



Water footprint, extended water footprint and virtual water trade of the Cantabria region, Spain. A critical appraisal of results, uncertainties and methods.

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Water footprint assessments have gradually gained recognition as valuable tools for water management, to the point that they have been officially incorporated to water planning in countries such as Spain. Adequate combinations of the virtual water and water footprint concepts present the potential to link a broad range of sectors and issues, thus providing appropriate frameworks to support optimal water allocation and to inform production and trade decisions from the water perspective. We present the results of a regional study carried out in Cantabria, a 5300 km² autonomous region located in northern Spain. Our approach deals with the municipal, shire and regional scales, combining different methods to assess each of the main components of Cantabria's water footprint (agriculture, livestock, forestry, industry, mining, tourism, domestic use and reservoirs), as well as exploring the significance of different approaches, assumptions and databases in the overall outcomes. The classic water footprint method is coupled with extended water footprint analyses in order to provide an estimate of the social and economic value of each sector. Finally, virtual water imports and exports are computed between Cantabria and the rest of Spain and between Cantabria and the world. The outcome of our work (a) highlights the paramount importance of green water (mostly embedded in pastures) in the region's water footprint and virtual water exports; (b) establishes the role of the region as a net virtual water exporter; (c) shows the productivity of water (euro/m³ and jobs/m³) to be highest in tourism and lowest in agriculture and livestock; and (d) demonstrates that statistical databases are seldom compiled with water footprint studies in mind, which is likely to introduce uncertainties in the results. Although our work shows that there is still plenty of room for improvement in regional-scale water footprint assessments, we contend that the available information is sufficient to attain meaningful results and to underpin water management practices.