



Virtual water trade flows and savings under climate change

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The international trade of food commodities links water and food systems, with important implications for both water and food security. The embodied water resources associated with food trade are referred to as ‘virtual water trade’. We present the first study of the impact of climate change on global virtual water trade flows and associated savings for the year 2030. In order to project virtual water trade and savings under climate change, it is essential to obtain projections of both bilateral crop trade and the virtual water content of crops in each country of production. We use the Global Trade Analysis Project model to estimate bilateral crop trade under changes in agricultural productivity for rice, soy, and wheat. We use the H08 global hydrologic model to determine the impact of climatic changes to crop evapotranspiration for rice, soy, and wheat in each country of production. Then, we combine projections of bilateral crop trade with estimates of virtual water content to obtain virtual water trade flows under climate change. We find that the total volume of virtual water trade is likely to go down under climate change, due to decreased crop trade from higher crop prices under scenarios of declining crop yields and due to decreased virtual water content under high agricultural productivity scenarios. However, the staple food trade is projected to save more water across most climate change scenarios, largely because the wheat trade re-organizes into a structure where large volumes of wheat are traded from relatively water-efficient exporters to less efficient importers.