NEWS OF IWMI'S WORK IN AFRICA

WATER FIGURES AFRICA

CONTENTS

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TURNING RESEARCH INTO DEVELOPMENT

IWMI International Water Management Institute
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SWITCH—Sustainable Water Management Improves Tomorrow Cities Health Project:

ERNEST ABRAHAM-MENSAH, LIQA RASCHID, OLUFUNKE COFIE, IWMI West Africa Office

The ecological 'footprints' of cities are ever growing through over-exploitation of available resources while producing massive waste streams (solid, gaseous, liquid) contaminating the urban environment.

SWITCH, the Sustainable Water Management Improves Tomorrow Cities Health Project encapsulates the need for a paradigm shift in water management to save tomorrow's water resources. This paradigm shift is to be realized through an international consortium of 32 partners from 13 countries, with a coordination office at UNESCO-IHE - Institute for Water Education, Delft, The Netherlands. Funded by the EU, the SWITCH integrated project aims at the development, application and demonstration of a range of tested scientific, technological and socio-economic solutions and approaches that contribute to the achievement of sustainable and effective urban water management schemes at the catchment level in the city of the future.

SWITCH demonstration activities are being carried out in selected urban centers in Europe, Asia, Africa, and Latin America with the involvement of key stakeholders in urban water management.

SWITCH in Accra, Ghana

Accra is one of the nine designated SWITCH 'Demo cities'. In Accra as in other demo cities, a Learning Alliance (LA) is set up as a platform for stakeholder consultations, dialogue and joint learning. The need for a city LA is based on the premise that by stimulating dialogue among strategic stakeholders in the urban water continuum, it will facilitate joint learning and change which are elements necessary for any innovation towards achieving integrated and sustainable urban water management.

The Accra stakeholders consist of the International Water Management Institute (IWMI), Kwame Nkrumah University of Science and Technology (KNUST) Kumasi—the two SWITCH consortium partners based in Ghana—and representatives of the policy makers, government ministries, departments, and agencies, service providers, civil society organizations, water user groups, NGOs in the water sector as well as those who can support, reinforce and strengthen SWITCH's activities and recommendations such as training/research institutes and financial organizations.

The Accra-LA has a coordination team of KNUST, IWMI and a civil society representative. City stakeholder consultations in 2006 have resulted in the identification and analysis of the urban water problems in Accra, as well as the possible SWITCH research responses within the context of the city LA. These problems are grouped into four priority areas for intervention:

1. Improper land use planning and control in urban water management
2. Poor access to safe water and sanitation especially in poor areas
3. Pollution of water bodies affecting downstream users and the environment
4. Flooding due to poor drainage systems, silted and blocked channels.

Several SWITCH research themes and partners are now responding to the stakeholders' identified problems. Broad research topics to address these issues include: demand management for optimization of urban water services; eco-sanitation and decentralized wastewater management using appropriate low cost, water saving technology; use of natural systems to control pollution of water bodies and drains, safe use of urban water for agriculture or other livelihood opportunities; and governance of integrated urban water management.

IWMI leads research on productive use of urban water

Within the SWITCH project, IWMI provides leadership to the component on the use of urban water (fresh and wastewater) for agriculture and other livelihood opportunities in Accra. In this regard IWMI will initiate and monitor the pilot project in Accra on productive use of water (including wastewater, storm water and freshwater) and come up with recommendations on technology options and guidelines for the use or reuse of these water sources for agriculture and other livelihood opportunities. The expected outcome is that appropriate and tested water management approaches for productive activities would be recommended and sought to be integrated into the policy, planning and decision-making frameworks of Accra municipality using the LA platform.

For further information please contact: Cofie Olufunke - o.cofie@cgiar.org

Note from the Editor

For more information on the research described in this issue, contact Tonya Schuetz, Editor. E-mail t.schuetz@cgiar.org
Postal address: Water Figures Africa, PMB CT 112, Cantonments, Accra, Ghana.

Water Figures Africa is also available online at www.iwmi.org/africawaterupdate

In our next issue

As more research results come through we make it our business to report on them. We will bring more news on the work being done by IWMI and its partners in Africa and inform about the research priorities of the regional offices.

Turn to the Water Figures Africa 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 resources institutions and policies, as well as the impact of water management decisions on health and the environment.

A tradeoffs analysis approach to wetland management: the case of the Limpopo River wetlands

MUTSA MASIYANDIMA, IWMI Southern Africa Office

Wetlands are valued for the many ecosystem services that they provide. For the local communities residing around wetlands, the provisioning services of wetlands, particularly for water and food are considered very important. Many wetlands in southern Africa are utilized for agriculture and other livelihood supporting uses. The wetlands are attractive units for their rich soils and year round soil moisture, which is favorable to crops during both the dry season and drought years. But, in addition to agriculture, wetlands also have many functions that are beneficial to the environment and humans, and if used unwisely these benefits will be destroyed. This research is analyzing trade-off among uses of wetlands in the Limpopo River basin with a view to facilitating sustainable wetland management and development. It focuses on the mix of agricultural (crop and livestock) and fisheries water use strategies in them, and the tradeoffs among the uses as a tool to guide planning for wetland use and conservation. It will develop guidelines and tools to assist decision making regarding the use and management of these wetlands to ensure that livelihoods continue to be supported in a way that does not compromise environmental security.

The results of a stakeholder analysis at one of the study sites illustrated the wide range of stakeholders involved in the management of wetlands and the diversity of the stakeholder perceptions. For this wetland, located in the upper catchment of the Olifants River basin, local community members mainly consider it as an agricultural resource for their livelihoods while stakeholders from outside focus more on its hydrological importance for downstream beneficiaries in the Olifants River. The latter also consider the wetland as an opportunity to develop the area economically using alternative livelihood activities such as craft industry and tourism. Similarly, solutions proposed by the various stakeholders differ according to their perception. From the stakeholder analysis, three main tradeoffs were identified at this wetland: between crop production, livestock grazing and natural vegetation production; between water for on-site food production and income generation and water supply downstream; and between today's livelihoods and future soil fertility.

Hydrological analysis was carried out to determine the impacts of using the wetland water for crop production on downstream flows in the Mohlapetsi River and flow contributions to the Olifants River. Contrary to the common perception of downstream stakeholders that the wetland contributes to downstream flows, the wetland plays no apparent role in runoff generation for the river. The wetland per se appears to make only a very small contribution to dry season flows. With this present level of understanding it is not clear how modifying land-use in the wetland will affect dry season flows in the river and result in a negative tradeoff. Therefore, the perceived tradeoff between water for on-site food production and income generation and water supply downstream remains just a perception.

GaMampa wetland uses, concerns and trade-offs

	Community	Both	Outside stakeholders
Uses and functions	Livestock grazing Hunting/fishing Harvest of other materials and food Religious and cultural function Filter function	Cultivation crafts materials regulation function	Tourism Supply to the Olifants River
Concerns	Conflict cultivation/livestock Protection of wetland resources Droughts/floods	Erosion	Reduction of wetland area

Trade-offs:

Crop production / livestock grazing and natural vegetation production

Crop production / hydrological functioning

Crop production today / tomorrow

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Malaria cases in relation to proximity to the Koka Reservoir

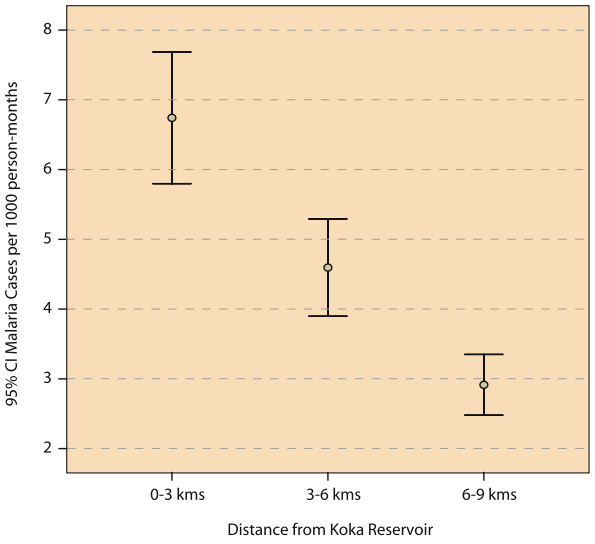
JONATHAN LAUTZE, TUFTS UNIVERSITY, BOSTON, USA, MATTHEW MCCARTNEY, IWMI EAST AFRICA OFFICE, DEREJE OLANA, OROMIA REGIONAL HEALTH OFFICE

Although rarely quantified, one of the recognized "externalities" of large dams is their impact on the health of people living around the adjacent reservoir. As part of the Challenge Program on Water and Food project: Improved planning of large dam operation: using decision support systems to optimize livelihood benefits, safeguard health and protect the environment, we are investigating malaria incidence in the vicinity of the Koka Reservoir in Ethiopia. Ultimately we aim to identify opportunities for modifying the operating regime of the dam to mitigate negative health impacts. We will determine any costs implementing these measures would impose on hydropower production and irrigation.

The study has determined the impact of the dam on the malaria burden in its vicinity. We analyzed eight years of data obtained from malaria control centers located close to the reservoir. People visit these centers to obtain free treatment, when they think they have malaria. In the records kept, diagnoses are linked to the person's "kebele" or village. We fixed the location of each kebele with a GPS (Global Positioning System) and determined the distance between them and the nearest point on the edge of the reservoir. We then divided the kebeles into three groups based on their proximity to the reservoir: those located within three kilometers, those between three and six kilometers, and those between six and nine kilometers. A three kilometer distance was selected because it corresponds approximately to the flight range of anopheles mosquitoes. Finally, we correlated malaria case rates with proximity to the reservoir.

The analysis found that the malaria case rate was greatest in the group of kebeles located closest to the reservoir and case rates decreased as the distance to the reservoir increased (Figure 1). The malaria case rate among people living within three kilometers of the reservoir was approximately 1.5 times greater than for those living between three and six kilometers from the reservoir and 2.3 times greater than for those living six to nine kilometers from the reservoir. Interestingly we also found that the reservoir increases malaria transmission during and immediately after the rainy season, but not in the dry season. We speculate that this is because other environmental factors (most notably temperature), and not breeding habitat per se, limit mosquito numbers in the dry season.

Figure 1 – box plot of malaria incidence in each of three groups



Topography of cerrado region mosquito larval habitat on the edge of the reservoir

Ongoing work aims to understand the dynamics of the link between the reservoir and mosquitoes. Our preliminary evidence indicates that puddles formed along the shoreline are the most important habitats for the development of mosquitoes that feed on the inhabitants of nearby communities. If these findings are confirmed, then it may be possible to operate the dam in such a way as to disrupt the larval development process, resulting in reductions in mosquito numbers, and hence malaria transmission. For example, this might be achieved by altering the rate of drawdown at critical times. Such an approach has been used in a few places, elsewhere in the world, such as the Tennessee Valley in the USA. Further research will also be undertaken to assess the tradeoffs and the economic implications that modifying the current operating regime would entail.

Many of the findings discussed above were taken from a forthcoming publication: Lautze, J., McCartney, M., Kirshen, P., Olana, D., Jayasingbe, G., and Spielman, A. The Effect of an African Dam on Malaria: The Koka Reservoir, Ethiopia. Tropical Medicine and International Health.

For further information please contact: Jonathan Lautze - Jonathan.Lautze@tufts.edu; or Matthew McCartney - m.mccartney@cgiar.org

Small Reservoirs Project - Outreach Activities

MARC ANDREINI, IWMI Washington, TONYA SCHUETZ, IWMI West Africa Office

People living in the arid areas experience highly variable rainfall, droughts, and floods. They often have insecure and impoverished livelihoods. There are limited options for provision of distributed storage. In many areas small reservoirs providing water to nearby communities are the only viable water supply. They do not require energy to operate and can be maintained with local labour and materials. Small reservoirs supply water for domestic use, livestock, small scale irrigation, fisheries, brick making, and other uses. Although reservoir ensembles store a significant quantity of water and have a significant effect on downstream flows, they have rarely been considered as systems, with synergies and tradeoffs resulting from their number and density. The Small Reservoirs Project (SRP) is developing tools to assist people at the basin/ensemble scale and the community/household scale. The project is working in three basins—the Limpopo, the Sao Francisco, and the Volta—integrating a variety of scientific disciplines and will contribute to improved management of these systems. A general approach and synthesis appropriate for general use was developed. In its third year the Small Reservoirs Project has started with outreach activities. Described below are two examples of outreach activities.

For further information please contact: Marc Andreini - m.andreini @cgiar.org, and visit the website at www.smallreservoirs.org

Small Reservoirs Project Marketplace at the Stockholm World Water Week, Sweden 22nd September 2006

At the Stockholm World Water Week the project team presented in a side event the research that has been done over the first two years of the project and discussed the way forward, the integration of the research components, and the synthesis of our work across the three basins (Volta, Limpopo, and Saõ Francisco). The project leader, Marc Andreini, opened the event and explained that well managed small reservoirs can improve the livelihoods of people living in semi-arid areas with highly variable rainfall. Posters summarizing the hydrological, water quality, health and socio-economic aspects of the project as well as the three basin perspectives were on display. The project's seven Principal Investigators briefly described each project component.

Then the 36 event participants were invited to join the discussion of their choice and enjoy dried typical snacks from the three regions where the project's activities are taking place (Ghana, Burkina Faso, Zimbabwe, Brazil). There were lively discussions at the individual posters. Ideas were exchanged and new relationships forged. At the end of the hour ten key points gleaned from the discussions were shared with the group.

Research Feedback Seminar with implementers, policy- and decision-makers in Bolgatanga, Ghana, 2nd November 2006

At the quarterly research feedback seminar the Small Reservoirs Project shared the status and findings of the project's research done in the Volta Basin with the White Volta Basin Board, consisting of key stakeholders, like the Ministry of Food and Agriculture's District Director, the Water Resources Commission's White Volta Basin Officer, District Assemblymen, Environmental Protection Agency representative. The tentative structure and possible formats of the Small Reservoirs Toolkit, the final output of the project, were discussed. The participants' ideas and suggestions on what is necessary with regards to the format and content of the toolkit for the implementers and users of the output were captured.

Note: The quarterly research feedback seminars are facilitated by the International Food and Policy Institute lead Challenge Program Project on Governance Modeling.

Creating Synergy and Partnership

Identifying Opportunities to Support the Nile Basin Initiative through Research and Capacity Building

YASIR MOHAMED, IWMI East Africa

The Nile Basin, covering over three million km2, is shared by ten countries and inhabited by over 160 million people. The basin is amongst the poorest regions of the world. More than 70% of the population live in rural areas, and directly depend on farming for their income and livelihoods. The basin is also endowed with vast land and water resources, and possesses a huge potential for development. A remarkable achievement towards the utilization of the Nile water resources was inaugurated with the establishment of the Nile Basin Initiative (NBI) in 1999. The initiative reflects a comprehensible shared vision defined by all riparian states for sustainable socio-economic development through the equitable utilization of the Nile water resources.

It has been acknowledged that successful execution of the NBI projects is confronted with the complexity of the river system itself and its biophysical and socio-economical interaction with the surroundings, exacerbated by scarce data, and the political intricacy within the basin. Although, right from the start, capacity building issues have been addressed within the NBI program, the applied training and building capacity of water professionals, surprisingly, the research component has hardly been explicitly incorporated into the NBI program.

The International Water Management Institute (IWMI), through a Memorandum of Understanding with NBI on behalf of the Consultative Group on International Agricultural Research (CGIAR) centers working in the basin, is committed to jointly devising appropriate collaborative programs to support the NBI processes and thus help achieve the envisioned goals and objectives. The Association for Strengthening Research in Eastern and Central Africa (ASARECA), representing national agricultural research organizations is also collaborating as a partner.

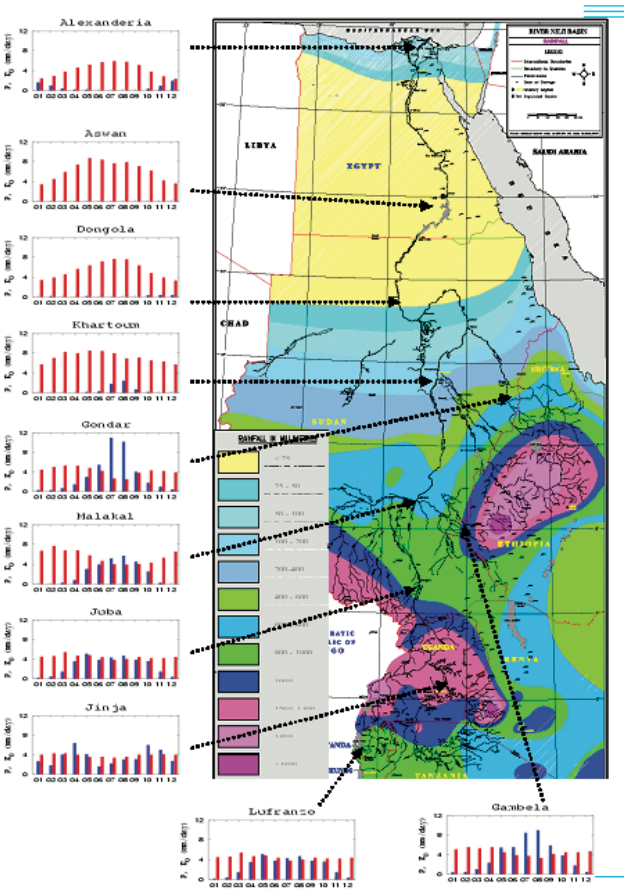
This project seeks support for a stakeholder consultation process to identify gaps in knowledge and opportunities for research that would directly support the NBI program. The objective is to create a long-term partnership of key players in knowledge generation and management for developing and managing land and water resources in the Nile, namely, the NBI, the CGIAR and ASARECA, in order to ensure that policies, investments and basin management strategies are informed by the best available scientific knowledge.

An intensive consultative discussion has been completed with almost all the NBI projects. The main objective of the discussion is to identify researchable areas that support NBI projects. In parallel, the project developed inventories of pertinent research projects in the basin, and lists of databases and research institutions working in the basin. The project is scheduled to be completed soon after the workshop that took place in February 9-10, 2007 in Entebbe, Uganda.

The project is funded by the International Development Research Centre (IDRC) and IWMI.

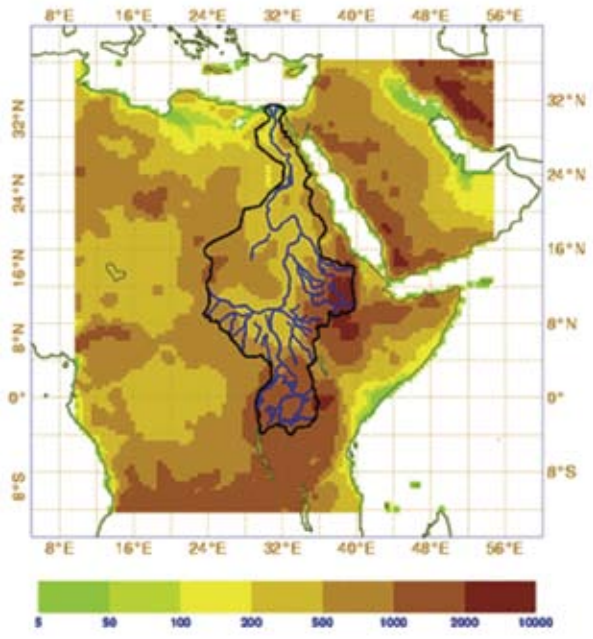
For further information please contact: Yasir Mohamed - y.mohamaed@cgiar.org

Mean annual rainfall in mm/yr[1];mean monthly preci pitation P (— Blue color), and potential evaporation E_0 (— Red color) in mm/day at key stations[2].



Source: [1] Nile Basin Atlas, TECCONILE; [2] Smith, 1993.

Location map of the Nile Basin



Regional Strategic Analysis and Knowledge Support System Node for Southern Africa

PIUS CHILONDA, IWMI Southern Africa Office

The Regional Strategic Analysis and Knowledge Support System for Southern Africa (ReSAKSS-SA) is one of the regionally focused programmes established in support of the implementation of the Comprehensive Africa Agriculture Development Programme (CAADP). It is also meant to inform and guide the design and implementation of other regional strategies in southern Africa, such as the Regional Indicative Strategic Development Plan of the Southern Africa Development Community, the SADC RISDP. It targets the identification and assessment of strategic options for agricultural growth and development in southern Africa, particularly those contributing most to poverty alleviation. ReSAKSS-SA sets out to address three main regional challenges:

- The need to increase agricultural growth to reach an average annual growth rate of 6%, envisioned by CAADP as necessary for attaining overall economic growth, poverty reduction and food security. Despite the importance of agriculture in SADC's economy, agriculture growth rates in the sector have been low and highly variable across the region, averaging only 2.6% per annum in the last decade (Figure 1).
- The need to enhance the contribution of agriculture to the achievement of the first Millennium Development Goal of halving poverty and hunger by 2015.
- The assessment of policy and investment alternatives that will yield the highest payoff given that countries in the region have committed themselves to increase the national budgetary allocation to the agricultural sector to 10%.

ReSAKSS-SA is being hosted by the International Water Management Institute (IWMI) and implemented jointly with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), in collaboration with the International Food Policy Research Institute (IFPRI). Related ReSAKSS programmes are being implemented in eastern Africa under the leadership of Common Market for Eastern and Southern Africa (COMESA) and the International Livestock Research Institute (ILRI) and in West Africa by the Economic Community of West Africa States (ECOWAS) and the International Institute for Tropical Agriculture (IITA). IFPRI is providing technical leadership and guidance in the implementation of the ReSAKSS in the three nodes.

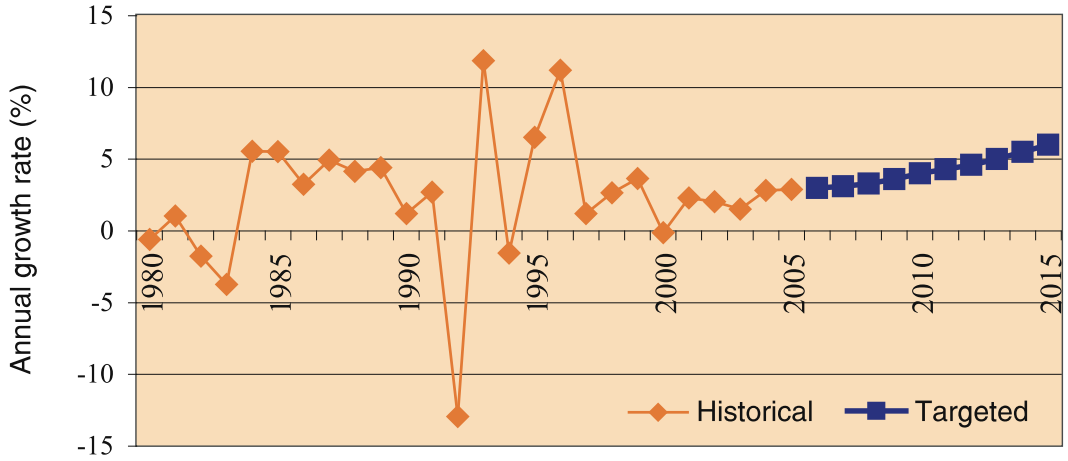
ReSAKSS-SA is a multi-donor initiative funded by the United States Agency for International Development (USAID), Department for International Development (DIFD) and Swedish International Development Cooperation Agency (SIDA). It is being organized and implemented through a network of regional institutions, government technical agencies, research institutions, universities, national and regional policy organizations, NGOs, donors, and other stakeholders at the local, national and international levels. The Director of SADC Food, Agriculture and Natural Resources Directorate is the chair of the ReSAKSS-SA Steering Committee. The ReSAKSS-SA work plan consists of four major activities:

- Monitoring and evaluating progress of agricultural growth, poverty reduction and public investments
- Region-wide options for accelerating agricultural growth and poverty reduction
- Options for increasing agricultural productivity
- Knowledge management and sharing.

The primary measure of the value of ReSAKSS-SA lies in how well policy makers use the information and analyses produced to make informed decisions. Recognizing that significant policy analyses results remain unknown to policy makers, ReSAKSS-SA places high priority on knowledge sharing. Targeted evaluations will assess the usefulness of this information to national and regional development investors and policy makers.

For further information please contact: Pius Chilonda - p.chilonda@cgiar.org

Figure 1 – Agricultural growth rates in the SADC Region



Source: World Bank (2006)

EMBRAPA[1] establishes an office in Accra, Ghana

PAULO ROBERTO GALERANI, EMBRAPA Regional Office, Accra Ghana

EMBRAPA Africa was established in December of 2006 in Accra, Ghana to transfer, adapt and test tropical agriculture technology in African countries. The objective is to contribute to food, fiber and energy security, through agriculture and socio-economic development, as well as environmental sustainability. The Brazilian corporation established its Ghana office to meet a Government policy to strengthen South-South cooperation and because it believes that the region could benefit greatly through the testing and adapting of tropical agricultural technologies. The demand for such collaboration is clear as a significant number of bilateral agreements have already been initiated by EMBRAPA with African countries.

The contribution of EMBRAPA and its partners to Brazil's agricultural development has been impressive during the last 30 years. From a typical food importer, Brazil became an important exporter of food, fiber and energy. Soybean, sugar cane, ethanol, orange juice, soybean complex (grain, oil and protein), cotton, poultry, beef, swine, fruits and cocoa, among others, are the most important products traded. In addition to these commodities, other products for local consumption, such as corn, cassava, banana, milk, eggs and rice, have also been produced, thus contributing to food security and food quality.

The knowledge involved in the development of these technologies is available for any African country that would be willing to collaborate with EMBRAPA. The Regional Office in Africa has the technical support and necessary links with all EMBRAPA's Research Centers in Brazil, including the eco regional centers dealing with forest research and development, agriculture and livestock research as well as capacity building.

The technologies involved in the expansion of agriculture in the Brazilian savanna, in the "cerrado" region, for example, could be well adapted to African regions. The soil of the cerrado is originally acidic and poor in terms of macro and micronutrients. However, the region has a very good topography, suitable for mechanization. The expansion of agriculture in this region was based on a number of crop production technologies such as new improved varieties, biological Nitrogen fixation, integrated pest (diseases, insects and weeds) management and soil and fertility management, including no tillage and crop rotation. The crop planted, initially, to open new areas, was the upland rice, which is tolerant to acidity, and soybean, after the second and third years. Currently, there are technologies to open new areas with any crop depending on the market and the farmer's decision.

For further information please contact: Paulo Roberto Galerani - galerani@cnpso.embrapa.br

[1]Empresa Brasileira de Pesquisa Agropecuária - The Brazilian Agricultural Research Corporation

New Staff joining IWMI in its African regional offices:

- **Dr. Everisto Mapedza** (Zimbabwean), Social Scientist, joined the IWMI Southern Africa office in Oct. 2006 as researcher.
- **Dr. Fitsum Hagos** (Ethiopian) joined IWMI East Africa office as Social Science/Economist, in Sept. 2006.
- **Mr. Christian Cheron** (French) is seconded to IWMI Southern Africa Office starting Feb. 2007 to succeed **Dr. Dominique Rollin.**
- **Dr. J. S. Pachpute** (Indian) joined IWMI Southern Africa Office as Post Doctoral Fellow in Jan. 2007.
- **Mr. Michael Menker** (Ethiopian) joined IWMI East Africa office as Irrigation/Agricultural Engineer in Jun. 2006.
- **Mr. Godsway Kafui Cudjoe** (Ghanaian) joined IWMI West Africa office as Research Officer – Ghana Strategy Support Program in Aug. 2006.
- **Mr. Makonnen Loulseged** (Ethiopian) joined IWMI East Africa office as Water Resources Specialist in Oct. 2006
- **Ms. Boitumelo Mogapi** (South African) joined IWMI Southern Africa office as Administration Clerk in May 2006.
- **Mr. Hosiah Ngwenya** (South African) joined IWMI Southern Africa office as Driver/ Messenger in May 2006.
- **Ms. Dudu Mazibuko** (South African) joined IWMI Southern Africa as Financial Administrator in May 2006.
- **Ms. Tsegereda Lemma** (Ethiopian) joined IWMI East Africa office as Secretary in June 2006.
- **Ms. Aster Denekew** (Ethiopian) joined IWMI East Africa office as GIS, IT & Database Expert in Jun. 2006.
- **Ms. Patience Abuchow** (Ghanaian) joined IWMI West Africa office as Administrative Assistant in Jul. 2006.
- **Mr. George Mortey** (Ghanaian) joined IWMI West Africa office as Administrative Officer, in Sept. 2006.
- **Mr. Alfred Ghartey** (Ghanaian) joined IWMI West Africa office as Driver in Sept.2006

IWMI staff movements in the African regional offices since October 2006:

- **Dr. Adesola Olutayo Olaleye,** Wetland Agronomist on a sabbatical, based at IWMI West Africa left the institute at the end of contract in May 2006.
- **Ms. Carol Valerie Whipp,** Financial Administrator, based at IWMI Southern Africa resigned in May 2006.
- **Dr. Dominique Rollin,** Agronomist based at IWMI Southern Africa office resigned in Jun. 2006.
- **Dr. Douglas Merrey,** Principal Researcher, based at IWMI Southern Africa left the institute at the end of contract in Jun. 2006.
- **Mr. Desalegne Simachew,** Liaison Scientist MUS Project based at IWMI East Africa Office left the institute in Jan. 2007.
- **Dr. Cliff Mutero,** Senior Researcher, based at IWMI Southern Africa left the institute at the end of contract in Dec. 2006.
- **Dr. Adetola Adeoti,** PDF – Agricultural Economist based at IWMI West Africa Office left the institute at the end of contract in Jan. 2007.