



THE WATER FOOTPRINT OF COLOMBIA
Results of the National Water Study



Multisectoral Blue and Green Water Footprint Assessment for Colombia

Colombia is located in the North of South America. It has a coastline of about 2900 km, a total land surface area of 114 million hectares and a population of 48 million inhabitants. It has 5 million hectares of planted crops and 40 million hectares of pasture (an average of 1.6 heads of livestock per hectare). 16 million hectares of protected areas, and 3 million hectares are moorlands, known as “Páramos”: an ecosystem of high importance in tropical altitudes due to its ability to retain rainwater.

Hydrologically, Colombia is divided into 5 main areas: Caribbean, Amazonian, Orinoco, Magdalena-Cauca and Pacific. Colombia has one of the leading positions in biodiversity in the world (SibColombia, 2015) and is number six in total internal renewable water resources (FAO, 2015). However, the country faces many water management challenges: 70% of its population is concentrated in a territory that has 13% of the Colombia’s water resources, whereas water pollution is a main constrain in water availability. The country is characterized by a high deforestation rate that is estimated in 147.946 hectares per year (IDEAM, 2013). Furthermore, it is estimated that water runoff will be reduced up to 30% in the areas with the highest demand, according to climate change scenarios.

Colombia periodically analyzes the status of its water resources through the National Water Study (ENA Estudio Nacional de Agua), published by the Colombian National Hydrological and Meteorological Institute (IDEAM). It has been published in 1998, 2000, 2004, 2008, 2010, 2014. In the most recent study, ENA 2014, the blue and green water footprint assessment was incorporated for the first time. ENA 2014 was also the first national water study, worldwide, directed by an official entity to incorporate the water footprint assessment for every country basin. The study is the result of a fruitful partnership among the IDEAM, the Global Programme Water Initiatives of the Swiss Agency for Development and Cooperation (SDC - GPWI), the Center of Science and Technology of Antioquia (CTA) and Good Stuff International Latin America and the Caribbean (GSI-LAC).

This study assessed the green and blue water footprint of five economic sectors: agricultural, domestic, industrial, energy and oil extraction; and for Colombia’s 316 river basins (among them 5 island areas), using the Water Footprint Network methodology (Hoekstra, et al., 2011). Blue and Green Water Scarcities were estimated as part of the WF sustainability assessment¹. The study was complemented with economic scenarios for the main agricultural products in the year 2022, and the analysis of virtual water flows for the main export agricultural products.

1. Blue water scarcity was defined in ENA 2014 as the “Water not Returned to Basin Index” (known in Spanish as IARC) and the Green water scarcity as “Water Pressure to Ecosystems Index” (known in Spanish as IPHE). The original meaning and calculation standard remains as in the WFN methodology.



Key Results

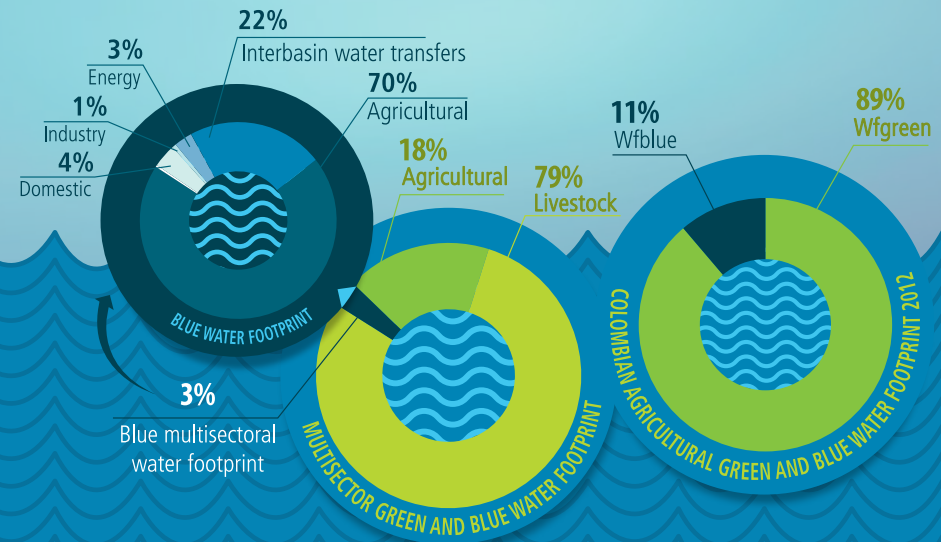
- Colombia's National Development Plan (2014 - 2018) marks deforestation as one of the main threats to the country's environmental sustainability and green growth. The analysis of green water scarcities (IPHE in ENA 2014) incorporates a new argument for defining strategic conservation areas for water risks mitigation.
- Green water accounting is included for the first time in the national water accounting². 97% of the total water footprint corresponds to the agriculture sector (including livestock) in the form of green water footprint.
- The analysis of the green water footprint and its sustainability indicates the competition between land use by the agriculture sector and land use for ecosystem conservation in order to evaluate the local situation to identify potential risk related with provision of ecosystem services essential for life and development.
- Blue and green virtual water flows of main export crops show the comparative advantages that Colombian agriculture has, since it is based 90% on green water. Sustainable agriculture in the country is a way of contributing to cover the world's growing food demand.
- The free trade agreements and the internal demand of biofuels, driven by the current local economic policy, promote the agroindustry of sugar cane, palm oil and cocoa, among others. These drivers, based on growth projections for the year 2022, will translate into impacts and on local water resources as well as conflicting uses of land.
- Water quality is a challenge for the country; the situation demands improved monitoring and control, free access to information and investment decisions for treatment and pollution reduction.

2. The green water is water that comes from rain and is stored in the non-saturated soil as humidity. It supports natural vegetation as well as rainfed agriculture.

The Colombian Water Footprint in Numbers



1. QUANTIFICATION GREEN AND BLUE WATER FOOTPRINT



2. ASSESSMENT GREEN AND BLUE WATER FOOTPRINT



The Colombian Water Footprint in Numbers

In Colombia, blue and green available water resources are estimated in about 2400 km³/yr, 52% of which are green water and 48% blue water. (Green water availability means the environmental flow has been deducted).

The green water footprint of crops is eight times its blue water footprint, which relates to irrigation water and was estimated as 7 Km³/year. The green water footprint of livestock is around 246 Km³/year. The pastures associated to extensive livestock farming in Colombia are not irrigated.

The blue water footprint of all the other sectors together (industry, energy, domestic and oil extraction) is approximately 3 Km³/year.

Blue water availability at the national level is 100 times higher than the blue water footprint, but there are four river basins located in the Caribbean region with critical blue water scarcities. Regarding green water, its availability is four times higher than the respective water footprint, whereas 22 river basins have critical green water scarcities. The latter indicates a pressure of agricultural activities on protected areas for conservation.

Coffee is Colombia's most representative agricultural product having the largest planted area in the country (close to 1 million hectares). The virtual water flow analysis for Colombia's main traded crop products shows that two thirds of the exported virtual water corresponds to Coffee and is 100% green water (12 Km³/year).

Recommendations

- Promote mechanisms to increase green water productivity (produce more in less area) and optimize the use of blue water (produce more with less water), both have to be addressed within the context of the existing National Policy for Integrated Water Resources Management.
- Review policies of economic incentives for bioenergy crops (palm and sugar cane) and define a limit of growth for these sectors based on the requirements for other uses (balance: water for people, water for development and water for the ecosystems).
- Many river basins in Colombia do not have any protected areas or ecosystem services protection schemes, in order to ensure water supply. It is urgent to define these areas and effective conservation schemes.
- The analysis of virtual water of export products allows visualizing the regional and local impacts of the corresponding water consumption. Guidelines and control mechanisms for efficient water use and conservation are needed.
- Based on the results obtained in this study, new possibilities on how the Water Footprint Assessment can be used emerge:
 - Support agricultural planning processes that incorporate water resources. For example, the agricultural land division in the context of post-conflict agricultural programmes.
 - Design of economic tools for conservation (Water Funds, Payment for Environmental Services).
 - Contribution to land planning and river basin management by providing additional tools to public institutions and other sectors for the analysis of water uses and availability.

2012
VIRTUAL WATER TRADE
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MILLION M³

ANNUAL
VIRTUAL
WATER
FLOW



"For IDEAM, the water footprint means a new dimension of knowledge that helps highlight pressures on ecosystems and to better understand and define guidelines of water use given the dynamics of productive sectors with water.

We hope that local authorities adopt this tool for a more sustainable and efficient resource management"

Omar Vargas (Hydrology Direction - IDEAM)

"An efficient, equitable and sustainable water management is one of the most pressing political, economic, environmental and social issues of this century.

The Water Footprint is a decision support tool for politicians, companies and opinion makers, who want to act for an efficient and sustainable water management".

Francois Munger (SDC - GPWI)

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Further information:

www.ideam.gov.co

www.cta.org.co

www.suizaguacolombia.net

www.goodstuffinternational.com

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