

Wicked Problems of Water and Trade



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Addressing the questions

Scientific objectives

- to study *the effect of international trade on domestic water resources* and the effect of *water availability on international trade*;
- to gain insight on how to *incorporate water sustainability considerations into trade policy* taking into account the global food challenge and *human rights to food*. (what rights?)
- to analyse the *challenges and opportunities* of incorporating water sustainability considerations into international trade policy. (NB sustainability means economic, social and ecological)

Policy relevant objectives

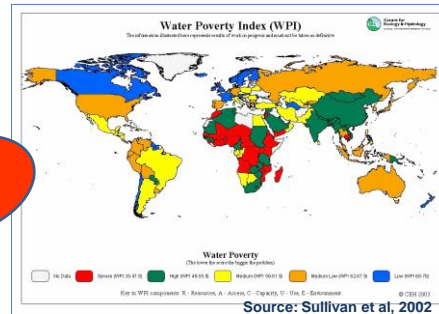
- to identify what type of *international trade rules* would promote a more wise use of water worldwide;
- to identify *what governance structures* would be necessary to enable a fair virtual-water trade;
- to analyse what is required from whom to progress on the *appropriate and fair* introduction and use of the virtual-water concept.



Trade takes many forms

Is the concept of virtual water useful as a mechanism for change?

- Do we need a mechanism of change in the way natural resources such as water are managed?
- Does the existing system of global water management currently meet our needs while protecting our life support system?



The *Water Poverty Index* has shown the inequity of the current system

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The concept of virtual water: holistic and inclusive?

- Most literature is based on the virtual water aspect of food trade
- If the concept is to be accepted, it must be recognised that it applies to all forms of production and distribution, at the micro and macro economic levels (*the legitimacy problem*)
- Given the complexity of the interlinkages between industrial, agricultural and natural production systems, accurate, quantitative analysis of the role played by water, is an almost impossible task
- From an economic perspective, addressing this '*interconnectivity problem*' can really only be achieved by doing a full input-output analysis, and even then this is limited by lack of accurate, available data



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Ensuring the maintenance of ecological integrity

(how to incorporate water sustainability considerations into trade policy)

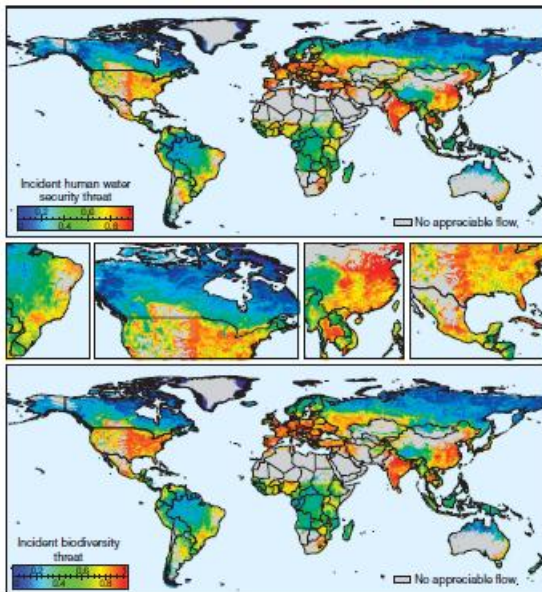
Why ecological integrity matters

- Life support system (not just for humans)
- Earth is an energy-driven complex system that must be properly maintained if it is to function correctly – as with any system, only a certain amount of integrity can be lost if irreversible change is to be avoided (already too late?)
- Without some control of private use of water resources, over-extraction of water will be inevitable in the face of human population growth and economic development
- We want to avoid '*mis-managing ourselves into extinction*'
- Impacts of climate change will only make the risk of this worse



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Mismanaging ourselves to extinction?



Detailed, comprehensive analysis of 23 variables across the world shows how current management practices have negative impacts on freshwater systems.

This demonstrates how current water governance is failing to deliver either water security or ecological integrity

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Source: Vorosmarty et al, 2010, Nature

Meeting human needs

Human needs are not the only important needs

- Reproduction and species survival – survival of the fittest – how will the concept of virtual water influence who is the fittest?
- But what about equity of access and moral values , what are the consequences of **not** delivering equitable access?
- What are the possible scenarios of the future – *policy first* or a *fortress world*?
- Can the current unacceptable levels of access be addressed with more effective reallocation of use?
- what is the role for virtual water in these discussions?

If we cannot manage real water correctly, what is the likelihood of us being able to manage virtual water?



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The effect of international trade on domestic water resources

- International trade basics: visible and invisible trade – how can we calculate the water content in trade of services – how can we explain the idea of '*virtual invisibles*' to the public?
- How to address international/domestic water transfers – whose priorities count? How can the virtual water concept help?

Some examples:

- Tourism on an island ecosystem, Grenada – downstream - upstream impacts of cruise ships taking on water
- HEP Energy export from major rivers: upstream/downstream impacts, eg in the Sengal basin and numerous others
- Water storage provision – Lesotho sells the service of water 'storage' to South Africa – domestic and international impacts
- What about existing rules and treaties – eg the Nile (virtual water as a tool for benefit sharing?)



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The effect of water availability (or lack of it) on international trade

- Drought impacts on GDP are well known (eg Kenya, D.Grey)
- Flood impacts disrupt local transport systems and create trade bottlenecks, and destroy the production systems on which trade is based (eg Bangladesh, Pakistan, Mekong, EU)
- Lack of adequate water access drives up levels of disease and loss of human capital, reducing trade advantages
- At all levels of economic activity, no water, no trade.....
- The crucial thing will be to ensure that while exports of virtual water will be inevitable in all exporting nations, adequate water is allocated to meet domestic needs (including for food, remember Ethiopia)
- What can be done about the vulnerability of countries dependent on virtual water through imported food?
- How can we regulate the issue of international purchases of agricultural land (and associated water), which has the potential to prevent countries accessing their own water?

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International trade rules for water sustainability

what type of international trade rules would promote a more wise use of water?

- Any agreements on virtual water rules must involve all nations
- Recognition of cultural differences in water values is essential
- In the context of existing trade rules, virtual water must be given a classification that ensures correct representation
- The concept of *e-flows* (environmental flows, water for nature) must be embedded as the foundation of any trade rules
- The calculation of such *e-flows* must be made on a standardised accepted way
- How can compliance with trade and management rules be ensured?

In addition to being an example of biodiversity and recreational values, this is a crucial part of our life support system



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Governance structures to support virtual water trade

what governance structures would be necessary to enable a fair virtual-water trade?

- First requirement for governance would be the recognition of the virtual water concept in a legal context, to allow its realistic inclusion into policy discourse
- Any rules-based system requires valid, reliable, and transparent monitoring processes
- A system to manage virtual water in trade must be designed to function in an internationally coordinated way, based on core measurements and standardised calculation structures
- Virtual water governance must be inclusive and representative, taking account of the needs of all the major water user groups, from the local to the global scale



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Governance can take many forms

Governance.....?

- To be effective, virtual water governance must be built on democratic principles with real budgets and real powers for regulating compliance
- A regulatory body would be needed to have an overview and supervisory role, with legal responsibility to ensure quality in implementation - in the same way that corporate law recognises and enforces Health and Safety responsibilities.
- This is especially important when considering the essential underlying IT systems that would be needed
- None of these are simple tasks

Governance of all natural resources is problematic, and there are rarely adequate returns to local populations. Any virtual water trade must not fall into this trap.



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Challenges and opportunities

(of incorporating water sustainability considerations into international trade)

Challenges

- Quantifying accurately how much virtual water there is in all products
- Building political will to recognise the concept and that this change is needed
- Designing a governance framework that is robust and accepted by business and the commercial sector
- Deciding how water in public goods and services must be addressed
- Ensuring and protecting both equity and the environment is crucial

Opportunities

- Finally gaining recognition of water as an essential factor of production that must be accounted for
- Clarifying the impact of commercial production decisions on national water resources



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So what are the *wicked problems* of virtual water?

(how to achieve an appropriate and fair introduction of the virtual-water concept)

- Accurate measurement of the extent and value of virtual water is essential as a starting point (*the interconnectedness problem*)
- How does something like water provision by nature to nomadic herders – Mongolia, E. Africa, Alaska, Northern Scandinavia, be included in the virtual water trade discourse? (*the legitimacy problem*)
- The concept must be inclusive across populations and cultures, and must take account of intergenerational change - equitable allocations of value will be vital or conflict will occur (*the representativeness problem*)
- Any trade rules must be adaptive in the face of global change (*the planetary boundary problem*)
- Existing trade rules must be managed more fairly, and powerful interest groups must be monitored and controlled (*the power and equity problem*)



Sharing the world's water is the wickedest problem of all, but virtual water may help us to adapt in an ever changing world

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