IPCC's Special Report on

Global Warming of 1.5°C

Assessment and Recommendations

Centre for Science and Environment's (CSE)

Key takeaways

- Human activities have caused approximately 1.0°C of global warming above pre-industrial levels. At this level of warming, intensity and frequency of weather extremes has already increased.
- The impacts at 1.5°C of warming on people and ecosystems is much higher than anticipated in the previous scientific reports.
- The impacts at 2°C will be far higher than 1.5°C and will be catastrophic for the poor and the developing countries.
- The goal of the Paris Agreement to limit warming to 2°C must be revised. For a safer world, the target must now be firmly put at 1.5°C.
- To remain within 1.5°C warming, the world will have to reduce CO_2 emissions by 45 per cent by 2030 from 2010 levels and reach net-zero emissions by 2050.
- Current efforts to fight climate change is meager and weak. The pledges made by the countries in the Paris Agreement will take us to 1.5°C between 2032-2050. Time to act is now.
- Even at 1.2°C warming, which is a little higher than the global annual average, India is severely affected by climate impacts. The impacts will increase significantly at 1.5°C and would be catastrophic for farmers and coastal communities at 2°C.
- The United States is the biggest obstacle to forming a global coalition to fight climate change. The US has not endorsed the IPCC 1.5°C report and has announced that it would exit from the Paris Agreement soon. Also, it is promoting large-scale use of fossil fuels.
- In the wake of utmost urgency to address climate change, the world needs a 'Plan B' to fight climate change as the 'Plan A', which is the Paris Agreement, will fail to contain temperatures within safer limits.

The impacts at 1.5°C are clear and dangerous

The IPCC's Special Report on Global Warming of 1.5°C clearly establishes that the world has already warmed by 1.0°C since pre-industrial levels. Some regions have warmed even more. **India, for instance, has warmed by about 1.2°C.**[1] The impact of this warming is already visible and is being experienced across the world. This year alone, various parts of the world was battered by extreme weather events in some form or the other — be it heat waves or drought in Europe and China, forest fires in the US, dust storms and unprecedented rainfall in parts of India, including historically high rainfall in Kerala and high precipitation in Japan and other island nations. With a further 0.5°C warming, the effects would be far greater and more pronounced than what science had already envisaged. The IPCC's 1.5°C Report gives out the following prognosis:

- The current 1°C rise in temperature has already created havoc; an additional 0.5°C rise would result in higher sea-level rise, higher temperatures, and increase in frequency and intensity of precipitation, droughts and hot days etc.
- The report is virtually certain that sea level will continue to rise in both 1.5°C and 2°C warmer worlds, well beyond the end of the current century.
- At 1.5°C, the world would reach some critical thresholds beyond which natural ecosystems would fundamentally change and, in some cases, would take millennia to recover.
    - Ocean acidification and warming is on the rise, with pernicious effects on survival, growth and development of marine life.
    - Coral reefs are already suffering, with 75 per cent of them affected by bleaching and death. A 1.5°C rise in global temperature would wreak disaster on coral and marine life, causing a 70-90 per cent coral loss.
    - The thresholds for irreversible, multi-millennial loss of ice sheets in Greenland and the west Antarctic may also be breached at 1.5°C.
- Rise in temperature would be greater in some regions. In the Arctic, for example it can be two to four times larger than the global average warming. As a result, 100 million people are projected to go into poverty through impacts on agriculture, food prices, food insecurity and hunger, income losses, lost livelihood opportunities, adverse health impacts and population displacements.
- The Report establishes that 90 per cent of disaster-related displacement in the past decade can be attributed to climate change and weather events and it is projected to increase in the 21st century with greater warming.

The impacts at 2°C will be catastrophic

The upper temperature goal of 2.0°C as set out in the Paris Agreement would result in catastrophic impacts. The report says that the impacts resulting from a 2°C warmer planet exceed what was anticipated in the IPCC's Fifth Assessment Report (AR5). Also, the impacts increases significantly in a 2.0°C warmer world compared to 1.5°C warming. Of all the regions, coastal and agricultural economies of developing countries, including India, would be worst affected at 2.0°C. In fact, 2.0°C would put a question mark on the survival of many communities in the developing world.

The ecological impacts of a 2°C warmer planet are calamitous in comparison to a 1.5°C warmer planet. This difference in temperature would lead to the following impacts, in some cases, irreversible:

a. Sea level rise will be around 0.1 m greater in a 2°C world compared to 1.5°C by 2100. This would effectively mean that many coastal cities and islands will inevitably be inundated by the end of the century. The lives of 10 million more people will be disrupted due to sea level rise in a 2°C world.
b. Coral reefs face complete extinction at 2°C.
c. 2 million km^2 of permafrost area will melt over centuries risking runaway climate change due to large-scale methane emissions.
d. Climate-induced extinction rates for plants, vertebrates and insects increases by 50 per cent, especially in tropical areas.
e. Risks from land-based heat waves will increase and at a faster rate, especially in Central and Eastern North America, Central and Southern Europe, the Mediterranean, Western and Central Asia, and Southern Africa.

1 CSE "Temperature Spiral", available at http://indiaenvironmentportal.org.in/media/iep/infographics/climate spiral annual/index.html

f. Extreme hot days would increase to 4°C in mid-latitudes; precipitation associated with tropical cyclones would be heavier.
g. At least one sea ice-free Arctic summer per decade (as opposed to one per century).

The socio-economic difference in impacts between a 2°C and a 1.5°C warmer world are tremendous.
a) A 2°C warmer world would lead to major losses to the global economy and increased susceptibility to poverty. It will lead to decline of agricultural yields and food systems for hundreds of millions of people by 2050.
b) Global water stress will increase by 50 per cent in a 2°C warmer world compared to 1.5°C.
c) The risk of vector-borne diseases such as malaria will increase.
d) Most adaptation needs will also be lower for global warming of 1.5°C compared to 2°C.

All the above will cause devastation to already disadvantaged and vulnerable populations, primarily indigenous people in the Arctic, agricultural and coastal livelihoods, and small-island developing states.

This is not to suggest that the world is safe at 1.5°C. A 1.5°C warmer world would still have much higher impacts compared to 1.0°C warming that we are experiencing today.

Climate change impacts in India will only get worse

Though the Summary for Policy Makers (SPM) has not specifically mentioned impacts on India, it clearly states that agricultural economies, which includes India, would suffer pronounced impacts of global warming in the form of floods, droughts, water scarcity and decrease in food production, exposing a greater proportion of an already vulnerable population to poverty, food and livelihood insecurity in the near future.

- Research shows that India is already one of the most vulnerable countries to climate change. Research done by CSE estimates that between 1901 and 2017, India has warmed by almost 1.2°C[2] — 0.2°C more than the global average temperature.
- Consequently, India is losing about 1.5 per cent of its GDP.[3]
- The risk of exacerbation of extreme poverty in India is significant under a 1.5°C warming scenario and is worse under current trends, as it is expected to drive 42 million Indians into poverty by 2030[4].

n The future of India will be incredibly grim in the face of increased temperatures and extreme events such as floods, water scarcity and drought.[5]

Current political will to fight climate change is meager and weak -- major emission cuts required before 2030 to limit warming to 1.5°C

The current level of climate ambition, as set out under the Paris Agreement, will lead to disastrous effects on the planet as it is not in line with limiting warming to even 2.0°C. With inadequate climate efforts, global warming is likely to reach 1.5°C between 2030 and 2050. If global emissions continue as per the commitments made under Paris Agreement, the carbon budget (the amount of CO_2 that the world can emit) for 1.5°C warming will be exhausted by 2030. In order to limit warming at 1.5°C, maximum efforts need to be done by 2030. That is, the world will have to reduce CO_2 emissions by 45 per cent by 2030 from 2010 levels and reach net-zero emissions by 2050.

- The world has three options: (a) Limit warming to 1.5°C; (b) Allow temperature to overshoot 1.5°C and then return to 1.5°C; and (c). Limit warming to 2°C. The impacts will be higher in the overshoot scenario compared to limiting warming to 1.5°C.
- The report outlines two types of budgets: the threshold peak budget (the total CO_2 emissions until the 1.5°C or 2°C limit is reached) and the threshold return budget (the total CO_2 emissions until the temperature returns to 1.5°C or 2°C after an overshoot).

2 CSE "Temperature Spiral", available at http://indiaenvironmentportal.org.in/media/iep/infographics/climate spiral annual/index.html

3 Interview with CRIDA, Hyderabad. Available at : https://www.downtoearth.org.in/news/climate-change-causes-about-1-5-per-cent-loss-in-india-s-gdp-57883

4 World Bank. 2018. "South Asia's Hotspots - The Impact of Temperature and Precipitation Changes on Living Standards". Available at: https://openknowledge.worldbank.org/bitstream/handle/10986/28723/9781464811555.pdf?sequence=5&isAllowed=y

5 Government of India - Ministry of Finance. 2018. "Climate, Climate Change, and Agriculture". Economic survey: Volume 1. Available at: http://mofapp.nic.in:8080/economicsurvey/pdf/082-101_Chapter_06_ENGLISH_Vol_01 _2017-18.pdf

- There is considerable uncertainty regarding carbon budget estimations, which is why the world cannot become complacent in its action towards climate change.
- To remain within 1.5°C warming, the world will have to reduce CO_2 emissions by 45 per cent by 2030 from 2010 levels and reach net-zero emissions by 2050.
- Pursuing the current Nationally Determined Contribution (NDC) targets under the Paris Agreement would mean the exhaustion of the 1.5°C carbon budget by 2030.
- The report suggests that the amount of carbon budget left to reach the 1.5°C limit is marginally more than what was anticipated under AR5.[6] But even this marginally higher carbon budget is likely to get exhausted in 2030s.
- Weak mitigation actions in near-term will lead to higher impacts and greater long term mitigation and adaptation challenges.
- It is not recommended for countries to pursue an overshoot pathway and instead focus on pathways that are consistent with deeper GHG emissions reductions until 2030.
- There are huge co-benefits to the economy of limiting warming to 1.5°C, which includes keeping millions of people out of poverty.
- The Report also illustrates the insufficiencies in adaptation finance and the need for more investment towards it.

The US is the biggest problem in the room

It is clear and evident that US poses the biggest obstacle in putting together a global coalition to fight climate change and limit warming to 1.5°C. By refusing to endorse the findings of the IPCC's 1.5°C Report, it has given a clear signal that it would continue with its climate regressive agenda, which includes obstructing the work of the UNFCCC and promoting fossil fuels like coal and gas. It is high time that the world unites against the obstructionist approach of the US.

- At the UNFCCC, first in the Kyoto Protocol and then in the Paris Agreement, the world has witnessed the US watering down ambition and equity and then quitting both the Agreements in support of its fossil fuel interests.
- Despite being the biggest historical contributor of greenhouse gases emissions, the US submitted one of the weakest and most unambitious climate action plans or NDCs under the Paris Agreement. Under Trump administration, it has reneged on its weak climate commitments and domestically rolled back the regulations and policies in pursuit of its pro-fossil fuel agenda.
- It has also pushed its fossil fuel agenda at important global forums including in G-20 and G-7 meetings and at the Bonn climate summit.[7] At climate negotiations, it has hampered progress on meaningful outcomes.
- The US' bad faith extends to the 1.5°C Report.[8] Through its comments on the draft Summary for Policy Makers (leaked to the media in the first week of October), the US has tried to question science and the link between poverty and climate change. It has pushed back on any suggestion on cutting down of coal, oil and gas consumption in line with a 1.5°C-compatible global economy. It has pushed to inflate the cost of taking climate action while obscuring the cost of inaction.
- To meet the 1.5°C target, the world can no longer afford a weak and unambitious climate goal to suit the interests of the Trump administration. It is high time that the world unites against the obstructionist approach of the US.

6 What was 420 $GtCO_2$ for a 66% likelihood of keeping warming under 1.5C and 580 $GtCO_2$ for 50% likelihood under AR5, is now 570 $GtCO_2$ for a 66% likelihood and 750 $GtCO_2$ for a 50% likelihood in the Special Report

7 Friedman, L. (2017), Trump Team to Promote Fossil Fuels and Nuclear Power at Bonn Climate Talks. Accessed on October 6, 2018 at https://www.nytimes.com/2017/11/02/climate/trump-coal-cop23-bonn.html .

8 Rattani, V. (2018), 'Climate wrecker' US pushes its regressive agenda at IPCC talks. Accessed on October 6, 2018 at https://www.downtoearth.org.in/news/-climate-wrecker-us-pushes-its-regressive-agenda-at-ipcc-talks-61792 .

The world needs a Plan B to keep warming within 1.5°C

The IPCC's 1.5°C Report has clearly established that the efforts under the Paris Agreement are not sufficient to contain global temperatures to even 2.0°C. As this plan is failing, the world needs to quickly devise a Plan B.

CSE has the following recommendations:

- **Keeping global warming within 1.5°C is very difficult. Still, the world must set its goal to limit warming to 1.5°C and not 2.0°C:** The window to remain within 1.5°C is very narrow, but it is scientifically and technologically feasible. It requires rapid de-carbonisation, upscaling of low carbon technologies, enhancement of 'sinks' all over the world, and reduction in consumption. Though this is very difficult in the current global economic system in which fossil fuels are the drivers of growth, but it does offer a slim chance to save humanity from the worst impacts of climate change. There will be an inclination among countries to reject the 1.5°C target as impractical and instead, keep the focus of 2.0°C. But this would be disastrous for the poor and for developing nations. If the world insists on sticking to the 2.0°C target, in all probability it will overshoot it. However, if the world agrees to keep warming within 1.5°C, it can contain it well within 2.0°C.

- **A UNFCCC-plus approach is needed:** Climate efforts cannot be restrictive to the UNFCCC and the Paris Agreement. The world needs to think and devise more forums and venues to address climate change.

- **Equity is essential and must be re-visited:** The Summary for Policy Makers point out that "social justice and equity are core aspects of climate-resilient development pathways that aim to limit global warming to 1.5°C". The world, however, requires a new formulation of equity in which every country must act now and actively raise its level of ambition. Developed countries must take the lead by rapidly de-carbonising their economies as well as reducing their consumption. Developing countries will have to pursue low-carbon pathways more vigorously and limit their addition of fossil fuel assets.

The fact is that the carbon budget is now inconsequential for 1.5°C. By 2030, emissions will have to be down by about 50 per cent from the 2010 levels and become net-zero by 2050. Dividing the carbon budget among countries is like fighting over the last scraps. Instead of fighting over the carbon budget, the world now needs to discuss economy-wide transformation in every country and how that can be supported and achieved — the world needs to reformulate equity in this context.

- **Enhancing sinks in natural ecosystems is the key to limiting warming to 1.5°C:** All pathways to reduce emissions, to keep the warming within 1.5°C, require Carbon Dioxide Removal (CDR) in the Agriculture, Forestry and Other Land Use (AFOLU) sector in varying degrees. Sequestering CO_2 in AFOLU sector will require incentivising billions of farmers and forest-dwellers to pursue sustainable practices that enhance carbon sinks. The world must come together to devise a mechanism to do this.

- **Action on all fossil fuels is a must:** The IPCC report emphasises the need to reduce coal consumption rapidly, though it allows for the use of gas with carbon capture and storage. CSE disagrees with this formulation. The world needs to act on all fossil fuels simultaneously.

- **Ultimately, rapid de-carbonisation and reducing consumption levels is the key:** The 1.5°C report states that the final energy demand in 2100 will be 20-60 per cent higher relative to the 2014 levels across available 1.5°C scenarios. Addressing this in a sustainable manner implies decarbonising existing consumption, as well as drastically reducing consumption going forward, especially in the developed world.[9] In the developing world, the focus must be more on rapid adoption of low carbon growth. A fossil fuel-free energy system and investments in energy efficiency will help grow the economy in most scenarios. Developing countries must seize this opportunity.

9 Bhushan, C. (2018), A Commentary on Consumption Rich Indians versus Rich (and Poor) Americans. Accessed at https://www.cseindia.org/a-commentary-on-consumption-rich-indians-versus-rich-and-poor-americans-9019