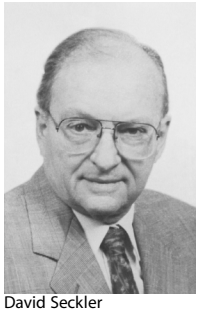
IWMI
INTERNATIONAL WATER MANAGEMENT INSTITUTE

NEWS

Update on the Progress and Impact of IWMI Research October 1999


David Seckler

INSIDE IWMI'S NEW STRATEGY

IWMI will continue to focus on its core activity of applied scientific research on integrated water resources management. The value of this work will be enhanced by IWMI's parallel priority—to help governments and institutions use IWMI findings and tools to improve their water management situations, says IWMI Director General, David Seckler. In this interview he discusses the main points of IWMI's new draft strategy.

Poverty eradication through better water management is an ambitious goal. What is IWMI's contribution to this effort?

• Our belief is that good scientific research leads to a better understanding of water scarcity issues. This data leads to practical solutions that help poor countries forecast crisis situations and develop strategies to avoid them. Our research findings are a starting point for encouraging the institutional changes and solutions needed to address the water crises in many countries. The knowledge we produce and share with our partners and governments combines with good public policy, effective institutions and management systems to achieve the sustainable use of water that will help reduce poverty.

IWMI's highest priority is on work that helps solve water scarcity and food security problems in developing countries that have large poor populations. These countries are located principally in sub-Saharan Africa and Asia.

A parallel goal is to enhance the impact of our scientific research by helping governments and institutions put IWMI tools into practice for their benefit. To achieve a good balance between research and outreach, we need to increase our budget from the current $10 million to about $15 million.

What is the impact of IWMI's recent work?

• Our work has an impact on various levels. In many cases our results are a catalyst for institutional and policy changes in countries. This is a more invisible result compared with the work of commodity-based crop research, whose results are more easily documented.

The projects we run in local communities in Asia, Africa and Latin America all generate data and practical information that are fed back into the community or local government, often with very positive results.

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Clear Research Data is Key to Water Security

IWMI STRATEGY FOR 2000 AND BEYOND

The 'new IWMI' is now five years old. Its draft 'Strategy for 2000 and Beyond' positions the institute as a leading research group on water management data for developing countries and as the CGIAR's integrated water management specialist.

As water scarcity and the decrease of clean water sources become a reality in many developing countries today, local policy makers and international organizations are recognizing an urgent need for high quality scientific information. This knowledge will give each government a clear picture of its water situation and highlight options to avoid a potentially critical situation. These needs are addressed in the new draft strategy of the International Water Management Institute (IWMI)—the roadmap for its research focus over the coming years.

The strategy charts the refocusing of IWMI research from irrigation to integrated water management over the past five years, under the guidance of the current Director General, David Seckler. It also documents some of the Institute's recent achievements and the impact of its scientific work. This includes the development of the

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To comment on the IWMI strategy...

Comments are encouraged from colleagues, partners and friends around the world.

To receive a copy see the IWMI Internet site www.cgiar.org/iwmi or contact IWMI Communications and Donor Relations fax +94 1 866854 e-mail iwmi@cgiar.org.

Irrigation in the Basin Context: IWMI's Work in Turkey

Can hydrological models help measure the impact of policy and management changes on basin water resources?

IWMI, in collaboration with the General Directorate of Rural Services (GDRS) in Turkey, has recently completed a 2-year project designed to understand the link between water management at the river basin, irrigation system and field levels. The primary focus of this work was to integrate different hydrologic models and use them to determine the impacts of possible policy and management changes on basin water resources.

The study was done in the Gediz Basin just north of Izmir in western Turkey. This basin is viewed as water-short, particularly in the summer, with increasing competition between irrigation, urban and industrial demand and environmental protection requirements.

Gediz Basin study

At the basin level the SLURP model (Semi-Distributed Land Use-based Runoff Processes) was used to simulate basin water resources. This is a model developed by the National Hydrology Research Institute in Canada, and customized for irrigation applications by IWMI's Turkish team.

Preprocessing involved development of a topographic model with defined hydrologic sub-basins, land cover classification based on NOAA satellite images and climatic data obtained from the Internet and national agencies. Using locally gathered information—on reservoir and diversion weir operating rules, irrigated areas and cropping patterns—the model successfully simulated current hydrologic conditions to form a baseline for further analysis. As well as generating hydrographs at the sub-basin and basin levels, SLURP produced maps of transpiration and other agro-climatic variables, and water productivity.

At the field level, crop-water processes, water balance and productivity indicators were determined using the SWAP simulation model (Soil-Water-Atmosphere-Plant relationships). The SWAP model, originally developed in Wageningen, the Netherlands, was calibrated using local experimental data and then applied to determine a range of productivity figures under current management practices.

SLURP + SWAP

To link these two models an aggregated version of SWAP was developed that determined water balance and productivity for unique combinations of soil, crop, and irrigation practices. These results were compared to those generated by SLURP for the same area because each irrigation system in SLURP was defined as a hydrologic subbasin. Using this comparison, together with estimates of transpiration generated by each model, it proved possible to link directly the results of the different models.

Modeling activities were complemented with a limited set of field studies that looked at actual management practices. They examined the irrigation system and field level; determined performance parameters at secondary and tertiary canal level and examined the effects of changing irrigation institutions on water management within irrigation systems. After 1995, all local-level management tasks were devolved to Irrigation Associations, which have proved robust and viable, and able to generate sufficient revenues to cover all of their regular activities.

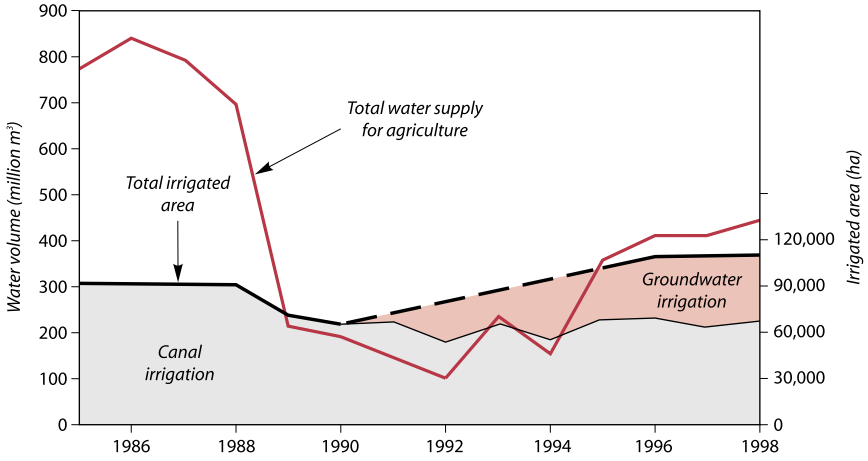
Management practices

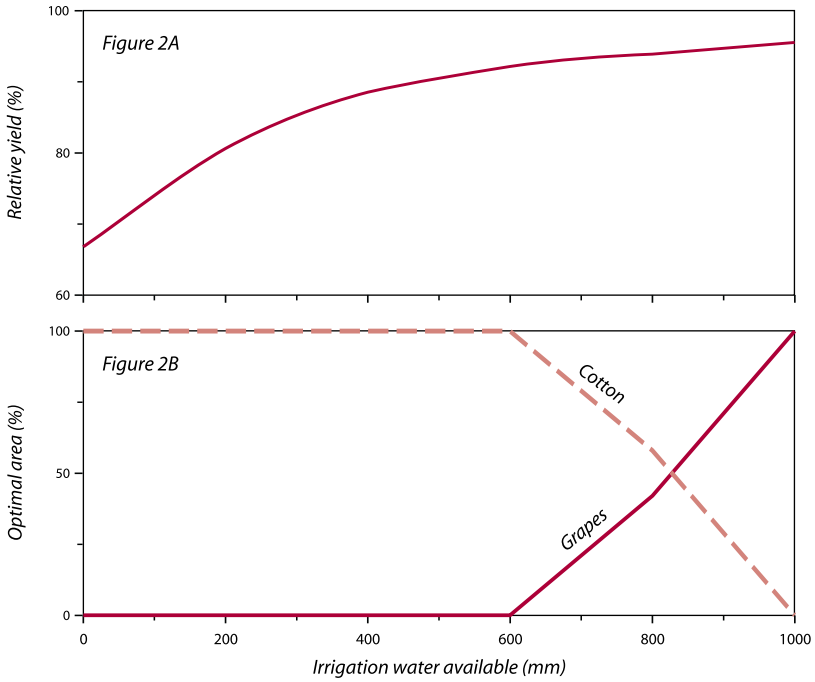
Of particular importance were field studies of groundwater utilization. Groundwater development was stimulated by the drought of 1989–1993 and has become of considerable importance. About one-third of all irrigation is from tube wells, all of which are either privately or communally operated, so that even though irrigation supplies are less than before the drought, cropping intensities and water productivity have increased during the past decade (figure 1).

The second phase of the project was to test a range of different scenarios related to water management. Each scenario was run using data typical of a wet year (using 1997 as a reference) and a dry year (using 1992, which was the worst year of the drought).

One scenario tested was to assess the probable impact of climatic change: predicted increases in tem-

FIGURE 1.
Water supply and irrigated area, Gediz Basin, 1985–1998.





perature and decreases in rainfall result in decreased stream flow and yields in the order of 10–30 percent less than at present.

A series of scenarios were run that examined the effects of reducing water allocations to the irrigation sector, changing irrigation frequencies and reducing the irrigation application rate. The results indicate that yields and water productivity can be substantially increased in years of above-average rainfall by reducing irrigation intervals and application rates, with more modest gains in years of below average rainfall. However, reductions in water to the agriculture sector inevitably resulted in reduced production

Obviously, increasing water availability will increase the productivity (figure 2A). However, the increase in yield depends on the crop selected by the farmer. Figure 2B shows that with low irrigation availability it is better for a farmer to opt for only grapes and with high availability to opt only for cotton. At intermediate values of irrigation water availability (between 600 and 1,000 mm) a mixture of cotton and grapes is preferable.

The final use of the models was in two complementary projects undertaken between IWMI, State Hydraulic Works (DSI), and local universities in Izmir.

During the summer, the SLURP model was used to study the impact of changed water allocation between irrigated agriculture and water conditions of a Ramsar bird sanctuary in the Gediz delta. To maintain adequate water for safe maintenance of bird habitats selective reductions in water allocation to irrigation systems are required. Modeling was able to quantify the volume and timing of water required and assess the impact on the upstream irrigation systems.

The second study applied the SLURP model to the Küçük Menderes Basin to demonstrate that we could run the model using only data (elevations, land cover, and climate) from the Internet. In this case, the model was used to investigate the viability of a planned reservoir and irrigation scheme. Using this public domain data it was possible to determine that the area planned for irrigation exceeded the water availability in the proposed reservoir, demonstrating the importance of remote modeling in water resources assessment.

A Water Vision for Sri Lanka

Considerable progress toward developing a 'water vision' that looks at Sri Lanka's water resources, scarcity scenarios and possible solutions, was made in September in a special workshop organized by IWMI and the Mahaweli Authority of Sri Lanka (MASL). This organization represents the interests of the Mahaweli River Basin, the largest in the country.

The meeting's objectives were to:

- Present information on integrated water resources planning and management in Sri Lanka, including the current status of water resources policy in the country.
- Create awareness of decision support tools that can facilitate policy dialogue related to water and food production.
- Highlight some key issues and challenges that merit consideration in developing the Mahaweli management system's future vision.

IWMI research staff members, Upali Amarasinghe, Charlotte de Fraiture, D. J. Bandaragoda, and Nanda Abeywickrama, Special Advisor to the Director General, made presentations of IWMI's research and policy tools that can support the development of a realistic and credible national vision. M. Wickramage, Director, Water Resources Secretariat and Ari Hewage, Executive Director, MASL presented the local perspective and explained the role and expertise of this organization.

The development of a national water vision is being encouraged by the World Water Vision exercise currently being developed for an inter-ministerial conference in March 2000 in the Netherlands. IWMI is involved in developing the global Water for Food and Rural Development—as well as the water vision for South Asia, one of the critical areas where water scarcity will threaten food security in the coming decades.

South Africa's Progressive New Water Law

Has South Africa succeeded in implementing its new Water Act? Recent IWMI studies on smallholder irrigation in the water-scarce Olifants River Basin reveal progress and some areas for improvement.

South Africa's National Water Act of 1998 is widely praised as a piece of innovative and bold legislation. It aims to manage absolute water scarcity with significant stakeholder participation, ranging from the local to the basin level. The law also intends to redress the inherited race and gender inequities in water distribution.

Has South Africa succeeded in implementing these aspects of its Water Act? Some first answers emerge from IWMI's recent research on smallholder irrigation in the water-scarce Olifants Basin. This research is done in partnership with the Department of Water Affairs and Forestry, the Northern Province Department of Agriculture, Land, and Environment, the University of the North, the University of Pretoria, and several NGOs.

Agriculture accounts for approximately 5 percent of the GDP in South Africa. Its irrigated agriculture extends to 1.3 million hectares, which is 8 percent of the cropland, but it provides 25 percent of the total output of agriculture. The distribution of water for agricultural use is quite inequitable, with large-scale white farmers dominating irrigated farming.

The privatization picture

The recent privatization policies have done away with the state irrigation subsidies for white farmers. The former white irrigation boards are being transformed into water user associations, according to the new Water Act. These associations will voice their interests in the Catchment Management Agencies formed under this Water Act.

In contrast, smallholder irrigation occupies only 100,000 hectares of the 1.3 million hectares of irrigated land. In the Olifants Basin, as elsewhere, irrigation schemes of black smallholders are concentrated in the former homelands. The apartheid regime collaborated with commercial enterprises or subsidized para-statal corporations to develop these irrigation schemes. Management decisions were typically highly centralized and top-down.

Stopping state support

Farmers had hardly any choice in crop selection, cropping calendar, or logistics such as the arrangement of tractor services, provision of seeds, fertilizers, and pesticides, operation and maintenance of the infrastructure, or marketing of their produce. This form of management was notoriously inefficient. Recent privatization policies withdrew these costly management services, often with little warning.

The impact of this sudden withdrawal of state support is evident in the Arabie-Olifants scheme in the former Lebowa homeland, in the Middleveld part of the Olifants Basin. Smallholders cultivated this 2,000-hectare scheme on plots of 1.3 hectares each. Better-off farmers, who are in the minority, have 5-hectare plots each.

When subsidies were stopped in 1997, farmers were suddenly responsible for organizing and financing most cultivation operations by themselves and for paying their bills for the electric pumps. Cultivation collapsed in 70 percent of the scheme. Although most of these farmers accepted the necessity of reform, they felt that the transition was too sudden. A handful of farmers started cultivating on their own to satisfy their hunger. The problem was further compounded because credit and good marketing channels were unavailable, or because they were not sure who was responsible for maintenance and repair of infrastructure. The government, which formally still owns the infrastructure, does not allocate funds for this maintenance. Many farmers are ready to abandon cultivation altogether.

It is significant that the 30 percent of the area that is still cultivated includes, on the one hand, parts of the scheme that had never had much external support, and on the other, the 5-hectare farmers in the central area where the para-statal agricultural office is located. This group has contacted a cotton company to do contract farming in their area on an experimental basis. The group is also demanding that the government announce a sound policy on irrigation management transfer.

The need for an income from irrigated agriculture is evident in the densely populated and poverty-stricken area around the Arabie-Olifants scheme. Population stress is increasing steadily, as many migrant laborers who have lost their jobs in the industrial and services sectors are returning.

More power to women

New small gardens along the canals are mushrooming; most of them cultivated by women. On the lands around the formal irrigated plots in the Arabie-Olifants scheme one Rural Women's Association successfully initiated 18 vegetable and maize gardens, each cultivated by 30–80 women, by providing a one-off subsidy for the equipment. The output of these plots—only 600 m^2—provides most of the household income.

If irrigated agriculture in the 70 percent of lands in the Arabie-Olifants scheme is to be ever revived, women farmers will also be primary players. Presently, more than 80 percent of the scheme's farmers are women, even though the land has been registered in men's names, especially before the 1990s. This situation is the legacy of over a century of government policies that encouraged black men to work in the mines and industries, leaving farming activities to women and giving them sufficient income to take care of the children, the sick, and the

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World Bank Endorses IWMI Atlas

The IWMI World Water Atlas received worldwide exposure recently in a review in the World Bank's electronic daily newspaper. The review explained how the Atlas brings agricultural mapping to a new level of performance that is far more detailed and precise than other methods used to date:

"The sophistication and precision of the data, which can be tracked over time, region, sub-region and locality, represents a breakthrough in mapping and agricultural study.

The Atlas displays and maps the temperature, precipitation and other parameters for single months, crop seasons or annual periods. A tremendous amount of other information—on population densities, river basins, vegetative indices, and other factors—can also be visually displayed and analyzed."

Explaining the impact of the Atlas, the review says that the new regional mapping information reveals a more precise picture and in some cases the exact opposite of what past data showed. In Sri Lanka, for example, previous maps showed that the southeastern tip of the island received a great amount of rainfall, and did not require irrigation. A map generated by the IWMI Atlas shows that irrigation is in fact needed to support year-round agriculture production in this region.

IWMI is now preparing new data for the Atlas; an updated version will soon be available.

The Atlas is available on the IWMI Internet site (http://www.cgiar.org/iwmi/Atlas.htm) or on CD-ROM.

Morocco: PODIUM helps develop 2020 agriculture strategy

IWMI was invited by the Moroccan Ministry of Agriculture, Rural Development and Fisheries to help develop a 2020 strategy for this country's regional agricultural development organizations.

To develop the strategy, IWMI Irrigation and Water Management Specialist, Dr. Hilmy Sally worked with Moroccan officials to explore scenarios for food production and water resources use in the year 2020.

The calculations and predictions were done using IWMI's policy dialogue model (PODIUM), a software tool that instantly computes a scenario based on demography, agricultural production, irrigation, water use, grain imports, exports, and other data.

The general scenario projected that the country's cereal requirements in 2020 could be met by a combination of rain-fed and irrigated agriculture with irrigation contributing to some 25 percent of the production—but accounting for only 1/12 of the land cultivated to cereals.

The annual rain-fed cereal production was highly variable, depending on the magnitude of precipitation for a given year. So some scenarios were generated to examine the impact of minimum rain-fed and irrigated areas to be cultivated to reach the threshold level of production that the country had set for itself. Here, several different yield hypotheses were tested.

Another set of scenarios looked at target yields to be achieved if less irrigated land were devoted to cereals, or if the volume of imports varied. The possible impacts on production and imports in equipping a certain proportion of rain-fed lands with supplemental irrigation were also investigated. In all cases, it was found that the depletion of the country's renewable water resources would be in the order of 30 percent.

VISITORS

Dr. Wim Bastiaanssen, an IWMI Fellow working at the International Institute for Aerospace Survey and Earth Sciences (ITC), the Netherlands, visited IWMI from 15 June to 2 July to work on Remote Sensing in Sri Lanka.

Dr. Frits W.T. Penning de Vries, Director of Research, International Board for Soil Research and Management (IBSRAM) visited IWMI in June.

Dr. Arumugam Kandiah of the International Program for Technology Research in Irrigation and Drainage (IPTRID) visited IWMI in July.

Mr. Peter Ditoto, a Consultant for CGNET Services International, and Mr. Zafar Iqbal from IWMI Pakistan visited IWMI HQ in July to examine IWMI's Information Technology activities, in particular IWMI's electronic communications.

Mr. Hakeem Khan from IWMI Pakistan visited Sri Lanka in July to work with Dr. Daniel Renault at IWMI HQ, on a paper on Sensitivity Assessment of Irrigation Structures.

Dr. Prachanda Pradhan, a Consultant Institutional Specialist, visited IWMI in August to review governance arrangements for the Global Water Partnership's Regional and Country Water Partnerships in South Asia.

NEW STAFF

Eline Boelee joined IWMI in September 1999 as an Associate Expert in the Health and Environment Global Program. Eline received her M.S. at the Wageningen Agricultural University and is awaiting her Ph.D. in 1999 from the same university. Prior to joining IWMI, Eline was an Assistant Researcher at Stichting KLV Loopbaancentrum (a career service for agricultural engineers).

Charlotte de Fraiture moved from Associate Expert to a full member of IWMI's research staff as an Assistant Water Resources Specialist in Colombo, in April 1999. Charlotte holds a bachelor's degree in Physical Geography from the State University, Utrecht and received an M.Sc. in Tropical Water and Land Management from the Wageningen Agricultural University in 1990. Charlotte is a member of the Irrigation and Water Resources Global Program and is continuing the work on performance indicators that she initiated in Colombia in 1996. Charlotte is collecting time series on agricultural, financial, and climatological aspects of irrigation systems and is also involved in developing and testing procedures for water accounting in the Huruluwewa watershed in Sri Lanka.

Michael Devlin joined IWMI in October 1999 as Head, Communications and Donor Relations. Michael received his Bachelor of Arts degree in Journalism/Radio TV and French Literature from Butler University, Indianapolis in 1980, followed by a specialist course in publishing and editing at the University of Wales in 1983. Most recently, Michael was Internet Editor/Press Officer at the EU Institution, Committee of the Regions in Brussels. He previously worked for 10 years as a consultant, focusing on corporate and institutional communication activities; for Dentsu, Marsteller and Rowland marketing and public affairs agencies and with SWIFT, the financial institution. At IWMI, Michael will be responsible for managing the Communications and Donor Relations Division, which includes editorial and publications services, the library and documentation services and general public awareness activities.

Peter Droogers transferred to Colombo in August 1999 where he is working with the Applied Information and Modeling Systems Group (AIMS) as a Researcher. Peter received his Ph.D. in soil-water dynamics from the Wageningen Agricultural University in 1997 where he worked on the development of simulation models for water dynamics, crop growth, agrometeorology, and nutrient dynamics for improved farm management. Prior to this he held a research position for 4 years in Wageningen in the international project on climatic and hydrological interactions between the vegetation, atmosphere, and land surfaces. Peter joined IWMI in Turkey in October 1997 and, using remote sensing and GIS, was modeling water basins for improved water resources planning and management before his transfer to Colombo.

Intizar Hussain joined IWMI in September 1999 as an Economist in the Irrigation & Water Resources Global Program. He obtained his Ph.D. in Agricultural and Resource Economics in 1996 from the Colorado State University, USA and his M.Sc. in Rural Regional Development Planning from the Asian Institute of Technology, Bangkok in 1992. Intizar joined the Australian Bureau of Agricultural and Resource Economics, Canberra, Australia in 1997 as a Research Officer and prior to joining IWMI he was a Principal Research Officer in the same organization. He has also worked as a Research Associate in the Human Settlements Development Division of the Asian Institute of Technology.

Geoff Kite transferred to Colombo in September 1999 where he is working with the Applied Information and Modeling Systems Group (AIMS) as a Basin Planner/Hydrologist. Geoff has 30 years' experience in hydrology and water resources engineering and has worked for government agencies, international agencies, and consulting companies in 17 countries in 4 continents. Geoff received his Ph.D. in Water Resources Engineering from the University of Ottawa, Canada, in 1973 and a master's degree in hydrology from the Colorado State University. In Turkey, Geoff was involved in using remote sensing and GIS for modeling water basins for improved water resources planning and management.

Ronald Loeve joined IWMI in September 1999 as an Associate Expert. Ronald received his M.S. and B.Sc. from the Agricultural University of Wageningen. Prior to joining IWMI, Ronald worked at Waterschap Noordoostpolder in the Netherlands (a government organization in water management) as Project Coordinator from November 1998 to August 1999. At IWMI, Ronald will be working with the Irrigation and Water Resources Global Program.

Hammond Murray-Rust transferred to IWMI HQ in September after completion of the Turkey program. Hammond received his B.Sc. from the University of London, M.S. from the University of Dar es Salaam, Tanzania, and Ph.D. from Cornell University, USA in Agricultural Engineering. After 4 years in Tanzania, studying soil erosion and watershed management, he taught college in the UK for 5 years. He worked from 1984 to 1986 at IRRI, and was with IWMI from 1986 to 1994 where he was based in Pakistan, Indonesia, and Sri Lanka. From 1995 to 1998 he worked with the Wageningen Agricultural University in the Water Management Project based in Peshawar, Pakistan before rejoining IWMI in the Turkey program on 1 September, 1998 as Team Leader. His primary areas of expertise are irrigation performance assessment, operation and maintenance of irrigation and drainage systems, and

rehabilitation and modernization. Since rejoining IWMI, Hammond's responsibilities have included managing IWMI's activities in Turkey and the Institute's program in Iran.

Hilmy Sally returned to IWMI in July 1999 as Irrigation and Water Management Specialist in the Irrigation and Water Resources Global Program. Hilmy received a Bachelor's degree in Civil Engineering from the University of Sri Lanka in 1977. He did postgraduate work in water resources development, earning a master's degree in 1980 from the Asian Institute of Technology in Bangkok, Thailand and a Ph.D. in 1985 from the Institut de Mecanique des Fluides/Institut National Polytechnique in Toulouse, France. Hilmy joined IWMI HQ in 1985 and contributed to the development and application of microcomputer-based simulation models in support of irrigation management. Hilmy moved to Ouagadougou, Burkina Faso, in 1991 as national program leader where he implemented a program of research, aimed at improving the performance of small-scale reservoir-based irrigation schemes. Since May 1996, Hilmy has been IWMI's regional representation for West Africa.

Tushaar Shah joined IWMI in June 1999 as Research Leader, Policy, Institutions and Management. Tushaar obtained a fellowship title in Management from the Indian Institute of Management, Ahmedabad in 1977 and a Masters in Economics from the Gujarat University, Ahmedabad in 1973. Before joining IWMI, he held the position of Director of the Institute of Rural Management, Anand, India from 1988 to 1995 where he was responsible for the overall management of the Institute. Since 1995, he has been a Consultant at various institutions including the World Bank, the Ford Foundation, Swiss Development Corporation and the Swedish International Development Agency. He has published many articles in professional journals.

Clear Research Data: The Key to Water Security *(Continued from page 1)*

powerful IWMI World Water Atlas and the Policy Dialogue Model (PODIUM) —an interactive, user-friendly computer model that presents water scarcity and food production scenarios. Other IWMI 'products' are its field projects in Asia, Africa and Latin America; and capacity building—the strengthening of research and management skills in developing country governments and organizations.

Water: Shared concerns

Doug Merrey, IWMI's Deputy Director General for Programs, explains: "Our draft strategy gives a clear picture of the 'new IWMI' and where our research efforts will be focused over the next five to ten years. This approach was developed based on our experience and in close cooperation with IWMI's partners and board members. Everyone in a river basin shares the same water resource—farmers, families, cities and towns and industry—so it must be managed for all to benefit from clean water. Irrigation is one part of this picture."

The message that clearly emerges from its strategy is that the Sri Lanka-based IWMI aims to be the specialist in generating sound scientific knowledge on water management and scarcity, especially in the Asia/Africa regions. A parallel priority is to use its findings to help poor countries' governments strengthen their capacity to better prepare for the water scarcity crisis that will hit many regions in the coming two decades.

There are many other institutions involved in water-related research, says Merrey. "But IWMI has become the specialist on research for water management and irrigation in the developing world. Our advantage is that we field a multidisciplinary international staff with broad scientific and practical water-related experience. We combine field and desk research and have a reputation for producing objective scientific knowledge on water policy and irrigation issues. IWMI works closely with partners in governmental, research and international institutions around the world," he adds.

Toward objective science

Today, there is a wealth of information about the policy and program designs needed to ensure food security and about the policies required for environmental sustainability. The IWMI strategy complements these efforts to solve the next urgent poverty-related crisis—water scarcity in poverty-stricken and food-insecure areas. Says Merrey: "The risk we see is that very little is known about the mix of policies, institutions and technologies that can help achieve water security for people living in poor, water-stressed regions. IWMI's research strategy is to find answers to these questions."

A new focus on Africa

In the coming year IWMI plans to intensify its work in sub-Saharan Africa. The Institute's research and capacity building projects here are managed by IWMI regional coordinators based in West Africa (WARDA), Kenya and South Africa. The Deputy Director General (Programs) coordinates this work from Headquarters. Relations with South Africa are expected to expand considerably in the coming year. Close contacts with this government are seen as a first step in possibly opening a regional office.

New Strategy *(Continued from page 1)*

The water management knowledge we produce—such as the PODIUM water scarcity scenarios being used as a scientific basis for the inter-ministerial World Water Vision recommendations to be presented in The Hague in March 2000—has a more fundamental impact on developing countries' water policies. Over the past year, we have seen a major shift in thinking to pinpoint water scarcity as the root of the agricultural/poverty dilemma in the developing world. IWMI's work has encouraged this change in attitude.

This aspect of our work has a fundamental impact on the course of policy decisions about the world water crisis. The basis for sound policy must be sound scientific knowledge that is based on good data. This is the primary 'commodity' that our scientists produce.

We have developed a set of concepts, technologies and methodologies in integrated water resources management (IWRM) linking the farm, system and basin levels. We are now working to put this new knowledge to work through applied/adaptive research and capacity building. A new emphasis that is highlighted in the draft IWMI strategy is our focus on achieving practical results at the local level, through action-oriented research with local partners using a 'learning by doing' approach.

Our work will be expanded to study the problems of poor farmers residing in dry marginal areas in sub-Saharan Africa and India. Here an important final impact of our work will be the transfer of techniques that help small farmers in water-scarce areas capture and use their limited water resources to increase agricultural production, safeguarding their household food security and incomes.

What are the obstacles to better water management? Is this a scientific or practical question?

• Both of these factors are important. Currently, weaknesses in policies and institutions are the major reason why even known management practices are not more widely applied. This weakness extends to research as well—we need better methods for economic analysis of the value of water in its multiple uses, and we need better methods for institutional analysis, particularly at river basin level. IWMI is working to strengthen its own expertise in the social, management and economic sciences, and we are encouraging our partners to do the same. We are also encouraging countries and their investors to pay more attention to policy and institutional reforms.

Does the change of focus to water management mean that irrigation is no longer the business of IWMI?

• We have not abandoned irrigation management at all. But a close look at the situation shows very clearly that irrigation management must be understood and studied in a broader water resources perspective. We have sought to achieve a balance that addresses the reality of today's water resource and scarcity issues. Some 60 percent of IWMI's budget is devoted to the management of water for irrigation, with 40 percent looking at water resource issues.

Our name change reflects the IWMI view that, faced with water scarcity, the agricultural and nonagricultural uses of water are increasingly interdependent. This view is now widely shared.

What is the greatest cause of water scarcity as you see it?

• Our line of thinking, is that scarcity does not mean only the lack or depletion of water. The release of polluted water caused by intense human activity in many developing countries also makes groundwater unfit for farming or drinking.

Our research shows that if water resources are not managed much more effectively and efficiently, the additional water required by irrigation will double. It is now generally recognized that water is the major constraint to food production and one of the major constraints on health and environmental quality in many developing countries.

If the world fails to invest in the research and development needed to find solutions and apply them, the health, livelihoods and incomes of millions of poor people will deteriorate.

New Water Law

(Continued from page 4)

returning pensioners. The challenge in the abandoned irrigated area is to establish women farmers' access to credit, inputs, services, and markets and to create water user associations comprising a majority of women members.

The National Water Act of South Africa is unique in its definition of membership issues for water user associations. It is one of the first laws in the world to give water rights to a person who farms a given piece of land, whether the person is the formal owner or merely the user of the plot. This arrangement is essential for all smallholders of communal land who are not familiar with the notion of ownership. This kind of progressive legislation can help improve the situation in many countries where women have weaker land rights than their male counterparts, even when they are the actual decision makers in farming.

The main problems in implementing the law are the adverse production and marketing conditions that exist for current and potential smallholder irrigators. Even today, smallholders are hardly able to demand that water be given to them.

- This IWMI project is funded by the Government of South Africa, the Swedish International Development Agency (SIDA); the Department for International Development (DFID), UK; and the Federal Ministry for Economic Cooperation and Development (BMZ); with the German Technical Cooperation Office (GTZ).

Related IWMI working papers

- Rural women's association: An assessment of the success factors and sustainability—(South Africa working paper 1)
- Land tenure on the Arabie-Olifants irrigation scheme—(South Africa working paper 2)
- Potential constraints of smallholder irrigation in South Africa: A Case study of the Olifants river irrigation scheme (South Africa working paper, forthcoming)

PUBLICATIONS AND ARTICLES

New Research Reports

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