Current pledges put over 600 million people at risk of higher water scarcity

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Our current pledges to reduce greenhouse gas emissions, which are projected to set the global mean temperature increase at around 3.5°C above pre-industrial levels, will expose 668 million people worldwide to new or aggravated water scarcity.

This is according to a new study published today, 13 September, in IOP Publishing's journal *Environmental Research Letters*, which has calculated that a further 11 per cent of the world's population, taken from the year 2000, will live in water-scarce river basins or, for those already living in water-scarce regions, find that the effects will be aggravated.

The results show that people in the Middle East, North Africa, Southern Europe and the Southwest of the USA will experience the most significant changes.

The results show that if the global mean temperature increases by 2°C – the internationally agreed target – then eight per cent of the world population (486 million people) will be exposed to new or aggravated water scarcity, specifically in the Near and Middle East.

Lead author of the research Dr Dieter Gerten, from the Potsdam Institute for Climate Impact Research, said: "Our global assessments suggest that many regions will have less water available per person.

"Even if the increase is restricted to 2°C above pre-industrial levels, many regions will have to adapt their water management and demand to a lower supply, especially since the population is expected to grow significantly in many of these regions."

"The unequal spatial pattern of exposure to climate change impacts sheds interesting light on the responsibility of high-emission countries and could have a bearing on both mitigation and adaption burden sharing."

According to Dr Gerten, the main driver of new or aggravated water scarcity is declining precipitation; however, increased temperatures will also lead to an increase in evapotranspiration of water and, thus, decrease the resources.

The anticipated increase in population will have even stronger effects on the ratio of water demand and water availability in some regions.

To assess the impacts of different mean global warming levels, the international group of researchers combined existing simulations from 19 climate change models with eight different global warming trajectories. The latter ranged from 1.5°C to 5°C increases above pre-industrial levels, resulting in a total of 152 climate change scenarios that were examined.

In addition to water shortages, the researchers assessed the impact that future climatic changes may have on global terrestrial ecosystems. They sought to discover what areas will be affected by strong ecosystem changes, and whether these areas are rich in biodiversity and/or contain unique species.

"At a global warming of 2°C, notable ecosystem restructuring is likely for regions such as the tundra and some semi-arid regions. At global warming levels beyond 3°C, the area affected by significant ecosystem transformation would significantly increase and encroach into biodiversity-rich regions," continued Dr Gerten.

"Beyond a mean global warming of 4°C, we show with high confidence that biodiversity hotspots such as parts of the Amazon will be affected."

More information: 'Asynchronous exposure to global warming: freshwater resources and terrestrial ecosystems' Dieter Gerten et al 2013 *Environ. Res. Lett.* 8 034032 iopscience.iop.org/1748-9326/8/3/034032/article

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