

## IWMI's New Director for Africa

*IWMI has appointed Dr Akiça Bahri as its new Director for Africa from September 2005.*

Dr Bahri holds degrees in agricultural engineering from the National Polytechnical Institute of Toulouse (France), and a Ph.D. from the Department of Water Resources Engineering (Lund University, Sweden). She has been working for the National Research Institute for Agricultural Engineering, Water and Forestry, in her home country, Tunisia, where she was in charge of research management in the field of agricultural water use. Her specific field is agricultural use of marginal waters (brackish and waste water) and sewage sludge, and their impacts on the environment.

Akiça is very involved in policy and legislative issues regarding water and sewage sludge reuse, and is a member of several international scientific committees. She has worked as a consultant to international organizations such as the World Bank, UNEP, and IPTRID, and as a lecturer in the Advanced International Training Programme "Water Resources Development in Arid and Semi-Arid

Regions", at Lund University (Sweden). She was a member of the Cemagref Specialized Commission of the Department, "Equipments for Water and the Environment", France, and member of the Scientific Committee of the Program Solidarité-Eau, Ministry of Foreign Affairs, France. She was elected in 2000 to the International Water Academy, and member of the Academy of Sciences for the Developing World in 2003. She has received awards from the Guinness Foundation, the International Foundation for Science, and the Kuwait Foundation for the Advancement of Sciences. Previously a member of IWMI's Board of Governors, she recently completed a 6-month Fellowship at the University of California at Davis as a Fulbright Scholar.

She is interested in dance, music, and sports such as swimming and tennis.

Akiça will be based at IWMI's sub-regional office in Accra, Ghana. Her appointment is part of a re-organization and re-focusing of IWMI's



management team and thematic structure that will improve the Institution's effectiveness.

Doug Merrey, the first Director for Africa, continues at IWMI as a Scientist working on institutions and policies. He will work with Akiça to make the transition smooth and effective. He remains based in the Southern Africa Sub-Regional Office, Pretoria, South Africa.

## Collaborating to Improve Agricultural Water Investment and Management

*This issue contains summarized findings of several component studies in the Collaborative Program on Investments in Agricultural Water Management in SSA: Diagnosis of Trends and Opportunities.*

Irrigation investments in SSA have been declining but most of the recent reports on how Africa can reduce poverty and grow economically emphasize the important role of agricultural development. And most have emphasized the need to invest more in water and land management.

Issue 2, 2005 of *Africa Water Update* carried an article on one study completed under the Collaborative Program, *Investing in Water-Livestock Interventions in sub-Saharan Africa*. This issue summarizes findings of several other component studies. The findings are not endorsed by any of the partners but are being used to synthesize authoritative recommendations on how to improve the outcomes of investments in 'agricultural water' (i.e., not only irrigation but also rainwater harvesting,

micro-irrigation, etc.). This will provide a basis for scaling up the level of investment, and thereby make important contributions to economic growth and poverty reduction in Africa.

This program is jointly undertaken by: The New Partnership for Africa's Development (NEPAD), The African Development Bank (ADB), The Food and Agriculture Organization of the United Nations (FAO), The International Fund for Agricultural Development (IFAD), Comprehensive Assessment of Water Management in Agriculture, The International Water Management Institute (IWMI) and The World Bank (WB). The full reports can be found at

[www.iwmi.org/africanwaterinvestment](http://www.iwmi.org/africanwaterinvestment) or contact Doug Merrey at [afriwater@cgiar.org](mailto:afriwater@cgiar.org).

### The Africa Water Update

provides practical information on sustainable water and land management for food, livelihoods and nature. Here, policymakers, researchers, implementers and other development professionals can find the latest thinking on key water and land management issues in Africa. The Update draws on research by IWMI and partners—as well as providing a forum for expert opinions and stakeholder perspectives.

**Also available on-line at**  
[www.iwmi.org/africawaterupdate](http://www.iwmi.org/africawaterupdate)  
in  
English & French

# Are Irrigation Projects too Expensive in sub-Saharan Africa?

Under certain conditions, unit costs of irrigation projects in SSA are comparable with those of South Asia, which has the lowest average unit cost.

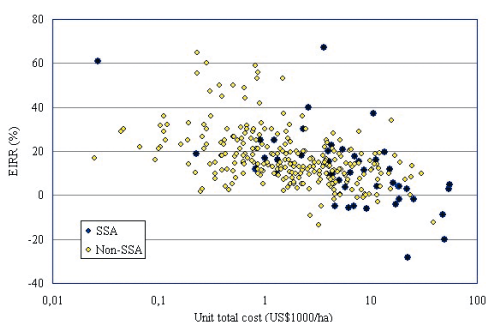
Classifying the data into 'new' and 'rehabilitation' projects, and 'success' and 'failure' projects, shows that a few very costly 'failure' projects in SSA drive up the average unit cost for the entire sample. Simply put, the average unit costs of 'success' projects in SSA are comparable with the averages for 'successes' in other regions, where 'success' is defined as having an economic rate of return of at least 10%.

This is an important and encouraging finding of a study of 314 irrigation projects implemented from 1967 to 2003 in 50 countries in Africa, Asia, and Latin America, funded or assisted by the World Bank, the African Development Bank and the International Fund for Agriculture Development.

Once the factors affecting unit costs are accounted for, there is no significant difference in the average unit costs between projects in SSA and South Asia (see Figure 1).

Project size is the most important factor determining the performance of irrigation projects, i.e., the larger the total area irrigated by the project, the higher the

Figure 1. Unit total cost and EIRR Of sample irrigation projects,  $r = -0.513$



Source: Inocencio, A., M. Kikuchi, D. Merrey, M. Tonosaki, A. Maruyama, I. De Jong, H. Sally, and F. Penning de Vries. 2005. "Lessons from Irrigation Investment Experiences of the WB, AfDB and IFAD: Cost-reducing and performance-enhancing options for sub-Saharan Africa", Report submitted to the World Bank. August, 2005.

probability of project success, in economic terms. This result confirms an earlier finding that 'big projects just do better than small projects' due to economies of scale. However, the results for SSA also show that small-scale irrigation schemes tend to cost less with better economic returns. Therefore, large-scale investment projects to support many small-scale irrigation

schemes is most cost-effective and likely to be successful. The current trend to develop regional projects may therefore prove to be an excellent investment strategy.

Irrigation components in sector-wide projects perform better and cost less in SSA than pure 'irrigation' projects. This is an opportunity to exploit the economies of scale in big projects, even if the area to be irrigated is relatively small.

Irrigation also addresses poverty more effectively if complementary investments in roads and other basic infrastructure are made or are already in place. Therefore, irrigation task managers should collaborate more with those working in rural development and multi-sectoral projects.

Detailed quantitative analyses indicate that, once the various factors influencing project performance are accounted for, SSA projects can actually perform significantly better than irrigation projects in South and Southeast Asia. Despite the relatively higher failure rate in the past, irrigation projects in SSA can therefore be good investment.

**For more information contact Arlene Inocencio at [africawater@cgiar.org](mailto:africawater@cgiar.org)**

## Promoting 'Healthy' Agricultural Water Development in sub-Saharan Africa

Contrary to widespread belief, community-based and small-scale agricultural interventions can have negative environmental and health impacts. However, there is almost no knowledge of the cumulative impacts of scaling-up.

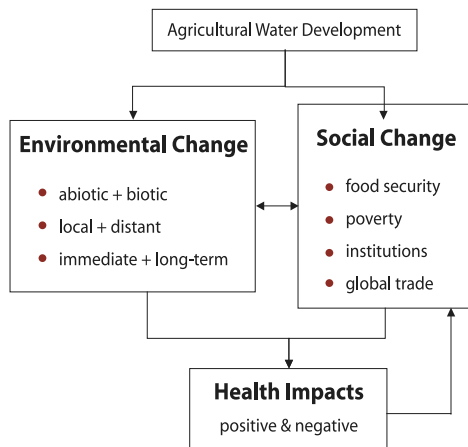
Untimely, availability of water is a key constraint to agricultural production in many parts of SSA. However, irrigation schemes have a poor track record in the region and failure to plan and manage negative environmental and health impacts is central to this.

The impacts of agricultural water development are complex and interlinked (Figure 2). The potential negative environmental impacts include degradation of river flow regimes, depletion of groundwater, sedimentation, soil salinization, waterlogging and water contamination. Potential adverse health impacts arise largely through an increase in water-related diseases.

Desk reviews and short field studies suggest that donors and governments should:

- implement strategic environmental assessment as a planning tool at national level and basin level.

Figure 2. Influence of agricultural water development on health.



- improve regional capacity for assessment by enhanced information sharing, training engineers and other professionals, and

establishing environmental units within the Ministry responsible for irrigation.

- improve data generation, analysis and monitoring strategies.
- innovatively finance recurring costs, e.g., through trust funds.
- encourage compliance with stipulated environmental and health obligations, e.g., through performance bonds, a sector-specific environmental management system, and an ethical code for scheme operators.
- combine strategic assessments of the potential cumulative impacts of scaling-up with rapid appraisals (e.g., checklists) where full environmental and health assessments are not economically justified.

**For more information contact Matthew McCartney at [africawater@cgiar.org](mailto:africawater@cgiar.org)**

# Reduce Poverty by Investment in Agricultural Water Management

SSA is one of the few regions where poverty has worsened during the last two decades. Recent case studies provide a preliminary understanding of the poverty reduction impacts of some agricultural water management interventions.

Research on the poverty impact of investments in agricultural water management is rare. Most of the agricultural water management interventions studied have either eased the severity of poverty or lifted some target beneficiaries out of poverty, but the effects are far below potential.

## Lack of investment

The water resources of SSA compare well with those of other developing regions. However, only around 4% of cultivated land in the region is actually irrigated. The reasons for such a low level of investment include perceptions of poor economic efficiency, poor financial viability and poor sustainability. But these are symptoms, not the underlying causes.

## Many factors affect outcomes

Improving access to irrigation will not automatically lead to poverty reduction because many factors affect the outcomes of investments. The impacts of agricultural water development on poverty are constrained by lack of access to complementary inputs, marketing constraints, institutional and organizational problems, water and land right issues, planning and implementation problems, low world market prices, cheap imports, and the dumping of food aid into domestic markets.

## Targeting

Targeting the poorest stratum is not easy to implement in practice, and the poorest farmers often achieve lower productivity levels than better-off farmers. However, because of the pervasiveness of poverty in the region, projects that do not intentionally target the poor may still end up reaching the poor, if not the poorest.

Given women's strong roles in African agricultural decision-making, the potential poverty reduction impact of gender-equitable investments is high – so *gender-sensitive targeting of investments is not merely a welfare issue, it is a productivity imperative.*

## Recommendations

- Target the poor based on clear definitions of poverty that differentiate between the poor and poorest in terms of training, credit provision, and access to inputs and other services.
- Integrate government roles as water regulator and as investor to provide an optimal legal and institutional environment for investments in water infrastructure.
- Invest also in roads, education, agriculture-related industries and services, and integrate the water resources



A disintegrating irrigation canal in a rural village in Hereford South Africa shows there is a need for improving rural infrastructure to help the poor.

development initiatives with existing national poverty reduction strategies to create synergies.

- Strengthen services such as agronomic research, extension and financial services.
- Target both men and women farm decision-makers and remove gender obstacles for women producers to promote agricultural growth at a potentially massive scale.
- Adopt institutional, organizational, legal, and regulatory mechanisms that enhance the functioning of markets.

**For further information contact Regassa Namara and Barbara van Koppen at [africawater@cgiar.org](mailto:africawater@cgiar.org)**

## Can More Irrigation Improve Food Security in sub-Saharan Africa?

*Upgrading existing rainfed agriculture through better water management should be a major part of investment strategy to achieve food self-sufficiency in the coming 25 years. But, without simultaneous improvements in marketing infrastructure, these investments will be ineffective.*

That is the conclusion drawn from a study of the interactions of water and food supply and demand in SSA over the next 25 years, using the WaterSim model developed by IWMI and IFPRI. WaterSim covers 111 economic regions and 125 river basins of the world, of which 40 regions and 18 major river basins are located in SSA.

Food demand will roughly double in the coming 25 years. WaterSim suggests that most future food production will come from rainfed agriculture: Even if SSA were to double its irrigated area, as suggested by the Commission for Africa, the impact on food supply would be less than 8% of total food production, except for rice and wheat – both minor crops accounting for less than 10% of

Table 1. *Wheat and rice production after doubling formal irrigated area.*

Crop	Irrigated area (m ha)	Irrigated yield (ton/ha)	Rainfed area (m ha)	Rainfed yield (ton/ha)	Production (m ton)	Demand (m ton)	Import (%)
Wheat	2.20	3.75	2.20	2.33	13.40	24.80	46.00
Rice	4.40	2.39	8.20	1.34	21.50	22.50	00.40

Source: WaterSim simulation.

food demand (Table 1) – with very high investment costs.

Substantial improvements in the productivity of rainfed agriculture are therefore critical. Water harvesting techniques successfully boost yields, often two or three times, but few farmers have adopted them. Scaling up local successes

therefore poses major challenges: Low profitability of agriculture and high risks discourage farmer investment in land and water. Lack of domestic market infrastructure and trade barriers increase costs and risks.

**For more information contact Charlotte de Fraiture at [africawater@cgiar.org](mailto:africawater@cgiar.org)**

# Successful Irrigation Projects Need Good Management

Planning and implementation of irrigation projects require major improvements to achieve the full benefits in terms of food security and poverty reduction. This is the main conclusion of a review and critical analysis of experiences and case studies covering 14 countries in SSA.

The planning and implementation processes analyzed are Identification and preparation, Implementation, Completion and evaluation, and after completion. These phases of the project life cycle are similar across international financing institutions. Weaknesses reported at the different stages of this cycle are summarized in Figure 3.

## Recommendations

Basically, financing agencies and governments share responsibility for project planning and implementation problems—and the solutions therefore lie with these two parties.

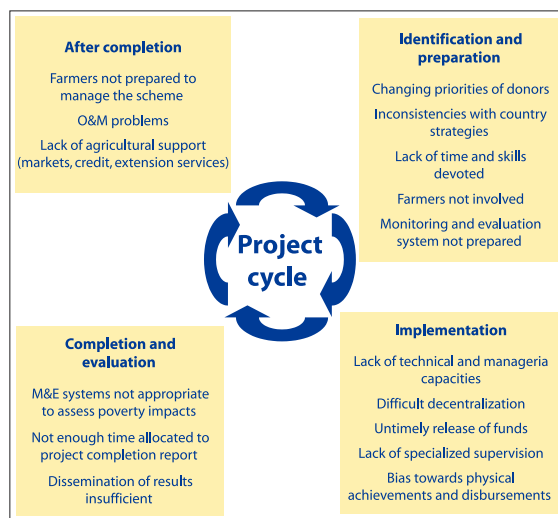
- Project management should not be viewed as an 'overhead' to be minimized, but as an essential feature of successful projects, with potentially huge pay-offs. It requires the deployment of adequate human and financial resources, for IFIs as well as government and other partner levels.
- Projects must be treated as learning and capacity-building opportunities that

contribute to a knowledge base on the planning and implementation of agricultural water projects (e.g., costs, technical options, standards/norms, policies, institutional arrangements for service provision, inventory of expertise), strengthening the institutional memory of governments and IFIs, and ultimately creating an environment that encourages and enables better quality investments.

In the future, irrigation project planners and implementers will be faced with new challenges: decentralization, and new frameworks of development assistance and financing instruments. Harmonizing procedures across international financing institutions would help hard-pressed governments to use these resources more effectively.

Figure 3.

Main weaknesses of the planning and implementation processes in agricultural water management projects



For more information contact **Doug Merrey** and **Sylvie Morardet** at [africawater@cgjar.org](mailto:africawater@cgjar.org).

# Enhancing Small Private Sector Investments

The 'private sector' is usually seen as a company or commercial undertaking. However, the private sector in the context of agricultural water is very large and diverse.

The agricultural water private sector (PS) includes all entities involved in crop, livestock and fish production and marketing, post-harvest activities and food processing, and supply chains for the goods, services and information used in the process. It ranges from smallholder farm households to agriculture-based micro-, small- and medium-sized enterprises (MSMEs).



The woman growing vegetables on her small plot is a private businesswoman—and she needs backup and support to succeed.

The PS's vast untapped investment potential can make a major contribution to agricultural development and complement public investments in it. An extensive study of cases from around the world including Africa shows that governments, development banks and donors, NGOs, farmer organizations, and even larger commercial enterprises all have critical roles to play.

**Governments** should: create an investment-friendly climate and encourage PS participation; set up stable policies, robust institutions, and sound infrastructure; guarantee water and land tenure and access for smallholders, and facilitate access to markets; improve water use efficiency. Extension services should bring these to rural communities and encourage PS participation for scaling up and out.

**Donors** should: assist governments to create an enabling environment and infrastructure; build research and extension capacity; promote direct investments; aim at market creation, institutional development, capacity strengthening, and technology development, not just one of these; encourage the entrepreneurial capacity of women; ground solutions on site-specific needs, capacity and outlook.

**Learning alliances** can address problems that are difficult to solve by a single actor. Governments, donors, NGOs and farmer organizations play different roles in harnessing and releasing PS potential for investments in water.

For more information contact **Hilmy Sally** at [africawater@cgjar.org](mailto:africawater@cgjar.org).

## IN OUR NEXT ISSUE

As more research results come through we make it our business to report on them. In the next issue we will continue to bring you more news of the work being done by IWMI and its partners in Africa.

Turn to the Africa Water Update for coverage on a range of subjects from irrigation impacts on poverty to crop water productivity, from multiple use systems to smallholder farming systems, from integrated water resources management for agriculture to water resource institutions and policies, as well as the impact of water management decisions on health and the environment.

Subsequent issues of the Africa Water Update will be coming out of Accra, Ghana, where our new Director for Africa will be based.

For more information on the research described in this issue, contact Mr. Thulani Magagula, Editor.

E-mail: [africawater@cgjar.org](mailto:africawater@cgjar.org)

Postal address: Africa Water Update, Private Bag X813, Silverton 0127, Pretoria, South Africa.

**We welcome your questions and comments.**