Tibetan Plateau water stores under threat: Study

The reservoirs of the Tibetan Plateau covers much of southern China and northern India. PHOTO ILLUSTRATION: UNSPLASH

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PARIS (AFP) - The Tibetan Plateau will experience significant water loss this century due to global warming, according to research published on Monday (Aug 15) that warns of severe supply stress in a climate change "hot spot".

The reservoirs of the Tibetan Plateau, which covers much of southern China and northern India, are fed by monsoons and currently supply most of the water demand for nearly two billion people.

But the plateau's complex terrain has made it difficult for scientists to predict how warming temperatures and altered weather patterns linked to climate change will affect the region's water stores.

Researchers based in China and the United States used satellite-based measurements to determine the net change in water and ice mass over the past two decades.

They added in direct measurements of glaciers, lakes and sub-surface water levels to estimate changes in the water mass, then used a machine learning technique to predict storage changes under scenarios such as higher air temperature and reduced cloud cover.

They found that due to an increasingly warm and wet climate, the Tibetan Plateau has lost just over 10 billion tonnes of water a year since 2002.

Writing in the journal Nature Climate Change, the team projected changes in water storage across the plateau under a middle-of-the-road emissions scenario, where levels of carbon pollution stay roughly at current levels before falling gradually after 2050.

They found two river basins were particularly vulnerable to water loss.

For the Amu Darya, central Asia's largest river, water loss could be equivalent to 119 per cent of the current demand.

Communities reliant on the Indus basement for water supply could see a loss equivalent to 79 per cent of current demand, the study showed.

The authors recommended that governments begin to explore alternative water supply options, including more groundwater extraction, to make up for the anticipated shortfall.

Dr Michael Mann, director of the Penn Centre for Science, Sustainability and the Media, said "substantial reductions in carbon emissions over the next decade" would limit global warming and the "predicted collapse of the Tibetan Plateau water towers".

"But even in a best-case scenario, further losses are likely unavoidable, which will require substantial adaptation to decreasing water resources in this vulnerable, highly populated region of the world. Just what that would look like is hard to say - we're in unchartered waters," Dr Mann, a study co-author, told AFP.

"Suffice it to say, some amount of suffering is locked in."

Discussion Questions

What are some other important water stores of water, especially those in a basin drainage system?

How does the change in the Tibetan water stores affect the water equation? How could its effect potentially be dangerous?