

# WATER FIGURES

TURNING  
RESEARCH  
INTO  
DEVELOPMENT

QUARTERLY NEWSLETTER OF THE  
INTERNATIONAL WATER MANAGEMENT INSTITUTE



## CONTENTS

Editorial: In Crisis: Food and Water (p.2) / Multiple-use Water Services: From Africa to Asia the Global Food Crisis is an Opportunity for Poverty Reduction (p.3) / Waste Not, Want Not (p.4) / The World Food Crisis-A Push for Urban Farming (p.5-6) / Straight Talk: Impacts of the Food Crisis on India's Water Resources (p.7) / Recent Publications (p.8)

## ISSUE 2 2008

### The Food and Water Crisis

Skyrocketing food prices have sent shockwaves around the world, and caused riots in some countries. Underlying the food crisis is an even deeper issue – the looming water crisis. Can this be managed? What solutions can research offer?

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# EDITORIAL

WATER FIGURES ISSUE 2, 2008




## In Crisis: Food and Water

World Environment Day falls on the 5th of June. This time, Water Figures examines not the natural environment, but our troubled food and water landscapes. We are now in the middle of a "World Food Crisis" where water and food are two inseparable elements. We are reminded of the crisis every time we go grocery shopping and see skyrocketing prices or dwindling stocks. But many people still fail to see the bigger issue shadowing the food crisis: the coming world water crisis. For many developing countries, physical water scarcity is already here. A growing global population, urbanization, changing diets, climate change and high fuel prices are drivers of what we are experiencing today. Adapting to these changes will require better water management and wise investments in water sector development. To grow food you need water – lots of it. Agriculture already takes up around 70% of the world's freshwater resources. The challenge is to grow more with less, and do more with less, stretching every drop more than every dollar. It could well be that the water crisis will still remain, long after the food crisis has been resolved.

The good news is that research offers hope for the future. IWMI's research has repeatedly stressed the importance of increasing water productivity, by getting the maximum benefit out of every drop of water. Multiple-use water services are one way of increasing water productivity. Another option is to curb the huge amount of wastage that takes place on a daily basis. Food thrown away still costs a lot of water, so wasted food is also wasted water. This was the theme of a recent press conference initiated by FAO, SIWI and IWMI in New York, which drew widespread media attention. Cutting down on waste can save water.

On a positive note, in developing countries like Africa and Southeast Asia, the food crisis is opening up opportunities for smallholders to get a share of the market once dominated by giant food cartels. Urban farming is transforming the socioeconomic landscape and providing food for growing cities.

In this issue IWMI also interviews one of its partners in India on the implications of the food crisis on groundwater resources. There are many facets to the food crisis. Our hope is that Water Figures will provide not just food for thought, but also plenty of fuel for action. 

Dawn Rodriguez  
**Editor**

### EVENTS

#### High Level Conference on World Food Security

3-5 June, at FAO Headquarters, Rome, Italy

Theme: The Challenges of Climate Change and Bio-energy.

#### Annual Conference of the North-South Centre: Water for Development: Prospects for Integrated Water Resources Management

4 June, in Zurich, Switzerland

#### World Environment Day 2008

5th June

Theme: "Towards a Low Carbon Economy".

#### Singapore International Water Week

23 to 27 June 2008 at Suntec Singapore International Convention and Exhibition Center

Launch of Network of Water Knowledge Hubs for Asia Pacific regions.

26 June, in Singapore

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### IWMI paper wins "Honorable Mention"

IWMI's paper entitled "At what scale does water saving really save water? Lessons from the use of resource conservation technologies in Pakistan.", published in the Journal of Soil and Water Conservation, was selected for the SWCS 2008 Editor's Choice Honorable Mention. The Editor's Choice Award is given annually to recognize the contribution of an author or group of authors for their notable article appearing in the front (A) section of the Journal of Soil and Water Conservation in the previous calendar year. This paper was authored by Mobin-ud-Din Ahmad, Mark Giordano, Hugh Turrall, Illyas Masih, and Zubair Masood. The award will be presented at the SWCS Annual Conference Awards Luncheon on Tuesday, July 29, 2008 in Tucson, Arizona, USA.



# Multiple-use Water Services: From Africa to Asia, the Global Food Crisis is an Opportunity for Poverty Reduction

BARBARA VAN KOPPEN

Many analysts of the staggering food prices highlight the fact that the impacts of the current food crisis are worse for poor people. However, assuming that all poor people are merely passive victims in the same circumstances may harm even more. Those who are the hardest hit are poor net food buyers who tend to spend up to 80% of their incomes on food. But even many poor urban net food buyers already grow some food or hold livestock for self-consumption, often using water that municipal planners designed for domestic purposes only. Surplus produce is sold. Urban agriculture and small-scale enterprise by an estimated 800 million farmers contributes to 15-20% of the world's food needs. This trend is likely to continue under the food price hikes.

**In rural areas, where a significant proportion of the poor are net food producers, the crisis could, in principle, lead to nothing less than a historical turning point towards poverty eradication. Agriculture is back on the agenda. Enter the era of the smallholder...**

Throughout history, agriculture has been the engine of economic growth in most middle and high-income countries. It still has an important potential in today's low-income countries, especially in Sub-Saharan Africa. However, market competition by the high-input, heavily mechanized large-scale farms is killing the markets for small-scale farmers. Indeed, the global crisis drives the importance of the global agrarian structure further home. Will the world's large food cartels seize the market opportunities, engendering a new wave of land and water grab in low-income countries? Or can pro-poor public intervention catalyze broad-based agricultural growth by citizens themselves, save food aid and other relief programs, and finally end poverty? Stimulating small-scale users' preferential access to today's flourishing agricultural markets would both increase productivity and decrease poverty.

The answer will also depend on the water sector. Water is an important, if not a limiting factor in increasing production and shaping the agrarian structure. A major untapped opportunity is stimulating multiple-use water services ('MUS') to bring more water to homesteads. This emerges from a eight-country comparative study on systems designed for single domestic use only, which, in reality, were used for multiple purposes (as most systems are) and on systems that were explicitly designed for multiple uses.

Research ([www.musproject.com](http://www.musproject.com)) found that quantities of factual water use are double or triple (50-100 liters or more per person per day) the quantities that the domestic sector currently adopts as its standard design criteria (of 25-50 liters per person per day). Water is used for domestic purposes, livestock, brick making, gardening, staple foods, tree growing, aquaculture and small-scale crafts and enterprise. Women and girls benefit in particular, not only because this alleviates their domestic chores, but also because their say over the output of homestead-based activities tends to be stronger than for other sites of agricultural production. For the land-poor, the homestead is often their only site for production.

Two types of technologies were broadly found to provide the best for such larger quantities of factual water use: first, individually managed homestead-based technologies like shallow wells or boreholes with improved lifting devices, run-on ponds, or roof water harvesting, and, second, communal systems with distribution networks up to a household connection or nearby street taps. If street taps are too scattered, the distance to the point of end-use becomes too prohibitive. The same holds for the third type of technology: single-access water points, like communal boreholes or village reservoirs.

## Case in Point:

The point at stake is well illustrated by farmers in Northeast Thailand. Reinforced by the economic crisis of the 1990s, a national strategy of economic sufficiency through homestead-based production was promoted in rural areas. Water was the limiting factor in Northeast Thailand. A growing network of farm leaders and farmers engaged in widespread experimentation with run-on ponds and other water harvesting structures, and integrated farming and aquaculture.



Rainwater storage tank in Nepal



Run-on pond in Northeast Thailand



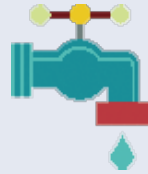
# Waste Not, Want Not

50% of water used to grow food globally is lost or wasted

**500 million people** could benefit from this “wasted water”



**30%** of food thrown away in USA



**40,000 billion liters** Equivalent amount of water wasted

Annual amount of food thrown in UK:

**6.7 million tons**



Leftovers in UK:

**1.2 million tons**



Food thrown away equals

**18 million tons** of carbon dioxide emissions each year

A 50% reduction of losses and wastage in the food production and consumption chain is a positive and very achievable target. Targeting these losses provides win-win opportunities to benefit farmers, businesses, ecosystems, and the global hungry.



More than enough food is produced to feed the world, but distribution of food is a problem – many are hungry, while at the same time many overeat.



Photo Credit Herath Manthrilake



Photo Credit Sumith Fernando

## Throw-away food

Not only do farmers have to supply food for our consumption but also for our wasteful habits.



# Wasted Food = Wasted Water

Massive quantities of food are lost in processing, transport, supermarkets and people's kitchens. Wasted food is also wasted water. According to the Comprehensive Assessment of Water Management in Agriculture presented last year, a continuation of today's food production and consumption and environmental trends will lead to crises in many parts of the world. But the magnitude of current losses and waste can be transformed into an unlikely source for optimism. Present possibilities to improve water productivity and reduce the quantity of food that is lost and wasted can enable us to feed growing, hungry and richer populations with available water resources.

*The Stockholm International Water Institute (SIWI), the Food and Agriculture Organization of the United Nations (FAO) and the International Water Management Institute (IWMI) held a press conference at the United Nations Headquarters Press Conference Room on May 14th 2008, for the launch of the report "Saving Water: From Field to Fork – Curbing Losses and Wastage in the Food Chain." Jointly authored by SIWI, in collaboration with IWMI and SEI (Stockholm Environment Institute) the 26-page study points out that water will be a key constraint to food production -- "unless we change the way we think and act about water resources."*



Photo Credit Sumith Fernando

Improving water productivity can enable us to feed growing, hungry and richer populations with available water resources.



## The World Food Crisis – A Push for Urban Farming

PAY DRECHSEL

***In many developed countries, backyard gardening is considered more of a recreational activity, but internationally it has the potential to feed entire cities with important commodities. This inner city food production or "urban agriculture" was a widely discussed topic at the last World Urban Forum in Vancouver, Canada, and is again on the agenda of the forthcoming 2008 Forum in Nanjing, China.***

The World Food Crisis, has pushed urban farming high on the global agenda coupled with the awareness that "world agriculture has entered a new, unsustainable and politically risky period". This is what Joachim von Braun, from the International Food Policy Research Institute (IFPRI) in Washington, DC, observed in his recent comment in *The Economist*, looking at the food riots which have erupted in countries all along the equator. "It's an

explosive situation and threatens political stability," worried Jean-Louis Billon in the same article. Jean Louis is president of Côte d'Ivoire's chamber of commerce. Tension is mounting, especially in growing cities which depend on food imports from rural areas and the global food market. Add to that the current migration of the world's population to cities—nearly 50% of people in the world live in urban environments—and urban food security becomes a huge issue, especially in developing countries where infrastructure is poor and overall poverty cannot accommodate increasing world food prices.

In response, Kwame A. Insaïdoo from Ghana asked in his recent article on "Dealing with skyrocketing global food prices" to revive mechanisms like "Operation Feed Yourself", which encouraged backyard farming, institutional and school gardens. In countries like Ghana and Nigeria, urban gardening was encouraged



Photo Credit www.ruaf.org

School children with their crops in a school garden in Lima

in the seventies through such programs to cope with food insecurity. Indeed, during political and economic crises, urban agriculture was always a popular strategy for maintaining urban food supplies throughout Africa, as Prof. Axel Drescher, advisor to the FAO, stated. After seven

years of conflict with a civil war lasting from 1989 to 1997, the Liberian Ministry of Agriculture in conjunction with FAO developed a plan of action for supporting emergency agricultural activities. Part of it was the encouragement of urban farming in backyards to aquaculture. According to a recent IWMI Research Report, in other civil-war prone countries of sub-Saharan Africa, war-related shortages of food supplies led to similar initiatives in support of urban agriculture, as reported in the 1970s, 1980s and the 1990s from Ghana, Zambia and Congo. Also in Freetown, Sierra Leone, urban agriculture played a significant role during the civil war when the rural-urban road network was blocked. Farming within and near Freetown became a basic survival mechanism, as Olufunke Cofie from IWMI-Africa reports in the 2007 "State of the World" report of The Worldwatch Institute.

Another famous example is Cuba—a country that turned to urban agriculture out of necessity when the collapse of the Soviet Union cutoff 50-80% of its trade flows and food prices sky-rocketed. In response to the food shortage, Cubans began to grow their own food within cities, despite strict laws against urban agriculture in places like Havana. Spaces such as rooftops, balconies, and vacant lots were used for food production. The government soon warmed up to the idea, and grants of land were made to any person who promised to grow food on it. Markets were opened and urban food

production not only helped to feed citizens, it eventually became profitable for urban farmers. The example of Havana became a benchmark for the success of other cities wishing to adopt formalized versions of urban agriculture. Many cities in the world followed this example by accepting and promoting urban agriculture.

John Ssebaana Kizito, former mayor of the city of Kampala in Uganda, boasted of urban agriculture's success in his city at the World Urban Forum. This success can be felt immediately among the urban poor who spend 60% or more of their income on food. Kampala farmers not only provide fruits and vegetables, they also supply 70% of the poultry products consumed in the city. In addition to food security, agriculture in the city of Kampala has opened up new job opportunities for people migrating into the urban setting. IWMI data showed that indeed, in many more cities, like Dakar, Bamako, Accra and Kumasi, depending on crop and season, between 60 and 100% of the leafy vegetables consumed are produced within the respective cities, with employment figures ranging from 1,000 to 15,000 jobs.

**Globally, 15 to 20% of the food produced in the world comes from some 800 million urban and peri-urban farmers as estimated by the United Nations Development Agency.**

In the past, urban agriculture was viewed by many governments as a form of squatting—in which people used land that they had "no right" to be on in order to obtain some type of food security. But, today, urban agriculture is receiving significant interest and legitimacy in the eyes of municipalities all over the globe and it is not only through the current attention on the World Food Crisis. Reasons go beyond food supply. Urban farming also cuts back on food miles—the energy required to get food to your plate, which is a big factor, especially where most packaged food is imported. IWMI data shows that the average food item found in a supermarket or food shop in Ghana's capital, Accra, travels by air 3,700 km before it is on the shelf, nearly twice as far as in New York. In Canada, with an average transport distance between farm and fork of 2,400 km, the David Suzuki Foundation estimated that the production of the food needed to feed a family of four, including packaging and distribution, releases up to eight tons of carbon dioxide annually.

Yet, despite their growing importance, urban and peri-urban agriculture are still subject to numerous constraints, such as lack of suitable land, uncertainty about land tenure, outdated legislation, insufficient access to irrigation water of appropriate quality, inadequate know-how, and low investments. In a number of ongoing projects, IWMI and its national partners are addressing such constraints, from bylaw revision to safer irrigation practices, where irrigation water is of poor quality.



Urban agriculture in Cuba. Today urban agriculture is receiving significant interest and legitimacy in the eyes of municipalities all over the globe.





# Impacts of the Food Crisis on India's Water Resources

*Water, a finite and vulnerable resource, is an essential component of sustainable agriculture. Its rational development, utilization and conservation are important elements of any development strategy. Dawn Rodriguez talks to one of IWMI's partners, Dr. Balwinder Sidhu, Director of Agriculture, Punjab, on the present food crisis and its relationship to water resources in India. Dr. Sidhu was a Senior Professional Research Fellow under the Groundwater Governance in Asia (GGA) Program.*

**As a result of the current food crisis with its soaring prices and shortages, the obvious solution appears to be that of increasing food production by growing more food to meet current demands. What implications would this have on water resources in India and in particular groundwater resources where overdraft is already a problem?**

To me, the current food crisis appears to be a combination of growing demand for food grains and also diversion of food grains like maize and soybean for production of biofuels. Irrigated agriculture is of great importance for food grains as about 55% of rice and about 90% of wheat in the country are produced in irrigated areas. However, 55% of the total food grain production is contributed by rainfed farming. Irrigated agriculture on the one hand has to provide a major share of increasing demand for food but on the other hand, it is threatened by water shortages arising out of competition from other sectors. In future, municipal water will always be the first priority. The industrial and environmental use of water is also likely to increase. Agriculture—especially the irrigation sector will have to get along with less and less water in times to come, and this water could be increasingly of a marginal quality.

Intensive agriculture practiced in the state has led to over-dependence on

groundwater. The cost of extraction of groundwater in case of agriculture is also low because of the supply of free power to tubewells. As a result, the water levels in most parts of the state are depleting. It is time that the State recognizes its dependency on groundwater resources, which are under stress due to the growing demand from agriculture and a growing population, as well as uncertain climatic changes.

**In the north-western parts of India where groundwater is over-exploited, the state government was trying to move farmers away from the irrigated paddy/wheat cropping system to cultivating vegetables and other high value crops. Do you think rising food prices will undo the government's work over the past 5-10 years and will farmers have to revert to water-intensive paddy/wheat cultivation again?**

In the northwestern parts of India, the diversification from irrigated paddy to mainly fruits and vegetables was seen as a step to save irrigation water. With the rising prices of wheat and paddy, the expansion of areas under fruit cultivation is likely to be affected due to a longer gestation period for fruits. However, the economics of vegetables will still be better than rice or wheat and our efforts to improve the marketing infrastructure for vegetables will also help in retaining the area expansion. The setback is likely to be for cotton and corn, where the area under cultivation is likely to decrease.

**What possible solutions do you see which could minimize the negative impacts of the food crisis on groundwater?**

Agriculture is the key to address the issues of poverty reduction, food security, natural resource management and environment sustainability, as it embodies the idea of interaction between land, water, air and people. The conflicts between development



Dr. Balwinder Sidhu, Director of Agriculture, Punjab

and conservation are likely to occur at least in the short-term. The solution lies in preparing a long-term strategy which should encompass improvement in water use efficiency, water quality management, in situ rainwater harvesting, renewed thrust on R&D in agriculture and promotion of resource conservation technologies (viz. zero tillage, laser-assisted land levelling, raised bed planting, direct seeding of rice etc.). Since people are both the means and the ends of the development process, human resources development and capacity building can play a vital role. The empowerment of people through accountability and good governance should be the priorities.

Agricultural water management must be integrated with other water management practices. In particular, action will be required on the part of water users, who sustain their well-being through groundwater abstraction; decision makers, both elected and non-elected; civil society groups and associations; and scientists who must advocate the use of sound science in support of better agricultural water management. In other words, better water resources management will require better governance and all stakeholders will have to operate on a higher level of social competence in future.



Photo Credit: IWMI-Ghana

Man watering crop in the Volta basin - Ghana.



## Recent Publications

For on-line access to IWMI Research Reports and Working Papers, see <http://www.iwmi.cgiar.org/Publications/index.aspx>

### IWMI Research Reports

1. Amarasinghe, Upali; Shah, Tushaar; Turrall, Hugh; Anand, B. K. 2007. India's water future to 2025-2050: business-as-usual scenario and deviations. Colombo, Sri Lanka: IWMI. 41p. (IWMI Research Report 123)
2. Saleth, Rathinasamy Maria; Dinar, A.; Neubert, S.; Kamaiah, B.; Manoharan, S.; Abayawardana, Sarath; Ariyaratne, Ranjith; de Silva, S. 2007. Institutions, impact synergies and food security: a methodology with results from the Kala Oya Basin, Sri Lanka. Colombo, Sri Lanka: IWMI. 46p. (IWMI Research Report 124)
3. Smakhtin, Vladimir; Gamage, Nilantha; Bharati, Luna. 2007. Hydrological and environmental issues of interbasin water transfers in India: a case of the Krishna River Basin. Colombo, Sri Lanka: IWMI. 26p. (IWMI Research Report 120)
4. Venot, Jean-Philippe; Turrall, Hugh; Samad, Madar; Molle, Francois. 2007. Shifting waterscapes: explaining basin closure in the Lower Krishna Basin, South India. Colombo, Sri Lanka: International Water Management Institute. 50p. (IWMI Research Report 121)
5. Zorner, Robert J.; Bossio, Deborah A.; Trabucco, Antonio; Yuanjie, Li; Gupta, Diwan C.; Singh, Virendra P. 2007. Trees and water: smallholder agroforestry on irrigated lands in Northern India. Colombo, Sri Lanka: International Water Management Institute. 41p. (IWMI Research Report 122)

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### IWMI Articles in Journals

1. Allan, T.; Lang, T.; Selborne, J.; Hauter, W.; Rooker, J.; Aldaya, M.; Llamas, R.; Reeves, N.; Gonzalez Ateka, M.; Mehta, L.; Rockstrom, J.; Molden, David. 2008. The big question: is our food too thirsty? *Food Ethics*, 3(1): 10-14.
2. Ayalew, D.; Boelee, Eline; Endeshaw, T.; Petros, B. 2008. Cryptosporidium and Giardia infection and drinking water sources among children in Lege Dini, Ethiopia. *Tropical Medicine and International Health*, 13(4): 472-475.
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