Who is eating up the world's aquifers? Groundwater depletion embedded in international food trade.

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Recent hydrological modelling and Earth observations have located and quantified alarming rates of groundwater depletion over the world. This is primarily due to water withdrawals for irrigation, but the connections with their main driver, global food consumption, have not yet been explored. Here we show that approximately eleven percent of non-renewable groundwater use for irrigation is embedded in food trade, of which two thirds are exported by Pakistan, the United States and India alone. We provide the first quantification of depleting groundwater embedded in the world’ s food trade by combining unique global, crop-specific estimates of non-renewable groundwater abstraction with international food trade data. A vast majority of the world’ s population lives in countries sourcing nearly all their staple crop imports from partners who deplete groundwater to produce these crops, highlighting risks for global food and water security. Groups of countries are found particularly exposed to these risks as they both produce and import food irrigated from rapidly depleting aquifers, such as the USA, Mexico, Iran and China. These results can help improve the sustainability of global food production and groundwater resources management by identifying priority regions and agricultural products at risk as well as the end-consumers of these products.

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