WATER FIGURES

TURNING RESEARCH INTO DEVELOPMENT

QUARTERLY NEWSLETTER OF THE
INTERNATIONAL WATER MANAGEMENT INSTITUTE

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Reducing our Water Footprint

While countries and companies scramble to measure their water footprint and its impact on the environment and the economy, the good news is that IWMI's research knowledge base offers viable solutions and options to help reduce water footprints. There are three basic steps to follow. Read more …

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EDITORIAL

WATER FIGURES ISSUE 1, 2009

Managing our Liquid Assets

The world is currently in the midst of a severe economic crisis that will shape the fate of nations and alter the lives of millions of people. World leaders, economists and great thinkers are debating the very future of our financial systems. Whatever the outcome, our economic world is going to change.

Our physical world is also changing. Nearly 7 billion people continue to extract and transform the Earth's resources, many to merely survive, some to prosper. Ultimately, all our economic activity rests on how we manage the Earth's resources. How we manage water, our most precious resource, will determine our quality of life.

Before the economic crisis, there were warning signs. Some were able to read those signs and tried to sound an alarm. They were largely ignored and now the entire world is reeling. There are warning signs that we are heading for an even more serious crisis if we don't manage our water resources in a more sustainable way. We can't manufacture more water, but we can use what we have more productively. We can reduce our water footprint.

To avoid water bankruptcy we can set up 'banks' for storing water in the form of ponds, rainwater harvesting structures, reservoirs and groundwater recharge systems. We can extract more value from each drop of water by diversifying and improving crop yields, multiple-use water systems, and managing for ecosystem services. We can improve our knowledge of water flows and use institutional governance mechanisms to make better water allocations. Finally, we can make better strategic investments in irrigation and water management practices to reduce individual and corporate water footprints.

In one form or another, IWMI has been working on reducing water footprints for decades. Our worldwide knowledge base offers science-based solutions to individuals, companies and countries interested in exercising better control over their water footprints. Let's not wait for a crisis to shake us out of our water spending mindset. Let's work together now to reduce water footprints so we tread more lightly on the Earth's resources.

Dawn Rodriguez
Editor

EVENTS

Water Footprint Reporting 2009 Conference

Brussels, Belgium, 5 -7 May.

34th WEDC International Conference on Water, Sanitation and Hygiene:

Sustainable Development and Multisectoral Approaches, Addis Ababa, Ethiopia, 18-22 May.

Singapore Water Week

Singapore, 22-26 June.

This year the theme is "Sustainable Cities – Infrastructure and Technologies for Water".

PRODUCTION CREDITS

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Launch of Knowledge Hub on Irrigation Service Reform

IWMI launched the Asia Pacific Water Forum's (APWF) Knowledge Hub on **Irrigation Service Reform** during a workshop in Bangkok from the 19th to 21st January 2009. This hub, led by IWMI and with the Food and Agriculture Organization of the United Nations (FAO) as a key partner will work towards the modernization of irrigation in the region. The theme of the workshop was "**Trends and Transitions in Asian Irrigation: What are the Prospects for the Future?**", and was part of an Asian Development Bank (ADB)-funded project. An issue paper with the same title is being prepared by IWMI and will be launched by the middle of this year. At the workshop, other papers prepared by IWMI and partners on Irrigation Management Reforms and Future Scenarios, were presented and discussed. The hub is expected to provide regional expertize in irrigation management and develop tools and products for a range of partners and clients including public and private sector players. This hub is part of the APWF network of knowledge hubs.

Share your views on the future of irrigation at **http://blog.iwmi.org/**

Shrinking the Global Water Footprint

We need to shrink the growing global water footprint and we need to do it quickly. While there is talk of a looming global water crisis, the reality is that for over a billion people, the water crisis is a reality. We can avert water bankruptcy if we move quickly with research-based solutions to reduce water consumption. Many private sector organizations are already measuring the volume of water they need to produce the goods they sell. Sustaining the world's economic engines will require practical solutions that reduce water consumption without unduly restricting business activity, limiting the benefits to communities or harming the environment. Moreover, as individuals, we can reduce our own water footprint by taking care of what we eat and how much we waste.

IWMI's research has consistently stressed the importance of better managing of scarce water to grow more food.

Steps to reduce the water footprint

Step 1: We can control the extent of a water footprint by first identifying what raw material is required to produce a product, and where it comes from.

Step 2: The next step is to estimate the water use of raw materials and water used in the production of the final product, the source of water used to produce it, and the impacts of its production. Does it come from lakes, rivers, reservoirs or aquifers? Is it from irrigation (blue water) or is it rainfed (green water)? Does it come from a country that is water-abundant or water stressed?

Step 3: Find ways of reducing the water footprint. By understanding, quantifying and mapping the water footprint of a specific product locate hotspots where better water management can reduce negative impacts of water use. Develop programs to reduce water use in the value chain from farmers field, transport, storage, and industrial process.

Making linkages and finding solutions

Goods are now produced on a worldwide scale. Cocoa grown in Africa is exported to Switzerland for chocolate production. Cotton grown in Central Asia is sent to Vietnam for garment manufacturing. For any given market chain, we can ask if the raw materials are grown in water-stressed areas and identify links between production and water stress. Then we can look at ways of reducing water stress by reducing the water footprint. For example, is it more economical to grow crops in water-abundant areas and ship them to areas where there is water scarcity? Can we switch to drought-tolerant crops in water-stressed regions?

IWMI has developed sophisticated GIS maps showing water-stressed areas, irrigated areas, and global environmental flows. There are also models and decision support tools. These can help manufacturers and product developers better understand the water footprint implications of the choices they make when they procure their raw materials and if they could make better choices. For example, one choice (and

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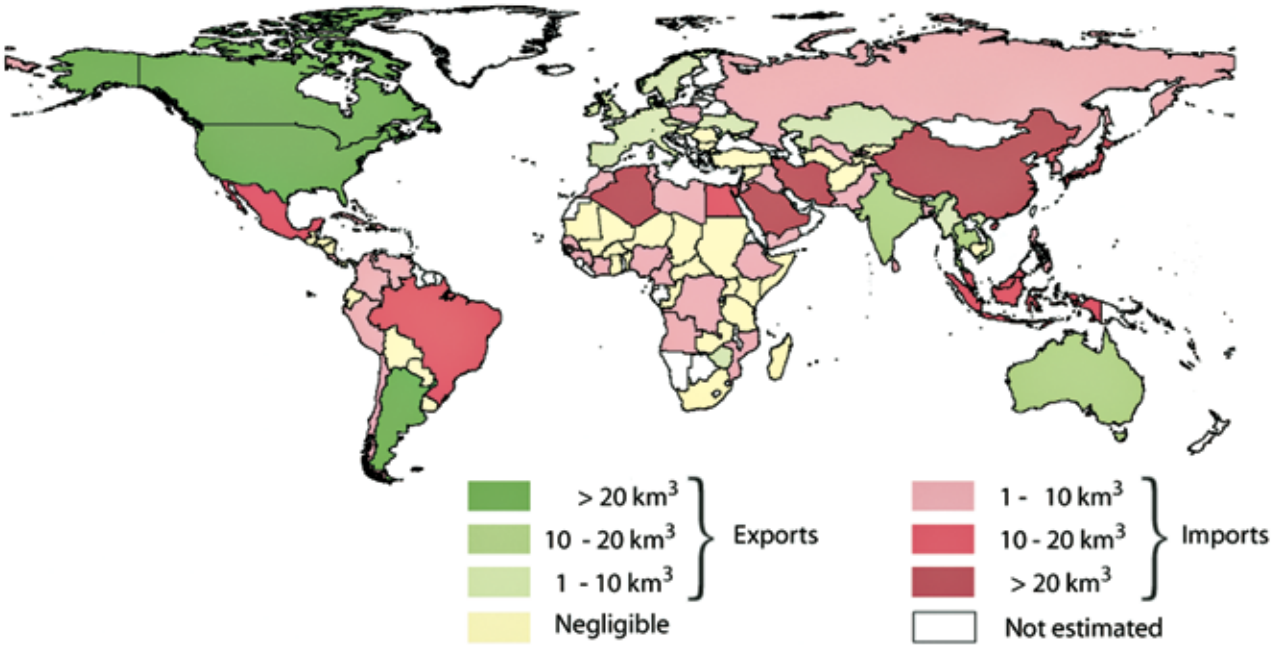
Virtual Water Trade of Cereals on Global Water Use



Source: Comprehensive Assessment of Water Management in Agriculture (CA).

"Virtual water" refers to the volume of water used to produce agricultural goods. Countries that import these goods essentially purchase water resources from exporting countries, thereby saving water they would have otherwise required to produce the goods in their own country.

Steps to measure and reduce th

"There is currently no commonly agreed set of metrics to measure a water footprint. This m
ignore the fact that good global water management is critical to doing business in the long

A **water footprint** reflects the amount of water used and its impact.

A **company's water footprint** extends beyond the water it takes to process a product to include the amount of water it takes to produce components.

An **individual's water footprint** includes the amount of water consumed to drink, to wash, but in fact is mostly determined by how much water it takes to produce the food we consume.

A **nation's water footprint** includes the water used from its own resources, plus the amount of water in its imports.

All water is not equal

While volumetric numbers illuminate the magnitude of the problem, they don't tell us the real impact.

The water impact of tea growing in Sri Lanka under high rainfall conditions is much more different to growing maize using unsustainable groundwater resources.

The water impact of animals grazing on pastureland is much more different than industrial production of beef using irrigated maize used to feed animals.

Water as rain is different to irrigation water which is different from water that returns to the atmosphere as evapotranspiration.

To reduce the impact we have to know which water and where is the impact.

Trends with a twist:

Sometimes it is wiser for a country that has water scarcity to import its food and products from water–rich areas than use up its own precious resources. The idea of virtual water, the amount of water used to produce food, helps us to think about it. IWMI and IFPRI's work on trade shows that it is possible to save water globally through virtual water trade from places where there is higher water productivity to places of lower water productivity.

But traders rarely think of water. According to data presented at the World Economic Forum in 2009, the world's top 10 exporters are water-scarce countries, and the world's top 10 importers are water-rich countries. IWMI research shows that certain states in water-deficit northwestern India send surplus grain to meet the deficit of water-abundant states.

Solution: Look for solutions outside of direct water management. National, regional and global trade can make a water difference.

Food takes a lot of water! But the variation in the amount gives us hope that there is scope to improve.

Look for solutions in agriculture: It is possible to grow more food with less water. This will require better water management and agricultural practices in rainfed and irrigated agriculture.

It is possible to reduce the application of irrigation water two to three times, with alternating wet and dry irrigation of rice.

e water footprint

akes it difficult to accurately measure the impact of industry on water, but we cannot term."

-José Lopez, Executive Vice President of Operations, Nestlé SA

Diet choices:

As more people move from grain–based diets to diets with more meat and vegetables more water will be needed.

As a rule of thumb, every calorie of food requires a liter of water to produce it.

Imagine a canal 10 meters deep, 100 meters wide and 7.1 million kilometers long. This is enough to go around the world 180 times. This is the amount of water it takes each year to produce food for today's population of 6.5 billion people. Add 2 to 3 billion more people and accommodate their changing diets from cereals to more meat and vegetables, and that could add another 5 million kilometers to the channel of water needed to feed the world's people.

-Comprehensive Assessment of Water Management in Agriculture

Solutions: Consider your own water footprint. How much do you eat? Where does the water come from? Do you waste food?

A vegetarian diet requires 2,000 liters of water per person per day.

A meat-based diet requires 4,000 or more liters of water per person per day.

Source: Comprehensive Assessment of Water Management in Agriculture (CA).

How much water do you eat?

Typical range in liters of water consumed by evapotranspiration depending on farm practices

1 kg wheat	500 to 2,500 liters
1 kg beef	5,000 to 15,000 liters
1 days food	2,000 to 5,000 liters

Cut down on waste

Wasted food is wasted water. Research by IWMI, the Stockholm International Water Institute (SIWI) and FAO show that as much as 50% of the food we produce is wasted through inefficient or ineffective manufacturing, storage, transport, marketing and non-consumption. We can conserve water by cutting down on waste.

Solutions: Industries can source water from places that use less water, and where the impact is minimal. They can help improve the water efficiency of the supply chain, by giving incentives to farmers including a good market, and by encouraging less waste in storage and transport.

How much water do you wear?

Not only is there virtual water in food but also in the everyday products you use like clothes.

1 cotton shirt weighing 250 grams	approximately 2,000 liters
1 pair of jeans weighing 1,000 grams	approximately 10,850 liters

Source: UNESCO-IHE

Solutions: Using raw materials that require less water, water reuse and recycling can reduce the volume of water used in manufacturing and finishing processes.

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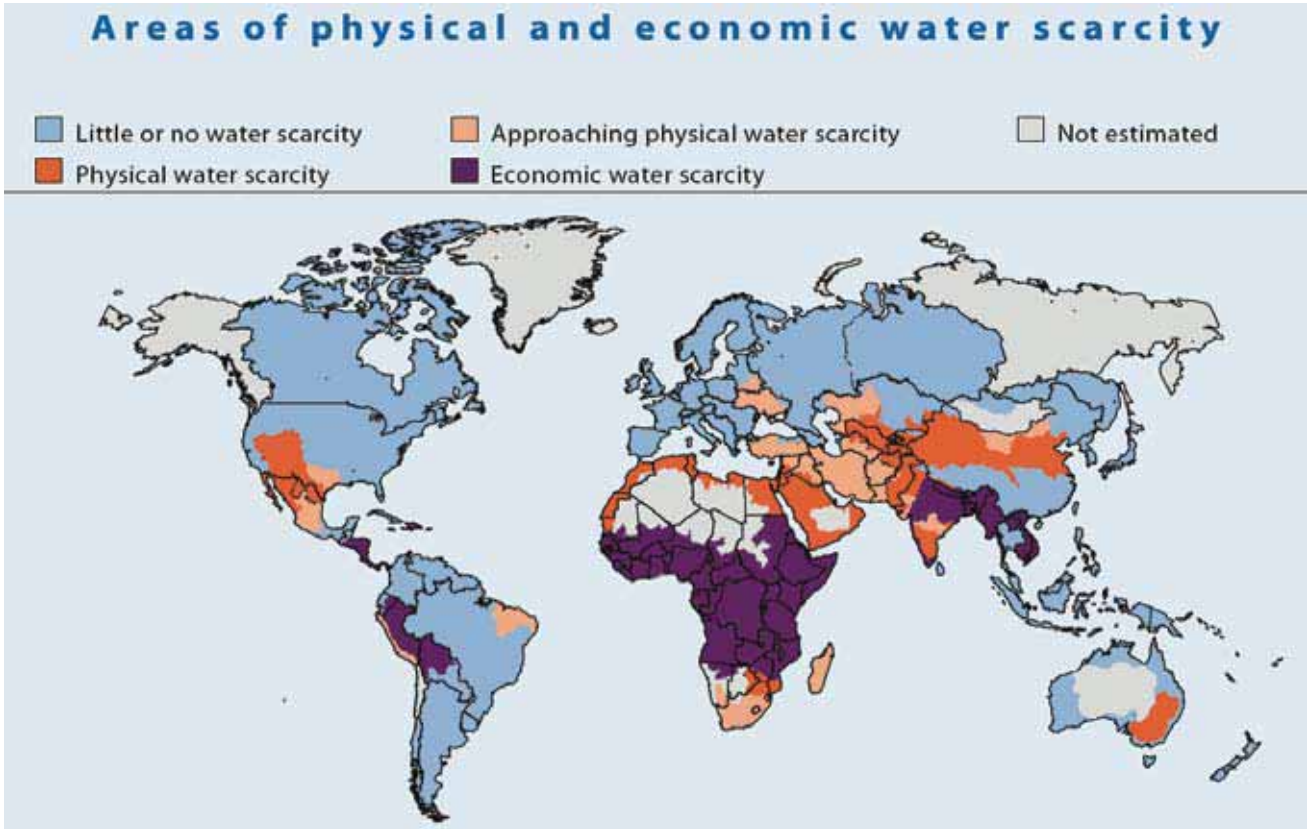

Source: Comprehensive Assessment of Water Management in Agriculture (CA).

there are many) is that a company that specializes in cotton clothing could reduce their water footprint by not importing cotton from a region that is water-stressed or they could look at more sustainable ways of growing cotton. IWMI's water scarcity and environmental water stress maps can be overlaid on water footprint, crop intensity, demand growth and productivity maps to identify water stress hotspots and areas with a high potential for improving water productivity. To design interventions that help in food production, it is necessary to understand the production process to identify ways of improving water productivity. Companies have an important role to play in influencing practices of water managers and farmers.

IWMI has pioneered techniques to raise water productivity by looking at water management on farmers fields to river basin to the globe. For example, supplemental irrigation can improve water productivity. Low-cost technologies can be used to access water to supplement rain, and help poor farmers to produce high quality goods with limited water supplies. Well-designed water allocation practices combined with water saving practices can release water to cities or the environment, while maintaining enough water in systems for farmers to grow food.

A recent paper by IWMI, FAO and the Stockholm International Water Institute (SIWI) quantified the volume of food wasted globally, another cause for the growing global water footprint. Wasted food is wasted water. Fifty percent of food is wasted through inefficient or ineffective manufacturing, storage and transport processes, and through inefficient marketing and non-consumption. Reducing this colossal waste would be a huge step towards reducing the global water footprint. IWMI research might well be able to offer some of the answers.

Flowers grown for export in Ethiopia. Ethiopia is a water-stressed country but this activity provides an income for many poor people. Sustainable solutions to using water efficiently can help reduce the water footprint.

Straight Talk:

Escaping the Water Crisis: The Hidden Water and Food Link

An interview with Dr. David Molden, Deputy Director General–Research at IWMI and also leader of the Comprehensive Assessment of Water Management in Agriculture (CA)

Q: Today, one-third of the world's population has to contend with water scarcity, and there are ominous signs that this proportion could quickly increase. What are the reasons for this?

A: One reason is that up to twice as much water will be needed to provide enough food to eliminate hunger and feed the additional 2.5 billion people that will soon join our ranks. The demands will be particularly overwhelming as a wealthier, urbanized population demand a richer diet with more meat, fish, and milk. The water needed for a meat-based diet is double that of a 2000 liter per day vegetarian diet. Meanwhile, cities and industries will demand more water. Biofuel production will also exert even more pressure on water supplies. We may reach the day when we will have literally made one too many trips to the planetary well. Given the current rate of development, we will not be able to provide water to grow enough food while also sustaining a healthy environment. The only solution is to learn how to live with less water by making much better use of what we have.

Q: Better water management is good for farmers, good for the environment and good for all of us. While we know many of the ingredients to make this happen, the big question is why doesn't it?

Micro-Irrigation in West Africa.

A: Actually, the good news is that it does happen. People are searching for tools, new and old, to produce more food with less water. They are adopting more precise irrigation practices, such as drip and sprinkler irrigation. Many farmers in Nepal and India, for example, now regularly use low-cost drip irrigation to grow vegetables. In sub-Saharan Africa, just a little water, combined with improved varieties, fertilizer and soil management, can go a long way. Farmers can double the yield per hectare they currently harvest, and double the amount of food produced per unit of water.

Over the last two decades in Asia, sales of pumps that allow farmers to more reliably and precisely apply water to their crops have skyrocketed. Rice farmers in parts of Asia are now saving water by a practice known as "wet and dry" irrigation rather than following the traditional practice of keeping rice paddies constantly flooded.

The bad news is that change isn't happening fast enough. For example, there are still far too many ill-maintained and poorly operated irrigation systems across Asia that provide two times more water than is really needed, and produce half as much as they should. In sub-Saharan Africa, the problem is not water waste, but the simple and devastating issue of access. Water is available, but many farmers lack access to enough water to produce food to feed their families.

Q: Why is it that today water in some areas is used so carelessly?

A: One problem lies with a policy environment that fails to connect the interests of different user groups. For example, farmers have little interest in being more conservative with water if the benefits flow to cities and not to them. Broadly speaking, water is a precious commodity, but for many users the costs are negligible. The price of water is not sending a signal to conserve. We need to craft more creative incentives to conserve the many interlinked users of water. Many countries do not invest enough in water to enable poor rural communities to grow more food. Poor countries simply cannot afford investments in large hydraulic infrastructure. Fortunately, research and development organizations have identified new and more affordable opportunities for low-cost water investment. For example, resource poor farmers can afford low-cost pumps, whereas conventional irrigation is well beyond their means, costing over US$4,000 per hectare.

Q: The industrialized world is quick to point its finger at agricultural producers, blaming them for water woes. Are they really to blame?

A: Our food habits are driving the problem. Fifty percent of food is wasted after it leaves farmers' fields. That's an equivalent water waste of 50%, because wasted food is also wasted water. Action is urgently required on several fronts. We must continue to encourage the many local actions that are having a positive impact now. We must establish policies that create incentives for farming communities to invest in better water management. And we must invest in the infrastructure and the knowledge systems needed to manage complex water systems for the benefit of all water users. Each of us can make a difference if we consider the water implications of our lifestyles and the water footprint we are leaving behind.

Dr. Molden can be reached at d.molden@cgiar.org

Interview by Dawn Rodriguez

Water from the Godavari River in India is used for washing, bathing and other multiple purposes.

Photo Credit Vladimir Smakhtin

The International Water Management Institute (IWMI) is a non-profit research organization and one of 15 international research centers supported by the Consultative Group on International Agricultural Research (CGIAR). IWMI has offices in Sri Lanka (headquarters), India, Pakistan, Nepal, Laos, Vietnam, Ghana, Ethiopia, South Africa, Syria and Uzbekistan.

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