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Shifting water demands onto the vulnerable? Water impacts of agricultural trade and investment

Our water footprints have gone global.[1] The drivers include modern agribusiness and the unprecedented reach of value chains. Those living where rain falls or rivers flow may give little thought to the water demands of their lifestyles. Others do not have that privilege. Worldwide, people's water uses contribute to an increasingly complex web of "virtual" water flows implied in agricultural production, trade, and investment. Wealthy countries, transnational investors, traders, and business elites capture many of the benefits. Rising climatic uncertainty demands that we pay attention to water risks. For many populations in the global South, proper management of these water flows could mean the difference between lives of dignity and lives of desperation. This policy brief examines key issues, with a particular focus on the water risks of global market-driven agricultural investment in developing countries.

The research featured here is focused globally.

Water footprint

Individuals, countries, and even humanity as a whole may be thought of as having a **water footprint** – a measure of our use of fresh water for drinking, agriculture, sanitation, industry, and more. Agriculture looms largest among these water uses, accounting for an estimated 92% of our global water footprint.[2]

This perspective has at least two major implications for sustainable development. First, we must ensure that humanity's water footprint never exceeds renewable freshwater supplies ("peak renewable water").[3] Less than 3% of Earth's water is fresh, and only a fraction of that is readily accessible – via rivers, lakes, and groundwater (collectively called

KEY MESSAGES

- Many countries import agricultural products that take a lot of water to produce. It is a good idea for water-scarce countries to import such commodities from water-abundant places. But sometimes the flow goes the other way: water-abundant countries buy from places where water is scarce or poorly managed. Overall, agricultural trade and investment frequently reflect economic power imbalances rather than rational use and allocation of water.
- Targets of foreign agricultural investment include food-insecure countries in sub-Saharan Africa and Southeast Asia that face growing water risks. In these and other countries, foreign agricultural investments too often threaten the water needs of smallholders and other local users.
- Developing countries should strengthen laws that protect their water resources and the human rights, customs, and livelihoods of food producers and other local water users. Trade or investment agreements that threaten this should be amended or avoided.

Box 1. Large-scale land deals and "water grabbing"

Critics suggest that investor countries seek to "grab" water via land investments. To test this idea, CDE analysed 475 intended or concluded land deals recorded in the Land Matrix database to see how they might relate to the water balances of host and investor countries (Breu et al. 2016). It also examined how water-balance effects might relate to water stress or contribute to global trade in "virtual water" – the water used to produce agricultural goods. The results suggest that land deals and the resulting virtual water trade could result in global water savings. Nevertheless, the merits of such "savings" depend on what is produced (food versus biofuels) and who benefits. At the same time, water-use intensity would increase in several vulnerable settings, particularly in 15 sub-Saharan countries. The results suggest that host countries with abundant water resources are not per se favoured targets of land deals.

Box 2. Water implications of biofuel investments in Peru

A CDE study of large-scale land acquisitions (Tejada and Rist 2017) highlights how power imbalances shape access to water. It looked at how the establishment of large sugarcane monocultures on Peru's northern coast resulted in a massive transfer of land and "blue water" rights from smallholders to biofuel companies. A combination of neoliberal land and water reforms, the creation of a national biofuel market, and discourses about the benefits of large-scale investments helped lay the ground. Biofuel projects were given preferred access to water infrastructure built and paid for by the Peruvian state, partly with World Bank loans. Recent changes in the rules may further limit local people's access to water. For example, new legislation rewards high-tech water-saving irrigation methods that only investors can afford. It also raises administrative hurdles (e.g. required fees and site examinations) that make it hard for small-scale users to get licences.

blue water), soil moisture (**green water**), and rainfall.[4] Second, we must share available fresh water and water-intensive goods more efficiently and equitably so that everyone's needs are met and no group's water footprint violates that of another.[5]

There is much to be done on the equitability front. The average US citizen consumes about 2,840 cubic metres of water per year – the equivalent of an Olympic swimming pool – whereas the average citizen of China makes do with roughly 1,070 m^3/yr.[6] The per capita water footprints of developing countries vary widely, from more than the USA to as low as 550 m^3/yr (DR Congo).[7] Consumption patterns – such as eating meat – explain a lot of the variation, as do levels of water efficiency (and pollution) of agricultural goods consumed.

Water stress and uncertainty

Challenges abound. Worldwide, agricultural water consumption is expected to increase by 70–90% over the next 40 years.[8] Climate change both heightens water demands – driving interest in biofuels and hydropower, for example – and threatens to radically impact supplies.[9] Changing rainfall patterns and glacial melting are already altering river flows and the quantity and quality of freshwater supplies. By 2025, two-thirds of the global population will likely be living in areas experiencing water stress.[10]

Trade and investment: shifting water burdens elsewhere?

People everywhere must find ways of satisfying their water needs. For countries unable to meet their water demands locally, trade can offer a way out – provided they can afford it. Trade can enable water-stressed countries to import the food they cannot grow domestically. This strategy is often associated with arid countries in the Middle East that use oil revenues to import water-intensive crops. But the global picture of water flows implied in trade is much more complex, with ever more goods crisscrossing the globe, ever faster.

The water embedded or implied in food imports (e.g. cereals) and similar traded goods is often referred to as **virtual water**.[11] As much as 40% of the water consumed globally is traded as such virtual water.[12] Of this, approximately 80% is embodied in farm commodities.[13] By absolute volume, the biggest net importers of virtual water are North Africa, the Middle East, Mexico, Europe, Japan, and South Korea. These import far more water-intensive goods than they export.[14]

The **external water dependency** is the extent to which a country relies on water resources from abroad. Several water-abundant European countries – including Germany, the UK, and the Netherlands – rely heavily on foreign water, with dependencies in the 60%–95% range.[15] They could grow more themselves, but instead push their water demands onto producers in southern Europe and the developing world.

Then there are countries in the Middle East and North Africa with large external water dependencies: Kuwait (92% dependency), Israel (82%), Saudi Arabia (66%), Libya (65%), and Algeria (51%).[16] These arguably have little choice but to meet many of their water needs with imports. And fears have emerged that they might use bolder forms of external water appropriation – not just trading for water-intensive goods, but rather directly buying or leasing land abroad to secure the water that comes with it.

"Grabbing" water via land deals?

Indeed, as foreign investments in agricultural land have grown, so too have concerns that wealthy investor countries might use them to take control of water resources in weaker developing countries. To clarify this, CDE researchers investigated the possible links between land investments and water resources globally and in local settings. Looking at the global level, a CDE study[17] (Box 1) reveals various trends.

Vulnerable target countries. In the 475 verifiable investments analysed, a remarkable 61% of the total crop water consumption (mainly "green water") would occur in only nine host countries in two distinct regions: five sub-Saharan states (Ethiopia, Mozambique, Sudan, South Sudan, and Sierra Leone, 30.6% of water consumed) and four tropical Asian countries (Indonesia, the Philippines, Cambodia, and Laos, 30.4%). Notably, these host countries face hunger problems[18] and climate-change risks.[19] If realized, the deals would increase national agricultural water consumption significantly in the cases of Sierra Leone (by 76%), Laos (52%), South Sudan (36%), Cambodia (33%), and others. They would also increase the intensity of water use per hectare in Cambodia (by nearly 100%), Sudan (64%), Ethiopia (60%), and elsewhere.

Investor countries. A mere six investor countries (of 54 in total) account for *over half* the water consumed via the investments. These include countries sometimes suspected of **water grabbing**[20] such as Saudi Arabia (10.9% of water consumed), China (also 10.9%), and India (6.8%). They also include the USA (8.1%), Brazil (5.2%), and, interestingly, Malaysia (10%).

Investor motivation. Considered as a group, so-called investor countries may not be motivated by water resources per se. Comparing the water balances in investors' "home" countries with those in the "host" countries showed only a weak tendency for water-stressed investor countries to target more

water-abundant host countries. But the prominence of investor countries such as Singapore, the Cayman Islands, and arguably even Malaysia, Brunei, and the USA hints at a more tangled, possibly riskier reality: many of these land deals may simply be market-driven (e.g. biofuel) investment vehicles linked to company headquarters in "investor-friendly" (e.g. low-tax) jurisdictions. Country-level water concerns (domestic or foreign) may be less of a priority than individual investor profits.

Water savings. Finally, a comparison of the water intensity of crops grown in investor countries versus target countries suggests that the land investments could contribute to global water savings through trade in virtual water (8.7% increase). But this global perspective risks obscuring important issues such as the distribution of these "savings" via exports and especially the impacts of these investments on vulnerable communities and individuals. Of particular concern are investments in areas where water is scarce or poorly managed.

Local water impacts of agribusiness investments

Turning to the local level, research by CDE (Box 2) and others highlights several risks.

Gradual elite capture of water. The full impacts of land investments on precious local water supplies and livelihoods may only emerge over time. Research on biofuel investments in Peru shows how local users may gradually lose more and more of their water access to better-connected, wealthy investors. As their operations grow, investors may be progressively prioritized for access to water sources (e.g. rivers, irrigation canals).[21] Or, as seen in Kenya, they may increasingly drill for groundwater, threatening wider hydrological cycles.[22]

Water efficiency. Ironically, as water grows even scarcer, the superior "efficiency"[23] of investment projects may be touted to further justify favouring agribusiness over small-scale farmers. Investors who can afford costly new irrigation technology may cope more easily with water scarcity and may obtain yet more water rights based on legislation rewarding more "efficient" users. In truth, small-scale farmers can be equally or more efficient water users if given proper support to optimize their traditional irrigation practices or to invest in new technologies themselves (see Mekdaschi Studer and Liniger 2013).

Location is everything. A vast foreign biofuel project affecting several villages in Sierra Leone illustrates the importance of the precise location of land deals. Even if investors keep lots of adjacent land available to locals, their investments frequently take the very best land in the area – that is, fertile land with secure, perennial water access that locals previously used to grow crops or raise livestock[24] (Marfurt et al. 2016).

Water pollution and damage. Finally, the artificial fertilizers and pesticides used in industrial-scale investment projects often pollute the area's water.[25] Continuous irrigation (e.g. for sugarcane) can raise the water table, causing unwanted infiltration and damage to neighbouring plots.[26]

Pro-poor, water-sensitive agricultural markets?

Nevertheless, agricultural trade and investment *could* be structured to facilitate more mutually beneficial sharing of water resources. But trade policies and land deals must give much greater weight to the capacities and needs of local resource users, consumers, and host governments in the developing world (Box 3).[27] Sustainable water use must also be made an explicit, binding concern in all areas and at every level, including in countries exporting water-intensive goods, importing and consuming them, or trading or handling them as investments.

Box 3. Guidelines on agricultural investment and trade

Three key sources of law govern agricultural investment and trade: domestic law, contracts, and treaties. From the perspective of developing countries, well-functioning investment and trade will respect domestic law first and enable responsive local changes if risks arise. Governments should strengthen and uphold domestic laws that protect public health, the environment, and the rights, customs, and livelihoods of local land and water users. Contracts or treaties that threaten these aims or give undue power to outside investors should be avoided or amended. See Smaller et al. (2014) for model sets of guidelines, principles, and negotiation advice.[28]
http://tinyurl.com/zxuqpny

Water sustainability standards

Water-related certification schemes backed up by proper monitoring and oversight are another promising strategy. Linking them to labels on consumer goods can enable consumers in Europe and elsewhere who are concerned about their water footprint to exert beneficial pressure. Several sector-specific (e.g. biofuel) and crop-specific (e.g. cotton) schemes exist, but do not necessarily protect smallholders. Ways must be found to make stricter sustainability certification criteria include the voices, interests, and livelihoods of local water users and producer organizations in exporting countries. See Vos and Boelens (2014) for a summary of schemes.[29]
http://tinyurl.com/zdu8gx6

Smallholder rice farming in the lowlands of the Chira valley, Peru. Local farmers use traditional irrigation methods to grow the staple crop for sale locally and nationally. They face increasing competition for water from large-scale biofuel projects. Photo: L. Tejada

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Policy implications of research

Countries externalize their water demands via trade and investment

Better management and distribution of freshwater resources and water-intensive goods will be key to confronting water threats and maintaining global stability. A global perspective on national water footprints, climatic change, and "virtual water" flows is useful to monitor trends, consider strategies, and aid negotiations.[30] It shows that many wealthier countries are pushing their demands for water-intensive goods onto others – some out of necessity, others simply because their economic strength allows it.

Need for national water, food, and energy strategies – embedded in broader, coordinated approaches

While the global view is helpful, decisions about water management are still likely best made closer to the national or subnational level by authorities that can be held locally accountable.[31] National and local authorities should together establish long-term water policies that go beyond domestic water supply to include local agricultural productivity, trade relations, and impacts on vulnerable producers of water-intensive goods at home and abroad. This should happen *before* domestic water supplies fall dangerously low.[32] These policies could be embedded in joint regional or even continent-wide water/food/energy strategies.[33] The goal should be to optimize the use and exchange of resources at appropriate geographic scales, heeding realities in climate (e.g. where rain falls), ecology (e.g. energy intensity of transport), society (e.g. need for secure livelihoods), and economics (e.g. need for mutually beneficial trade). Improving intra-regional agricultural trade and investment (e.g. *within* Africa, Southeast Asia, or Latin America) may be an important part of long-term solutions.[34]

Suggested further reading

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