

# Referencias, Diferencias entre huella hídrica y huella de agua

Huella Hídrica de Productos,  
Servicios y Organizaciones

## CONTENIDO

<b>DIFERENCIAS Y COMPATIBILIDAD ENTRE LA HUELLA HÍDRICA Y LA HUELLA DE AGUA .....</b>	<b>2</b>
<b>ENTIDADES RELACIONADAS CON LA HUELLA HÍDRICA .....</b>	<b>3</b>
Comunidad de la Water Footprint Network.....	3
Otras entidades de interés .....	3
<b>REFERENCIAS BIBLIOGRÁFICAS.....</b>	<b>4</b>

## DIFERENCIAS Y COMPATIBILIDAD ENTRE LA HUELLA HÍDRICA Y LA HUELLA DE AGUA

La huella hídrica y la huella de agua son términos relacionados pero diferentes.

Se calculan a través de dos metodologías distintas. Para el cálculo y gestión de la huella hídrica se emplea la metodología de la **Water footprint Network**, en cambio, para el cálculo y la evaluación de la huella de agua se utiliza la norma **ISO 14046**.

La huella hídrica se centra en la cuantificación del **agua consumida**, mientras que la huella de Agua, de manera adicional, evalúa también los **impactos ambientales asociados**, bajo un enfoque de análisis del ciclo de vida.

Concretamente, la huella hídrica es un indicador del uso del agua dulce, que mide los volúmenes de agua consumidos por origen y los volúmenes de agua contaminados por tipo de contaminación, y se divide en tres componentes o tipos de consumo:

- **Huella hídrica azul o agua azul:** El agua superficial y subterránea evaporada, incorporada en el proceso o producto, retornada a otra cuenca o vertida al mar.
- **Huella hídrica verde o agua verde:** El agua de lluvia que se evapora y evapotranspira por las plantas y que por tanto no se convierte en escorrentía.
- **Huella hídrica gris o agua gris:** El agua necesaria para diluir la contaminación generada por una actividad.

Por su parte, la huella de agua se basa en la recopilación y evaluación de las entradas, salidas y los impactos ambientales potenciales relacionados con el agua asociados con una organización, producto o proceso

En ambos estudios se tienen en cuenta los **flujos directos e indirectos** de agua.

La huella hídrica se expresa en términos de **volumen de agua por unidad de tiempo**. Si se quiere referir a un producto, la huella hídrica se expresa en forma de **volumen de agua por unidad de producto**. Por el contrario, la unidad de medida de la huella de agua **varía en función de las categorías de impacto e indicadores seleccionados**, aunque también va referida siempre a la unidad funcional seleccionada.

## ENTIDADES RELACIONADAS CON LA HUELLA HÍDRICA

### Comunidad de la Water Footprint Network

Fundada como una red de múltiples partes interesadas sin fines de lucro, **Water Footprint Network** tiene como objetivo ayudar a los socios a iniciar actividades, compartir mejores prácticas y desarrollar herramientas y materiales que ayuden a alcanzar la misión establecida por la comunidad:

*“Utilizar el concepto de huella hídrica para promover la transición hacia un uso sostenible, justo y eficiente de los recursos de agua dulce en todo el mundo”.*

### Otras entidades de interés

**Red EsAgua:** Red pionera en España de entidades comprometidas con la reducción de su huella hídrica. Esta iniciativa surge de la necesidad de las organizaciones de disponer de información relativa al uso sostenible del agua dulce y del uso de indicadores de sostenibilidad como huella hídrica y huella de Agua. Sus principales actividades son:

- Promover el conocimiento del concepto de huella hídrica y concienciar sobre la importancia al tejido empresarial, las entidades públicas y a la sociedad en general.
- Fomentar la reducción del impacto y gestión de la huella hídrica y huella de agua de las entidades adheridas, facilitando el intercambio de experiencias y buenas prácticas en esta materia.
- Posicionar a las entidades españolas como referentes en huella hídrica y en el ámbito de la sostenibilidad en el uso de agua.

Promovida por la Water Footprint Network y DNV, la Red EsAgua cuenta con empresas españolas pioneras en el interés por la huella hídrica.

**AENOR:** Asociación Española de Normalización y Certificación (AENOR). En enero de 2017, comienza su naturaleza como empresa, separándose jurídicamente en dos partes independientes:

- La Asociación Española de Normalización (UNE), que es la entidad designada por España para realizar las actividades de normalización en el país (normas UNE) y también participa en la normalización a nivel internacional (normas EN e ISO).
- La nueva AENOR Internacional, S.A.U. encargada de realizar las actividades de evaluación de la conformidad (certificación) y otras actividades auxiliares.

Cabe resaltar que AENOR ha lanzado el nuevo Manual de Evaluación de la Huella Hídrica traducido al castellano y elaborado por Water Footprint Network, con el que se pretende mejorar la metodología de cálculo de la huella hídrica para servir mejor a los distintos objetivos que plantean los diferentes sectores de la sociedad, al mismo tiempo que se esfuerzan por alcanzar la coherencia, la consistencia y el rigor científico.

A su vez, la norma ISO 14046:2014 ha sido elaborada por el comité técnico AEN/CTN 150 *Gestión ambiental* cuya secretaría desempeña AENOR.

Por otro lado, AENOR como organismo de certificación, entre otras entidades, realiza verificaciones tanto de estudios de huella hídrica como de huella de agua.

## REFERENCIAS BIBLIOGRÁFICAS

Principalmente existen dos normas y metodologías de gran reconocimiento internacional para el cálculo de la huella hídrica y huella de agua:

- **Water Footprint Network:** En 2002, Arjen Hoekstra, desde el Instituto UNESCO-IHE para la Educación sobre el Agua, creó la huella hídrica como una métrica para medir la cantidad de agua consumida y contaminada para producir bienes y servicios a lo largo de toda su cadena de suministro. A raíz del creciente interés funda la plataforma de Water Footprint Network de colaboración entre empresas, organizaciones e individuos para resolver las crisis mundiales del agua promoviendo un uso justo e inteligente del agua. De esta iniciativa, surge *el Manual de evaluación de la Huella Hídrica*, elaborado por Arjen Y. Hoekstra, Ashok K. Chapagain, Maite M. Aldaya y Mesfin M. Mekonnen en el que se establece el estándar mundial en materia de huella hídrica.
- **UNE-ISO 14046:2014:** El nacimiento del concepto de huella hídrica, siguió desarrollándose, dando lugar a otras metodologías como la de la norma ISO 14046. En la norma se especifican los principios, los requisitos y las directrices relacionados con la evaluación de la huella de agua. ISO 14046, utiliza el término de huella de agua en su traducción al castellano, y se refiere a los impactos ambientales sobre el recurso agua a lo largo del ciclo de vida de productos.

A su vez, ambas normas están muy relacionadas con la metodología del análisis de ciclo de vida, estandarizada por las normas **UNE-EN ISO 14040** y **UNE-EN ISO 14044**. Estas normas establecen los requisitos, directrices, principios y marco de referencia de todo análisis de ciclo de vida.

Existen multitud de publicaciones relacionadas con la huella hídrica, a continuación, se citan algunas:

- Yi, J., Gerbens-Leenes, P.W., Guzmán-Luna, P. (2023) Water, land and carbon footprints of Chinese dairy in the past and future. *Sustainable Production and Consumption*, 38: 186-198
- Siyal, A.W., Gerbens-Leenes. W., Aldaya, M.M., Naz, R. (2023) The importance of irrigation supply chains within the water footprint: an example from the Pakistani part of the Indus basin. *Journal of integrative environmental sciences*, 20: 2208644
- Siyal, A.W., Gerbens-Leenes, P.W., Vaca-Jiménez, S.D. (2023) Freshwater competition among agricultural, industrial, and municipal sectors in a water-scarce country. Lessons of Pakistan's fifty-year development of freshwater consumption for other water-scarce countries. *Water Resources and Industry*, 29: 100206
- La Zhuo and Mesfin M. Mekonnen and Arjen Y. Hoekstra (2016) Consumptive water footprint and virtual water trade scenarios for China - With a focus on crop production, consumption and trade. *Environment International*, 94: 211-223
- La Zhuo and Mesfin M. Mekonnen and Arjen Y. Hoekstra (2016) Benchmark levels for the consumptive water footprint of crop production for different environmental conditions: A case study for winter wheat in China. *Hydrology and Earth System Sciences*, 20(11): 4547-4559

## REFERENCIAS Y DIFERENCIAS ENTRE HH Y HA

- La Zhuo and Arjen Y. Hoekstra (2017) The effect of different agricultural management practices on irrigation efficiency, water use efficiency and green and blue water footprint. *Frontiers of Agricultural Science and Engineering*, 4(2): 185-194
- La Zhuo and Mesfin M. Mekonnen and Arjen Y. Hoekstra (2016) The effect of inter-annual variability of consumption, production, trade and climate on crop-related green and blue water footprints and inter-regional virtual water trade: A study for China (1978-2008). *Water Research*, 94: 73-85
- La Zhuo and Mesfin M. Mekonnen and Arjen Y. Hoekstra and Yoshihide Wada (2016) Inter- and intra-annual variation of water footprint of crops and blue water scarcity in the Yellow River basin (1961-2009). *Advances in Water Resources*, 87: 29-41
- L. Zhuo and M. M. Mekonnen and A. Y. Hoekstra (2014) Sensitivity and uncertainty in crop water footprint accounting: A case study for the Yellow River basin. *Hydrology and Earth System Sciences*, 18(6): 2219-2234
- Yue Zhang and Kai Huang and Yajuan Yu and Beibei Yang (2017) Mapping of water footprint research: A bibliometric analysis during 2006–2015. *Journal of Cleaner Production*, 149: 70-79
- G. P. Zhang and A. Y. Hoekstra and R. E. Mathews (2013) Water Footprint Assessment (WFA) for better water governance and sustainable development. *Water Resources and Industry*, 1-2: 1-6
- G. P. Zhang and A. Y. Hoekstra and R. E. Mathews (2013) Water Footprint Assessment (WFA) for better water governance and sustainable development. *Water Resources and Industry*, 1-2: 1-6
- Z. Zeng and J. Liu and P. H. Koeneman and E. Zarate and A. Y. Hoekstra (2012) Assessing water footprint at river basin level: A case study for the Heihe River Basin in northwest China. *Hydrology and Earth System Sciences*, 16(8): 2771-2781
- Hui Xu and May Wu (2018) A first estimation of county-based greenwater availability and its implications for agriculture and bioenergy production in the United States. *Water (Switzerland)*, 10(2):
- Shilp Verma and Doeke A. Kampman and Pieter van der Zaag and Arjen Y. Hoekstra (2009) Going against the flow: A critical analysis of inter-state virtual water trade in the context of Indias National River Linking Program. *Physics and Chemistry of the Earth*, 34(4-5): 261-269
- D. Vanham and G. Bidoglio (2014) The water footprint of agricultural products in European river basins. *Environmental Research Letters*, 9(6)
- D. Vanham (2013) An assessment of the virtual water balance for agricultural products in EU river basins. *Water Resources and Industry*, 1-2: 49-59
- Davy Vanham and Giovanni Bidoglio (2013) A review on the indicator water footprint for the EU28. *Ecological Indicators*, 26: 61-75
- D. Vanham and M. M. Mekonnen and A. Y. Hoekstra (2013) The water footprint of the EU for different diets. *Ecological Indicators*, 32: 1-8
- John Stier (2011) A Practical Perspective on Water Accounting in the Beverage Sector.
- Elizabeth M. Shaw (2011) *Hydrology in practice*. 543
- Joep F. Schyns and Arjen Y. Hoekstra (2014) The added value of Water Footprint Assessment for national water policy: A case study for Morocco. *PLoS ONE*, 9(6):

## REFERENCIAS Y DIFERENCIAS ENTRE HH Y HA

- Joep F. Schyns and Arwa Hamaideh and Arjen Y. Hoekstra and Mesfin M. Mekonnen and Marlou Schyns (2015) Mitigating the risk of extreme water scarcity and dependency: The case of Jordan. *Water (Switzerland)*, 7(10): 5705-5730
- G. Salmoral (2010) The water footprint of olive oil in Spain.
- SABMiller (2009) Water footprinting identifying & addressing Water risks in the value chain.
- Richard R. Rushforth and Elizabeth A. Adams and Benjamin L. Ruddell (2013) Generalizing ecological, water and carbon footprint methods and their worldview assumptions using Embedded Resource Accounting. *Water Resources and Industry*, 1-2: 77-90
- L. Ruini and M. Marino and S. Pignatelli and F. Laio and L. Ridolfi (2013) Water footprint of a large-sized food company: The case of Barilla pasta production. *Water Resources and Industry*, 1-2: 7-24
- Mireia Romaguera and Arjen Y. Hoekstra and Zhongbo Su and Maarten S. Krol and Mhd Suhyb Salama (2010) Potential of using remote sensing techniques for global assessment of water footprint of crops. *Remote Sensing*, 2(4): 1177-1196
- M. Pahlow and J. Snowball and G. Fraser (2015) Water footprint assessment to inform water management and policy making in South Africa. *Water SA*, 41(3): 300-313
- M. Pahlow and P. R. van Oel and M. M. Mekonnen and A. Y. Hoekstra (2015) Increasing pressure on freshwater resources due to terrestrial feed ingredients for aquaculture production. *Science of the Total Environment*, 536: 847-857
- B. Orłowsky and A. Y. Hoekstra and L. Gudmundsson and Sonia I. Seneviratne (2014) Today's virtual water consumption and trade under future water scarcity. *Environmental Research Letters*, 9(7):
- Mesfin M. Mekonnen and Arjen Y. Hoekstra (2014) Water footprint benchmarks for crop production: A first global assessment. *Ecological Indicators*, 46: 214-223
- Mesfin M. Mekonnen and Arjen Y. Hoekstra (2018) Global Anthropogenic Phosphorus Loads to Freshwater and Associated Grey Water Footprints and Water Pollution Levels: A High-Resolution Global Study. *Water Resources Research*, 54(1): 345-358
- Mesfin M. Mekonnen and Arjen Y. Hoekstra (2016) Sustainability: Four billion people facing severe water scarcity. *Science Advances*, 2(2):
- Mesfin M. Mekonnen and Arjen Y. Hoekstra (2015) Global Gray Water Footprint and Water Pollution Levels Related to Anthropogenic Nitrogen Loads to Fresh Water. *Environmental Science and Technology*, 49(21): 12860-12868
- M. M. Mekonnen and A. Y. Hoekstra (2010) A global and high-resolution assessment of the green, blue and grey water footprint of wheat. *Hydrology and Earth System Sciences*, 14(7): 1259-1276
- Mesfin M. Mekonnen and Arjen Y. Hoekstra (2014) Water conservation through trade: The case of Kenya. *Water International*, 39(4): 451-468
- M. M. Mekonnen and A. Y. Hoekstra (2012) The blue water footprint of electricity from hydropower. *Hydrology and Earth System Sciences*, 16(1): 179-187
- Mesfin M. Mekonnen and Arjen Y. Hoekstra (2012) A Global Assessment of the Water Footprint of Farm Animal Products. *Ecosystems*, 15(3): 401-415

## REFERENCIAS Y DIFERENCIAS ENTRE HH Y HA

- M. M. Mekonnen and A. Y. Hoekstra (2011) The green, blue and grey water footprint of crops and derived crop products. *Hydrology and Earth System Sciences*, 15(5): 1577-1600
- Mesfin M. Mekonnen and Markus Pahlow and Maite M. Aldaya and Erika Zarate and Arjen Y. Hoekstra (2015) Sustainability, efficiency and equitability of water consumption and pollution in latin America and the Caribbean. *Sustainability (Switzerland)*, 7(2): 2086-2112
- Mesfin M. Mekonnen and P. W. Gerbens-Leenes and Arjen Y. Hoekstra (2015) The consumptive water footprint of electricity and heat: A global assessment. *Environmental Science: Water Research and Technology*, 1(3): 285-297
- M. M. Mekonnen and A. Y. Hoekstra and R. Becht (2012) Mitigating the Water Footprint of Export Cut Flowers from the Lake Naivasha Basin, Kenya. *Water Resources Management*, 26(13): 3725-3742
- Mesfin M. Mekonnen and P. W. Gerbens-Leenes and Arjen Y. Hoekstra (2016) Future electricity: The challenge of reducing both carbon and water footprint. *Science of the Total Environment*, 569-570: 1282-1288
- Mesfin M. Mekonnen and P. W. Gerbens-Leenes and Arjen Y. Hoekstra (2016) Future electricity: The challenge of reducing both carbon and water footprint. *Science of the Total Environment*, 569-570: 1282-1288
- J. M. (Jacqueline Myriam) McGlade and International Resource Panel Working Group on Water Efficiency. (2012) Measuring water use in a green economy. 87
- Alex Mayer and Stanley Mubako and Benjamin L. Ruddell (2016) Developing the greatest Blue Economy: Water productivity, fresh water depletion, and virtual water trade in the Great Lakes basin. *Earths Future*, 4(6): 282-297
- V. Mathioudakis and P. W. Gerbens-Leenes and T. H. Van der Meer and A. Y. Hoekstra (2017) The water footprint of second-generation bioenergy: A comparison of biomass feedstocks and conversion techniques. *Journal of Cleaner Production*, 148: 571-582
- Jing Ma and Arjen Y. Hoekstra and Hao Wang and Ashok K. Chapagain and Dangxian Wang (2006) Virtual versus real water transfers within China. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 361(1469): 835-842
- J Liu and H H G Savenije (2008) *Hydrology and Earth System Sciences* Food consumption patterns and their effect on water requirement in China. *Hydrol. Earth Syst. Sci*, 12: 887-898
- Junguo Liu and Dandan Zhao and P. W. Gerbens-Leenes and Dabo Guan (2015) Chinas rising hydropower demand challenges water sector. *Scientific Reports*,
- Cheng Liu and Carolien Kroeze and Arjen Y. Hoekstra and Winnie Gerbens-Leenes (2012) Past and future trends in grey water footprints of anthropogenic nitrogen and phosphorus inputs to major world rivers. *Ecological Indicators*, 18: 42-49
- Marissa H. Linneman and Arjen Y. Hoekstra and Wouter Berkhout (2015) Ranking water transparency of dutch stock-listed companies. *Sustainability (Switzerland)*, 7(4): 4341-4359
- Fatemeh Karandish and Arjen Y. Hoekstra (2017) Informing national food and water security policy through water footprint assessment: The Case of Iran. *Water (Switzerland)*, 9(11):
- JoanneZygmunt (2007) *Hidden Waters A Waterwise Briefing*.



- Donna Jefferies and Ivan Muñoz and Juliet Hodges and Vanessa J. King and Maite Aldaya and Ali Ertug Ercin and Llorenç Milà I Canals and Arjen Y. Hoekstra (2012) Water footprint and life cycle assessment as approaches to assess potential impacts of products on water consumption. Key learning points from pilot studies on tea and margarine. *Journal of Cleaner Production*, 33: 155-166
- Nicole Jackson and Megan Konar and Arjen Y. Hoekstra (2015) The water footprint of food aid. *Sustainability (Switzerland)*, 7(6): 6435-6456
- Ridha Ibidhi and Arjen Y. Hoekstra and P. Winnie Gerbens-Leenes and Hatem Chouchane (2017) Water, land and carbon footprints of sheep and chicken meat produced in Tunisia under different farming systems. *Ecological Indicators*, 77: 304-313
- Rick J. Hogeboom and Luuk Knook and Arjen Y. Hoekstra (2018) The blue water footprint of the worlds artificial reservoirs for hydroelectricity, irrigation, residential and industrial water supply, flood protection, fishing and recreation. *Advances in Water Resources*, 113: 285-294
- Rick J. Hogeboom and Arjen Y. Hoekstra (2017) Water and land footprints and economic productivity as factors in local crop choice: The case of silk in Malawi. *Water (Switzerland)*, 9(10):
- Arjen Y. Hoekstra and Mesfin M. Mekonnen (2016) Imported water risk: The case of the UK. *Environmental Research Letters*, 11(5):
- Arjen Y. Hoekstra and Joost Buurman and Kees C.H. Van Ginkel (2018) Urban water security: A review. *Environmental Research Letters*, 13(5):
- Arjen Y. Hoekstra and Ashok K. Chapagain and Pieter R. van Oel (2017) Advancing water footprint assessment research: Challenges in monitoring progress towards sustainable development goal 6. *Water (Switzerland)*, 9(6):
- Arjen Y. Hoekstra and Mesfin M. Mekonnen and Ashok K. Chapagain and Ruth E. Mathews and Brian D. Richter (2012) Global monthly water scarcity: Blue water footprints versus blue water availability. *PLoS ONE*, 7(2):
- Arjen Y. Hoekstra and Ashok K. Chapagain and Guoping Zhang (2016) Water footprints and sustainable water allocation. *Sustainability (Switzerland)*, 8(1):
- Arjen Y. Hoekstra and Ashok K. Chapagain (2007) The water footprints of Morocco and the Netherlands: Global water use as a result of domestic consumption of agricultural commodities. *Ecological Economics*, 64(1): 143-151
- Arjen Y. Hoekstra (2016) A critique on the water-scarcity weighted water footprint in LCA. *Ecological Indicators*, 66: 564-573
- Arjen Y. Hoekstra (2014) Water for animal products: A blind spot in water policy. *Environmental Research Letters*, 9(9):
- Arjen Y. Hoekstra (2014) Sustainable, efficient, and equitable water use: the three pillars under wise freshwater allocation. *Wiley Interdisciplinary Reviews: Water*, 1(1): 31-40
- Y. Hoekstra (2012) Computer-supported games and role plays in teaching water management. *Hydrology and Earth System Sciences*, 16(8): 2985-2994
- Arjen Y. Hoekstra (2011) The global dimension of water governance: Why the river basin approach is no longer sufficient and why cooperative action at global level is needed. *Water (Switzerland)*, 3(1): 21-46
- Arjen Y Hoekstra (2010) The relation between international trade and freshwater scarcity.

- Y. Hoekstra and P. Q. Hung (2005) Globalisation of water resources: International virtual water flows in relation to crop trade. *Global Environmental Change*, 15(1): 45-56
- Y. Hoekstra and A. K. Chapagain (2007) Water footprints of nations: Water use by people as a function of their consumption pattern. *Water Resources Management*, 21(1): 35-48
- A Y Hoekstra and A K Chapagain (2004) Glossary on Water Footprints and Virtual Water.
- Arjen Y Hoekstra and Ashok K Chapagain and Maite M Aldaya and Mesfin M Mekonnen (2009) *Water Footprint Manual*.
- Arjen Y Hoekstra and Ashok K Chapagain and Pieter R van Oel (2018) IMPACT FACTOR 1.832 Message from the Guest Editors Special Issue Progress in Water Footprint Assessment.
- Elizabeth. Hastings and Guy C. (Guy Charles) Pegram and South Africa. Water Research Commission. (2012) Literature review for the applicability of water footprints in South Africa : report to the Water Research Commission. 61
- Anne Gobin and Kurt Christian Kersebaum and Josef Eitzinger and Miroslav Trnka and Petr Hlavinka and Jozef Takáč and Joop Kroes and Domenico Ventrella and Anna Dalla Marta and Johannes Deelstra and Branislava Lalić and Pavol Nejedlik and Simone Orlandini and Pirjo Peltonen-Sainio and Ari Rajala and Triin Saue and Levent Şaylan and Ruzica Stričević and Višnja Vučetić and Christos Zoumides (2017) Variability in the water footprint of arable crop production across European regions. *Water (Switzerland)*, 9(2):
- Julian Fulton and Heather Cooley and Peter H Gleick and Nancy Ross and Paula Luu (2012) *Californias Water Footprint*.
- I.C.M. Francke and J. F.W. Castro (2013) Carbon and water footprint analysis of a soap bar produced in Brazil by Natura Cosmetics. *Water Resources and Industry*, 1-2: 37-48
- Kuishuang Feng and Klaus Hubacek and Jan Minx and Yim Ling Siu and Ashok Chapagain and Yang Yu and Dabo Guan and John Barrett (2011) Spatially explicit analysis of water footprints in the UK. *Water (Switzerland)*, 3(1): 47-63
- Kai Fang and Reinout Heijungs and Geert R. De Snoo (2014) Theoretical exploration for the combination of the ecological, energy, carbon, and water footprints: Overview of a footprint family. *Ecological Indicators*, 36: 508-518
- A.Ertug Ercin and Arjen Y. Hoekstra (2014) Water footprint scenarios for 2050: A global analysis. *Environment International*, 64: 71-82
- Ertug Ercin and Arjen Y. Hoekstra (2016) European water footprint scenarios for 2050. *Water (Switzerland)*, 8(6):
- Ertug Ercin and Maite Martinez Aldaya and Arjen Y. Hoekstra (2011) Corporate Water Footprint Accounting and Impact Assessment: The Case of the Water Footprint of a Sugar-Containing Carbonated Beverage. *Water Resources Management*, 25(2): 721-741
- David Ellison and Cindy E. Morris and Bruno Locatelli and Douglas Sheil and Jane Cohen and Daniel Murdiyarso and Victoria Gutierrez and Meine van Noordwijk and Irena F. Creed and Jan Pokorny and David Gaveau and Dominick V. Spracklen and Aida Bargués Tobella and Ulrik Ilstedt and Adriaan J. Teuling and Solomon Gebreyohannis Gebrehiwot and David C. Sands and Bart Muys and Bruno Verbist and Elaine Springgay and Yulia Sugandi and Caroline A. Sullivan (2017) Trees, forests and water: Cool insights for a hot world. *Global Environmental Change*, 43: 51-61

## REFERENCIAS Y DIFERENCIAS ENTRE HH Y HA

- Aurélien Dumont and Gloria Salmoral and M. Ramón Llamas (2013) The water footprint of a river basin with a special focus on groundwater: The case of Guadalquivir basin (Spain). *Water Resources and Industry*, 1-2: 60-76
- A K Chapagain and A Y Hoekstra (2004) Water footprints of nations *Value of Water*.
- Ashok K. Chapagain and Arjen Y. Hoekstra (2008) The global component of freshwater demand and supply: An assessment of virtual water flows between nations as a result of trade in agricultural and industrial products. *Water International*, 33(1): 19-32
- K. Chapagain and S. Orr (2009) An improved water footprint methodology linking global consumption to local water resources: A case of Spanish tomatoes. *Journal of Environmental Management*, 90(2): 1219-1228
- A K Chapagain and A Y Hoekstra and H H G Savenije and R Gautam (2006) The water footprint of cotton consumption: An assessment of the impact of worldwide consumption of cotton products on the water resources in the cotton producing countries.
- A K Chapagain and A Y Hoekstra and H H G Savenije (2006) Hydrology and Earth System Sciences Water saving through international trade of agricultural products. *Hydrol. Earth Syst. Sci*, 10: 455-468
- Raul Munoz Castillo and Kuishuang Feng and Klaus Hubacek and Laixiang Sun and Joaquim Guilhoto and Fernando Miralles-Wilhelm (2017) Uncovering the green, blue, and greywater footprint and virtual water of biofuel production in Brazil: A nexus perspective. *Sustainability (Switzerland)*, 9(11):
- F Bultink and A Y Hoekstra and M J Booij (2010) Hydrology and Earth System Sciences The water footprint of Indonesian provinces related to the consumption of crop products. *Hydrol. Earth Syst. Sci*, 14: 119-128
- Holger Brueck and Joachim Lammel (2016) Impact of fertilizer N application on the grey water footprint of winter wheat in a NW-European temperate climate. *Water (Switzerland)*, 8(8):
- Anne Marie Boulay and Arjen Y. Hoekstra and Samuel Vionnet (2013) Complementarities of water-focused life cycle assessment and water footprint assessment. *Environmental Science and Technology*, 47(21): 11926-11927
- Caroline K. Bosire and Mats Lannerstad and Jan de Leeuw and Maarten S. Krol and Joseph O. Ogutu and Pamela A. Ochungo and Arjen Y. Hoekstra (2017) Urban consumption of meat and milk and its green and blue water footprints—Patterns in the 1980s and 2000s for Nairobi, Kenya. *Science of the Total Environment*, 579: 786-796
- Brooke Barton and Shirley Morgan-Knott (2010) MURKY WATERS? Corporate Reporting on Water Risk A Benchmarking Study of 100 Companies Authored by With scoring and analysis by.
- M. M. Aldaya and A. Y. Hoekstra (2010) The water needed for Italians to eat pasta and pizza. *Agricultural Systems*, 103(6): 351-360
- Maite M. Aldaya and Pedro Martínez-Santos and M. Ramón Llamas (2010) Incorporating the water footprint and virtual water into policy: Reflections from the Mancha Occidental region, Spain. *Water Resources Management*, 24(5): 941-958
- Zhuo, L., Mekonnen, M.M. & Hoekstra, A.Y. (2016) Water footprint and virtual water trade of China. *Value of Water*, 69:

- Zhang, G.P., Hoekstra, A.Y. & Tickner, D. (2012) Proceeding of the Session Solving the water Crisis: Common Action toward a Sustainable Water Footprint. Value of Water, 60:
- Chouchane, H., Hoekstra, A.Y., Krol, M.S. & Mekonnen, M.M. (2013) Water footprint of Tunisia from an economic perspective. Value of Water, 61:
- Zhuo, L., Mekonnen, M.M. & Hoekstra, A.Y. (2013) Sensitivity and uncertainty in crop water footprint accounting: A case study for the Yellow river basin. Value of Water, 62:
- Hoekstra, A.Y. (2013) Wise freshwater allocation: Water footprint caps by river basin, benchmarks by product and fair water footprint shares by community. Value of Water, 63:
- Mekonnen, M.M. & Hoekstra, A.Y. (2013) Water footprint benchmarks for crop production. Value of Water, 64:
- Franke, N.A., Boyacioglu, H. & Hoekstra, A.Y. (2013) Grey water footprint accounting: Tier 1 supporting guidelines. Value of Water, 65:
- Mekonnen, M.M., Pahlow, M., Aldaya, M.M., Zarate, E. & Hoekstra, A.Y. (2014) Water Footprint Assessment for Latin America and the Caribbean: An analysis of the sustainability, efficiency and equitability of water consumption and pollution. Value of Water, 66:
- Schyns, J.F., Hoekstra, A.Y. (2014) The water footprint in Morocco: The added value of Water Footprint Assessment for national water policy. Value of Water, 67:
- Pahlow, M., Krol, M.S. & Hoekstra, A.Y. (2015) Assessment of measures to reduce the water footprint of cotton farming in India. Value of Water, 68:
- Ercin, A.E., Aldaya, M.M. & Hoekstra, A.Y. (2011) The water footprint of soy milk and soy burger and equivalent animal products. Value of Water, 49:
- Mekonnen, M.M. & Hoekstra, A.Y. (2011) The water footprint of electricity from hydropower. Value of Water, 51:
- Hoekstra, A.Y. & Mekonnen, M.M. (2011) National water footprint accounts: The green, blue and grey water footprint of production and consumption. Value of Water, 50:
- Hoekstra, A.Y. & Mekonnen, M.M. (2011) The relation between national water management and international trade: A case study for Kenya. Value of Water, 52:
- Hoekstra, A.Y. & Mekonnen, M.M. (2011) Global water scarcity: The monthly blue water footprint compared to blue water availability for the worlds major river basins. Value of Water, 53:
- Hoekstra, A.Y., Aldaya, M.M. & Avril, B. (2011) Proceedings of the ESF Strategic Workshop on accounting for water scarcity and pollution in the rules of international trade. Value of Water, 54:
- Gerbens-Leenes, P.W., Mekonnen, M.M. & Hoekstra, A.Y. (2011) A comparative study on the water footprint of poultry, pork and beef in different countries and production systems. Value of Water, 55:
- Ercin, A.E., Mekonnen, M.M. & Hoekstra, A.Y. (2012) The water footprint of France. Value of Water, 56:
- Ercin, A.E., Mekonnen, M.M. & Hoekstra, A.Y. (2012) The water footprint of Switzerland. Value of Water, 57:
- Hoekstra, A.Y., Booij, M.J., Hunink, J.C. & Meijer, K.S. (2012) Blue water footprint of agriculture, industry, house-holds and water management in the Netherlands. Value of Water, 58:

## REFERENCIAS Y DIFERENCIAS ENTRE HH Y HA

- Verma, S, Kampman, D.A., van der Zaag, P. & Hoekstra, A.Y. (2008) Going against the flow: A critical analysis of virtual water trade in the context of Indias National River Linking Programme. *Value of Water*, 31:
- Mekonnen, M.M. & Hoekstra, A.Y. (2010) The green, blue and grey water footprint of farm crops and derived crop products. *Value of Water*, 47:
- Gerbens-Leenes, P.W. & Hoekstra, A.Y. (2010) Burning water: The water footprint of biofuel-based transport. *Value of Water*, 44:
- van Lienden, A.R., Gerbens-Leenes, P.W., Hoekstra, A.Y. & van der Meer, Th.H. (2010) Biofuel scenarios in a water perspective: The global blue and green water footprint of road transport in 2030. *Value of Water*, 43:
- Mekonnen, M.M. & Hoekstra, A.Y. (2010) A global and high-resolution assessment of the green, blue and grey water footprint of wheat. *Value of Water*, 42:
- Aldaya, M.M., Munoz, G. & Hoekstra, A.Y. (2010) Waterfootprint of cotton, wheat and rice production in Central Asia. *Value of Water*, 41:
- Chapagain, A.K. & Hoekstra, A.Y. (2010) The green, blue and grey water footprint of rice from both a production and consumption perspective. *Value of Water*, 40:
- Ercin, A.E., Aldaya, M.M. & Hoekstra, A.Y. (2009) A pilot in corporate water footprint accounting and impact assessment: The water footprint of a sugar-containing carbonated beverage. *Value of Water*, 39:
- Gerbens-Leenes, P.W. & Hoekstra, A.Y. (2009) The water footprint of sweeteners and bio-ethanol from sugar cane, sugar beet and maize. *Value of Water*, 38:
- Bulsink, F., Hoekstra, A.Y. & Booij, M.J. (2009) The water footprint of Indonesian provinces related to the consumption of crop products. *Value of Water*, 37:
- Aldaya, M.M. & Hoekstra, A.Y. (2009) The water needed to have Italians eat pasta and pizza. *Value of Water*, 36:
- Aldaya, M.M. & Llamas, M.R. (2008) Water footprint analysis for the Guadiana river basin. *Value of Water*, 35:
- Mekonnen, M.M. & Hoekstra, A.Y. (2010) Mitigating the water footprint of export cut flowers from the Lake Naivasha Basin, Kenya. *Value of Water*, 45:
- Van Oel, P.R., Mekonnen, M.M. & Hoekstra, A.Y. (2008) The external water footprint of the Netherlands: Quantification and impact assessment. *Value of Water*, 33:
- Hoekstra, A.Y. & Chapagain, A.K. (2006) The water footprints of Morocco and the Netherlands. *Value of Water*, 21:
- Hoekstra, A.Y. (2006) The global dimension of water governance: Nine reasons for global arrangements in order to cope with local water problems. *Value of Water*, 20:
- van der Zaag, P. (2006) Water vulnerable value in Africa. *Value of Water*, 22:
- Hoekstra, A.Y. & Hung, P.Q. (2002) Virtual water trade: A quantification of virtual water flows between nations in relation to international crop trade. *Value of Water*, 11:
- Chapagain, A.K. & Hoekstra, A.Y. (2003) Virtual water flows between nations in relation to trade in livestock and livestock products. *Value of Water*, 13:
- Hoekstra, A.Y. (2003) Virtual water trade: Proceedings of the International Expert Meeting on Virtual Water Trade. *Value of Water*, 12:
- Chapagain, A.K. & Hoekstra, A.Y. (2003) The water needed to have the Dutch drink coffee. *Value of Water*, 14: