

New study raises the global human freshwater footprint

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Global freshwater footprint Credit: Fernando Jaramillo, Navarino Environmental Observatory

The new study shows that dams and irrigation considerably raise the global human consumption of freshwater by increasing evapotranspiration. This effect increases the loss of freshwater to the atmosphere and thereby reduces the water available for humans, societies and ecosystems on land.

"Small things that we do on the surface of the Earth can have large

global effects. Previously, the global effects of local human activities such as dams had been underestimated. This study shows that, so far, the effects are even greater than those from atmospheric climate change", says Fernando Jaramillo, postdoc at the Department of Physical Geography at Stockholm University.

The researchers have compiled and analysed data from 1901 to 2008 for climate, hydrology and water use in one hundred large hydrological basins spread over the world. Their results raise the previous estimate of the global human freshwater footprint by almost 20 percent. The increase in total freshwater loss from the landscape to the atmosphere from human activities is calculated to be around 4 370 km³ per year. This corresponds to two thirds of the annual flow of the Amazon River, the world's largest river by discharge.

"The human-caused increase in this loss is like a huge river of freshwater from the landscape to the atmosphere. We have changed so much of the [freshwater](#) system without knowing it. Our study shows that we have already passed a proposed planetary boundary for [freshwater consumption](#). This is serious, regardless of whether we have crossed a real boundary or if the boundary has been underestimated", says Gia Destouni, Professor at Stockholm University.

More information: Jaramillo F, Destouni G, Local flow regulation and irrigation raise global human water consumption and footprint, *Science*, 2015 www.sciencemag.org/lookup/doi/10.1126/science.aad1010

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