

Virtual water cannot remedy freshwater shortage

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The implementation of virtual water into trading deals has been suggested as a realistic solution to solving the global inequality of renewable freshwater, but new research suggests that it may not be as revolutionary as first thought.

In a study published today, Tuesday 7 June, in IOP Publishing's journal *Environmental Research Letters*, researchers have claimed that virtual water is unlikely to increase water use [equality](#), primarily because the existing amount of virtual water is not large enough to overcome the inequalities that exist.

Lead author David Seekell, of the University of Virginia, said, "Virtual water is unlikely to overcome these constraints because there just isn't enough to go around."

80 per cent of humanity currently lives in regions where [water security](#) is threatened, meaning that as the [global population](#) grows against a finite volume of freshwater, a more equal distribution of water use between countries will be needed.

Virtual water—the amount of water it takes to produce goods or a service—has been suggested as a possible solution to this growing problem by using virtual water values to inform international trade deals.

Most goods carry a virtual water value—for example, producing one kilogram of beef requires 15 thousand litres of water—which can act as

a significant tool for addressing a country's input and output of water.

For example, a trade deal could be struck where products with a high virtual water value, such as oranges, could be exported from countries where there is an efficient and abundant water supply, into a country where the requirement of water to grow that particular product is more of a burden.

This would allow the receiving country to save on water, relieving the pressure on their limited water resources, and allowing the water to be used elsewhere in its infrastructure.

This study, performed by researchers at the University of Virginia, assessed the [inequality](#) in water use between countries and examined how different uses, such as industrial, household, and for agricultural products consumed domestically, contributed to the overall inequality.

To do this, the authors compared United Nations statistics on both social and human development statuses with water usage statistics for a range of countries.

Their study concludes that virtual water transfers are not sufficient to equalise water use among nations because water used for agriculture consumed domestically dominates a nation's water needs and cannot be completely compensated by current volumes of virtual water transfers.

Seekell continued, "Even if it cannot completely equalise water use between countries, virtual water may stand to contribute to this effort if there is increased transfer from high water use to low water use countries, but the danger here is that these transfers effectively prop up populations above the carrying capacity of their natural resources and this could actually erode a population's long-term resilience to drought or other disasters.

"There are a myriad of political and economic barriers to trade, and because water is not usually a deciding factor in trade decisions, it is unlikely that global trade will ever be viewed as efficient from a [water use](#) point of view."

More information: Virtual water transfers unlikely to redress inequality in global water use, D A Seekell et al 2011 *Environ. Res. Lett.* 6 024017 [doi: 10.1088/1748-9326/6/2/024017](https://doi.org/10.1088/1748-9326/6/2/024017)

Abstract

The distribution of renewable freshwater resources between countries is highly unequal and 80% of humanity lives in regions where water security is threatened. The transfer of agricultural and industrial products to areas where water is limited through global trade may have potential for redressing water imbalances. These transfers represent 'virtual water' used in commodity production. We evaluated the current water-use inequality between countries and the potential of virtual water transfers to equalize water use among nations using multiple statistical measures of inequality. Overall, the actual use of renewable water resources is relatively equal even though the physical distribution of renewable water resources is highly unequal. Most inequality (76%) in water use is due to agricultural production and can be attributed to climate and arable land availability, not social development status. Virtual water use is highly unequal and is almost completely explained by social development status. Virtual water transfer is unlikely to increase water-use equality primarily because agricultural water use dominates national water needs and cannot be completely compensated by virtual water transfers.

Provided by Institute of Physics

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