

REFERENCE NOTES – CLIMATE IMPACT SKITS – ARCTIC CANADA

- Sea ice depleting at 7% per decade; expected that by 2050 Arctic waters could be nearly ice-free in summerⁱ
 - Decreasing sea ice → direct impact on Indigenous livelihoods and health (travel across sea ice less predictable, more dangerous, prevents access to traditional hunting and harvesting activities)
 - Shorelines become more exposed, more prone to erosion, flooding, wave and storm surges – disrupting ocean mammals' habitat and Indigenous food sources
 - Could open-up northern shipping routes, leading to increased industrial activity such as mining, resource exploration and shorter shipping routes → affect on Indigenous communities
 - Sea ice reflectivity serves as global air conditioner; without it, arctic system temperatures increase – land and oceanⁱⁱ
- Significant degradation of continuous permafrost, especially in the Yukonⁱⁱⁱ
 - Thawing of permafrost has potential to release large pools of carbon that can act as feedback to the climate system
 - Threat to structural integrity of water supplies, buildings, waste disposal, pipelines^{iv}
- Sea level rise - Expected rise in mean (MSL) between 0.18 and 0.59m globally by 2100, but likely significantly higher levels in Arctic and impacts felt much sooner in the century (closer to 2050)
 - Impact is risk of flooding
 - Western arctic, sea-level rise and coastal erosion threaten cultural heritage sites
- Terrestrial Vegetation Zones and Biodiversity
 - Estimated that the boreal forest will replace between 11% and 50% of all Arctic tundra
 - Anticipated increased disturbances such as pests and fire heightened
- Species impact
 - Narwhals, polar bears and walrus at risk (impact of declines in sea ice thickness)
 - Reproductive failure
 - Starvation due to inaccessibility of food sources (no ice bridges)



ⁱ Source: Canadian Centre for Climate Services, Govt of Canada <https://www.canada.ca/en/environment-climate-change/services/climate-change/canadian-centre-climate-services/basics/trends-projections/changes-sea-ice.html>

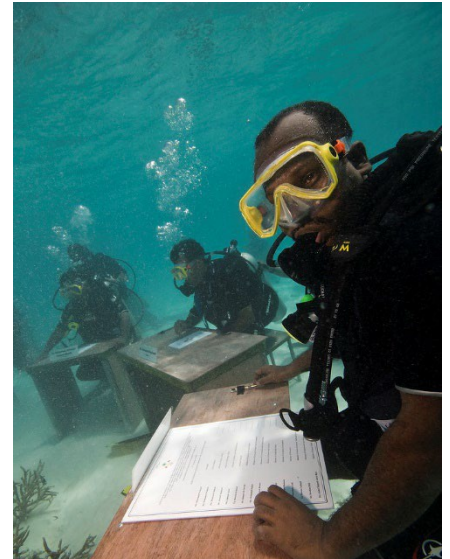
ⁱⁱ Source: World Wildlife Foundation. Climate Change Threats. <https://www.arcticwwf.org/threats/climate-change/>

ⁱⁱⁱ Source: Government of Canada: "Implications of Changing Climate for the Arctic Environment" <https://www.nrcan.gc.ca/environment/resources/publications/impacts-adaptation/reports/assessments/2008/ch3/10325>]

^{iv} Source: Report Climate Change Impacts and Adaptation in Northern Canada – Briefing prepared for the Senate Standing Committee on Forestry and Agriculture <https://sencanada.ca/content/sen/committee/372/agri/power/north-e.htm>

REFERENCE NOTES – CLIMATE IMPACT SKITS – CARIBBEAN AND ISLAND NATIONS

- Key impactsⁱ:
 - sea level rise,
 - loss of biodiversity
 - deterioration, erosion and bleaching of coral reefs
 - stronger hurricanes and extreme weather events
 - longer dry seasons and shorter wet seasons
 - loss of tourism with high hit on economy
- 1 metre sea level rise by 2100; 1 0.5 m rise in sea level will result in 38% of beach loss
- 70% of Caribbean population lives on the coast; sea level rise will destroy infrastructure in urban areas and affect entire populations
- 1/3 of turtle nesting habitat lost by 2050
- Sea surface temperature increases – leading to increased incidence of ciguatera in fish
- Forest mortality of 5.2% per annum
- Drinking water supplies contaminated by salination from salt-water ingress into groundwater
- Devastating health impacts, with 250,000 additional deaths *per year* due to malnutrition, malaria, diarrhea and heat stress predicted
- Food and nutrition security could be severely impacted with projected reduction of around 20% of crop yields for beans and maize by 2050ⁱⁱ



ⁱ All data comes from the “Global Americans High Level Working Group on Inter-American Relations and Bipartisanship, “The Caribbean’s Extreme Vulnerability to Climate Change: A Comprehensive Strategy to Build a Resilient, Secure and Prosperous Western Hemisphere. 2022. <https://theglobalamericans.org/reports/the-caribbean-extreme-vulnerability-climate-change/>

ⁱⁱ World Bank Blogs “10 Key points on climate change impacts, opportunities and priorities for Latin America and the Caribbean

REFERENCE NOTES – CLIMATE IMPACT SKITS – INDIA



- In a nutshellⁱ, India will be hit by climate change in all possible ways.
- Extreme heat – projected to increase up to 4 degrees due to differential heat increases
 - With 4 degrees increase, west coast and southern India will shift to high-temperature climatic region with enormous impacts on agriculture
 - Expected to have 90-120 days with temperature over 35 degrees (IPCC)
- Changing Rainfall
 - 2 degrees increase = highly unpredictable monsoon with lots of flooding
 - 4 degrees increase = extreme monsoons previously occurring every 100 years, will occur every 10 years
- Groundwater
 - Already challenged – even without climate change 15% of India's groundwater resources are overexploited – wells that used to be dug to 100 feet, now often require 300+ feet
 - 60% of agriculture is rain-fed, making food supply of India highly dependent on groundwater.
- Sea level rise
 - Indian ocean expected to increase by 1-2 degrees in temperature by 2050
 - Mumbai has the world's largest population exposed to coastal flooding; large parts of the city built on reclaimed land below high-tide mark
 - Expected that almost 1000 buildings and 24km of road will be under water by 2050 at low-tide, and 2500 buildings and 126km of roadway affected by sea-level rise during high tideⁱⁱ
- Drought
 - Northwest India will have frequent drought
 - By 2040 significant crop yield decreases; could lose 1.3-3.4% GDP (between 43-81 billion EUR) in rice and wheat yields alone.



➤ Health

- increasing malnutrition and related health disorders
- Child stunting expected to increase by 35% by 2050
- Malaria, vector-borne diseases, diarrheal infections and child mortality to increase



ⁱ Unless otherwise cited, all references are from the World Bank "India: Climate Change Impacts"

ⁱⁱ "Key Infra in Mumbai, other coastal cities may submerge by 2050", the Hindustan Times, April 8, 2022.

<https://www.hindustantimes.com/india-news/key-infra-in-mumbai-other-coastal-cities-may-submerge-by-2050-101649357980809.html>

REFERENCE NOTES – CLIMATE IMPACT SKITS – SUB-SAHARA AFRICA



- Responsible for less than 4% of global GHG emissions
- Young people currently make up 62.9% of the population in sub-Saharan Africa – by 2050, it is expected that the population will double to 945 million
- African continent expected to have greater than average temperature increase, with average increase ranging from 3-6 degrees higher by 2100

- Total deglaciation on the African Continent by 2040
- By 2050, lowering of Gross domestic product (GDP) by 3%, exacerbating povertyⁱ
- By 2030, more than 118 million extremely poorⁱⁱ exposed to extreme heat, drought and flooding
- By 2050, could see a decrease in annual precipitation by up to 30%ⁱⁱⁱ
- By 2050, sub-Saharan Africa could have as many as 86 million internal climate migrants;
 - the main driver of migration will be lack of water^{iv}
- Sub-Sahara Africa deemed the most vulnerable to the changing climate due to region's very low adaptive capacity (acute poverty, limited facilities to mitigate or adapt to climate change, and heavy dependence on rain fed-agriculture with highly sensitive food systems)^v
 - Estimated that by 2050 crop and fodder growing periods will be shortened by 20%
 - Cereal yields expected to drop by 40%
 - More than 30% of population predicted by 2050 to experience acute food insecurity and famine



ⁱ "State of The Climate in Africa 2021" (WMO-No.1275), World Meteorological Organization, <https://news.un.org/en/story/2021/10/1103362>

ⁱⁱ Extremely poor is defined as those living on less than \$1.90 per day

ⁱⁱⁱ "The Climate Crisis: Climate Change Impacts, Trends and Vulnerabilities of Children in Sub Saharan Africa", unicef, 15 September 2020.

^{iv} World Bank Group, "Groundswell Part 2: Acting on Internal Climate Migration", 2021 <https://openknowledge.worldbank.org/handle/10986/36248>

^v "Climate Change, Land, Water, and Food Security: Perspectives from Sub-Saharan Africa", Samuel Appiah Ofori, Samuel Jerry Cobbina, and Samuel Obiri, published in Frontiers in Sustainable Food Systems, 01 July 2021 , <https://doi.org/10.3389/fsufs.2021.680924>