



Climate Change Impacts

Our Earth is warming. Earth's average temperature has risen by 0.6 – 0.7°C over the past 60 years, (information taken from [IPCC presentation](#)) and it is projected to rise further over the next hundred years. Small changes in the average temperature of the planet can mean large and potentially dangerous shifts in climate and weather.

Rising global temperatures have been the cause of changes in weather and climate patterns globally. Many places have seen changes in rainfall, resulting in more floods, droughts, or intense rain, as well as more frequent and severe heat waves. The planet's oceans and glaciers have also experienced some big changes - oceans are warming and becoming more acidic due to the increased CO₂ in the atmosphere, ice caps are melting, and sea levels are rising. As these and other changes become more pronounced in the coming decades, they will likely present challenges to our society and our environment.

The Intergovernmental Panel on Climate Change (IPCC) is the leading international body for the assessment of climate change. The IPCC reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide, relevant to the understanding of climate change. Thousands of scientists from all over the world contribute to the work of the IPCC on a voluntary basis. Review is an essential part of the IPCC process, to ensure an objective and complete assessment of current information. IPCC aims to reflect a range of views and expertise.

Because of its scientific and intergovernmental nature, the IPCC embodies a unique opportunity to provide rigorous and balanced scientific information to decision makers. By endorsing the IPCC reports, governments acknowledge the authority of their scientific content. The work of the organization is therefore policy-relevant and yet policy-neutral, never policy-prescriptive.

The main activity of the IPCC is to provide at regular intervals Assessment Reports of the state of knowledge on climate change. The latest one is *Climate Change 2007*, the IPCC's Fourth Assessment Report. The IPCC is currently preparing the Fifth Assessment report, which will be released in phases from September 2013 to October 2014

Some data on the fifth assessment report is already available; three main messages are being advocated in the report:

1. The warming of the climate due to Green House Gas (GHG) emissions is unequivocal
2. The human influence on the Climate System is clear
3. Continued GHG emissions will increase Climate Change

They also state: *“Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions.”*



The tables below, from the IPCC's fourth assessment report shows in detail the impacts per region and the impacts due to changes in extreme weather and climate events including the likelihood of these events occurring.

Examples of some projected regional impacts.

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| <p>Africa</p> | <p>By 2020, between 75 and 250 million of people are projected to be exposed to increased water stress due to climate change.</p> <p>By 2020, in some countries, yields from rain-fed agriculture could be reduced by up to 50%. Errata Agricultural production, including access to food, in many African countries is projected to be severely compromised. This would further adversely affect food security and exacerbate malnutrition.</p> <p>Towards the end of the 21st century, projected sea level rise will affect low-lying coastal areas with large populations. The cost of adaptation could amount to at least 5 to 10% of Gross Domestic Product (GDP).scenarios (TS).</p> <p>By 2080, an increase of 5 to 8% of arid and semi-arid land in Africa is projected under a range of climate</p> |
| <p>Asia</p> | <p>By the 2050s, freshwater availability in Central, South,East and South-East Asia, particularly in large river basins, is projected to decrease.</p> <p>Coastal areas, especially heavily populated megadelta regions in South, East and South-East Asia, will be at greatest risk due to increased flooding from the sea and, in some megadeltas, flooding from the rivers.</p> <p>Climate change is projected to compound the pressures on natural resources and the environment associated with rapid urbanisation, industrialisation and economic development.</p> <p>Endemic morbidity and mortality due to diarrhoeal disease primarily associated with floods and droughts are expected to rise in East, South and South-East Asia due to projected changes in the hydrological cycle.</p> |
| <p>Australia and New Zealand</p> | <p>By 2020, significant loss of biodiversity is projected to occur in some ecologically rich sites, including the Great Barrier Reef and Queensland Wet Tropics.</p> <p>By 2030, water security problems are projected to intensify in southern and eastern Australia and, in New Zealand, in Northland and some eastern regions.</p> <p>By 2030, production from agriculture and forestry is projected to decline over much of southern and eastern Australia, and over parts of eastern New Zealand, due to increased drought and fire. However, in New Zealand, initial benefits are projected in some other regions.</p> <p>By 2050, ongoing coastal development and population growth in some areas of Australia and New Zealand are projected to exacerbate risks from sea level rise and increases in the severity and frequency of storms and coastal flooding.</p> |
| <p>Europe</p> | <p>Climate change is expected to magnify regional differences in Europe's natural resources and assets. Negative impacts will include increased risk of inland flash floods and more frequent coastal flooding and increased erosion (due to storminess and sea level rise).</p> <p>Mountainous areas will face glacier retreat, reduced snow cover and winter tourism, and extensive species losses (in some areas up to 60% under high emissions scenarios by 2080).</p> <p>In southern Europe, climate change is projected to worsen conditions (high temperatures and drought) in a region already vulnerable to climate variability, and to reduce water availability, hydropower potential, summer tourism and, in general, crop productivity.</p> <p>Climate change is also projected to increase the health risks due to heat waves and the frequency of wildfires.</p> |
| <p>Latin America</p> | <p>By mid-century, increases in temperature and associated decreases in soil water are projected to lead to gradual replacement of tropical forest by savanna in eastern Amazonia. Semi-arid vegetation will tend to be replaced by arid-land vegetation.</p> <p>There is a risk of significant biodiversity loss through species extinction in many areas of tropical Latin America.</p> <p>Productivity of some important crops is projected to decrease and livestock productivity to decline,</p> |



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| | <p>with adverse consequences for food security. In temperate zones, soybean yields are projected to increase. Overall, the number of people at risk of hunger is projected to increase (TS; medium confidence).</p> <p>Changes in precipitation patterns and the disappearance of glaciers are projected to significantly affect water availability for human consumption, agriculture and energy generation.</p> |
| <p>North America</p> | <p>Warming in western mountains is projected to cause decreased snowpack, more winter flooding and reduced summer flows, exacerbating competition for over-allocated water resources.</p> <p>In the early decades of the century, moderate climate change is projected to increase aggregate yields of rain-fed agriculture by 5 to 20%, but with important variability among regions. Major challenges are projected for crops that are near the warm end of their suitable range or which depend on highly utilised water resources.</p> <p>Cities that currently experience heat waves are expected to be further challenged by an increased number, intensity and duration of heat waves during the course of the century, with potential for adverse health impacts.</p> <p>Coastal communities and habitats will be increasingly stressed by climate change impacts interacting with development and pollution.</p> |
| <p>Polar Regions</p> | <p>The main projected biophysical effects are reductions in thickness and extent of glaciers, ice sheets and sea ice, and changes in natural ecosystems with detrimental effects on many organisms including migratory birds, mammals and higher predators.</p> <p>For human communities in the Arctic, impacts, particularly those resulting from changing snow and ice conditions, are projected to be mixed.</p> <p>Detrimental impacts would include those on infrastructure and traditional indigenous ways of life.</p> <p>In both polar regions, specific ecosystems and habitats are projected to be vulnerable, as climatic barriers to species invasions are lowered.</p> |
| <p>Small Islands</p> | <p>Sea level rise is expected to exacerbate inundation, storm surge, erosion and other coastal hazards, thus threatening vital infrastructure, settlements and facilities that support the livelihood of island communities.</p> <p>Deterioration in coastal conditions, for example through erosion of beaches and coral bleaching, is expected to affect local resources.</p> <p>By mid-century, climate change is expected to reduce water resources in many small islands, e.g. in the Caribbean and Pacific, to the point where they become insufficient to meet demand during low-rainfall periods.</p> <p>With higher temperatures, increased invasion by non-native species is expected to occur, particularly on mid- and high-latitude islands.</p> |

Note:

Unless stated explicitly, all entries are from Working Group II SPM text, and are either very high confidence or high confidence statements, reflecting different sectors (agriculture, ecosystems, water, coasts, health, industry and settlements). The Working Group II SPM refers to the source of the statements, timelines and temperatures. The magnitude and timing of impacts that will ultimately be realised will vary with the amount and rate of climate change, emissions scenarios, development pathways and adaptation.

Examples of possible impacts of climate change due to changes in extreme weather and climate events, based on projections to the mid- to late 21st century. These do not take into account any changes or developments in adaptive capacity. The likelihood estimates in column two relate to the phenomena listed in column one.

| Phenomenon ^a and direction of trend | Likelihood of future trends based on projections for 21 st century using SRES scenarios | Examples of major projected impacts by sector | | | |
|---|--|--|--|---|---|
| | | Agriculture, forestry and ecosystems | Water resources | Human health | Industry, settlement and society |
| Over most land areas, warmer and fewer cold days and nights, warmer and more frequent hot days and nights | Virtually certain ^b | Increased yields in colder environments; decreased yields in warmer environments; increased insect outbreaks | Effects on water resources relying on snowmelt; effects on some water supplies | Reduced human mortality from decreased cold exposure | Reduced energy demand for heating; increased demand for cooling; declining air quality in cities; reduced disruption to transport due to snow, ice; effects on winter tourism |
| Warm spells/heat waves. Frequency increases over most land areas | Very likely | Reduced yields in warmer regions due to heat stress; increased danger of wildfire | Increased water demand; water quality problems, e.g. algal blooms | Increased risk of heat-related mortality, especially for the elderly, chronically sick, very young and socially isolated | Reduction in quality of life for people in warm areas without appropriate housing; impacts on the elderly, very young and poor |
| Heavy precipitation events. Frequency increases over most areas | Very likely | Damage to crops; soil erosion, inability to cultivate land due to waterlogging of soils | Adverse effects on quality of surface and groundwater; contamination of water supply; water scarcity may be relieved | Increased risk of deaths, injuries and infectious, respiratory and skin diseases | Disruption of settlements, commerce, transport and societies due to flooding; pressures on urban and rural infrastructures; loss of property |
| Area affected by drought increases | Likely | Land degradation; lower yields/crop damage and failure; increased livestock deaths; increased risk of wildfire | More widespread water stress | Increased risk of food and water shortage; increased risk of malnutrition; increased risk of water- and food-borne diseases | Water shortage for settlements, industry and societies; reduced hydropower generation potentials; potential for population migration |
| Intense tropical cyclone activity increases | Likely | Damage to crops; windthrow (uprooting) of trees; damage to | Power outages causing disruption of public water | Increased risk of deaths, injuries, water- and food-borne | Disruption by flood and high winds; withdrawal of risk coverage in vulnerable areas by private insurers; |

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| | | coral reefs | supply | diseases; post-traumatic stress disorders | potential for population migrations; loss of property |
| Increased incidence of extreme high sea level (excludes tsunamis) ^c | Likely ^d | Salinisation of irrigation water, estuaries and fresh- water systems | Decreased fresh-water availability due to saltwater intrusion | Increased risk of deaths and injuries by drowning in floods; migration-related health effects | Costs of coastal protection versus costs of land-use relocation; potential for movement of populations and infrastructure; also see tropical cyclones above |

Notes:

- a) See Working Group I Table 3.7 for further details regarding definitions.
- b) Warming of the most extreme days and nights each year.
- c) Extreme high sea level depends on average sea level and on regional weather systems. It is defined as the highest 1% of hourly values of observed sea level at a station for a given reference period.
- d) In all scenarios, the projected global average sea level at 2100 is higher than in the reference period. The effect of changes in regional weather systems on sea level extremes has not been assessed.

Ref. http://www.ipcc.ch/publications_and_data/ar4/syr/en/spms3.html

For more information on impacts of Climate Change see <http://www.ipcc.ch/> and <http://www.climatehotmap.org/global-warming-effects/>