

Pro-Poor Strategies in Irrigation

The benefits of irrigation often bypass the poor because of unequal access to resources, the lack of infrastructure and support services, as well as agricultural policies. A recently completed IWMI study investigates the relationship between poverty and irrigation and recommends measures to extend the paybacks of irrigation to poor people as well.

Although irrigation has increased production and reduced famine, poverty persists in Asia, particularly in South Asia, which is home to more poor people than sub-Saharan Africa. The Green Revolution doubled annual cereal production to nearly 800 million tons with most countries achieving self-sufficiency in food grains, but refining strategies will be necessary to address poverty more effectively.

Focus on poor farmers

In the context of the UN's millennium goal of halving poverty by the year 2015, IWMI launched a study in 2001 to discover how irrigation can offer more benefits to the poor. Its objective was to determine realistic options to increase returns to poor farmers in low-productivity irrigated areas, while also improving the overall performance and



Photo credit: IWMI-HQ

Poverty is much higher in areas without access to productive water in comparison to irrigated areas. Living in a non-irrigated region in Uda Walawe, Sri Lanka, this woman struggles to provide the basic needs of her family.

sustainability of established irrigation schemes.

Funded by the Asian Development Bank, the study explored the links between irrigation and poverty in six Asian countries, chosen for their social and economic diversity,

as well as their handling of the transfer of irrigation management from public agencies. India, Pakistan and Bangladesh formed a contrast with Vietnam and China (where economic development has proceeded more fairly), and with Indonesia

(where irrigation development is part of a large government transmigration scheme). A similar indepth study in Sri Lanka's Walawe Basin, financed by Japan Bank of International Co-operation Institute, further enriched the results of the main study.

Pro-poor, poor-neutral, or anti-poor?

Unique in its magnitude and scope and the most thorough of its kind ever carried out, the study suggests that irrigation's impact on poverty in developing countries can be strongly pro-poor, poor-neutral, or even anti-poor, depending on a set of conditions identified in the study. The impact on the poor depends on factors such as land and water distribution, the quality and sustainability of irrigation and infrastructural management, the availability of inputs and support services, and water and

Continued on page 3 ►

In Conversation ... with Akiça Bahri



Photo courtesy Akiça Bahri

Akiça Bahri—IWMI's new Director for Africa

We met Akiça recently to ask her about her evolving relationship with IWMI. Having served as a member of IWMI's Board of Governors (January, 2003-November, 2004), Akiça has taken up a new challenge as Director of IWMI Africa. Currently at IWMI-HQ, she will be based at the IWMI Ghana office.

A former Director of Research at the National Research Institute for Agricultural Engineering, Water and Forestry, at the Ministry of Agriculture and Water Resources back home in Tunisia, Akiça's major fields of research over the years have included water resources development, irrigation with brackish water, water reuse and the agricultural use of sewage sludge. Her diverse professional engagements have included stints with international agencies, such as the United Nations Development Program, the World Bank and the International Program for Technology and Research in Irrigation and Drainage, and have carried her to other countries within and beyond the Mediterranean region.

Continued on page 7 ►

Perspective

In this issue, we introduce an opinion column by a guest writer, **Perspective**, presenting a personal point of view on a topic related to water management issues, of her/his choosing. We begin with Frank Rijsberman, thinking aloud about IWMI's engagement with controversial water issues.

Should We Debate Controversial Water Issues?

By Frank Rijsberman

Dealing with controversy

There are plenty of controversial issues related to water and food. Are big dams bad? Should water be priced? Should we use Genetically Modified Organisms to develop drought resistant plants? Is SRI (the System of Rice Intensification) really working or is it voodoo science?

How do we deal with these issues? Do we bring them out in the open? Debate the advantages and disadvantages? Do we volunteer our opinion? Do we even have one? Are we open to new ideas or do we cling stubbornly to our own cherished ideologies? Are we *really* convinced about what we say, or do we merely toe the line? And on a national or global scale, should governments or institutions, (each with their respective agendas), determine the 'official' position on a certain issue?

How we deal with these questions depends on many things—our culture, our political system, our education. With apologies for the broad generalizations to follow, Dutch people, old or young, highly placed or not, tend to voice their opinions. Asian people tend not to argue as much, but listen to their elders or seniors. Dutch people think of their culture as honest, while Asians might view it as rude. Asian people think of their culture as respectful, while the Dutch might view it as hypocritical. Our culture clearly matters. The political system we live in also clearly affects the way we deal with "dissent", i.e., opinions differing from the official position. Education matters as well. Scientists are trained to think for themselves,



Frank Rijsberman, Director General, IWMI

develop positions based on the facts and seek out new knowledge to improve those positions.

How does IWMI deal with controversy?

IWMI is an international research institute that aims to have influence and impact. We generate new knowledge that we then share with others. To have influence or impact implies that others must develop or change their position based on what we put on the table.

For example, some years ago IWMI proposed that 'water productivity' was a better concept than 'irrigation efficiency' in analyzing how water is used in agriculture. We have come out with research results showing that water pricing in agriculture may not be a good idea, even though that challenges the current conventional wisdom held by many economists, the World Bank and many governments. We investigate whether SRI really works or not and publish the results, whatever they may be.

IWMI loves controversy

It is in the nature of our institute to engage in controversial issues. We make the best contribution when controversy exists, because that means people hold different views and there is *uncertainty* about the right answer. We address the issue, do the research, and come up with knowledge that helps people shape their opinions. Shift the debate. Have influence, have impact.

IWMI should therefore not shy away from controversy, but embrace it.

Dissent breeds new ideas. Dissent challenges the status quo. IWMI loves controversy because debate helps bring out the best arguments and helps people to feel at ease making up their own minds.

So, the answer is, yes, we should debate controversial water issues. We should bring arguments to the table and facilitate the sharing of knowledge, encouraging people, stakeholders and policymakers to develop their own positions on controversial issues.

We will continue to sponsor debate and dialogue.

IWMI sponsors debate

Another case in point is the 2004 Stockholm Water Week and the 2005 ICID Conference in Beijing—IWMI sponsored sessions where the Comprehensive Assessment encouraged debate on controversial issues. Respectfully, appreciative of both sides of the argument and the debaters.

But some organizations do not have a culture of debate, and some countries deal differently with dissent. While acknowledging that, IWMI will also try to bring new knowledge to the table. Challenging old knowledge. Based on facts. Transparently. Because that is the heart of our business.

Furthermore, we are an international organization with many cultures represented in our staff. We are also thoroughly aware of our status as guests in the countries in which we work. Facilitators of debate, sharing knowledge, not the custodians of the truth.

Do you have a different perspective on the ideas presented above? Write to Nicola at nicolap@cgiar.org

Pro-Poor Strategies in Irrigation....

agricultural policies. Irrigation can be anti-poor in situations where adverse social, health and environmental effects outweigh the benefits the poor receive from irrigation. However, in China and Vietnam, where resource distribution is more equitable, the productivity of irrigated agriculture is higher and poverty is low.

The study shows that land and irrigation interventions will not deliver the desired poverty reducing outcomes, unless fundamental ineq-

and guidelines for enhancing and redistributing benefits of irrigation investments to the poor through policy and institutional reforms.

Commenting on the study, Dr. Robin Bourgeois, IS/DB Programme Leader of UNESCAP-CAPSA, remarked that, "The merits of this work are immense and another great virtue of this study is that it also provides a broader knowledge about poverty and poverty alleviation in rural Asia." She goes on to point out that by high-



Photo credit: IWMI/Pakistan

Farmers in neighboring plots in rural Pakistan—the participation of women is important in local resource management and livelihood generation activity.

uities relating to their distribution are addressed. Explaining further, the project leader, Dr. Intizar Hussain, said that, "The objective of poverty reduction must drive the process of policy formulation, institutional development and irrigation reform and not be a byproduct of them." The study provides a generic framework for understanding and designing pro-poor interventions in irrigated agriculture and offers a set of options

lighting differences between South Asia and other countries, it confirms that poverty can be both the result and cause of institutional arrangements and voluntary reforms, and that the lessons and options derived from the study concerning the links between irrigation and poverty are true for any 'technology package.'

The project team hopes that the study lessons and the proposed pro-poor intervention options and guide-



Photo credit: IWMI-Southeast Asia

High value crops, such as this onion crop harvested by farmers in Yogyakarta, Indonesia, can generate employment and increase incomes in poor communities.

lines will be useful to the government policymakers and planners, irrigation managers, donors, NGOs, researchers and other stakeholders involved in poverty alleviation efforts in developing Asia and elsewhere.

Sources:

- Executive Summary: Pro-Poor Intervention Strategies in

Irrigated Agriculture in Asia. Poverty in Irrigated Agriculture: Issues, Lessons, Options and Guidelines. *Intizar Hussain.*

- Press Supplement: Pro-Poor Intervention Strategies in Irrigated Agriculture in Asia.

For more information, please contact Intizar Hussain at i.hussain@cgiar.org.



Photo credit: IWMI/IO

Farmers in the Uda Walawe, Sri Lanka, bring their produce to the weekly market in the nearby town of Embilipitiya. Among other factors, farmers' livelihoods also depend on their access to markets.

Sunita Narain, member of IWMI's Board of Governors, felicitated in Stockholm

The Centre for Science and Environment (CSE), an Indian non-governmental organization, and its dynamic leader, Ms. Sunita Narain, were honored with the Stockholm Water Prize this year for efforts that include fighting powerful, bureaucratic resource control, empowering women and rejuvenating traditional rainwater harvesting.

Ms. Narain, an internationally respected advocate for water and

the environment, human rights, democracy and health, has been with the CSE since 1982 and is its current director. In her acceptance speech, Ms. Narain said, "I accept this award on behalf of thousands of water engineers and water managers all over the world, especially in Asia, Africa and Latin America. These people are discounted in the formal knowledge system of the world ... CSE's own work and be-

lief has been based on the imperative of change. It is also based on the arrogance that we can bring about change because we are working our democracy."

The 2005 Stockholm Water Prize acknowledged CSE's contribution to build a water-literate society that values the raindrop and teaches society to learn from the frugality of our ancestors, to build a water prudent world. The movement has the



Photo courtesy IWMI

Ms. Narain receiving the \$150,000 prize and a crystal sculpture from King Carl XVI Gustaf of Sweden.

potential to change the water futures of the world.

Livelihoods in the Ferghana Valley

Extending the benefits of water reforms to the poor...

Reforms to the water sector, however well-intentioned, cannot be truly effective unless considered within the social, economic and cultural context of water users. Guest writer Nargiza Nizamedinkhodjayeva takes a look at the research on rural livelihoods in the Ferghana valley, conducted within IWMI's Integrated Water Resources Management Project, which is implemented by the Scientific Information Center of the Interstate Commission for Water Coordination.

It is often the case that despite large investments, development and government projects fail to have any significant impact on the most vulnerable people in society. This is because they are conceived with an insufficient understanding of the needs of the rural poor. Consequently, it becomes very important to find out what people really do in circumstances of diverse access to basic capitals, what factors constrain their livelihoods, and how to address them.

This was the rationale behind the research on rural livelihoods in the Ferghana valley. Launched in 2004, the study was part of the on-going Integrated Water Resources Management Project in the valley, which is supported by the Swiss Development Corporation. One of the latter project's key goals is to reform water management institutions at two system levels—the main and secondary canals—in consultation with stakeholders. The region's water users, including farmers, will thus benefit greatly by their participation in the decision-making process and the improvements to irrigation services.

At the same time, water users are called upon to bear part, and eventually the full, costs of operating and maintaining the irrigation and drainage systems. Yet, the new Water Users Associations, created under the IWRM project, are able to collect less than half of the irrigation service fees (ISF) needed for operation and maintenance work.

A daily struggle for life

The study of rural livelihoods in the Ferghana valley may shed some light on this situation. Covering 180 households in three Central Asian states (Kyrgyzstan, Uzbekistan and Tajikistan) spanning the valley, the study discovered, for instance, that official national statistics do not reflect the number of people living below the poverty line.



Poor farmers in Uzbekistan preparing the soil for cultivation—the lack of capital and basic resources is a common obstacle to greater livelihood security.

Little has changed for the poor since the fall of the Soviet Union. In fact, social and economic gaps have widened, with people holding high positions in the administrative hierarchy, who were influential during the Soviet period, continuing to prosper more than ordinary people.

Furthermore, it is becoming increasingly common to find women acting as *breadwinners* of their households, in addition to their conventional responsibilities as housewives and babysitters. The most vulnerable households among the rural poor are also headed by women, often with many dependants, and poorly educated; access to key resources like land and water is, thus, crucial to their livelihoods.

It is no surprise then that many people claim that they find it more difficult to fulfill their basic needs, when compared with Soviet times. The research study notes that people have poor access to sanitation and their dwelling conditions have worsened. Nutritional levels have suffered, with the frequency and volume of meals decreasing, although food expenses form the lion's share of a household's total expenditure, especially in Uzbekistan. The overwhelming majority at all three sites reported that

they cannot afford meals three times a day.

The economic difficulties of the rural poor of the Ferghana valley are reflected in the high levels of unemployment (and underemployment) as well, especially during the non-vegetation season. A particularly vicious outcome of this situation is the growing number of children in the workforce. Although not officially recognized, child labor is a grim reality. This disruption of education, which enables a premature entry into the workforce, contributes much to the cycle of poverty.

Agriculture in the Ferghana

Farming is a major source of income in the Ferghana valley (as well as herding livestock and casual off-farm employment); but there are enormous differences in income from landholdings of the same size, depending on the individual farmer's financial capital, ability to make the right choice about where to invest and what to grow, take risks and find networks for marketing her/his produce. Furthermore, since the Central Asian states are struggling to make the transition to a free market economy, farmers face many challenges due to poor markets and decreasing crop yields caused by the poor quality of seeds and fertilizers, and soil degradation. An unreliable water supply and deteriorating irrigation and drainage systems, climate changes, weak credit opportunities and a lack of entrepreneurial skills increase the odds against the farmer even more.

Cultivators across the study sites voiced similar concerns about the timing, adequacy and equality of the distribution of irrigation to their farms and kitchen gardens. The unreliability and, especially, poor

Continued on page 5 ➤



Many poor people in Tajikistan have no access to clean water for drinking and for other domestic purposes.

(Continued from page 4)

quality of drinking water has also become a serious issue, giving rise to viral diseases, which were unheard of during the Soviet era.

The irrigation reforms— from the perspective of the rural poor

What bearing will the socioeconomic background of the region's inhabitants have upon the IWRM Project? How will it influence the stakeholders' *willingness* and *capacity* to work with the new institutions of water management?

The significance of the study, thus, lies in its contextualization of reforms to the water sector against the social and economic fabric of life in the Ferghana valley. For instance, the study found that people would be willing to pay an ISF, *only* if they can expect benefits in return. Thus, farmers are interested in receiving a reliable supply of water if, they can make—and are entitled to—a profit on their produce (or, at least, if they

can produce enough to get by). An actual improvement in the water supply, which translates into higher incomes through better harvests or expansions in irrigated area, strengthens the case for an ISF.

Moreover, people have to agree to a level of ISF; for example, in Tajikistan, people want to pay ISF differentiated by soil and irrigation source depending on gravity and pump irrigation. The fact that many a household income is earned in-kind is particularly significant, for it alerts researchers to the possibility that people may not be able to pay their ISF in cash.

There are no incentives to convince people to invest in irrigation maintenance. As noted above, the water delivery service is poor; and people do not know how they can change the situation.

And finally, a period of adjustment is necessary when people are required to pay, in part or full, for the irrigation water supply.

The study revealed that the ISF is very much an unresolved issue.



Photo credit: IWMI-Central Asia

The standard of living has declined as a result of economic difficulties since the fall of the Soviet Union.

Most people pay with a share of their harvest; the fee can also consume a huge share of income. Unlike in developed and developing countries where the irrigation service fees can be respectively, 4-6 percent and not more than 15 percent of net farming income, the ISF is already much higher in the Ferghana valley, and expected to

rise to *more than 50 percent*, after the management of irrigation is transferred completely from the state to water users.

Imposing the additional burden of maintaining the irrigation system, without simultaneously reforming other sectors of economy, thus will only drive the poor of the Ferghana valley even further into poverty.

Stockholm Water Week—In search of diverse solutions for future water resources management

The last week of August saw academics and business professionals, as well as representatives from development agencies and financial institutes, civil society and government, NGOs and international organizations converge on the city of Stockholm for this year's Stockholm Water Week. The annual event has become a forum for experts in the field of water management to exchange views and experiences, identifying effective strategies to common problems in the process.

This year's Stockholm Water Prize, recognizing "efforts towards the conservation and protection of the world's water resources, which contribute to the health of the planet's ecosystems and its inhabitants," was awarded to the Centre for Science and Environment, an Indian NGO led by Ms. Sunita Narain, member of IWMI's Board of Governors. (See related story on page 3).

The theme for SWW 2005 was "Drainage Basin Management—Hard and Soft Solutions in Regional Development." In contrast to the wave of political support for *hard solutions* (i.e., physical structures for water development, storage, conveyance, productivity enhancement and treatment) in the last century, greater awareness of the resulting environmental degradation, the relatively poor

performance of existing schemes, budget constraints and perceived financial risks have diminished enthusiasm for hard solutions as the exclusive answer to water management dilemmas.

Instead, countries have begun to explore the contribution of *soft solutions*—i.e., institutional arrangements and governance, including market, legal, political, administrative and human resource systems—as well. Discussions thus favored a multi-disciplinary approach, encompassing the natural sciences, engineering, social sciences, policy and citizen involvement.

Below, Dr. Deborah Bossio—Theme Leader, *Land, Water and Livelihoods*, and Principal Soil Scientist—and Dr. Pay Drechsel—Theme Leader, *Agriculture, Water and Cities*—discuss IWMI's participation at this year's Stockholm Water Week.

Dealing with soil degradation

Participants at the seminar on *Approaches to Mitigate Land Degradation and Gully Erosion* noted that water is a main cause of many forms of degradation, including soil erosion and formation of gullies. With land degradation intrinsically linked to poverty throughout the developing world, resolving or mitigating these problems, which are both social and environmental, calls for interdisciplinary and socio-economic approaches. This was the rationale behind the inclusion for the first time of a workshop on land degradation in the program of the Stockholm Water Week.

Stressing the adverse impacts of erosion and the resulting degradation of water quality, on liveli-

hoods and health, as well as downstream infrastructure, Dr. Deborah Bossio suggested that the mitigation of land degradation is, consequently, a key entry point to improved water management in the future. She argued that most soil conservation programs have met with limited success, because of a lack of sensitivity to food security concerns of farmers.

Further, Dr. Bossio highlighted that the intensification of small-holder farming systems by reversing land degradation is already contributing to livelihood security. She also emphasized the need for a shift in thinking on soil degradation to address *root causes* rather than the *symptom* of degradation, as a way to integrate concerns of farmers and downstream water users.

An Equitable and Sustainable Paradigm of Water Use

by Pay Drechsel

Participants at the Stockholm Water Week came from about 115 countries. IWMI was represented by several staff and four of its recent or new Board members, Dr. Walter Huppert, Dr. Akiça Bahri, Dr. Margaret Catley-Carlson and the 2005 World Water Prize laureate, Ms. Sunita Narain.

IWMI co-convened with the Stockholm International Water Institute (SIWI) and the International Water Association (IWA) a full-day workshop on "Water Provision across Sectors and Jurisdictions." The workshop attracted a full house with keynote presentations by Prof. Ben Braga and Dr. Pay Drechsel. Prof. Olli Varis chaired the session assisted by IWMI.

The workshop focused not only on urbanization-related challenges for water supply, sanitation, and the environment, but also on transboundary water allocation. It targeted intersectoral and interregional transfers of water, as well as the issue of maintaining water quality in order to meet the resource needs of the future. Discussions noted that transfers will also include re-allocations from one sector to another, for instance, from uses which yield a low return per flow unit of water to activities that promise to give a comparatively high return per unit water flow. The workshop considered an integrated approach to supply cities and agriculture through cascading use, re-use and re-allocations of available water resources.

Several presentations, like that of Prof. Braga, addressed the issue of urban water supply, while others looked at wastewater generation. IWMI's contribution addressed the question of how to link in safe ways water and agriculture across the urban-rural divide of low-income countries.

The workshop concluded that

- In order to provide water for growing urban areas, the river basin is often not sufficient as a management unit. In many cases, water derives from more than one basin. Thus, decision-making mechanisms need to include a higher instance than the traditional basin authority.

Where water is scarce, there might be competition for water between countries or along the urban-rural divide. This calls for the setting-up of mechanisms, which facilitate cross-sectoral agreements. The argument was underscored by a case study of the Umbeluzi River passing Swaziland and Mozambique.

- In low-income countries, relatively inexpensive measures, such as anti-worm campaigns or increased washing of vegetables, could help to minimize public health risks significantly, even where irrigation is based on raw or semi-treated wastewater.

Water Policy Briefings

The latest issue (No: 14) of the *Water Policy Briefing* series, entitled "Planning Groundwater Use for Sustainable Rural Development," focuses on the increasing use of groundwater in Sri Lanka, which is allowing small farmers to grow more crops, minimize the impact of droughts, and profit from selling high-value produce.

But how can this be sustained? This issue discusses how

the lessons learned from other countries with longer histories of groundwater use can help policymakers, planners, and development organizations avoid the pitfalls and dangers of indiscriminate use, and capture the benefits that groundwater can bring.

The *Water Policy Briefing* series presents new perspectives and solutions to water problems in developing countries. Each

briefing is based on peer-reviewed research that challenges policymakers and planners to think differently about the way water is managed for agriculture.

To read copies of the *Water Policy Briefing* series visit: <http://www.iwmi.cgiar.org/waterpolicybriefing/index.asp>



Peter McCornick—new Director for Asia—moves to New Delhi

Dr. Peter G. McCornick is originally from South West Scotland. He and his wife, Miriam, have two children, Sean (17) and Mak'da (9). Miriam and Mak'da have moved to New Delhi, while Sean has started a degree in management and marketing at the University of South Carolina in the United States.

Peter has a BSc degree in Agricultural Engineering from the University of Newcastle upon Tyne in the United Kingdom, and an MS and PhD in Agricultural Engineering from Colorado State University. He is a registered Professional Civil

Engineer in Colorado. He has over twenty-five years of experience in the planning, development and management of water resources, working on, among other things, integrated water resources management; irrigated agriculture; environment; water reuse; rural and urban water supply; institutional development; policy implementation; and project implementation.

Peter has spent more than ten years living in the developing world, with long-term assignments in Jordan, Eritrea and Indonesia (Timor and Java). He has also undertaken

short-term assignments in a number of countries in Africa, South and South East Asia, and the Middle East. In addition, he has worked in Colorado, Idaho, Alberta and the UK.

For the past four years Peter has been seconded from IWMI

as senior water specialist to the United States Agency for International Development (USAID) in Washington, providing support to

USAID projects, primarily in Africa, Asia and the Middle East.

Peter became Director for Asia, in August this year.



Sean, Peter, Mak'da and Miriam on holiday in South Carolina, August 2005.

Photo courtesy Peter McCornick

In Conversation ...

RU: *Akiça, your work has taken you to many developing countries across the world. What would you say are the major issues confronting low-income farmers?*

Akiça: The lack of basic resources is certainly one of the major obstacles. Poor farmers don't have finances to buy the equipment they need. They are forced to rely on the labor of their family members—this is also the reason that farming families have a large number of dependants.

I would emphasize land tenure as a very important issue that is often overlooked as well. Many struggling farmers neither own nor rent their farms; they are only sharecroppers.

They also have to deal with eroded lands, problems with soil fertility and the low quality of water resources.



Photo credit: IWMI-Africa

Blending and conveyance of reclaimed water discharged by 3 wastewater treatment plants in Tunisia.

Markets pose another frequent problem—it takes a while for countries to develop infrastructure. Farms are very often located far from any markets. I have seen some farmers, who have managed to obtain a good harvest, but still can't get their produce to market for the lack of a truck. You see, it is the producer who is most exposed to all the risks associated with bad weather conditions and so on.

RU: *Akiça, wastewater farming is a reality for many urban dwellers.*

This is an issue you have focused upon a great deal.

How conscious are farmers of the hazards of wastewater farming?

Akiça: The hazards of wastewater farming depend on the quality of the wastewater.

Untreated, raw wastewater with household and industrial waste, carrying soluble chemicals and microorganisms, is the most problematic. It is linked to a high degree of health and environmental issues, and its use must be accompanied by management measures, such as crop selection, irrigation methods and precautions of use. Also, by public health campaigns to raise awareness about how to prevent major health problems, as well as plant, soil and aquifer contamination and degradation. The control of contaminants at the source is also an important measure.

On the other hand, tertiary or advanced treated wastewater may be used for different purposes without restriction.

I have seen irrigators, who knew how the composition of raw wastewater varied during the day and the year. So they knew when it was least harmful to use.

The other side of the coin is that they wouldn't consume their own produce but would buy vegetables from another city, hoping they had not been irrigated with polluted water!

In some countries, farmers even object to the treatment, and not only because it removes part of the nutrients. Farmers may also lose their water rights—for wastewater treatment may imply transferring their water rights to the treatment agency or the municipality.

So to answer your question, yes, some farmers are aware of the nutrient content of the water and the risks of using it—nevertheless, most of them are not. They use the wastewater without taking any health precautions and often supplement their crops with fertilizers, without taking into account the water input.

The risks depend on the crops they are irrigating; the degree of expo-

sure while applying the water; the type of application, whether surface, overhead or localized irrigation; and other factors. This calls for a combination of adequate health protection measures and good agronomic practices.



Photo credit: IWMI-Africa

Irrigation with wastewater, as in this field in Tunisia, is crucial to many livelihoods.

RU: *How is research at IWMI helping to reduce the hazards of wastewater farming for farmers and consumers?*

Akiça: IWMI's research program aims to make the scientific community, decision makers, and various stakeholders aware of the extent and importance of wastewater farming around the world. We hope to promote the safe and productive use of wastewater that minimizes the negative impacts of urban wastewater on peri-urban agriculture and the environment in developing countries.

IWMI's work is oriented towards policies and institutions for urban agriculture, and the techniques that could be tested and improved in the context of low-income countries.

The health risks linked to wastewater are ranked according to the kinds of pathogen in the water; there are also different pathways of contamination, depending on the type of crops, the system of irrigation, the post harvest manipulations, the hygienic status of a population, food hygiene and preparation practices.

So the answers must be designed to suit the particular situation. For example, IWMI is planning to test the effectiveness of different mitigation measures, such as anti-helminthic vaccination, low-cost treatment options, washing and disinfecting the produce to reduce contamination, and so on...

I think wastewater has to be treated at some point; the question is how and for which purpose. There is a range of

treatment options. Which treatment process you select depends on a set of conditions. Sophisticated treatment processes, which are skill and energy intensive, might be used in certain circumstances and for certain uses. But water reuse offers different reuse opportunities depending on the reuse market. Even if the current focus in developing countries is on agricultural reuse, the use of reclaimed water for afforestation, landscape irrigation, groundwater recharge, and environmental enhancement should also be screened.

RU: *You have taken up a new role at IWMI as Director of IWMI Africa. Where do you think IWMI can make the most impact to reduce hunger and poverty, while supporting livelihoods and protecting the environment?*

Akiça: There are a lot of current programs on crucial subjects, like transboundary water issues. The political division of the African continent during colonial times introduced tremendous complications to sharing common water resources—rivers and aquifers don't recognize national boundaries!

IWMI is also active in areas, like basin water management, rainfed agriculture, wastewater reuse, wetlands and environmental flows, small-scale irrigation and multiple use systems, which have a significant impact on the people of Africa. I'm certainly looking forward to a challenging and absorbing few years.



Photo credit: IWMI-HO

Peaches irrigated with reclaimed water in Tunisia.

Recent Publications

For on-line access to IWMI Research Reports and Working Papers, see www.iwmi.org/pubs

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