

16 SOCIAL IMPACTS OF CLIMATE CHANGE

By Ross Rutherford, President, Engineers for Social Responsibility Inc.

Introduction

This paper assembles information from several reliable and knowledgeable sources on the existing and potential social impacts of climate change. These include the World Bank, Intergovernmental Panel on Climate Change (IPCC), National Oceanic and Atmospheric Administration (NOAA) and the NZ Parliamentary Commissioner for the Environment.

Key risks related to the effects of global warming on humans

The key risks of climate change for human beings identified by the IPCC¹ include the following:

- Risk of death, injury, ill-health, or disrupted livelihoods in low-lying coastal zones and small island developing states and other small islands, due to storm surges, coastal flooding, and sea level rise.
- Risk of severe ill-health and disrupted livelihoods for large urban populations due to inland flooding in some regions.
- Systemic risks due to extreme weather events leading to breakdown of infrastructure networks and critical services such as electricity, water supply, and health and emergency services.
- Risk of mortality and morbidity during periods of extreme heat, particularly for vulnerable urban populations and those working outdoors in urban or rural areas.
- Risk of food insecurity and the breakdown of food systems linked to warming, drought, flooding, and precipitation variability and extremes, particularly for poorer populations in urban and rural settings.
- Risk of loss of rural livelihoods and income due to insufficient access to drinking and irrigation water and reduced agricultural productivity, particularly for farmers and pastoralists with minimal capital in semi-arid regions.
- Risk of loss of marine and coastal ecosystems, biodiversity, and the ecosystem goods, functions, and services they provide for coastal livelihoods, especially for fishing communities in the tropics and the Arctic.

Potential effects on poverty in Africa and Asia

According to the World Bank², as the coastal cities of Africa and Asia expand, many of their poorest residents are being pushed to the edges of liveable land and into the most dangerous zones for climate change. Their informal settlements cling to riverbanks and cluster in low-lying areas with poor drainage, few public services, and no protection from storm surges, sea-level rise, and flooding.

¹ IPCC 5th Assessment Report (AR5 Working Group II), 2014

² What Climate Change Means for Africa, Asia and the Coastal Poor, World Bank, June 2013

² What Climate Change Means for Africa, Asia and the Coastal Poor, World Bank, June 2013



These communities – the poor in coastal cities and on low-lying islands – are among the world’s most vulnerable to climate change and the least able to marshal the resources to adapt.

They face a world where climate change will increasingly threaten the food supplies of Sub-Saharan Africa and the farm fields and water resources of South Asia and South East Asia within the next three decades, while extreme weather puts their homes and lives at risk.

Another World Bank report³ warns that the combined human and economic impacts of extreme weather on poverty are far more devastating than previously understood. The report’s findings underscore the urgency for climate-smart policies that better protect the most vulnerable. Poor people are typically more exposed to natural hazards, and are often unable to draw on support from family, friends, financial systems, or governments. In a press release dated 14 November 2016 referring to the report, World Bank Group President Jim Yong Kim said that “*Severe climate shocks threaten to roll back decades of progress against poverty. Storms, floods, and droughts have dire human and economic consequences, with poor people often paying the heaviest price*”.

The report focuses on building resistance to disasters. This will be increasingly important should the frequency of extreme weather events increase as global temperatures increase.

Food & water security

A World Bank report¹ states that according to research, in Sub-Saharan Africa food security will be the overarching challenge, with dangers from droughts, flooding, and shifts in rainfall. If the world experiences between 1.5°C-2°C warming, this will result in drought and aridity that will contribute to farmers losing 40-80 percent of cropland conducive to growing maize, millet, and sorghum by the 2030s-2040.

Water scarcity in some areas and overabundance of water in others are the hallmarks of climate change in South Asia, the researchers found. Inconsistencies in the monsoon season and unusual heat extremes will affect crops. Loss of snow melt from the Himalayas will reduce the flow of water into the Indus, Ganges and Brahmaputra basins. Together, they threaten to leave hundreds of millions of people without enough water or food. Bangladesh and the Indian cities of Kolkata and Mumbai will be confronted with increased flooding, intense cyclones, sea-level rise, and warming temperatures.

Fish generally respond to ocean warming through moving to higher latitudes and deeper waters, altering the catch composition. Continuing warming to a level that exceeds the thermal tolerance of tropical species may significantly reduce the catch potential for socioeconomically vulnerable coastal fishing communities in tropical developing countries. It has been estimated that the fish catch potential will fall by 40% in the tropics over the next three to four decades⁴.

In the Arctic increasingly variable spring weather conditions and changes in the rate at which ice melts in the spring are affecting access to traditional hunting and fishing camps.

Effects of sea level rise on cities and coastal habitats

The major causes of sea level rise are thermal expansion caused by warming of the oceans (which absorb approximately 90% of the increased atmospheric heat associated with human

³ Unbreakable: Building the Resilience of the Poor in the Face of Natural Disasters, World Bank Report, 2016

⁴ www.ipsnews.net/2009/10/biodiversity-dwindling-fish-catch-could-leave-a-billion-hungry/

activity) and increased melting of land-based ice such as glaciers and ice sheets⁵. The latest satellite data from NASA gives a current sea level rise rate of 3.4 mm/year. IPCC estimates indicate a range of 40-60cm increase in the global sea level by 2100, although more recent studies indicate that the actual increase could be significantly higher.

A recent report by the New Zealand Parliamentary Commissioner for the Environment⁶ points out that “It is certain that the sea is rising and will continue to do so for centuries to come. What is uncertain is how rapidly it will rise.” For a sea level rise of 30cm, extreme high water levels such as those that occurred in Auckland in January 2011 and in Wellington in June 2013 (which are referred to as 1 in 100 year events) would be expected to occur every 4 years at the port of Auckland, once a year at the ports of Wellington and Christchurch, and every 2 years at the port of Dunedin. A sea level rise of 100cm would affect an estimated 565 homes in Auckland, 2,023 in Wellington, 4,530 in Christchurch, 3,287 in Dunedin and 4,279 homes in Napier. Nearly 2,700 homes in Dunedin are less than 50cm above the high spring mark.

While these figures are clearly concerning, many countries will be much more severely affected by sea level rise than New Zealand.

Even a small increase in sea level can have devastating effects on some coastal habitats. As seawater reaches farther inland, it can cause destructive erosion, flooding of wetlands, contamination of aquifers and agricultural soils, and lost habitat for fish, birds, and plants.

Hundreds of millions of people live in areas that will become increasingly vulnerable to flooding. Higher sea levels would force them to abandon their homes and relocate. Low-lying islands could be submerged completely.

In South East Asia, coastal cities will be under intense stress under the most commonly predicted climate change scenarios. A sea level rise of 30 cm would cause substantial flooding in some cities and inundate low-lying cropland with saltwater corrosive to crops. Vietnam’s Mekong Delta, a global rice producer, is particularly vulnerable to sea level rise. A 30 cm sea level rise there could result in the loss of about 11 percent of crop production. At the same time, storm intensity is likely to increase¹.

According to Scientific American, May 20, 2016, five reef islands in the Solomon Islands have been lost completely to sea level rise and coastal erosion, and a further six have been severely eroded.

Sea level rise, in combination combined with human activities including sediment removal and subsidence from groundwater extraction, is threatening the future of many river deltas. According to an article in Nature Magazine⁷, more than 500 million people live on deltas including in cities such Shanghai, Dhaka and Bangkok. The Danube delta is home to about 2,000 plant and 5,000 animal species, many of which are threatened. By 2100, land losses from rising sea levels alone could reach 5% for the Ganges-Brahmaputra (Bangladesh and West Bengal, India), 30% for the Mekong (Vietnam), Nile (Egypt) and Yellow River (China) deltas and more than 80% for the Lower Danube delta (Romania and Ukraine).

⁵ National Ocean Service, NOAA, US Department of Commerce website accessed January 2017.

⁶ Preparing New Zealand for rising seas: Certainty and Uncertainty, Parliamentary Commissioner for the Environment, November 2015

⁷ Protect the world’s deltas, Nature Magazine, Vol 516, 4 December 2014

A World Bank Study⁸ identified that in terms of the overall cost of damage, the cities at the greatest risk are: 1) Guangzhou, 2) Miami, 3) New York, 4) New Orleans, 5) Mumbai, 6) Nagoya, 7) Tampa, 8) Boston, 9) Shenzhen, and 10) Osaka. The top four cities alone account for 43% of the forecast total global losses.

However, developing-country cities move up the list when flood costs are measured as a percentage of city gross domestic product (GDP). Many of them are growing rapidly, have large populations, are poor, and are exposed to tropical storms and sinking land.

The study lists the ten most vulnerable cities when measured as percentage of GDP as: 1) Guangzhou; 2) New Orleans; 3) Guayaquil, Ecuador; 4) Ho Chi Minh City; 5) Abidjan; 6) Zhanjing; 7) Mumbai; 8) Khulna, Bangladesh; 9) Palembang, Indonesia; and 10) Shenzhen. In most of these cities, the poor are most at risk as rapid urbanization has pushed them into the most vulnerable neighbourhoods, often in low-lying areas and along waterways prone to flooding.

According to a recent item in the Washington Post⁹, in the U.S. alone about 5 million people live within 1.2m of high tide.

A Huffington Post Blog¹⁰ states that keeping the world to a 2°C temperature rise would result in 130 million people needing to be evacuated in the coming decades. A 4°C rise (our current path) could result in sea level rise that would submerge land where 470-760 million people now live. In China alone 64 million people would be threatened by a 2°C temperature rise, increasing to 145 million people for a 4°C rise.

Security

Climate change is projected to reduce renewable surface water and groundwater resources in most dry subtropical regions intensifying competition for water resources.

Climate change is projected to increase the displacement of people, and can indirectly increase risks of violent conflicts. In this context it is significant that one of the UK's most senior military figures has warned that climate change risks are increasing the threat of instability and posing a risk to geopolitical security¹¹. A press release by the US Department of Defence dated 29 July 2015 on its report on Security Implications of Climate Change includes the following: *"The report finds that climate change is a security risk, Pentagon officials said, because it degrades living conditions, human security and the ability of governments to meet the basic needs of their populations. Communities and states that already are fragile and have limited resources are significantly more vulnerable to disruption and far less likely to respond effectively and be resilient to new challenges...."*

⁸ Which Coastal Cities are at Highest Risk of Damaging Floods?, World Bank, August 19, 2013

⁹ 10 things you should know about sea level rise and how bad it could be, Washington Post, May 20, 2016

¹⁰ New Map Shows the Impact of Future Sea Level Rise, January 28, 2016.

¹¹ Climate change 'will see more UK forces deployed on conflicts around the world', The Guardian, Monday 10 November 2014.

Health

Deaths due to heat stress¹² are increasing. Young children, the elderly, and those who are already ill are less able to withstand high temperatures. The recent record heatwave in India produced the highest temperature recorded (51°C in Phalodi, Rajasthan in May 2016), destroyed crops and has resulted in the deaths of hundreds of people¹³.

Scientists expect a warmer world to bring changes in "disease vectors"—the mechanisms that spread some diseases. Insects previously stopped by cold winters are already moving to higher latitudes (toward the poles)¹⁴.

Projected changes in temperature and precipitation under global warming are likely to lead to other effects that threaten human health and safety. For example, changing precipitation patterns and prolonged heat can create drought, which can cause forest and peat fires, putting residents and firefighters in danger. However, a warming atmosphere also holds more moisture, so the chance of extreme rainfall and flooding continues to rise in some regions with rain or snow. In many heavily populated areas, sea-level rise is more likely to put people in the path of storm surges and coastal flooding. Warmer ocean waters may spawn more intense tropical hurricanes and typhoons while ocean cycles continue to be a factor in the frequency of tropical cyclones.

Wealthy nations are more likely to adapt to projected climate change and recover from climate-related disasters than poor countries. Even within nations, less economically fortunate individuals are more vulnerable because they are less likely to have air conditioning and well-insulated homes, and because they have fewer resources to escape danger.

Insurance

Insurance is one of the primary mechanisms used to protect people against weather-related disasters. We rely on insurance to protect investments in real estate, agriculture, transportation, and utility infrastructure by distributing costs across society.

Flooding from increased storm frequencies in some areas can have a major impact on insurance costs.

Climate change may make it harder and more expensive for many people to insure their homes, businesses, or other valuable assets in risk-prone areas.

Conclusion

The potential social impacts of climate change are very large and are already starting to become evident.

Some impacts are due primarily to increases in the emissions of greenhouse gases, while others result from climate change increasing the severity of the effects of other factors relating to human socioeconomic development.

The effects fall disproportionately on low income populations in less developed countries.

¹² In 2003 a heatwave resulted in the deaths of 70,000 people in Europe according to J.-M. Robine et al., in *Comptes Rendus Biologies*, Vol 331, Issue 2 (2008). Such events are likely to become more frequent in the future.

¹³ India Record-Breaking Heatwave Kills Hundreds, Destroys Crops, Nature World News, May 25, 2016

¹⁴ Global Warming Effects Around the World, Union of Concerned Scientists website, 2011

It is not an exaggeration to state that the impacts on some societies could cause their collapse and could lead to forced migration of large numbers of people. Potential outcomes include warfare as nations fight over diminishing resources or seek to protect their borders.

Climate change effects are increasing and indeed accelerating because of the failure of societies and the international community to act with sufficient conviction and determination.

Measures to mitigate the effects of climate change are essential, but they do not deal with the underlying causes.

Much more urgency must be given to implement effective and sustained action to reduce greenhouse gas emissions to avoid unprecedented disaster for humanity.

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