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Food supply reliance on groundwater

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Water resources, essential to sustain human life, livelihoods and ecosystems, are under increasing pressure from population growth, socio-economic development and global climate change. As the largest freshwater resource on Earth, groundwater is key for human development and food security. Yet, excessive abstraction of groundwater for irrigation, driven by an increasing demand for food in recent decades, is leading to fast exhaustion of groundwater reserves in major agricultural areas of the world. Some of the highest depletion rates are observed in Pakistan, India, California Central Valley and the North China Plain aquifers. In addition, the growing economy and population of several countries, such as India and China, makes prospects of future available water and food worrisome. In this context, it is becoming particularly challenging to sustainably feed the world population, without exhausting our water resources.

Besides, food production and consumption across the globe have become increasingly interconnected, with many areas' agricultural production destined to remote consumers. In this globalisation era, trade is crucial to the world's food system. As a transfer of water-intensive goods, across regions with varying levels of water productivity, food trade can save significant volumes of water resources globally.

This situation makes it essential to address the issue of groundwater overuse for global food supply, accounting for international food trade. To do so, we quantify the current, global use of non-renewable groundwater for major crops, accounting for various water productivity and trade flows. This will highlight areas requiring quickest attention, exposing major exporters and importers of non-renewable groundwater, and thus help explore solutions to improve the sustainability of global food supply.