IWMI Research in Africa

IWMI
International
Water Management
Institute

Our Mission

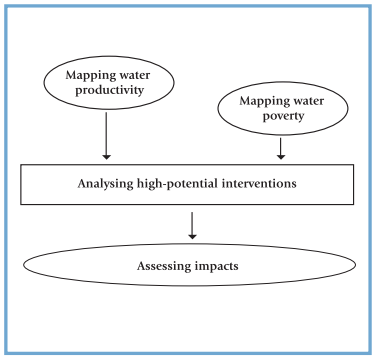
Improving the Management of Water and Land for Food, Livelihoods and Nature

IWMI Research in Africa

Over the past few years, IWMI has expanded its program in Africa to meet the increased demand for research in the region. Water scarcity, poverty, conflicts arising from transboundary issues in water management, land degradation and loss of biodiversity are some of the driving factors prompting expansion.

The thematic structure of the Institute's research agenda complements and relates to its research framework, providing better coverage of key issues. IWMI works with a range of partners in Africa to study the land and water management challenges faced by poor rural communities. These challenges are those that affect their nutrition, livelihoods and health as well as the integrity of environmental services.

A New Research Framework



In 2005, IWMI developed a new and tighter research framework to help carry out its mission while contributing to the achievement of the Millennium Development Goals. The new framework organizes IWMI's research around four areas:

1. Mapping water productivity at basin level
2. Mapping water poverty to assess spatial patterns of poverty and links to land and water resources
3. Assessing high potential interventions to improve productivity, enhance livelihoods and environmental integrity
4. Assessing impacts of interventions on land and water productivity, food security, livelihoods and nature

IWMI Research Themes

Basin Water Management

Theme 1 research examines trade-offs and options in managing agricultural water at the basin scale and contributes to improved equity and productivity in water use by developing appropriate tools and methodologies. IWMI is helping to improve irrigation efficiency in Sub-Saharan Africa and promoting intersectoral approaches to basin water management in Tanzania. Water productivity is also the focus of IWMI's research in the Olifants basin of South Africa.

Agriculture, Water and Cities

Theme 3 research targets the rapidly growing sector of urban and peri-urban agriculture to make use of urban resources while protecting human and environmental health. Wastewater irrigation is a common practice in countries such as Ghana, where poor farmers rely heavily on it as a resource for irrigating high-value cash crops. IWMI is looking at maximizing the benefits of wastewater irrigation for farmers while safeguarding the health of both farmers and consumers.

Water Management and Environment

Through Theme 4 research, IWMI examines and tests farm, field and system level interventions that safeguard the environment and the associated delivery of ecosystem services vital to human well-being. In Africa, IWMI studies how these services can enhance land and water resources management for forests, fisheries and wetlands.

Land, Water and Livelihoods

Under Theme 2 research, IWMI identifies and tests high potential interventions that conserve resources and increase land and water productivity. The aim is to improve livelihoods, health and equity. Research also promotes community-based water arrangements for marginalized African communities to support their right to water for health and livelihoods. IWMI promotes simple practices such as rainwater harvesting and home garden production for water and food security.

Key Issues and Projects

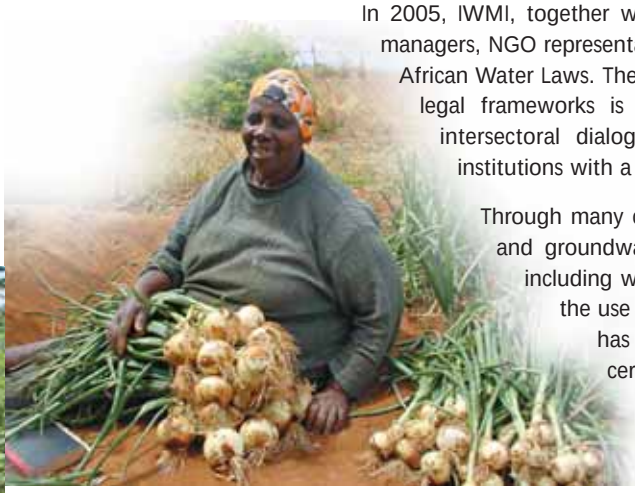
Transboundary Water Governance in Africa

Effective transboundary water governance is critical to development in Africa. The continent has over 60 international basins and virtually every African country shares at least one. The implementation of integrated water resources management at basin level in Africa requires hydro-economic cooperation among riparian countries.

The African Transboundary Governance Project is supported by the CGIAR Challenge Program on Water and Food and led by IWMI. It focuses on the Volta (Ghana and Burkina Faso) and the Limpopo Basins (Botswana, Zimbabwe, South Africa and Mozambique).

The study is also designed to provide broader lessons applicable to other Sub-Saharan Africa transboundary basins. It will lead to new and strengthened research partnerships, a synthesis of case studies and specific recommendations for including indigenous approaches in the Volta and Limpopo basins.

African Water Laws



In 2005, IWMI, together with other partners, brought together lawyers, water resource policymakers and managers, NGO representatives and academics from twelve African states for an international workshop on African Water Laws. The interface between African local community-based water arrangements and other legal frameworks is still inadequately understood and the workshop provided a framework for intersectoral dialogue and recommendations for more efficient water resources management institutions with a pro-poor focus.

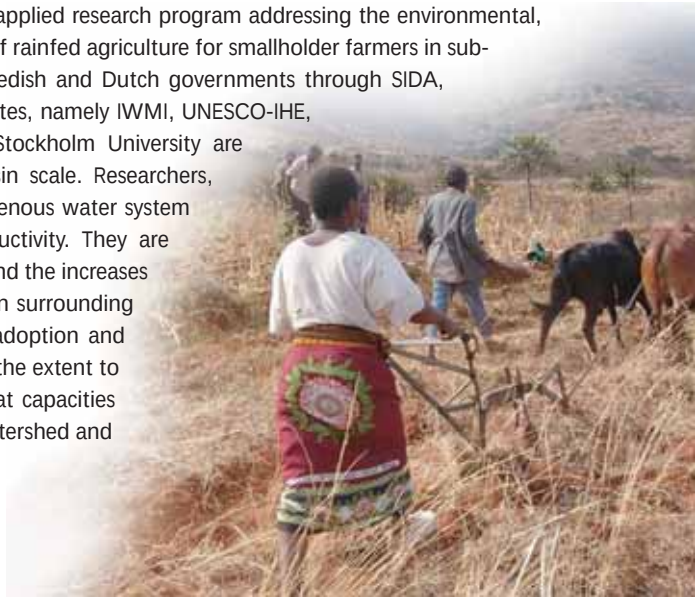
Through many centuries, the majority of Africans have harnessed rainfall, run-off, surface water and groundwater resources through self-constructed and operated water harvesting devices including wells, water withdrawals from rivers, construction of village dams and ponds, and the use of pumps in order to meet their needs for drinking and domestic purposes. Water has also been collected for livestock watering, irrigation, fisheries, small businesses and ceremonial uses.

Ma Tshepo Khumbane is a senior advisor to IWMI and founder of the Water for Food Movement which works with rural women in South Africa teaching them rainwater harvesting, home garden production and food production.

Smallholder System Innovations in Integrated Watershed Management

The Smallholder System Innovations (SSI) program is a multidisciplinary applied research program addressing the environmental, social and institutional conditions required to improve the sustainability of rainfed agriculture for smallholder farmers in sub-Saharan Africa. SSI started in January 2004, and is funded by the Swedish and Dutch governments through SIDA, WOTRO, and DGIS, and by UNESCO-IHE and IWMI. Five research institutes, namely IWMI, UNESCO-IHE, University of KwaZulu-Natal, Sokoine University of Agriculture and Stockholm University are involved in the program which operates at field, watershed and basin scale. Researchers, together with relevant stakeholders, are exploring indigenous and exogenous water system innovations in smallholder farms for improved land and water productivity. They are studying aspects such as adoption and adaptation of these innovations and the increases in production that result from them; the effects of these innovations on surrounding systems; and the institutional arrangements necessary for facilitating adoption and adaptation of good practices. This research will generate knowledge on the extent to which rainfed farming can be upgraded in a sustainable way and what capacities are required among local farmers, community institutions and formal watershed and basin authorities, to make sustainable agricultural water use possible.

Research within the program is carried out by 8 PhD and 2 Post Doctoral Fellows in two pilot catchments in Southern Africa. While the program aims to achieve excellence in scientific research, it also contributes to building human capacity in Integrated Water Resources Management with specific focus on balancing water for food and nature in Southern Africa.



Land preparation using a ripper at a Farmer Field School in Makanya, Tanzania

IWMI Resea

APPIA–Improving Irrigation Performance in Sub-Saharan Africa

Supported by the French government, the APPIA project is implemented by IWMI in East Africa and the Regional Association for Irrigation and Drainage, together with two regional interstate schools in Water and Rural Engineering in West Africa. It helps farmers and extension services to improve irrigation efficiency. IWMI works with national partners to coordinate the project in Ethiopia and Kenya. The next phase will include scaling up and beyond the current pilot irrigation scheme in Ethiopia, Kenya and West Africa.

The project aims at enhancing irrigation practices and skills among farmers and extension staff through on-farm demonstrations and experiments.

It is helping to increase farmers' access to markets by setting up better channels of information and improving farmers' bargaining powers.

Cropping calendars, quality controls and post-harvest processing are planned.

Action plans are monitored to determine if irrigation performance has actually improved. A new training manual is being produced in association with IPTRID.

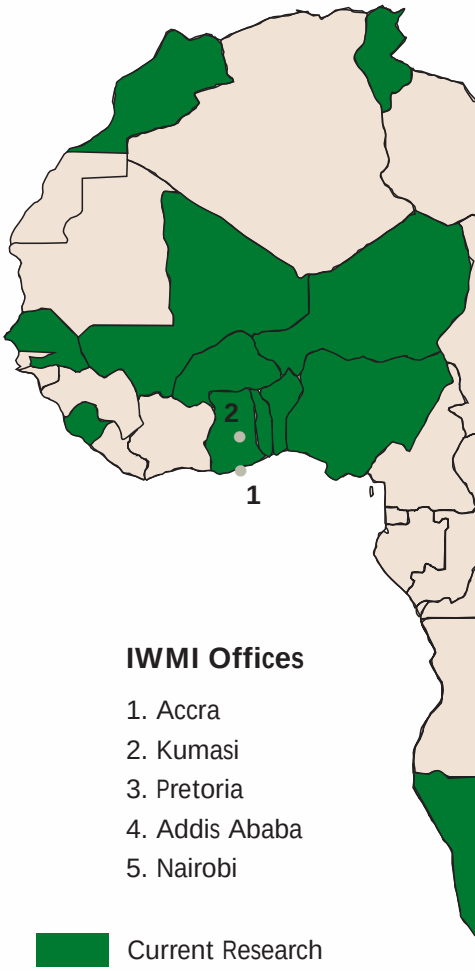
Sustaining Wetlands to Support Rural Livelihoods

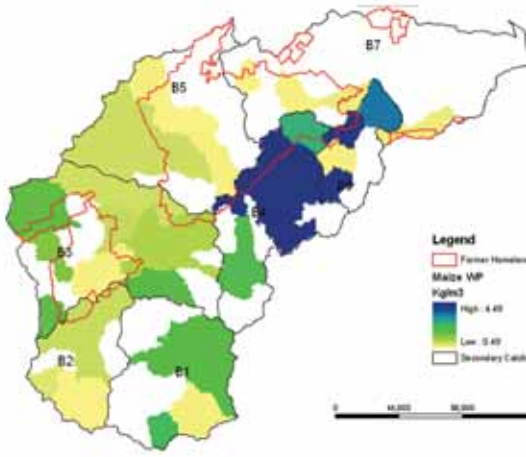
IWMI recognizes that wetlands are at the heart of the livelihood strategies of many poor rural people. The capacity of wetlands to retain moisture for long periods makes them a valuable resource for agriculture. IWMI carries out research to generate knowledge useful for the sustainable management of wetlands.

The project aims to assist Lesotho, Malawi, Mozambique, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe to put in place or to enhance mechanisms that minimize the degradation of wetland ecosystems and optimize the ecosystem and livelihood benefits that are generated by wetlands. It will also generate generic guidelines, tools and methodologies for sustainable land and water management in wetlands that will also be useful for other parts of Africa.

IWMI and partners are mapping wetland boundaries and features through remote sensing and GIS. IWMI assesses the potential of wetlands to support agriculture, taking into account the environmental and social consequences of wetland development and change.

The project evaluates appropriate technologies such as drip irrigation, treadle pumps and gully treatment. Research also determines the possible impact of climate change on wetlands. Research is funded by the Challenge Program on Water and Food and GEF.





Water productivity (WP) refers to the benefit derived per un of water. As seen in the map of the Olifants Basin, the wate productivity of maize, the staple crop, varies across the basi and the average WP is relatively high in quarternary catchments outside the former homelands.

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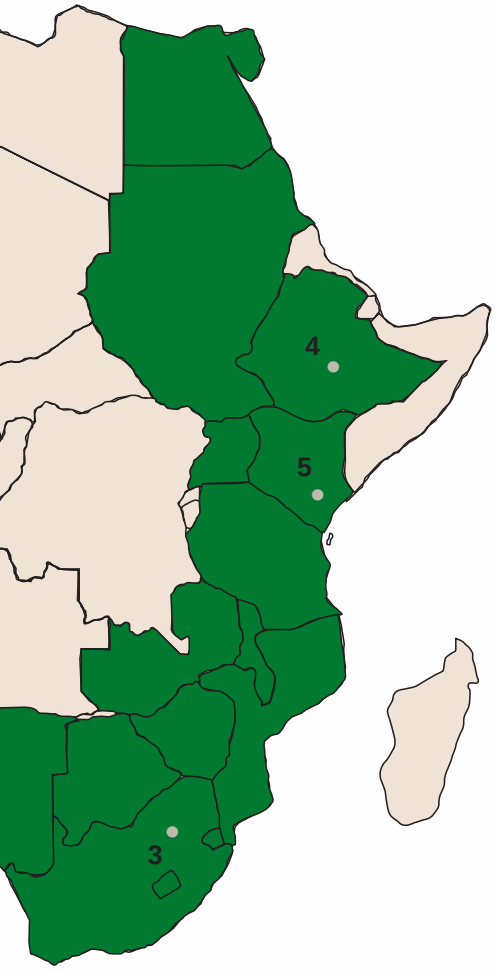


Safe Use of Wastewater in Peri-Urban Agriculture The "Farm to Fork" Research Approach

In and around African cities, many irrigation sources are heavily polluted with untreated urban wastewater and run-off. Because of the high costs involved, wastewater treatment is not a viable option for many municipalities. Nevertheless, wastewater provides a valuable source of water for poor farmers, who use it to grow leafy, nutrient-rich vegetables for a living, despite attempts to ban wastewater use.

IWMI, in partnership with the CGIAR Challenge program on Water and Food, is developing integrated strategies to safeguard public health "from farm to fork" while sustaining the urban food supply of perishable vegetables.

Health Impact Assessment of Small Dams in Morocco

Small reservoirs in semi-arid areas of Africa serve multiple purposes. They provide water for domestic needs, livestock and irrigation, but can also generate negative impacts such as the spread of water-related diseases. IWMI, IDRC, the National Institute of Agricultural Research (NIAR) and the National Institute of Hygiene (NIH) are assessing health impacts and socio-economic trade-offs, while evaluating the potential technical shortcomings of the Asgherkiss Dam in Southern Morocco. This 18-month project will develop interventions to enhance health benefits for nearby communities, methodologies for participatory impact assessment of small dams elsewhere, and guidelines for improved strategies and policies.

Improving Agricultural Water Productivity in the Olifants Basin, South Africa

The Olifants River Basin in South Africa is one of IWMI's benchmark basins where research is carried out. Covering an area of 56,672 square kilometers, it is a water-scarce basin in which the majority of the people are poor. Sixty percent of the population live in former homeland areas and have access to just 19% of the cultivated land where they produce just 7% of the total basin maize crop, while the rest is produce by a few large-scale commercial farmers. IWMI is focusing on increasing water productivity (WP) and alleviating poverty in this basin.

The highly skewed land and water distribution, and extremely high levels of unemployment, malnutrition and disease, are serious and complex questions being addressed by the Government of South Africa. IWMI is collaborating with the Government, four universities and two NGOs to find ways to help poor communities improve their access to and use of water for productive and home uses, while also designing an institutional framework that will give the poor a voice in future water management decisions.

"The Africa Water Update provides practical information on IWMI's work in Africa on sustainable water and land management for food, livelihoods and nature. Here, policymakers, researchers and implementers can find the latest thinking on key water and land management issues in Africa. The update draws on research by IWMI and partners while providing a forum for expert opinions and stakeholder perspectives."

Key Issues and Projects

RIPARWIN–An Intersectoral Approach to River Basin Management

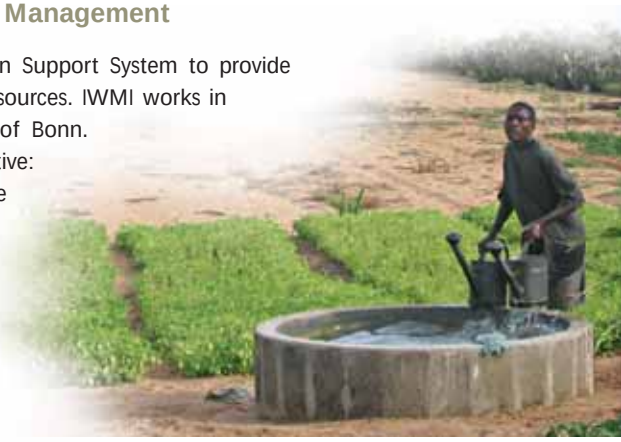
The RIPARWIN Project in Tanzania tests the theory that irrigation efficiency and productivity in upstream areas will "free up" water for downstream users. The research covers how water managers assess demands and allocate water between different sectors as well as the impacts of water saving and livelihood strategies and their economic implications.

With strong support from DfID, RIPARWIN is implemented by the Soil and Water Management Group at Sokoine Agriculture University, Tanzania, in collaboration with the Overseas Development Group at the University of East Anglia and IWMI.

Project Achievements

The project engaged in capacity building of farmers and other stakeholders while improving overall irrigation efficiency. It also reviewed a scheme for formal water rights for different sectors. Research carried out provided a better understanding of the hydrological functioning of downstream wetlands and other ecosystems. In addition, a computer-based decision aid was developed to help assess water demands.

Providing Technological Support for Integrated Water Resources Management



The GLOWA Volta Project in West Africa is working on a science-based Decision Support System to provide countries in the region with the necessary information to manage their water resources. IWMI works in partnership with the Center for Development Research (ZEF) of the University of Bonn. The Volta Basin is also a benchmark basin of two of IWMI's key partners in this initiative: The Challenge Program on Water and Food (CPWF) and the Comprehensive Assessment on Water in Agriculture (CA).

Life in the Volta Basin is built around access to water. People depend on water for cultivation, brick making, livestock rearing and domestic purposes. There are over 1,700 small reservoirs in Burkino Faso and Northern Ghana. Reservoirs provide a good option for increasing micro-irrigation in the Volta Basin.

Improving Agricultural Water Investment and Management in Sub-Saharan Africa

Investments in agricultural water are necessary to increase profitable production and food security while reducing poverty in Africa. A joint study carried out by IWMI and partners looked at how outcomes of investments in agricultural water, including irrigation, rainwater harvesting and micro-irrigation, can be improved. The recommendations emerging from this study can provide a basis for scaling up the level of investment and make important contributions to economic growth and poverty reduction in Africa.

Crops and livestock are closely linked components of both irrigated and rainfed production systems. The livestock sector is profitable where rapid urban growth creates a demand for animal products and provides poor farmers with opportunities to generate income.

This program was undertaken by IWMI in collaboration with the New Partnership for Africa's Development (NEPAD), The African Development Bank (ADB), the Food and Agricultural Organization of the United Nations (FAO), The International Fund for Agricultural Development (IFAD), the International Livestock Research Institute (ILRI) and the Comprehensive Assessment of Water Management in Agriculture (CA).

Gender issues cut across IWMI's research themes. As women play a strong role in African agricultural decision making, the potential poverty reduction impact of gender-equitable investments is high.

Sub-Saharan Africa is one of the few regions where poverty has worsened over the past two decades. There is a need for investment in roads, education, agriculture-related industries and services and a need for water resources development initiatives to be integrated with national poverty reduction strategies.

Capacity Building through University Partnerships

"IWMI provided me with good experience to write papers and attend workshops, but more importantly, I found the flexibility and broad-mindedness of IWMI's work the most rewarding thing about working here. Working with IWMI taught me to take a more holistic approach to water management."

Ben Keraita, PhD student, University of Copenhagen, Denmark

"The overall goals of our university are teaching research and development. Our IWMI partnership provides the prerequisites for achieving these goals through the provision of equipment, funds for joint field research and inputs from IWMI staff through part-time teaching assignments at our university."

Prof. Charles Quansah, Department of Crop Science, Kwame Nkrumah University of Science and Technology (KNUST)

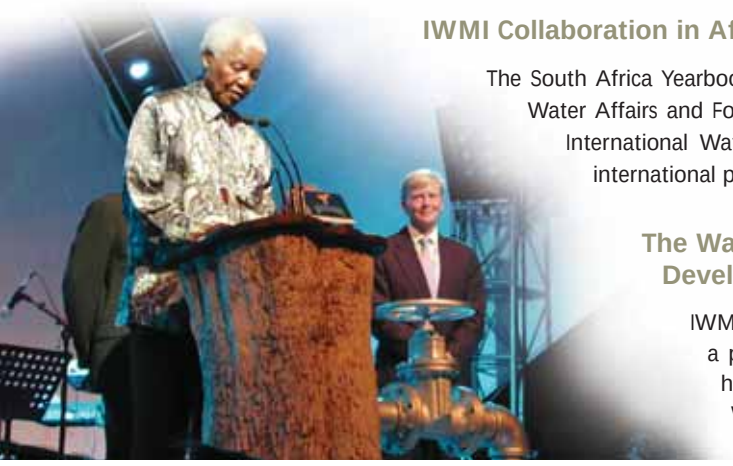
In all IWMI projects, capacity building plays a significant role. Research planning, data analysis and interpretation are usually carried out in close collaboration with various local and international partners, involving as many students as possible from universities in Africa and overseas. Many students have participated in IWMI projects and contributed with their theses to the success of IWMI's research.

The sub-regional office for the Nile Basin and East Africa, in collaboration with regional universities and universities in the North, for example, provided opportunities for 3 Phd and 16 MSc students in 2005 alone. This support involves funding, facilities, supervision and co-publishing rights.

Creating Impacts

Providing Guidelines for Policymakers in Ghana

IWMI has contributed to the development of Ghana's Irrigation Policy, National Water Policy, and the Strategic Environmental Assessment of the country's Environmental Sanitation Policy.



Nelson Mandela and HRH The Prince of Orange at the inauguration of the WaterDome during the World Summit on Sustainable Development, South Africa 2002.

IWMI Collaboration in Africa

The South Africa Yearbook 2002 to 2003 commented on IWMI's work with the Department of Water Affairs and Forestry stating that "A fruitful collaboration has been initiated with the International Water Management Institute's regional office, for cross-referencing with international practices and capacity building of the Department's personnel."

The WaterDome–Pushing Water High on the Global Development Agenda

IWMI, on behalf of the Africa Water Task Force organized the "WaterDome", a parallel event to the 2002 World Summit on Sustainable Development held in Johannesburg, South Africa. Inaugurated by Nelson Mandela, the WaterDome attracted some 15,000 visitors, including over 100 ministers from the water, agriculture and environment sectors as well as heads of state, international development agencies and the media. It also demonstrated IWMI's influence in shaping the global debate on Water, Food and Environment.

Contact Information

Headquarters and Global Research Division
127, Sunil Mawatha, Pelawatte,
Battaramulla, Sri Lanka.
Mailing Address:
P. O. Box 2075, Colombo, Sri Lanka.
Telephone: +94-11 2787404, 2784080
Fax: +94-11 2786854
Email: iwmi@cgiar.org

Regional Office for Africa
CSIR Campus, Martin Odei Block,
Airport Res. Area, Accra, Ghana.
Mailing Address:
IWMI Ghana, PMB CT 112, Cantonments, Accra, Ghana.
Telephone: +233-(0) 21 784752-4
Fax: +233-(0) 21 784752
Email: iwmi-ghana@cgiar.org

Sub Regional Office for Nile Basin & Eastern Africa
C/o ILRI-Ethiopia Campus, Wereda 17,
Kebele 21, Addis Ababa,
Ethiopia.
Mailing Address:
P. O. Box 5689, Addis Ababa, Ethiopia
Telephone: +251-011 6457222/3 or 6463215 Ext: 346
Fax: +251-011 6461252/6464645
Email: IWMI-Ethiopia@cgiar.org

Sub Regional Office for Southern Africa
141, Cresswell Street, Weavind Park 0184
Pretoria, South Africa.
Mailing Address:
Private Bag X813, Silverton 0127, Pretoria, South Africa.
Telephone: +27-12 845-9100
Fax: +27-12 845-9110
Email: iwmi-africa@cgiar.org

Ghana - Second Office
University Liaison Office,
C/o KNUST, Kumasi, Ghana.
Telephone/Fax: 00233-(0) 51-60206
Email: iwmi-kumasi@cgiar.org

Kenya - Project Office
IWMI - Nairobi,
C/o World Agroforestry Center
P O Box 30677-00100 GPO
Nairobi, Kenya.
Telephone/Fax: +254 20 7224000/+254 20 7224001
Email: iwmi-nairobi@cgiar.org

IWMI works closely with Africa-wide, sub-regional organizations and many national and agricultural research systems such as the New Partnership for African Development (NEPAD), Forum for African Research on Agriculture (FARA), Soil and Water Management Network of Associations for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), and the Nile Basin Initiative (NBI). IWMI's roles in Africa are not only knowledge generation and application but also knowledge brokering, by bringing together South-South institutions, for example the Indian Council of Agricultural Research (ICAR) and SWMnet for collaborative research in East Africa.

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