CLIMATE REPORT HELP SHEET

Intergovernmental Panel on Climate Change (IPCC) Special Report: **Global Warming of 1.5 ºC (October 2018)**

• Produced in response to 2015 Paris Climate Change Convention. It looks at the effects of 1.5°C of human-induced warming compared to 2°C (warming: temperatures greater than the global annual average)

• Anthropogenic change has caused an increase of 1.0°C since pre-industrial levels, this is likely to reach 1.5°C between 2030-2052 at the current rate (0.2°C per decade)

• Reaching and sustaining net zero global human-induced CO2 emissions would halt anthropogenic warming on multi-decadal timescales

• Warming is experienced in many land and ocean regions and seasons, it is two to three times higher in the Arctic. There will be an increase in heavy precipitation and drought in several regions.

• Many land and ocean ecosystems and services they provide have already changed, impacts may be long lasting or irreversible

• By 2100, global mean sea level rise will be 0.1 metre lower with 1.5°C warming versus 2°C. A reduction of 0.1 m in global sea level rise implies that up to 10 million fewer people will be exposed to risks, based on population in 2010 and assuming no adaptation. Even at 1.5°C sea level will rise well beyond 2100 and melting polar ice regions will trigger further rise.

• Slower rate of sea level rise allows for adaptation in human and ecological systems e.g. in vulnerable island communities who face increased saltwater intrusion, flooding and damage to infrastructure

• Impacts on biodiversity and ecosystems, including species loss and extinction, are projected to be lower at 1.5°C of global warming compared to 2°C

• Of 105,000 species studied, 6% of insects, 8% of plants and 4% of vertebrates are projected to lose over half of their climatic geographic range for warming of 1.5°C, compared with 18% of insects, 16% of plants and 8% of vertebrates for 2°C

• Forest fires and spread of invasive species is lower at 1.5°C compared to 2°C of global warming

• Limiting rise to 1.5°C will reduce increases in ocean temperature and acidity, and decreases in ocean oxygen levels i.e. reducing risks to marine biodiversity, fisheries, ecosystems, and services to humans

• One global fishery model projected a decrease in global annual catch of about 1.5 million tonnes for 1.5°C of global warming compared to a loss of more than 3 million

tonnes for 2°C of global warming

• Ice-free Arctic sea in summer is lower at 1.5°C, one sea ice-free Arctic summer is projected per century versus at least one per decade with 2°C

• Coral reefs are projected to decline by a further 70–90% at 1.5°C with larger losses (>99%) at 2ºC

• Climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth are projected to increase with global warming of 1.5°C and increase further with 2°C

• Populations at disproportionately higher risk include disadvantaged and vulnerable populations, indigenous peoples, and local communities dependent on agricultural or coastal livelihoods.

• Regions at disproportionately higher risk include Arctic ecosystems, dryland regions, small island developing states, and Least Developed Countries.

• Poverty and disadvantage will increase in some populations, limiting warming reduces the number of people exposed to risks and susceptible to poverty by up to several hundred million by 2050.

• Risks to human health will increase e.g. vector-borne diseases such as malaria and dengue fever will increase with warming from 1.5°C to 2°C, including potential shifts in their geographic range

• Reductions in projected food availability are larger at 2°C with reductions in yields of maize, rice, wheat, and other cereal crops. Livestock will be affected.

• Limiting warming to 1.5°C may reduce population exposure to water stress by up to 50%

• Tropics and Southern Hemisphere subtropics will experience the largest impacts on economic growth

• Need to lower energy and resource intensity, increase rate of decarbonisation and carbon dioxide removal, and reduce emissions of methane and black carbon (35% or more by 2050 relative to 2010)

• Need to stay within total carbon budget, the budget reduces with time as increase in carbon dioxide emissions and future carbon release from permafrost which set a feedback loop

• We require rapid and far-reaching transitions in energy, land, urban and infrastructure (transport and buildings), and industrial systems

REFERENCES

SUMMARY FOR POLICY MAKERS

IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission

pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, Maycock, M. Tignor, and T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp.

FRAMING AND CONTEXT (CHAPTER 1)
Allen, M.R., O.P. Dube, W. Solecki, F. Aragón-Durand, W. Cramer, S. Humphreys, M. Kainuma, J. Kala, N. Mahowald, Y. Mulugetta, R. Perez, M. Wairiu, and K. Zickfeld, 2018: Framing and Context. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press.

MITIGATION PATHWAYS COMPATIBLE WITH 1.5°C IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT (CHAPTER 2)
Rogelj, J., D. Shindell, K. Jiang, S. Fifita, P. Forster, V. Ginzburg, C. Handa, H. Kheshgi, S. Kobayashi, E. Kriegler, L. Mundaca, R. Séférian, and M.V. Vilariño, 2018: Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press.

IMPACTS OF 1.5ºC GLOBAL WARMING ON NATURAL AND HUMAN SYSTEMS (CHAPTER 3)
Hoegh-Guldberg, O., D. Jacob, M. Taylor, M. Bindi, S. Brown, I. Camilloni, A. Diedhiou, R. Djalante, K.L. Ebi, F. Engelbrecht, J. Guiot, Y. Hijioka, S. Mehrotra, A. Payne, S.I. Seneviratne, A. Thomas, R. Warren, and G. Zhou, 2018: Impacts of 1.5ºC Global Warming on Natural and Human Systems. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press.

STRENGTHENING AND IMPLEMENTING THE GLOBAL RESPONSE (CHAPTER 4)
de Coninck, H., A. Revi, M. Babiker, P. Bertoldi, M. Buckeridge, A. Cartwright, W. Dong, J. Ford, S. Fuss, J.-C. Hourcade, D. Ley, R. Mechler, P. Newman, A. Revokatova, S. Schultz, L. Steg, and T. Sugiyama, 2018: Strengthening and Implementing the Global Response. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T.Waterfield (eds.)]. In Press.

SUSTAINABLE DEVELOPMENT, POVERTY ERADICATION AND REDUCING INEQUALITIES (CHAPTER 5)
Roy, J., P. Tschakert, H. Waisman, S. Abdul Halim, P. Antwi-Agyei, P. Dasgupta, B. Hayward, M. Kanninen, D. Liverman, C. Okereke, P.F. Pinho, K. Riahi, and A.G. Suarez Rodriguez, 2018: Sustainable Development, Poverty Eradication and Reducing Inequalities. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global

response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press.

USEFUL RESOURCE - FAQ IPCC
https://www.ipcc.ch/site/assets/uploads/sites/2/2018/12/SR15_FAQ_Low_Res.pdf

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)
***Global Assessment Report:* Biodiversity and Ecosystem Services (May 2019)**
• Looks at the changes over the last five decades and scenarios for the future. Authored by 145 experts from over 50 countries over the past three years with inputs from another 310 contributing authors

• 1 million animal and plant species are threatened with extinction more than ever before in human history

• Since 1980 greenhouse gas emissions have doubled, raising average global temperatures by at least 0.7C

• Average abundance of native species in major terrestrial habitats has fallen by at least 20% (since 1900)

• More than 40% of amphibian species, 33% of reef-forming corals and more than a third of all marine mammals are threatened

• At least 680 vertebrate species had been driven to extinction since the 16th century

• Three-quarters of the land-based environment and about 66% of the marine environment have been significantly altered by human actions

• Five direct drivers in changes in nature include (in descending order): (1) changes in land and sea use; (2) direct exploitation of organisms; (3) climate change; (4) pollution and (5) invasive alien species

• More than a 1/3 of land surface and nearly 75% of freshwater are for crop or livestock production

• Value of agricultural crop production has increased by 300%, 60 billion tons of renewable and
nonrenewable resources are now extracted globally every year – having nearly doubled since 1980

• Land degradation has reduced productivity of 23% of land surface, crops are at risk from pollinator loss

• 100-300 million people are at risk of floods and hurricanes due to loss of coastal habitats and protection

• In 2015, 33% of marine fish stocks were being harvested at unsustainable levels

• Urban areas have more than doubled since 1992 and plastic pollution has increased tenfold since 1980

• 300-400 million tons of heavy metals, solvents, toxic sludge and other wastes from industrial facilities are dumped annually into the world's waters

• Fertilisers from animal agriculture entering coastal ecosystems have produced more than 400 ocean 'dead zones', totalling more than 245,000 km2 (591-595) – combined area greater than United Kingdom

• Loss of intact ecosystems has occurred in the tropics, home to the highest levels of biodiversity E.g. 100 million hectares of tropical forest were lost from 1980-2000, mainly from cattle ranching in Latin America (42 million hectares) and plantations in South-East Asia (7.5 million hectares, of which 80% is for palm oil)

• Since 1970 the global human population has more than doubled (from 3.7 to 7.6 billion), rising unevenly across countries and regions; and per capita gross domestic product is four times higher

• Global goals for conserving and sustainably using nature and achieving sustainability cannot be met by current trajectories, and goals for 2030 and beyond may only be achieved through transformative changes across economic, social, political and technological factors

• Evolution of global financial and economic systems to build a global sustainable economy, steering away from the current limited paradigm of economic growth is needed

REFERENCES

IPBES. 2019. IPBES. [Online]. [21 May 2019]. Available from: https://www.un.org/sustainabledevelopment/blog/2019/05/nature-decline-unprecedented-report/

UN. 2019. UN Sustainable Development. [Online]. [21 May 2019]. Available from: https://www.un.org/sustainabledevelopment/blog/2019/05/nature-decline-unprecedented-report/