WATER NEUTRALITY: a concept paper

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1. Introduction

Water is a critical natural resource which presents us with numerous challenges that come together at the global, national and local level. These range from water shortages and droughts, to floods and declining water quality. Together with poor water management, they all contribute to increased malnutrition and disease, a loss of biodiversity and agricultural production and reduced economic growth and social stability, at times leading to conflicts over water resources.

The consequences of water shortages are experienced most acutely at the river basin and local levels. These shortages are manifested by a lack of reliable access to safe and affordable water and sanitation in many major urban areas, an increased pressure on water to grow food and sustain livelihoods in rural or semi-rural areas and a rapid deterioration of the ecosystems that in turn supply water and depend on water for their proper functioning. Globally there is enough freshwater in the world for domestic purposes, industry, to produce food and sustain ecosystems. But water resources are distributed very unevenly and the access to the resources for many poor people is financially, technically or politically constrained.

Markets and trade exert their own influence on water use. Products grown or manufactured using water in one place are moved through trade to another and thereby the water that is embedded in the product is moved from one place to the other. Trade links or supply chains link consumers to producers and vice versa, as such, embedded water is imported by consumers from producing countries that export the embedded water. If exporting countries are water scarce or lack good water management practices, trade induced water use can have strong influence on the local water situation. In recent years, this observation has led to the development of a body of academic knowledge around the water "footprints" of countries, cities, businesses and individuals. It is considered that the water footprinting methodology is likely to provide the technical basis on which a credible concept for improving the visibility and management of such flows can be developed and agreed. One such approach is "water neutrality".

2. Exploratory meeting on "neutrality"

Against this background, a small group of organizations met on 12 September, 2007, in the Netherlands to discuss approaches to water "neutrality[1]" that could contribute to the overall water stewardship that is required of individuals, business, governments and other entities to address the water crises. The main focus of the meeting was on gaining a common understanding of how water neutrality might be defined in terms of:
a) applying water footprinting concepts[2] to individuals, products and entities,

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[I] Twente University
[II] World Wide Fund for Nature, WWF
[III] The Coca Cola Company
[IV] World Businesses Council for Sustainable Development
[V] Water Neutral (www.waterneutral.org) / Emvelo Group
[VI] UNESCO IHE – Institute of Water Education

[1] As detailed in this paper "water neutral" was chosen as an inspirational phrase that resonates with the public and could be used to describe one's efforts to off-set their water footprint. The authors wish to point out that they understand they do not "own" this concept nor have responsibility for global water stewardship or its associated terms and processes. They have convened in a spirit of openness and transparency with the aim to further the collective understanding and action on this important concept.

[2] The water footprint concept is an analogy with the 'ecological footprint' that quantifies the *area* needed to sustain people's living, the 'water footprint' indicates the *water* required to sustain a population. Adapted from Hoekstra and Chapagain (2007) – see footnote 4 for the full reference and page 4 for a more elaborate definition or visit www.waterfootprint.org

b) taking action to reduce such footprints, and
c) defining what can be done to "off-set" the irreducible water use – i.e. balancing in communities and nature the water consumed in a given lifestyle or enterprise.

This concept paper is the tangible outcome of the meeting and attempts to describe the discussions that the group had on water footprints, offsets and neutrality. It is meant as a discussion paper to spark the interest among a wider group of people and organisations and invite these to join the debate with the aim to come to an academically sound and practically actionable approach to water neutrality that helps alleviate the water crisis and contributes to water stewardship.

3. Is water neutrality possible?

The term water neutrality has been picked-up in recent years by a range of commentators and actors involved in water issues. Taking a strict interpretation, no individual or entity that uses water can ever be entirely water neutral, as water use cannot be reduced to zero. However, we feel that as long as the term is used in a consistent and transparent manner to drive positive action on water issues, then it might have potential similar to that of carbon neutrality. There is clearly a need to define the term involving a wide constituency of actors in water.

While we took a first stab at understanding and clarifying the water neutrality concept, we have identified that there are definitely a large variety of technical and normative issues that are to be researched and further debated. These are mainly related to water footprint and water offsets. For example:

- How to allocate responsibilities among supply chain entities for reducing water footprint, and for any corresponding offsets?
- What would be a water offset in time and space? Is offsetting at all possible in water? Are offsets, projects or payments? What would be a suitable price? How to link off- sets to specific hydrological issues i.e. water taken from aquifers but 'returned' to rivers, water taken in wet or dry seasons etc.
- Are there any differences in applying the concept of water neutrality and offsets to individuals and communities as opposed to businesses?
- What could be the adverse consequences of such an approach?

Next to this we have realized that there are similarities between the water neutral concept and the carbon neutral concept. And therefore we are taking in the lessons from "carbon" but only as far as the similarities go because water has its own very specific characteristics - like its geographically confined nature, the fact that most water is a renewable and not a fossil resource - to which the carbon lessons will not fully apply.

4. Structure of this Concept paper

In the annexes to this concept paper there are two sections:

1. A technical discussion note on water neutrality drafted by Professor Arjen Hoekstra
2. A background note on global water issues

5. The process from here

While the few people in the room on 12 September were a useful group for an initial exploration of the water neutrality concept, this was just a first step in what we hope will be a transparent and inclusive process that will lead to `a scientifically sound and actionable approach to water neutrality or an alternative and more practical solution for business and other actors that will help alleviate the water crises and contribute to water stewardship'.

The aim of this note is to explain the thinking thus far, to invite comment, and to generate interest with a wide range of sectors, geographies and organisations to join in the further deliberations.

We aim to establish a process over the coming 12-18 months to:

- substantiate water neutrality as an appropriate approach
- review how it can or should be integrated with other concepts to enhance achievement of the overall goals
- define water neutrality in a technically credible way
- agree on the definition and its usage with a wide range of water stakeholders
- develop and make available tools and methodologies that will enable others to undertake their own action towards neutrality
- consider what type of verification might be required to ensure that claims made about neutrality are credible.
- Consider what institutions and processes are necessary to make the approach work

The process is expected to involve physical and virtual meetings, web-postings, consultations and feedback, commissioning of technical research papers and peer review.

6. An invitation

We feel that the concept of water neutrality and the challenge of making it operational is exciting and inspirational. We also feel that - correctly applied - it has the potential to accelerate action that is required to strengthen water management world-wide. It is not the only solution, but we anticipate that it can be an important part of the total package of measures required for good water stewardship.

- We would like you to come back to us, with your comments and thinking.
- We invite you to join us in this process to develop an approach that helps contribute to the solutions that are badly needed.

We look forward to hearing from you!

Please send your feedback to Richard Holland at: freshwater@wwf.nl

Part 2: Water Neutrality: a discussion note[3]

Introduction

Various human activities consume or pollute a lot of water. The issue addressed in this discussion note is whether humans can somehow neutralise or offset their 'water footprint'. The question is very general and interesting from the point of view of both individual consumers and larger communities, but also from the perspective of governments and companies. This note is intended to elaborate the idea of water neutrality for businesses, but the introduction takes a broader perspective. The note starts with an introduction of the water footprint concept that was introduced by Professor Hoekstra in 2002, in the past five years the concept has been developed further with colleagues at UNESCO-IHE and University of Twente[4]. It is important to be clear what is understood by the 'water footprint' of an individual, community or business, and behaviour or product, because it is this water footprint that is to be reduced, neutralised or offset. Next, an effort is made to give content to the concept of water neutrality.

The water footprint concept

The concept of the 'water footprint' has been developed to provide an indicator of water use that includes various forms of water use: consumptive use of rainwater (green water), consumptive use of water withdrawn from groundwater or surface water (blue water) and pollution of water (grey water). A water footprint is more than a figure for the total water volume used; it refers specifically to the type of water use and where, when and how the water was used. A water footprint has a certain environmental impact depending on the conditions of the system where the footprint is localised. For example, a given water footprint has a larger impact in a highly water-stressed area than in an area where water is abundantly available.

The water footprint of a particular final product, i.e. a consumption good or service, is estimated by considering how much water has been used to produce it, considering water use in all steps of the production chain. When one wants to assess the water footprint of an individual one will have to identify the goods and services consumed by the individual and assess the volumes of water that were used to make and consume those goods and services. One will have to look at the full production chain for each of the goods and services consumed and assess the water use in each phase of the production chain. When assessing the water footprint of a community (e.g. family, village, province, nation), one takes a similar approach, looking at all goods and services consumed by the community.

One can also assess the water footprint of producers, be it a single producer, a company or a whole economic sector. The World Business Council for Sustainable Development expects that in due time governments will ask large business to account for their water footprints[5]. The water footprint of a business is defined here as 'the total volume of freshwater that is used directly or indirectly to run and support a business and that is associated with the use of the business outputs'. This water footprint can be assessed by looking at:

- the water use in the producer's supply chain (indirect water use),
- the direct water use by the producer (for producing/manufacturing or for supporting activities),
- the water use inherently associated with the consumption of the producer's products by others.

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[3] Water Neutral: a discussion note, Arjen Y. Hoekstra, Twente Water Centre, University of Twente, The Netherlands, a.y.hoekstra@utwente.nl, 2007

[4] Hoekstra, A.Y. and Chapagain, A.K. (2007) Water footprints of nations: water use by people as a function of their consumption pattern, *Water Resources Management* 21(1): 35-48.
Hoekstra, A.Y. and Chapagain, A.K. (2008) Globalization of water: Sharing the planet's freshwater resources, Blackwell Publishing, Oxford, UK. In press.

[5] WBCSD (2006) Business in the world of water: WBCSD scenarios to 2025, World Business Council for Sustainable Development, Conches-Geneva, Switzerland.

The water footprint (WF) of a business thus includes three components: the supply-chain WF, the operational WF and the end-use WF. Each of these components potentially breaks down again into a green, blue and grey water footprint (Figure 1). The green WF is the part of a water footprint that refers to the volume of water evaporated from the global green water resources (rainwater stored in the soil as soil moisture). The blue WF refers to the volume of freshwater that evaporated from the global blue water resources (surface water and ground water). The grey WF refers to the volume of polluted water. The latter is calculated as the volume of water that is required to dilute pollutants to such an extent that the quality of the water, conforms to agreed water quality standards.

Many businesses in the industrial or service sector will typically have a water footprint as shown in Figure 1. Particularly when a company does not have agricultural activity itself but is partly based on the intake of agricultural products (crops, meat, milk, eggs, leather, cotton, wood/paper), the supply-chain WF will generally be much larger than the operational WF. In the supply-chain WF green water will often be dominant, while in the operational WF it will be blue or grey water. Also in the bio-industry a business WF will be shaped as in Figure 1, because water volume used for making the feed (the bio-industry's supply chain) is much larger than the water volumes used for operating a bio-industry (drinking, cleaning, pollution). For crop farms, however, the operational WF will be much larger than the supply-chain WF. The end-use WF will for nearly all businesses be relatively small. This can be understood given the fact that water use in households in the world is smaller than water use within industries, which in turn is much smaller than world water use in agriculture. Roughly, if we describe the economic system as a linear chain that goes from agricultural production and mining through manufacturing and retailing to consumption, we see that water use intensities gradually decline. About 85% of the global water footprint by human being is related to water use in agriculture, about 10% to water use in industry and 5% to water use by households[67].

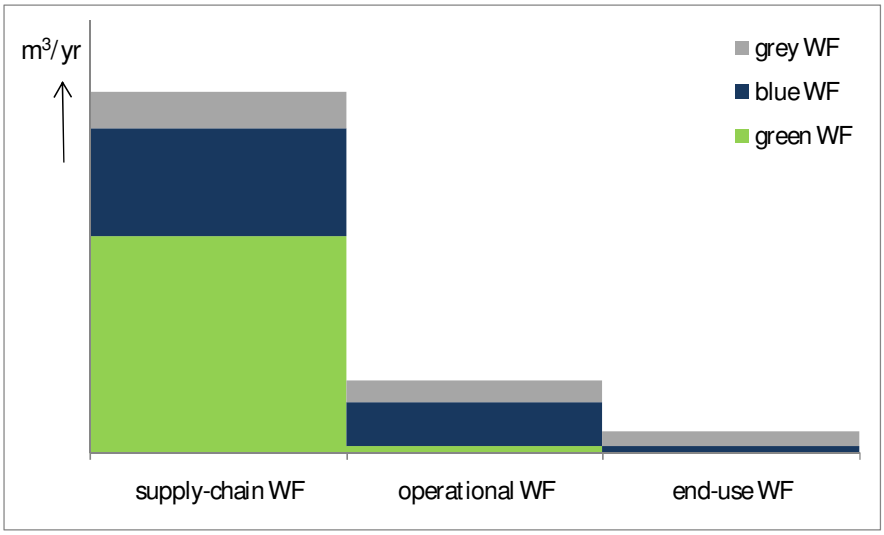

Figure 1: The components of the water footprint of a business.

The water neutral concept

The idea of the water-neutral (or water-offset) concept is to stimulate individuals and corporations that undertake water-consuming activities to make their activity 'water neutral' by investing in water

6 The distribution of world water use over the agricultural, industrial and domestic sector is 70-20-10% if one looks at blue water use only (source: FAO, Aquastat); the distribution is 85-10-5% if one looks at total water use, including both blue and green water use (Hoekstra and Chapagain, 2007, see footnote 7 below). Blue water use refers to water withdrawals; green water use refers to use of rainwater.

7 Hoekstra, A.Y. and Chapagain, A.K. (2007) Water footprints of nations: water use by people as a function of their consumption pattern, *Water Resources Management* 21(1): 35-48.

Hoekstra, A.Y. and Chapagain, A.K. (2008) Globalization of water: Sharing the planet's freshwater resources, Blackwell Publishing, Oxford, UK. In press.

saving technology, water conservation or environmental protection measures, wastewater treatment and water supply to the poor that do not have proper water supply. In other words, water-neutral consumption or production offsets the adverse environmental and social consequences of the consumption- or production-related water footprint. A water-neutral concept was conceived for the 2002 Johannesburg World Summit for Sustainable Development (WSSD) by Pancho Ndebele[8]. The idea at the time of the Summit was to quantify the water consumed during the conference by delegates and translating this into real money. Delegates, corporations and civil society groups were encouraged to make the summit water neutral by purchasing water neutral certificates to offset their water consumption during the ten-day summit, with the offset investment being earmarked for the installation of playpumps to water needy communities in South Africa and water conservation initiatives. The water neutral concept is currently being discussed within various communities, including academia, environmental NGO's and businesses, as a potential tool to translate water footprints into modes of action.

The water-neutral or water-offset concept shows similarity to the carbon-neutral or carbon-offset concept as has been developed in response to the challenge of taking climate change counter-measures. The principle of the concept is that a person reduces his/her water footprint as much as possible and pays a justified amount of money for the residual water footprint that he/she presses on the global water resources. It can be an instrument to raise awareness, stimulate measures that reduce water footprints and generate funds for the sustainable and fair use of freshwater resources.

Now the water neutral concept has been discussed in a bit wider audience it has become clear that the concept of water neutrality can be applied in a variety of contexts. Individual consumers or communities can try to become water neutral by reducing their water footprint and offsetting their residual water footprint. Socially responsible travelers who visit a water-scarce country where many people do not have even basic water supply facilities can try to 'neutralise' their water use during their stay by investing in projects to enhance sustainable and equitable water use. Large events like the Johannesburg Conference, the FIFA World Cup or the Olympic Games, that generally have a significant additional impact on local water systems, can be organised in a water neutral way by minimising water use and pollution by all possible means and by investing in local water projects aimed at improved management of the water system as a whole and for the benefits of society at large. Finally, businesses may like to become water neutral, be it from the perspective of minimising business risks (the risk of running out of water) or from the idea that it offers an attractive way of presenting the business towards the consumer.

In a strict sense, the term 'water neutral' is troublesome and even may be misleading. It is often possible to reduce a water footprint, but it is generally impossible to bring it down to zero. Water pollution can be largely prevented and much of the water used in various processes can be reused. However, some processes like growing crops and washing inherently need water. After having done everything that was technically possible and economically feasible, individuals, communities and businesses will always have a residual water footprint. In that sense, they can never become water neutral. The idea of 'water neutral' is different here from 'carbon neutral', because it is theoretically possible to generate enough energy without emitting carbon. Alternative names to 'water neutral' that have been suggested include water offset, water stewardship, and water use reduction and reuse. However none of these other terms seem to have the same gravity or resonance (inspiration) with the media, officials or NGO's as the term neutrality. For pragmatic reasons it may therefore be attractive to use the term 'water neutral', but there is a definite need to be clear about precisely what it entails if reduction of water use to zero is not possible.

In order to be 'water neutral' there are at least two requirements:

1. all that is 'reasonably possible' should have been done to reduce the existing water footprint;
2. the residual water footprint is offset by making a 'reasonable investment' in establishing or supporting projects that aim at the sustainable and equitable use of water.

[8] More info on www.waterneutral.org

The phrases between brackets (reasonably possible, reasonable investment) include normative elements that need further specification and about which one needs to reach consensus. The investment can be done in real terms in the form of own effort, but it can also be in terms of providing funds to support projects run by others. The size of the investment (the offset or 'pay off' price) should probably be a function of the vulnerability of the region where the (residual) water footprint is located. A certain water footprint in a water-scarce area or period is worse and thus requires a larger offset effort than the same size water footprint in a water-abundant region or period.

Water neutrality of a business

We elaborate the idea of water neutrality now one step further for the specific case of a business. When can a business be declared 'water neutral'? In line with the above a first requirement is that all that is 'reasonably possible' has been done to reduce the total water footprint of the business. This is most urgent in regions where the impact of the water footprint is high. A second requirement is that 'reasonable and effective investments' are in place to offset the residual water footprint. The larger the impacts of the residual water footprint, the larger the required investment.

A business can take full responsibility for reducing its operational water; it can strive towards using the best available technology (BAT). Besides, a business has influencing power with its suppliers, which it must use to get them to reduce their operational footprint (the businesses supply-chain WF). A business can also switch to another supplier that has a lower water footprint. A business also has influencing power with end users through educational efforts, but it also has direct responsibility in designing products such that they inherently use or pollute less water. An example: why produce water-use-intensive dishwashers if a similar or even higher quality dishwasher can be made that uses less water per dish wash? Businesses are responsible for improving the water-use characteristics of their products when technology allows.

Once maximum efforts have been made to reduce the three components of the business footprint, then offsets are needed to balance the residual water footprint.

The ability of businesses to reduce their supply-chain WF and end-use WF is limited in the sense that they have to influence others, while they have full control over their operational WF. This does not mean however that it is not their business. A business relying on a supply chain that cannot be characterised as 'water neutral' is not water neutral itself, even though the business has limited power to change the operations in its supply chain. There is a subtle difference between 'business water-neutrality' and 'business responsibility' or 'business ability'. When a business has done its best to make its supply-chain WF water neutral, it does not automatically imply that the business is 'water neutral'. The issue is that if a business has taken its responsibility to influence agents in the supply chain to reduce water use in the supply chain it does not mean that it was actually successful. If the business still gets its inputs from a wasteful supply chain – even though the business is not the one to blame because they did make their efforts to change it – the products from this business cannot be called 'water neutral' and as a consequence the business itself cannot be called 'water neutral'.

Discussion

The water neutral concept includes a normative aspect in that consensus needs to be reached about what effort to reduce an existing water footprint can reasonably be expected and what effort (investment) is required to sufficiently offset the residual water footprint. Other remaining key questions are thus:

1. How much reduction of a water footprint can reasonably be expected? Is this performance achieved by applying so-called Better Management Practices in agriculture, or Best Available Technologies in manufacturing? How does one deal with totally new products or activities?
2. What is an appropriate water offset price? What type of efforts count as an offset? Whether projects or payments, efforts should ideally be focused on those specific areas where a water footprint has greatest impact.
3. Over what timespan should mitigation activities be spread and how long should they last? If the footprint is measured at one period of time, when should the offset become effective?
4. What are the spatial constraints? When a water footprint has impacts in one place, are the limits to the distance from there should be considered a reasonable for offset activity to take place?

Accounting systems need to be developed that prevent double offsetting. For example, a business can offset its supply-chain WF while the business in the supply chain offsets its own operational WF. How to share offsets? And where offsets are achieved in projects that are joint efforts, how much of any calculated water benefits can an individual entity claim?

Despite the possible pitfalls and yet unanswered questions, it seems that the water neutral concept offers a useful tool to bring stakeholders in water management together in order to discuss water footprint reduction targets and mechanisms to offset the environmental and social impacts of residual water footprints. The concept will be most beneficial in actually contributing to wise management of the globe's water resources when clear definitions and guidelines will be developed. There will be a need for scientific rigour in accounting methods and for clear (negotiated) guidelines on the conditions that have to be met before one can talk about water neutrality.

Part 3: Background on Water Issues

Background

Across the world, still over 1 billion people lack access to safe water and about 2.6 billion people are still in need of sanitation services. If the current trends continue, by 2015 still 1.7 billion will have no access to basic sanitation and 1 billion people will be without safe drinking water.[9] Next to this, according to the International Water Management Institute (IWMI), approximately 450 million people in 31 countries already face serious shortages of water. These shortages occur almost exclusively in developing countries, which are ill-equipped to adopt the policy and technology measures needed to address the crisis.

By the year 2025, it is estimated that one-third of the world's population will face severe and chronic water shortages. And these shortages are not just in rural areas of developing countries; we have seen similarly great challenges in urban and peri-urban areas of major metropolitan areas throughout the developing world and increasingly in the developed world.[10] Apart from direct assess to water and sanitation, associated negative effects of the water crises can be found in terms of health impacts and decreased food security for the poor. Some three quarters of the 1.2 billion poor and the 800 million malnourished people in the world live in affected areas, with subsistence agriculture as their sole or primary source of food and income. [11]

The health impacts of the water crisis are well established.[12] Some diseases are closely correlated with the lack of access to water supply and sanitation combined with unhygienic behavior, particularly diarrheal diseases. Poor people suffer diarrheal diseases that kill some two million people each year – and over ninety percent are children under the age of five. Other diseases are water-related because the habitat for the vector transmitting the disease is closely linked to water, or live in water, e.g. malaria, filariasis, schistosomiasis, guinea worm. While still others can be caused by natural or anthropogenic low quality water or pollutants, such as arsenic, fluoride, heavy metals, persistent organic pollutants or endocrine disruptors. And there is another class that can be added here: health impacts that are compounded in vulnerable communities -- including the infirm (such as AIDS sufferers), the elderly, and children. In the Nyanza district in Kenya, for example, experts at Emory University inform us that "Diarrhea is the last straw. It is the sickness that kills them [AIDS sufferers]." [13]

In the year 2000, the United Nations and the international water community announced explicit goals – the Millennium Development Goals (MDGs) – for human development over the next several decades. One of these explicitly addressed water by setting the goal of reducing by half the proportion of people unable to reach or afford safe drinking water by 2015. A comparable goal for sanitation was announced in 2002 at the World Summit on Sustainable Development (WSSD) in Johannesburg, South Africa. Yet, even if these goals are achieved, hundreds of millions of people will still lack basic water and sanitation services two decades from now.[14]

Unfortunately, according to recent assessments,[15] the United Nations water goals and solutions to other water problems are unlikely to be achieved given current levels of financial and political commitment. Despite growing awareness of water issues, international economic support for water

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9 Meeting the MDG drinking water and sanitation target : the urban and rural challenge of the decade., WHO and UNICEF, 2006

10 Rich countries, Poor water, WWF report, 2006. www.panda.org/freshwater

11 World Health Organization, www.who.int

12 Rijsberman, Frank "The Water Challenge," Copenhagen Consensus Challenge Paper, May 2004. Rijsberman is Director General, International Water Management Institute, Colombo, Sri Lanka and Professor, UNESCO-IHE, International Institute for Water Education, Delft, The Netherlands and Wageningen Agricultural University, the Netherlands.

13 Mullen, Rhonda, "Collaboration in Kenya," Public Health, Emory University, Winter 2004/05.

14 Gleick, Peter H., The World's Water 2004-2005, Island Press.

15 Gleick, op.cit.

projects of all kinds is marginal. Not including WSSD commitments, official development assistance (ODA) for water supply and sanitation projects from countries of the Organization for Economic Cooperation and Development (OECD) and the major international financial institutions has actually declined over the past few years from approximately $3.5 billion per year (average from 1996 to 1998) to $3.1 billion per year (average from 1999 to 2001). Countries where less than 60 percent of the population has access to an improved water source received only 12 percent of the money.[16]

The UN World Water Development Report (2003) provides global estimates of funding for the water sector in the range of US$110 to US$180 billion, and concludes that there is a massive investment gap and that the sources of finance are inadequate. It is also estimated that the bulk of both current and future financing comes, and will have to come, from domestic public and private funding – not international financing through development. Overseas Development Assistance has a role to play and can be useful in the short term, but charitable aid is not sustainable over the long term. The US, for example, in November 2005 passed its "Water for the Poor Act" amending the US Foreign Assistance Act of 1961 to make increasing access to safe water and sanitation, in an affordable and equitable way, a major purpose of US foreign assistance efforts.

Despite the massive investment in water resource development and infrastructure during the twentieth century – in recent decades also reaching the developing world – the water crisis persists and imposes a significant cost on society. The 2003 report from the United Nations Task Force on Water and Sanitation gives some sense of the cost of the problem, noting that the total burden of diseases associated with poor quality water, sanitation and hygiene has been assessed as 82 million Disability Adjusted Life Years (DALYs) annually: taking a low valuation of $500 per DALY, the economic cost amounts to $40 billion annually.

Next to this, human activities often severely impact the worlds limited freshwater resources. Mainly due to abstraction and pollution of rivers, lakes and aquifers there is rapid deterioration of freshwater ecosystems and the environmental services that they provide. The authoritative Millennium Ecosystems Assessment (2005) states that in the 20th century, over 50% of all wetlands globally have been converted to other uses. Also water abstraction from freshwater systems has doubled since 1960 and will increase further by 30-70% depending on the scenario used. Dams and infrastructure already fragment 60% of the worlds largest rivers. As a result of this degradation, freshwater ecosystems tend to have the highest proportion of species threatened with extinction and vital environmental services like food production, purification, erosion control and hydrological regulation are severely inhibited. The Assessment tells us that "many of the poorest of the poor people are the first victims of the decreased productivity of these systems because they are directly dependent on these systems for their daily lives". As an example from the MEA (2005) the use of two ecosystem services - capture fisheries and water - is now well beyond levels that can be sustained even at current demands, much less future ones with all related impacts on the poor. [17] Also the 2007 Millennium Development report shows that while progress is being made on most of the 'development' MDGs (1-6) the MDG on environmental sustainability (7) reports an ongoing decline in biodiversity and ecosystem health.[18]

As an example, normally water scarcity maps do not depict the water scarcity that takes into account environmental quality as one of the criteria. Smakhtin et al (2004) have been the first to produce a world map on water stress indicators that does take into account the environmental water stress. Environmental water stress is assessed as the percentage of available water resources currently abstracted compared to environmental water requirements. Environmental water requirements are defined as the volume of water needed by a river to maintain key ecosystem

16 Organization for Economic Cooperation and Development (OECD), 2003. Creditor Reporting System. Aid activities in the water sector 1997-2002. Volume 2003/1. OECD, Paris.

17 MEA (Millennium Ecosystem Assessment) 2005. *Ecosystems and human well-being: synthesis.* Island Press.

18 Millennium Development Goals Report 2007. www.un.org/milleniumgoals

functions and biodiversity. This is expressed as a % of the naturalised flow of a river, and can vary under different conditions, notably between arid and non-arid river systems. In Figure 2 the red depicts the systems under the highest environmental water stress.[19]

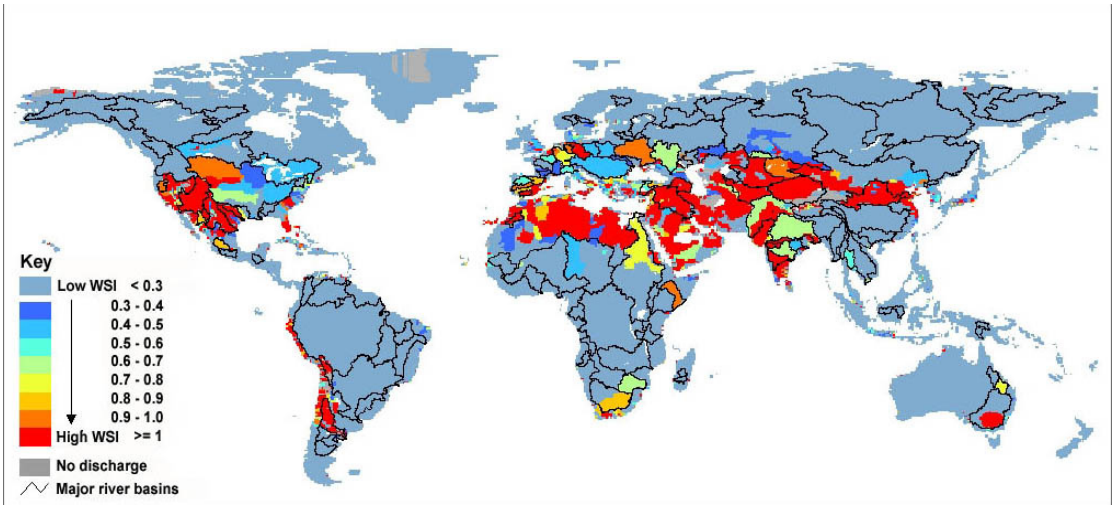

Figure 2: Water stress indicators (WSI) taking into account Environmental Water Requirements (Source: Smakhtin et.al., 2004)

The problem is not so much that there are no water resources, but the problem is the access to these resources. Generally, the poor have less access to these resources mainly for economical and political reasons. And, in terms of the environment, it is usually seen and depicted as a net user while obvious valuable ecosystem services like clean water and food supply are normally not accounted for in economic and political terms. Without fair water governance systems in place that take into account the needs of all water users including the environment, there is very low probability of increasing the access to water for the poor and sustaining the environment and its services. For this reason, at WSSD in 2002, the international community adopted the target on establishing Integrated Water Resource Management plans as part of the Millennium Development Goal framework to spark the application of integrated water management principles to managing water resources taking into to account the needs of all users. [20]

Globally, roughly 10 percent of all water diverted for human purposes is used for domestic purposes; 20 percent for industrial uses and 70 percent for agriculture.[21] To produce one kilogram of cereal grains requires about one cubic meter, or a thousand liters, of drop evapotranspiration.[22] In summary, it takes about seventy times more water to grow food for people than people use directly for domestic purposes – and roughly one thousand times more than people need drink.[23] So in a sense the competition between domestic uses and agricultural uses does not really exist, also domestic uses seem to politically prevail over the other uses. However in the case of almost non-

19 Smakhtin, V.; Revenga, C; and Doll, P. 2004. Taking into account environmental water requirements in global-scale water resources assessments. Comprehensive Assessment Research Report 2. Colombo, Sri Lanka: Comprehensive Assessment Secretariat.

20 Gleick, Peter H., The World's Water 2004-2005, Island Press

21 These numbers are higher in developed countries – e.g. Europe is up to 50 percent – because agriculture plays a smaller role in the economy in temperate zones as it needs less irrigation (more green water and less blue water). The water used for industrial purposes is dominated by cooling water for thermal power plants and process water. Only a small portion is incorporated in products (e.g. food and drinks) – the remainder is highly price elastic – that is, consumption can be reduced drastically as water gets more costly. Rijsberman, op.cit

22 Evapotranspiration is a measure of the amount of water consumed during the growing process of plants, either transpired through the plants' stomata or evaporated from the soil. Ibid.

23 see: http://www.worldwatercouncil.org/virtual_water/documents/virtual_water_final_synthesis.pdf.

existent water services to the poor and high water stress this argument will not hold true. Then competition does exist. [24]

Mainly because of increasing water scarcity and increasing demands on a finite supply of freshwater, the water crises have entered into mainstream political and economic debates. Especially the attention is increasing in the corporate sector who are starting to look at water from a business risk perspective. A risk that needs to be carefully managed. An example of this is the global water tool that is tool for companies to map their water use and assess their risks relative to global operations and supply chains.25

It seems that we are at a stage where academia, civil society and business have started to develop innovative tools and approaches that can help stakeholders to come together around a shared agenda on water stewardship. As part of this agenda, the concept of decreasing and offsetting water footprint can act as a potential entry point for business and other stakeholders to start positioning themselves as water stewards.

[24] Rijsberman, Frank "The Water Challenge," Copenhagen Consensus Challenge Paper, May 2004. Rijsberman is Director General, International Water Management Institute, Colombo, Sri Lanka and Professor, UNESCO-IHE, International Institute for Water Education, Delft, The Netherlands and Wageningen Agricultural University, the Netherlands.

[25] Www.wbcsd.org – global water tool