seriously undermine the health and the well-being of communities in those countries. Existing health systems provide some protection against risks arising from climate variability and change. There is an urgent need to improve the capacity of health systems to cope with additional burdens of climate-sensitive health problems, and to strengthen the most critical current policies and health protection measures in South-East Asia.



气候变化 影响我们的健康

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A look at the health impacts of climate change in the western Pacific region

Changing climate hazards to health in the western Pacific

In the past 50 years there have been more heatwaves, fewer frosts and more rain in some parts of the region, but less rain and an increase in the intensity of droughts in other areas, especially in Australia. Sea levels have risen by about 7 cm and there are increasing stresses on water supply and agriculture, alterations in natural ecosystems, reduced seasonal snow cover, and glacier shrinkage.

The climate of the 21st century will be warmer, with further changes in extreme events. Heatwaves and wild fires are certain to increase in intensity and frequency. Floods, landslides, droughts and storm surges are very likely to become more frequent and intense. Warmer temperatures will have adverse effects on food production, water availability and the spread of disease vectors.

Health vulnerabilities to climate change

Human-induced climate change significantly amplifies the likelihood of heatwaves increasing the possibility of heat strokes, cardiovascular and respiratory disorders. Tropical cyclones, storm surges, flooding, and drought have both short- and long-term effects on human health, including drowning, injuries, increased disease transmission, decreases in agricultural productivity, and an increased incidence of common mental disorders. Because the impacts are complex and far-reaching, the true health burden is not yet fully appreciated.

Rising sea levels will increase the risk of coastal flooding and population displacement. The most vulnerable areas in the western Pacific region are the small islands. Many small islands are located in tropical or sub-tropical zones whose weather and climate are already conducive to the transmission of malaria, dengue, and food- and water-borne communicable diseases. Warmer sea surface temperatures during El Niño events have been associated with ciguatera outbreaks in parts of the Pacific.

Other climate-sensitive diseases of concern to small islands include: heat stress, malnutrition and skin diseases. The observed increasing incidence of many of these diseases in small islands is attributable to a combination of factors, including poor public health practices, inadequate infrastructure, poor waste management practices, increasing global travel, and changing climatic conditions.

Responses to protect health

Some countries in the region have considerable adaptive capacity. Existing health systems provide substantial protection against risks arising from climate variability and change in these countries. Vulnerable countries, especially small islands, have a high burden of climate-sensitive diseases but poor public health capability to respond. Health systems in small island countries often have major existing weaknesses, and are likely to be further strained by the anticipated impacts of climate change on fundamental health determinants. There is an urgent need to improve the capacity of health systems to cope with additional burdens of climate-sensitive health problems, and to strengthen the most critical current policies and health protection measures in vulnerable parts of the western Pacific region.



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The paintings, produced by the Italian painter Elisabetta Farina, are linked to a broader WHO initiative named *Art for Health* aimed at using art work to raise awareness on international health issues. The collection is part of a suite of other products and initiatives developed for a global advocacy and outreach campaign. Data on the present and expected impacts of climate change on health are provided alongside the different subjects and languages.

For further information, visit:
Department of Public Health and Environment
<http://www.who.int/phe>

For information on the WHO regions, visit:
<http://www.afro.who.int/>
<http://www.emro.who.int/>
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