Drought losses in China will soar with continuing global warming, study says

October 1 2018

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Economic losses caused by drought in China may double if the global

temperature rises by 1.5°C to 2.0°C above pre-industrial levels, with increasing drought intensity and areal coverage across China, a new economic assessment study by Chinese scientists found.

The study, based on 30 years' loss statistics of 31 provinces and cities from 1986, identify the intensity, area and duration of drought events in China, and assess the future socio-economic pathways and their related the adaptation capacity.

Recent years have seen significant increase in drought losses around the world. About 20 percent of China's direct economic losses by weather and climate disasters are caused by drought.

Drought-affected crop area averages 2,090,000 km^2 per year for the period from 1949-2017, equivalent to 1/6 of the total arable land. Annual direct economic losses reached more than seven billion US dollars during 1984 to 2017, according to 2015 price level.

In their study, scientists projected drought losses in China under a global temperature increase of 1.5°C and 2.0°C. Regional gross domestic product under various shared socioeconomic pathways showed different results, but all pointed to the same fact.

"Estimated loss in a sustainable development pathway at the 1.5°C warming level increases ten-fold in comparison to the reference period 1986-2005, and nearly three-fold, relative to the interval 2006-2015," said first author Prof. Su Buda, a researcher with the Xinjiang Institute of Ecology and Geography (XIEG) of the Chinese Academy of Sciences.

Annual average drought loss for the 2.0°C warming level in a growth-oriented development pathway is estimated to be approximately two times of that in the 1.5°C warming range, according to the study.

The Paris Agreement proposes to keep the global mean temperature increase to well below 2.0°C above pre-industrial levels, and to pursue efforts to limit the warming to 1.5°C, in order to reduce the risk and impacts of a warming climate.

"Keeping the global average temperature increase under or equal to 1.5°C above pre-industrial levels can reduce the annual drought losses by several tens of billions of USD," said by Prof. Jiang Tong, corresponding author of the study from National Climate Center of China Meteorological Administration.

China's national GDP drought-loss share has decreased from 0.23 percent in 1986-2005 to 0.16 percent in 2006-2015 due to the rapid increase of national GDP. However, the trend was projected to reverse in the future, with the loss share gradually increasing under a warming scenario, taking improved adaptation capacity into account, the study showed.

"More efforts on mitigation are needed, so that the 1.5°C warming limit is not exceeded," Dr. Su said.

The study was jointly completed by researchers from institutions including XIEG, National Climate Center of China, Meteorological Administration's Institute for Agricultural and Forest Environment of Polish Academy of Sciences, Nanjing University of Information Science & Technology, Huazhong University of Science & Technology, and Universitaet Tuebingen in Germany.

Results of the study were published in the *Proceedings of the National Academy of Sciences* (*PNAS*), titled "Drought losses in China might double between the 1.5°C and 2.0°C warming."

More information: Buda Su el al., Drought losses in China might

double between the 1.5 °C and 2.0 °C warming, *PNAS* (2018). www.pnas.org/cgi/doi/10.1073/pnas.1802129115

Provided by Chinese Academy of Sciences