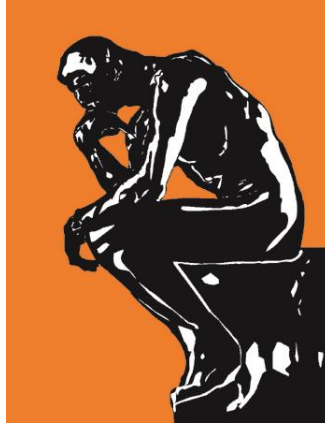


Virtual water and groundwater security

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Virtual water is defined on the website of the Department of Water Resources Management (Ministry of Natural Resources and Environment) as follows:

“Virtual water is the amount of “real” water needed to produce food and other goods. Therefore, “virtual water” is also known as “the amount of water embedded in the product.” The concept of virtual water was first introduced by Prof. John Anthony Allan, affiliated simultaneously with Imperial College London and the School of Oriental and African Studies, in 1993. The calculation method for the amount of “virtual water” by Prof. Allan provides researchers with a basic foundation to evaluate the relationship between water resources and production and consumption sectors.” [1]

In a recent study by Cai et al. [2] about water shortages in Beijing-Tianjin-Hebei urban areas, virtual water has become the central concept of the groundwater security strategy by suggesting increasing imports of water-intensive agricultural products instead of utilizing the depleted groundwater resources for production.

The article writes:

“The results showed that the groundwater overdraft of the BTH region is tradedriven, 51.1% of groundwater use was attributed to exports to other provinces within China, and the agricultural sector made the largest contribution. To mitigate the trade-driven groundwater scarcity of cities in the BTH region, adopting a virtual water strategy which means importing products with intensive groundwater embodied

rather than producing them with lower groundwater use efficiency may be a panacea. Our scenario analysis has showed the impact of relocating the original agricultural products of the BTH region to other provinces under the consideration of sustaining food security on groundwater use in different regions in China.”

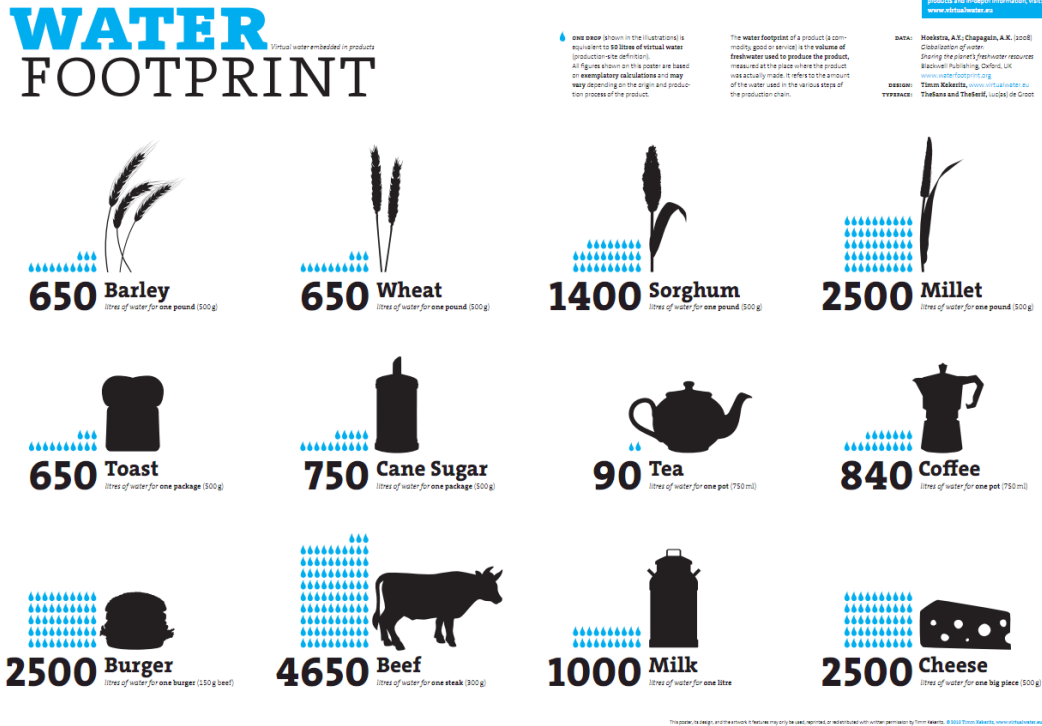


Illustration. Water footprint; <https://undisciplinedenvironments.org/2016/01/28/what-does-virtual-water-conceal/>

However, despite reviewing the content, we could not see how the authors discussed the households’ economic and financial issues from both production and consumption perspectives. This issue is of considerable significance as China’s other major agenda is poverty eradication. The financing of households and producers is central to a system of economic behavior, including agricultural production (i.e., direct consumption of water resources in the area and the influence of socio-cultural values and beliefs on conservation policies) [3]. The article also does not mention the concept of poverty.

Furthermore, although obtaining scientific information through experiments is essential, it is difficult to ignore the reality of consumer and business culture. This cultural system is strongly connected to the business system and the calculation of economic benefits based on

resources. Shifting the existing cultural system is not easy, even from initial perceptions (see [4]).

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