

WHAT IS BEYOND THE WATER AND CARBON FOOTPRINT? THE PRESSING ISSUE OF FOOD AND WATER SECURITY

Viglizzo, E.F.¹ & Ricard, M.F.²

GPS (Group of Producing Countries from the Southern Cone)



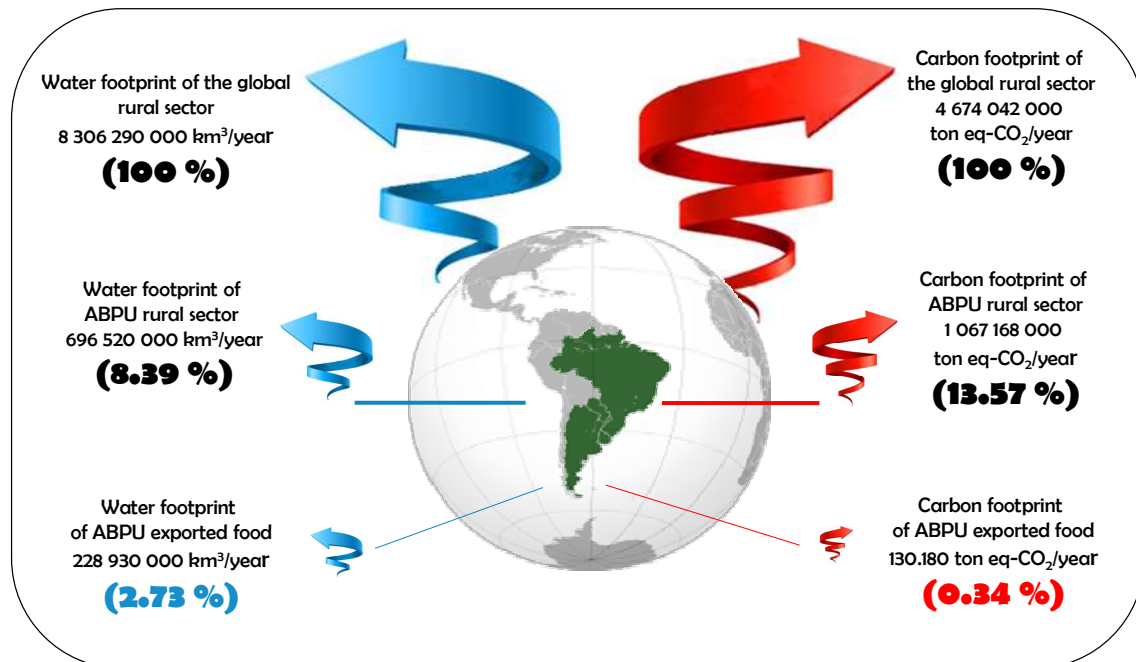
The complex relation of [carbon \(CF\) and water \(WF\) footprints](#) with food security is at the core of [GPS](#) objectives. Humans left their footprint on the planet during their evolution, being [global warming](#), [climate change](#) and [water scarcity](#) three important impacted fields that indirectly affect the sustainability of the global food system. The critical role of [food security](#) in a context of climate change and water withdrawal deserves special attention.

The issue of CF and WF is cause of increasing concern of food-exporting countries in the Argentina, Brazil, Paraguay and Uruguay (ABPU) region because of the relevant role that this region has in global water and [food security](#). It is necessary to put in context the question of water use, carbon emission and food security in the ABPU region and propose strategic ways to undertake the issue.

When people focus their attention on footprints only, part of the story is missed. Two tales are useful to understand the problem: a small and a big one. On the one hand, the small tale strictly refer to CF and WF. Both, [the CF and the WF, seem to be highly correlated](#), and as we demonstrated, animal (e.g., meat, milk) and processed products (e.g., bread, oilseeds, biofuels) show higher footprint than primary and not processed products like grains, vegetables, fruits and so on. Several questions arise when we look ahead. Are the CF and WF of exported food in the ABPU region a threat to the global environment? Are those exports destabilizing the global carbon and water balance? Would the imposition of trade sanctions on the region because of this issue be justified? Or are regional footprint of food exports a false dilemma and potential sanctions a demonstration of commercial myopia?

The big tale, on the other hand, shows that the water embedded in food and the carbon released throughout the food chain in ABPU exporting countries are fully irrelevant in practical terms and have no measurable impact on the global water and carbon balance. The figure below shows the incidence of ABPU food exports on the balance of water and carbon assessed in terms of its global implications. The CF and WF

of its exported food respectively represents only 2.7% and 0.3% of the total water consumption and carbon emissions of global agriculture. Then, putting too much attention on the footprints of food exports in ABPU region may be fully irrelevant in practical terms. Why? The answer is simple: those footprints will not have any [meaningful impact](#) on the global balance of water and carbon.



Incidence of ABPU rural sector on the balance of water and carbon in the total rural figures of the world. Own elaboration from [Mekonnen and Hoekstra \(2012\)](#) and [FAO \(2016a\)](#).

The pressing challenge in ABPU is neither water nor carbon footprint generated by food exports. The main problem is how to tackle GHG emissions at the broad regional scale (e.g. the Mercosur region) of total ABPU rural sector, which respectively represent 8% and 23% of global figures through sensible and coordinated land-use policies. Problems related to carbon emission and water use in agriculture should be resolved on broad-scale basis beyond the inconsequential small-scale footprint view. To address the broad-scale problem, mitigation efforts should be focused on three main sources of emission for the rural sector: [deforestation](#), [cattle production](#) and [crop operations](#). [Carbon emissions can be mitigated](#) by: (i) decreasing deforestation rates, (ii) increasing the carbon sequestration in the root system of grasslands and savannas, (iii) improving animal genetics and reproductive performance, (iv) reducing the time required by animals to reach the slaughter weight, and (v) incorporating “high-tech, precision farming” in crops cultivation, which involve a link between inputs use and cropping operations with satellite images and modern tools of information technology.

Because of its [large availability of land and renewable water](#), the ABPU region plays today, and will play in future, an increasing strategic role in global food and water security by exporting food and virtual water to food- and water-scarce countries. So, beyond the short-sighted view on water and carbon footprint, it should be recognized that ABPU's exports of food and virtual water will help to alleviate the future increase of water and food demand in a global context of climate change and population growth.

Author's Biography:

¹ Agronomist, MSc, PhD (Catholic University of Louvain, Belgium). Teaching and research activities at Univ. Nac. La Pampa, Mar del Plata, Austral. Senior researcher at CONICET of Argentina. Scientific consultant and lead author in global and regional projects of international organizations: IPCC (Intergovernmental Panel on Climate Change), MEA (Millennium Ecosystem Assessment), IAASTD Global (International Assessment of Agricultural Science and Technology for Development), IRP (International Resource Panel), PROCISUR (International Cooperation Program for the Southern Cone), GEO 5, IPBES, TEEB. GPS Environmental Advisor. Multiple award-winner. Author of many papers, books and articles in national and international scientific publications.

² Natural Resource Engineer, MSc and PhD (National University of Mar del Plata, Argentina). Current position: postdoctoral fellow at CONICET (Argentina) in the field of agricultural and environmental sciences. Pre- and post-graduate teaching at National Universities (La Pampa and Córdoba). Author and co-author of scientific articles in international journals and books chapters. Research activities at GPS.