IWMI Research in West Africa

- Adaptive management strategies to address climate change
- Improving land and water management in agricultural river basins
- Identifying promising solutions for agricultural water management
  - Revitalizing public irrigation systems
  - Enhancing farmer-driven water solutions
  - Managing water in rain-fed areas
- Sustainable groundwater use
- Urban agriculture in and around cities
- Resource recovery from liquid and solid waste

IWMI
International Water Management Institute

Our vision

Water for a food-secure world

Our mission

To improve the management of land and water resources for food, livelihoods and the environment

About IWMI

IWMI is an international non-profit organization that is one of the 15 research centers supported by the Consultative Group on International Agricultural Research (CGIAR).

Introduction

West Africa faces a number of water management challenges due to high climate variability, the potential effects of climate change and farmers' limited access to water and their limited capacity to cope with changes in water availability. IWMI's research in West Africa is meeting the increased demand for developing evidence-based strategies and solutions on how water can be used more productively and sustainably under changing conditions of availability.

Adaptive management strategies to address climate change

The livelihoods of millions of West Africans are extremely vulnerable to the existing effects of climate variability and the potential adverse effects that climate change is likely to have on the region's water resources. Adaptive management of the available water resources is critical to mitigate the potential impacts that climate change is likely to have on the already prevailing poverty and food insecurity in the region.

IWMI and partners are currently working within West Africa and East Africa to:

- investigate how climate change may affect existing water storage options and how to account for climate change in the planning and management of new water storage options; and
- develop mechanisms to manage water resources that are shared between urban and rural areas to ensure equitable water access both now, and in the future, given the expected effect climate change is likely to have on water availability.

Lessons learned from these processes will be out-scaled to other West African countries and used to create management and policy recommendations.

Capacity building through education and training

To build the capacity of the next generation of land and water management professionals, IWMI provides postgraduate education and postdoctoral research opportunities to young rising stars in this field of work. Over the last 10 years, IWMI has supported over 70 Masters students, PhD students and postdoctoral fellows from West Africa. A high percentage of graduates and postdoctoral fellows remain working in the agricultural water management sector, and it has been rewarding for IWMI to see these young professionals grow and make valuable contributions to research within local and international institutions both in West Africa and overseas.

For project specific information, please visit:

africastorage-cc.iwmi.org

uradapt.iwmi.org

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IWMI; Ernest Acheampong, IWMI; and Prue Loney, IWMI.

Improving land and water management in agricultural river basins

Without good water management there is a real risk that water users will divert, control and use more water from river basins than is environmentally sustainable. Water management in river basins is complex because of the interconnectedness between the water cycle, aquatic ecosystem and the competing demands of various water users.

Photo credit: IWMI

Effective transboundary water governance is critical to development in West Africa. IWMI and partners are performing extensive research on the Volta and Niger basins to improve our understanding of water access and availability, and how major drivers of change can influence water access and availability in the future. Results from this research will be fed into:

- adaptive management strategies to safeguard good quality land and water availability in these regions; and
- policy to ensure equitable arrangements for water sharing and improved collective management of land and water resources.

For project specific information, please visit:

www.glowa-volta.de
ghanadamsdialogue.iwmi.org

A model platform

The Ghana Dams Dialogue has been contributing towards well-informed decision-making and sustainable planning and management of dams in Ghana by providing a platform for key stakeholders to deliberate over problems and find ways to address the negative impacts of the construction of hydropower dams on the affected communities. The platform has helped consolidate into one association the communities from different dam-affected areas, hydropower authorities, and government ministries and other organizations by facilitating a transparent and non-confrontational dialogue thereby defusing any tensions between the groups and paving the way for more effective interactions in the future.

During 2009 the Dialogue was the only platform of its kind from Africa to participate in the international Hydropower Sustainability Assessment Forum. Recommendations from participants in the Dialogue were incorporated into the International Hydropower Association's Sustainability Assessment Protocol to improve the sustainability assessment framework of international hydropower development and operation.

IWMI's guiding principles

- Poverty alleviation and gender equity
- Improving and safeguarding access to water as a pathway to poverty reduction
- Integrated water resources management
- Understanding how agriculture interacts with other ecosystems
- Providing scientific evidence for water policymakers and water managers

Donors

- African Development Bank
- Bill & Melinda Gates Foundation
- Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (Federal Ministry for Economic Cooperation and Development) (BMZ), Germany
- Canadian International Development Agency (CIDA)
- CGIAR Challenge Program on Water and Food (CPWF)
- Department for International Development (DFID)
- European Commission
- Google Foundation
- Government of the Netherlands
- International Development Research Centre (IDRC)
- International Fund for Agricultural Development (IFAD)
- Japan International Research Center for Agricultural Sciences (JIRCAS)
- Ministry of Agriculture, Forestry and Fisheries of Japan
- Rockefeller Foundation
- United States Agency for International Development (USAID)

Identifying promising solutions for agricultural water management

IWMI and partners are identifying the most promising agricultural water management technologies and practices that can be promoted and up-scaled to improve food security across West Africa.

Revitalizing public irrigation systems

The majority of public irrigation systems across West Africa are underperforming due to poor maintenance, lack of uptake of the irrigation technology, and inadequate policies and institutions surrounding their use. IWMI aims to improve the performance and productivity of selected small- and large-scale irrigation schemes in Burkina Faso and Niger, by identifying impediments to irrigated agricultural productivity and implementing targeted interventions. Lessons learned from these countries will be up-scaled and out-scaled to other regions throughout West Africa.

For project specific information, please visit:

waipro.iwmi.org

Enhancing farmer-driven water solutions

In many parts of West Africa farmers who have not been well served by government water services have taken matters into their own hands, creating their own agricultural water management solutions. These include technologies and practices to capture, store or drain water, lift and transport it, and apply it to crops in the field. The availability of relatively cheap motorized pumps that enable the lifting of water from diverse water sources has particularly improved irrigation and agricultural productivity for small farm holders across West Africa. Consequently, the area irrigated under farmer-driven water solutions is increasing and it is much larger than that of public irrigation systems. However, these farmer-driven solutions do not get due recognition in the national agricultural and water policy agenda. IWMI is identifying promising investment options for governments and donors to enhance and speed-up the uptake of farmer-driven water solutions.

For project specific information, please visit:

awm-solutions.iwmi.org
challengingcontextawm.iwmi.org

Managing water in rain-fed areas

Rain-fed farming areas in West Africa suffer chronically from low productivity, resulting in food insecurity and poverty for rural populations. In these regions, water productivity tends to be very low and evaporation losses are high. Crop losses occur due to water stress and inadequate or nonexistent water management. IWMI is, therefore, working to improve land and water management interventions and technologies in rain-fed farming areas.

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Photo credit: Prue Loney, IWMI

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Recognizing farmer-driven irrigation solutions

Until recently, the importance of small-scale farmer-driven irrigation solutions have typically failed to be officially recognized in West Africa, and as a result these irrigation solutions have received little or no public funding or investment. However, now that one West African country (Ghana) has recognized the importance of small-scale farmer-driven irrigation in its National Irrigation Policy, it is hoped that other West African countries will do the same and that funding and investment in these irrigation solutions will increase.

Across West Africa, farmers are increasingly relying on their own small-scale irrigation solutions – small motor pumps, long flexible pipes, manual water fetching with buckets and watering cans – over public irrigation. IWMI research established that although unrecognized in statistics and national regulations, the small-scale irrigation sector in Ghana is at least twice the size of the large-scale public irrigation sector. These research results significantly influenced Ghana's new National Irrigation Policy, which recognizes that small-scale irrigation is equally as important as the large-scale public irrigation sector.

IWMI and partners also introduced their research findings and recommendations on safe wastewater irrigation to Ghana's Irrigation Policy Steering Committee. As a result the new policy asks to "support best practices for the safe use of marginal quality water in accordance with the World Health Organization's guidelines for the safe use of wastewater, excreta and greywater in agriculture" and "encourages research of safe irrigation practices for irrigated urban and peri-urban agriculture."

It is anticipated that the new irrigation policy will have significant implications on Ghana's irrigation sector and the tens of thousands currently unsupported small-scale farmers driving their own irrigation solutions.

Photo credit: IWMI

International partners

- Addis Ababa University
- Africa Rice Center (AfricaRice)
- African Union, Semi-Arid Food Grains Research and Development (SAFGRAD)
- Alliance for a Green Revolution in Africa (AGRA)
- Center for Development Research, University of Bonn (ZEF)
- Centre Régional pour l'Eau Potable et l'Assainissement à faible coût (CREPA)
- Delft University of Technology (TU Delft)
- Economic Community of West African States (ECOWAS)
- ETC Foundation
- Food and Agriculture Organization of the United Nations (FAO)
- International Development Enterprises (IDE)
- International Food Policy Research Institute (IFPRI)
- International Livestock Research Institute (ILRI)
- Potsdam Institute for Climate Impact Research
- Resource Centres on Urban Agriculture and Food Security (RUAF)
- Stockholm Environment Institute (SEI)
- Swiss Federal Institute of Aquatic Science and Technology (EAWAG)
- UNESCO-IHE Institute for Water Education
- University of London, Development Planning Unit
- World Bank
- World Health Organization (WHO)
- WorldFish Center

West African national partners

- Accra Metropolitan Assembly (AMA), Ghana
- Comité National d'Irrigation et de Drainage (CNID-B), Burkina Faso
- Council for Scientific and Industrial Research (CSIR), Ghana
- Direction Générale du Génie Rurale (DGGR), Niger
- Environmental Protection Agency (EPA), Ghana
- Federal University of Technology, Akure (FUTA), Nigeria
- Ghana Irrigation Development Authority (GIDA), Ministry of Food and Agriculture, Ghana
- Institut de l'Environnement et de Recherches Agricoles (INERA), Burkina Faso
- Institute of Statistical Social Economic Research (ISSER), Ghana
- Justice, Development and Peace Commission (JDPC), Nigeria
- Kumasi Metropolitan Assembly (KMA), Ghana

West African regional partners

- Association Régionale pour l'Irrigation et le Drainage (ARID), Burkina Faso
- Center for African Wetlands (CAW), Ghana
- Comité permanent Inter-Etats de Lutte contre la Sécheresse dans le Sahel (CILSS)
- Economic Community of West African States (ECOWAS), Water Resources Coordination Unit (WRCU)
- Institut Africain de Gestion Urbaine (IAGU), Senegal
- Institut International d'Ingérnierie de l'Eau et de l'Environnement, Burkina Faso

Sustainable groundwater use

Groundwater for domestic purposes sustains the lives of an estimated 400 million rural people in Africa, yet groundwater use for agriculture remains underdeveloped in West Africa. Much of the potential of groundwater remains locked in the ground due to a range of technical, socioeconomic and policy barriers.

By synthesizing existing groundwater data from Burkina Faso, Ghana, Mali, Niger and Nigeria, and conducting intensive fieldwork and analysis in two focal countries, Ghana and Mali, IWMI and partners are:

- assessing groundwater availability and sustainability, including the impacts associated with its use and the likely impacts of climate change on its availability;
- understanding target users of groundwater and their behavior;
- identifying opportunities and constraints in using groundwater, and providing advice to investors on groundwater interventions;
- assessing government policies relevant to the development and management of resources; and
- developing a groundwater strategy for the West Africa region.

For project specific information, please visit:

gw-africa.iwmi.org

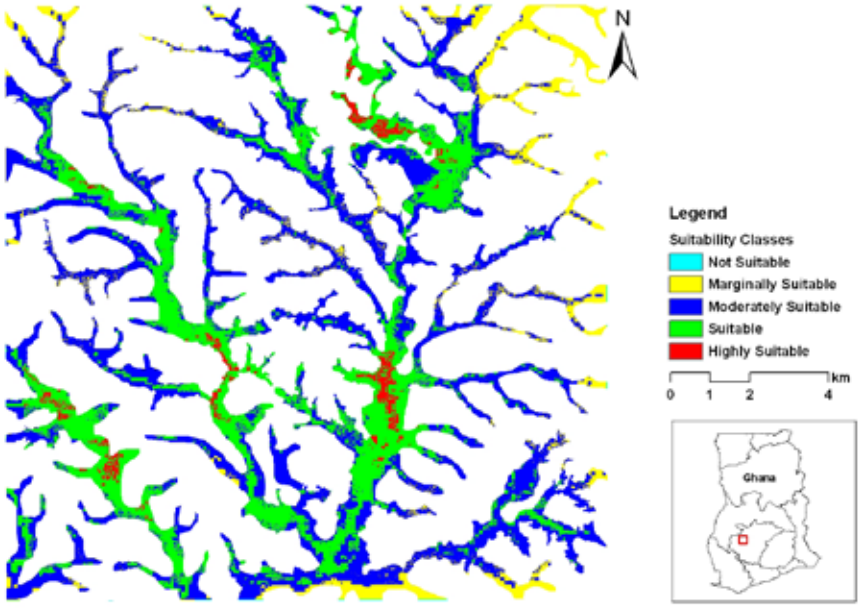
Decision support systems for choosing sites for rice cultivation

To help boost rice production in order to meet the ever-increasing domestic demand across West Africa, and to reduce the overreliance on imports, IWMI has been investigating the potential to enhance rice production in West Africa's rain-fed inland valleys. IWMI conducted extensive research to:

- determine the suitability of inland valleys for rice cultivation;
- prioritize areas that could be developed for rice cultivation; and
- understand factors that previously constrained the utilization of these areas by farmers and governments.

Using remote sensing and geographic information system (GIS) tools, IWMI developed a model to help select the best rain-fed inland valley sites within West Africa for rice cultivation.

Suitability of inland valleys for rice cultivation in Ghana



Source: Gumma, M. K.; Thenkabail, P. S.; Fujii, H.; Regassa, N. 2009. A spatial model for selecting the most suitable areas of rice cultivation in the inland valley wetlands of Ghana using remote sensing and GIS. *Journal of Applied Remote Sensing* 3(1): 21p.

Urban agriculture in and around cities

Photo credit: Andrea Silverman, IWMI

As urbanization in West Africa increases, so does the importance of urban and peri-urban agriculture (UPA). In some cities, up to 90% of the vegetables consumed are produced in urban areas. IWMI and partners have been promoting policy support and strategic innovations in urban agriculture in Ghana, Nigeria, Sierra Leone and Liberia through multi-stakeholder processes. IWMI provides technical support through its research on liquid and solid waste management, and facilitates the development of gender-sensitive policies and action plans on UPA which are integrated into the programmes of municipal authorities, non-governmental organizations (NGOs), private enterprises, training and research institutions, and other key stakeholders. IWMI also promotes knowledge sharing on UPA to strengthen the capacity of local stakeholders. Farmers are supported through urban producer field schools and trained to be innovative along the value chain, 'from seed to table', thereby ensuring sustainable agriculture in and around cities.

For project specific information, please visit:

ruaf.iwmi.org

Resource recovery from liquid and solid waste

Recovering water, nutrients and energy from waste resources is a high priority objective in rapidly expanding cities where resources for agricultural production are limited and maintaining a healthy environment is a challenge. IWMI and partners are contributing to improved food security and environmental sanitation by researching the safe and productive use of water, nutrients, organic matter and energy from liquid and solid waste. Our innovative research includes technical solutions as well as business-oriented approaches to enhance and up-scale tested waste reuse options, while carefully addressing and mitigating related health risks for farmers and consumers.

For project specific information, please visit:

westafrica.iwmi.org

What is urban and peri-urban agriculture?

Urban and peri-urban agriculture refers to agricultural practices and the related processing and marketing activities that occur in and around cities and towns. Urban agriculture comprises a variety of production systems, ranging from the production of food for household subsistence to commercial production. In West Africa, it is estimated that approximately 20 million city dwellers practice urban agriculture, making it one of the most popular farming systems in the subregion.

West African national partners

- Kwame Nkrumah University of Science and Technology, Ghana
- Ministere de l'Agriculture, de l'hydraulique et des resources halieutique, Burkina Faso
- Ministry of Agriculture and Food Security, Sierra Leone
- Ministry of Food and Agriculture, Ghana
- Obafemi Awolowo University, Nigeria
- Office du Niger, Mali
- Olabisi Onabanjo University, Nigeria
- Savanna Agricultural Research Institute, Ghana
- University of Development Studies, Ghana
- University of Ghana, Ghana
- University of Ibadan, Nigeria
- University of Maiduguri, Nigeria
- Volta Basin Development Foundation (VBDF), Ghana
- Water Research Institute (WRI), Ghana
- Water Resources Commission (WRC), Ghana

West African regional partners

- Volta Basin Authority (VBA), Burkina Faso
- West and Central African Council for Agricultural Research and Development (WECARD), Senegal

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