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IWMI is on the move!

Facing the challenge of a changing environment

The demands on international research organizations are changing rapidly. Increasing capabilities of national research organizations in many large developing countries demand that organizations such as IWMI move out of their way—while remaining a reliable partner in areas where international organizations have a comparative advantage. International research centers have an edge in carrying out comparative work in sites across countries, in developing international networks and partnerships and in doing strategic, upstream policy-oriented research. At the same time, there are other countries, for example in sub-Saharan Africa, where national research budgets are under pressure and capacity building is crucial.

In all countries where IWMI works, the impact of new technologies—including remote sensing, GIS, the Internet—on the way research is carried out and cooperative research is implemented is very significant. Involvement of stakeholders in agenda setting, in research, in policy development and in implementation of policies has become given in many countries. The reorganization of the CGIAR that is currently underway demonstrates the need to adjust to this changing environment.

In addition, IWMI is faced by the challenge that ‘water’ is rising on many political agendas. This is happening because the scarcity of water is felt in an increasing number of countries and seen as a future threat by many others. Providing enough water to produce food, sustain rural livelihoods, healthy populations and a healthy environment is going to be a major challenge—particularly in Asia and Africa.

To address these challenges, IWMI’s new Director General led a major exercise in the second half of 2000 to develop a new Strategic Plan. This process involved many of its staff members and stakeholders. The new Strategic Plan was approved by the IWMI Board in December 2000 and well received by the CGIAR’s Technical Advisory Committee (TAC) in March 2001¹. Through this new Strategic Plan—the Institute’s business plan for the coming years—the Board of Governors is confident that IWMI will be ready for the challenges that it faces. IWMI is also ready to play its part in the new and reinvigorated CGIAR that will emerge from the current reorganization.

Implementing the Strategic Plan

The change in research focus over the past five years of the former IIMI²—with its exclusive focus on managing irrigation systems—to that of the new IWMI—has repositioned the organization considerably. Integrated water resources management at the basin level has become the Institute’s core business: Extending the focus from downstream water management in irrigated agriculture to upstream concerns in catchment areas, to small-scale water management and water harvesting,

¹The IWMI Strategic Plan 2000-2005 is available from IWMI, www.iwmi.org, and its key issues are briefly summarized in this document as well.

²The International Irrigation Management Institute (IIMI) changed its name to the International Water Management Institute (IWMI) in 1997.

from irrigated to rain-fed agriculture, and to interactions with other water users and the environment. Putting people first and working directly with farmers, water user organizations and water managers have always been a hallmark of IWMI—old and new.



In light of this shift in the research domain, a further extension towards water and land management comes naturally. The management of water and land resources, and water and land use planning and management, are closely intertwined and need to be looked at together. This focus is reflected in the new IWMI mission adopted in Strategic Plan 2000-2005 as:

improving water and land resources management for food, livelihoods and nature

The integration of the program of the former IBSRAM³ into IWMI sharpens the focus on land use issues in IWMI's predominantly water-oriented research agenda. Smallholder land and water systems is one of the five cross-cutting IWMI research themes into which the majority of IBSRAM's programs are merged. Another new research theme for the Institute is sustainable groundwater management, which is being done vigorously through a series of research activities, particularly in India, Pakistan and China. Increased research on the agriculture-environment interface is also emerging.

Work in Africa is expanding rapidly through the new regional office for Africa in Pretoria, and an office of the former IBSRAM in Ghana. Where IWMI had only one internationally recruited researcher resident in Africa in mid-2000, this will climb to ten before the end of 2001. With another regional office opening in India early in 2001, it is expected that by the end of 2001 more than half of IWMI's researchers will work outside headquarters in Sri Lanka, particularly in the regional offices in South Africa, Pakistan, India and Thailand.

This will be largely due to a very considerable expansion in research capacity during 2001. Recruitment of about seven former IBSRAM researchers is part of this, but a larger part is a drive to recruit young researchers (mostly internationally recruited PostDocs) from the South. IWMI expects to have appointed 15 new PostDocs and Associate Experts before the end of 2001.

I quote these numbers to demonstrate that 'IWMI is on the move'. The refocusing of the research agenda over the past five years has put the Institute in a good position to move forward rapidly to address the challenges that face international research organizations today—particularly, the improved management of water and land resources. IWMI is ready to contribute to increased food security for all, better livelihoods for the rural poor and to a healthy natural environment.

Prof. Klaas Jan Beek
Chairman of the Board of Governors

³The International Board for Soil Research and Management (IBSRAM) had transformed itself into an international organization focusing on sustainable land management through research networks in Asia and Africa. No longer independently viable, IBSRAM wound down its operations and transferred its programs to IWMI, effective 1 April 2001.

Genomics and Water Management?

Water for agriculture gets squeezed—poor farmers first

As populations rise, incomes rise, and countries industrialize—the demand for water in urban areas in developing countries will rise very strongly in the coming decades. At the same time increased environmental awareness will place more and more emphasis on maintaining a healthy environment for people and for nature. The large-scale development of river and groundwater resources is less acceptable now than it was in the 1960-1990 period, when the large majority of the world's 45,000 large dams was built. Additionally, water infrastructure built in recent decades is becoming obsolete—for example through silting up of reservoirs, and crumbling irrigation networks—and there appears to be a decreasing willingness to fund rehabilitation and replacement of this infrastructure. Groundwater levels are falling in key aquifers that have contributed substantially to food security in recent years through provision of water-on-demand to millions of farmers who tapped them directly through tube wells. In all these developments, as resources become more scarce, the poor and vulnerable are hit first and suffer the most.

Water for agriculture is being squeezed as this resource is moved out of the farming sector and diverted to urban areas. Groundwater sources are drying up, and the willingness to develop new resources has declined for financial as well as environmental reasons. The consequences of this situation are visible, for instance, in Pakistan, home to the world's largest irrigation system and today, to increasingly serious droughts. Agriculture has grown used to cheap and plentiful water in irrigated areas. As the human population tripled in the 20th century, water use multiplied sixfold, mostly for agriculture. Agricultural productivity has risen sharply in recent decades due to higher-yielding crop varieties and increased fertilizer use. This increase was also due to major investments in water resources infrastructure and to massive energy subsidies for pumping groundwater, that are less likely to be repeated in the coming decades.

Against this background, the question appears to be: **How will we find sufficient water to provide food security, health and livelihoods to a growing world population— in harmony with other water users and the environment?** This is truly a global challenge, that should perhaps be reformulated as follows:

How can we grow the food we need with the water available?

To grow enough food and provide sustainable livelihoods to poor people with the available water will require a considerable overhaul of the way agriculture is practiced. The dominant

agricultural philosophy that views land as the scarce resource and aims to maximize crop yields per unit of land through better varieties—while removing nutrients and water as constraints¹—needs to be replaced. It should be replaced by a philosophy that views land, water, nutrients and genetic resources as an integrated set of scarce resources that need to be managed by the stakeholders.²



For water and land resources management there are three priorities:

1. To implement better water and land resources management practices in agriculture, forestry and fisheries.
2. To increase the understanding between agriculture and other water users, particularly environmental uses.
3. To reduce agriculture's water use and dependence.

We are proposing major initiatives, involving the CGIAR in a central role, to address these priorities.

Comprehensive assessment of water management in agriculture

There are many ways in which water can be managed better, ranging from better technology such as laser-land-leveling or drip irrigation to better involvement of users in planning and management of resources. Collectively these are known as 'integrated water resources management' and most of IWMI's work deals with specific aspects of this. Particularly in upper catchment areas and on hillsides, but not limited to these areas, better water management should be intertwined with better land management, for example through integrated watershed or catchment management approaches.

While it is clear that water and land resources management in currently cultivated systems can be improved, it is not clear by how much irrigated areas should be expanded in the coming decades. Irrigated agriculture—'old style', large-scale publicly funded irrigation systems—has gained an ambiguous reputation with parts of society. The willingness to invest in new systems has declined. Others, particularly in the irrigation and drainage community, hold it self-evident that considerable expansion of irrigated areas is necessary and unavoidable to achieve food security and reduce hunger and poverty in rural areas.

IWMI has initiated a major research program to assess the benefits and costs of the investments in water management for agriculture in the past and to assess future options.³

¹Achieved through higher-yielding varieties, cheap fertilizer and essentially free water.

²This is, of course, nothing more or less than a plea for integrated natural resources management.

³The Comprehensive Assessment of Water Management in Agriculture, reformed from the former System-Wide Initiative on Water Management (SWIM) and therefore also referred to as SWIM-2.

This program is designed to involve CGIAR institutes and other partners in an international effort to provide credible and authoritative knowledge—international public goods—to the agriculture and environment communities. This research is embedded in a wider program that will foster dialogue among the agricultural and environment communities, particularly, at national and basin levels.

Dialogue on Water, Food and Environment

Bridging the gaps in perception on the desirable directions in water management for agriculture will reduce conflicts among users and increase the resources available for broadly supported investments. To this end, a broad consortium is being established that will catalyze a process of cross-sectoral *dialogue on water for food and environmental security*.⁴ IWMI has taken the initiative for this exercise and will host the Dialogue Secretariat. A sponsor group chaired by the Netherlands government has been established to support the exercise. Significant resources from outside the CGIAR are expected to be available for the program and its components such as the Comprehensive Assessment. The Dialogue will be formally launched in August 2001 at the Stockholm Water Symposium.

The global challenge for water and agriculture

But there is a broader global challenge that goes considerably beyond the implementation of improved water and land management practices in agriculture, forestry and fisheries. That is the challenge of addressing water and land resources management practices in conjunction with (1) breeding plants that are more drought-resistant and have a higher yield per unit of water and (2) the management of soil fertility.

The CGIAR system is uniquely positioned to address this challenge. The crop centers combine the expertise to address drought resistance and water productivity—even though concentrating on these multiple traits will mean a relative shift in focus. It will require a considerable paradigm shift to think in terms of *yield per unit of water* as a significant complement to *yield per unit of land*. Key areas of a major research programme that addresses this water and agriculture challenge, to be addressed in a coordinated framework, can be grouped as follows:

1. Increasing the drought-stress tolerance of key irrigated and rain-fed food and cash crops through breeding and biotechnology, thereby adapting agriculture to increased climatic variability due to anthropogenic climate change.
2. Increasing the water productivity of key food and cash crops through breeding and biotechnology.

⁴Initially consisting of the Food and Agriculture Organization (FAO); Global Water Partnership (GWP); International Commission on Irrigation and Drainage (ICID); IUCN, The World Conservation Union; International Water Management Institute (IWMI); United Nations Environment Programme (UNEP); World Health Organization (WHO); and World Water Council (WWC).

3. Improving soil water and soil fertility management to sustainably increase crop yields, particularly in rain-fed agriculture.
4. Improving integrated water resources management at the basin level to increase water productivity and (re-)allocate water resources to a sustainable mix of high-value uses, from crops to forestry, to fisheries, the environment and domestic and industrial use, and reduce conflicts among users.
5. Integrated natural resources management with full involvement of all stakeholders and explicit sustainability and poverty alleviation objectives.

The potential of genomics for water and agriculture

The overall objective of the global challenge program on water and agriculture could be to sustainably increase global food production by 40% while reducing the renewable water resources used in agriculture by 10–20% in the next 25 years. This would imply a reduced use of water for agriculture over current projections by some 600-700 cubic kilometers—of the same order as the additional water required for domestic and industrial purposes.

Improved water resources management practices by themselves are unlikely to achieve this goal. In fact, the largest potential for a breakthrough may come from the advances in genomics that allow the manipulation of the multiple genes that govern drought-tolerance and water productivity in plants.



Frank Rijsberman
Director General

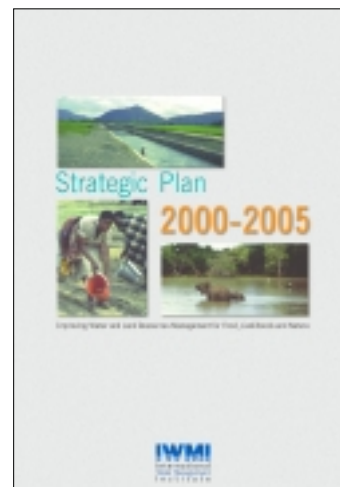
IWMI's road map to 2005

The IWMI Strategy 2000-2005 is our road map, which guides the Institute's research agenda for the next five years. It identifies the problems that need to be solved related to water, poverty and rural development; chooses the areas where we are confident we can make a contribution-an impact that grows out of research findings-and explains how we will organize ourselves to deliver on this commitment.

The strategic plan was developed over a six-month period in a series of brainstorming sessions between IWMI staff and partners. The drafting was facilitated by a task force led by the Director General. This process included open consultations, and input on three drafts, from some 70 IWMI colleagues and stakeholders worldwide-from the donor, research and national partner communities.

Out of these discussions grew a series of facts and conclusions about how the Institute can best move forward. Some examples are:

- **The Institute has expertise in certain areas that can be capitalized on.** Two new research themes were formed to bring out specific areas of excellence that were "hidden" in general research activities. The Institute decided to create specific research themes for smallholder water and land innovations and sustainable groundwater questions.
- **More research "firepower" is needed to tackle a broader research agenda.** A post doctoral program was started, and a first group of young professionals joined the Institute in January 2001. Through this program IWMI will increase its research ranks by up to 50 researchers over five years. This will also dramatically increase the number of young scientists from the South at the Institute.
- **Research goals are quantifiable and impact-oriented. The Institute has a wealth of research that will be more aggressively disseminated and put into the hands of users.** The new work plans that guide each of IWMI's five research themes are as specific as possible about the type of outputs (in terms of types of tools and practical materials to be delivered) and impact (in terms of people affected). A series of strategic partnerships have been signed with national agencies, international NGOs with broad local links and research institutes with complementary expertise. The goal of these partnerships is to bring research results to users.



Setting Strategic Priorities: Five Research Themes

The continuity of IWMI's research and its strategic priorities over the coming five years will be driven by five Research Themes:

- Integrated Water Management for Agriculture
- Sustainable Smallholder Land and Water Management Systems
- Sustainable Groundwater Management
- Water Resources Institutions and Policies
- Water for Health and the Environment

The Themes are **five interconnected research missions** for IWMI. The work of each Theme is guided by an action plan and specific targets to be attained.

A series of Benchmark River Basins complements the work of the Research Themes. These are IWMI's 'field laboratories,' where water management tools and concepts are tested in real-life situations, and data is gathered on an ongoing basis.

A further impact of this activity is the long-term partnerships that IWMI will forge with local universities, research institutes, national authorities and others in the countries where Benchmark Basins are located. Benchmark sites are being established in Sri Lanka, Pakistan and Southern Africa in 2001. By 2005 there will be some 10-12 such Basins across Asia and Africa.

Research Themes:

Integrated Water Management for Agriculture

Understanding irrigation in its true context. From field to river basin, looking at the needs of farms, communities, and nature.

This research theme brings together much of the core of the Institute's expertise, knowledge base and research outputs that have been produced over the past five years. Over the coming five years, this research will be deepened-concentrating on the areas of irrigation management, river basin analysis and global-scale strategic analysis of water resources.

A key focus of all research under this theme will be to look at irrigation management from the perspective of the competing uses of water in river basins, including agriculture, nature, local communities, cities, industry, etc.

Regional Offices					
Research Themes	Sri Lanka (Asia including China)	Thailand (Southeast Asia)	Pakistan (Central Asia/ Middle East)	South Africa (Africa)	India
	Integrated Water Management for Agriculture				
	Sustainable Smallholder Water and Land Management Systems				
	Sustainable Groundwater Management				
	Water Resources Institutions and Policies				
Water, Health and Environment					

Sustainable Groundwater Management

Providing a more precise understanding of the socio-ecological problems surrounding groundwater. Aggressively promoting solutions for its sustainable use in developing countries.

The goal of IWMI's groundwater research is to help countries, regions and local communities achieve sustainable use and management of groundwater, in ways that promote food and livelihood security for the poor women and men in Asia and Africa.

Activities include: assessing the extent of groundwater use for irrigation; exploring groundwater mapping techniques; understanding the factors contributing to overdraft and contamination; and evaluating groundwater recharge practices at the village and regional level.

A series of groundwater research products will grow out of this research, including research publications, models, analytical tools and policy papers aimed at encouraging policy makers to take action.

Sustainable Smallholder Land and Water Management Systems

Identifying and evaluating water and land use innovations developed by poor communities. Promoting their transfer to benefit people in other areas.

Across Asia and Africa many villages and poor communities have developed novel approaches for handling scarce water and land resources. This research theme concentrates on identifying these promising innovations and evaluating them to understand why they work. Examples include, treadle pumps, bucket and drip irrigation technologies, and water-harvesting initiatives.

The final step is to study how these practices can be adapted and transferred to help improve the livelihoods of the poor in other countries. The end result of this research is tools, concepts and 'appropriate technologies' that help poor people farm small landholdings more profitably and sustainably.

Water Resources Institutions and Policies

Studying and proposing 'best institutional and policy practice' for water management in developing countries. Creating a lasting network of institutional policy research groups to drive change.

This research theme examines how communities, governments and society deal with problems of water resources management. It involves the study of legal aspects, policies and institutional arrangements-from the rural communities to regional and national levels. The goal of this work is to produce guidelines and best practices that can help policy makers better manage their countries' water resources.

The work covers the institutional and policy implications of:

- Strategies for enhancing the productivity of water (at national, basin and local levels).
- Building poverty and gender concerns into national and subnational water management regimes.
- Managing water scarcity and its consequences.
- Farmer-led participatory irrigation management and irrigation management transfer.

Water Health and Environment

Putting health and environmental issues on the water management agenda. Creating tools to better address the health and environmental aspects of water in agriculture.

This research aims to improve the lives of poor people in agricultural areas by gaining a better understanding of the interactions between water use in agriculture, human health and environmental needs.

Health. The health component of this research includes studying changes in the operation and design of irrigation systems that could reduce snail and mosquito vector populations to prevent malaria, Japanese encephalitis and schistosomiasis. Research also examines the health impacts of common practices such as the domestic use of irrigation water and the use of untreated wastewater to irrigate crops. The goal is to find ways of maximizing the positive benefits of these practices while minimizing the health risks.

Environment. IWMI's water and environment research attempts to bridge the gap between irrigation and the environment (nature conservation) sectors. A large part of this work involves documenting the relationship between water used for agriculture and the needs of natural ecosystems, and the competition between these two sectors. Through this work, IWMI is developing practical ways to quantify and manage irrigation water and drainage flows in ways that sustain ecosystems while obtaining optimum agricultural production.



Fighting Malaria with Better Agricultural Practice

What are the links between agriculture and the spread of malaria? How can agricultural-based interventions reduce malaria in rural areas?

The Systemwide Initiative on Malaria and Agriculture (SIMA), focuses the combined skills and abilities of the agricultural research community, government agencies, malaria programs, and non governmental and community-based organizations, on the problem of malaria in agricultural areas.

For the past two decades, chemical, pesticides and drugs have been the weapons of choice in the battle against malaria. But as mosquitoes are becoming more resistant to pesticides and many drugs are losing their effectiveness against the malaria parasite, communities affected by this disease are ready for new approaches—ones that are cost-effective and don't involve harmful pesticides. Agricultural-based interventions offer new hope.

While malaria has well-known environmental determinants—specifically its links to water—little research has been done that examines the links between water use in agriculture and the 350 million annual cases of malaria in Asia and Africa. A better understanding of these links is the first step towards finding innovative solutions. Under SIMA, research will study water and land practices across a range of crops and ecosystems in Africa to determine the farming activities that encourage, and discourage, the breeding of malaria vector mosquitoes. Based on this research, guidelines and tools will be developed and tested for use in community-based efforts and NGO and government initiatives.

IWMI, as the lead institute of the initiative, hosted an exploratory meeting in Colombo in December of 2000. An electronic discussion has been launched to stimulate the exchange of ideas between interested potential partners. A key stakeholders' meeting was held in Nairobi, Kenya to pool available knowledge and shape the research agenda.

For documentation and full details, point your browser to: www.iwmi.org/sima

A New Regional Office in South Africa

There is now widespread agreement that in much of Africa, making water available to rural poor people for both productive and domestic uses is a key opportunity for reducing poverty and improving people's lives. IWMI's study of global water scarcity shows that at a national level, nearly all African countries are either water-scarce or lack the financial resources needed to develop sufficient water resources to meet projected needs. Analysis on a smaller scale reveals that even in countries which seem to have enough water, there are pockets of scarcity and acute shortages.

To further strengthen its work in Africa, IWMI opened a new Africa Regional Office in Pretoria, South Africa in November 2000. This regional office coordinates IWMI's research activities in southern and sub-Saharan Africa, and provides support to three smaller sub regional offices in Ghana, Kenya and Cote d'Ivoire. The IWMI scientific team based in the region—expected to grow to 20 professional staff in the next five years—includes specialists in areas such as hydrology, agriculture, sociology, economics and gender.

Primary research activities in Africa include:

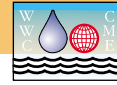
- work with regional and international partners to identify long-term opportunities and limitations for enhancing food security and economic development, while conserving soil and water resources.
- applied research to find viable technologies, practices, institutions and policies that will lead to immediate gains in food secu-

rity and incomes for poor men and women in rural areas.

- dialogues with policy makers and stakeholders to help them incorporate best practices into their agricultural and water management planning.
- capacity building through: financial and intellectual support to MSc. and Ph.D. students, the recruitment of postdoctoral researchers, curriculum development with universities and training programs.

To accomplish this work, IWMI will tap the expertise of researchers and technical experts from a number of African universities. The Institute is also working with governments and local and international NGOs to ensure that research results reach end users. IWMI's participation in the Southern African Regional Irrigation Association (SARIA) is a good example of the kind of collaboration the Institute hopes to encourage through its work in the region. IWMI is a founder member of the Association, which was launched in October 2000 to overcome the lack of interaction between irrigation professionals, farmers and officials in the region.

IWMI's research program for the region builds on more than a decade of work in the region. This research has focused on areas such as catchment management at the national, regional and international scales; small-scale community irrigation and transfer of former government-run irrigation schemes to farmers; water harvesting, groundwater and small-holder precision irrigation; and the health impacts of agricultural expansion, including malaria, schistosomiasis and nutrition.



How much water do we need for food production and nature?

Dialogue on Water, Food and Environment

IWMI is a founder member and a catalyst behind the creation of the Dialogue on Water, Food and Environment. This is an important new research initiative that brings together the agriculture and environment communities. The objective of this initiative is to arrive at a knowledge-based consensus between these two communities, on the present and future needs of water for food production, livelihoods, health and nature in developing countries.

The current partners in this initiative are: Food and Agriculture Organization (FAO); Global Water Partnership (GWP); International Commission on Irrigation & Drainage (ICID); World Conservation Union (IUCN); International Water Management Institute (IWMI); United Nations Environmental Programme (UNEP); World Health Organization (WHO); and World Water Council (WWC).

The process started in December 2000 when over 130 stakeholders from around the world came to a planning and design meeting in Colombo to help shape the Dialogue initiative. An agenda with points for action has been agreed on between all partners, and the group is now planning for specific action. A Consortium was formed at a meeting in March 2001 at the FAO. A Dialogue secretariat is planned to be hosted by IWMI, and IWMI Director General Frank Rijsberman was elected the first chair of the Consortium.

For papers, discussions and full details, point your browser to: www.iwmi.org/dialogue

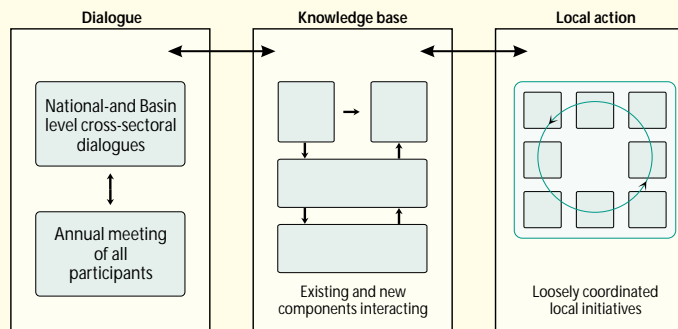
Comprehensive Assessment of Water Management in Agriculture: Costs, Benefits and Future Directions

The Dialogue acts at the policy level and will be fed with information from a Knowledge Base drawn from research done by experts on relevant topics-

Comprehensive Assessment of Water Management in Agriculture: Costs, Benefits and Future Directions. This assessment will look at the global situation of water management for agriculture since 1950 to the present. It will conduct studies in a number of ecosystems where there is likely to be a competition between the need to expand food production and maintain local wetlands and other natural systems.

IWMI's work on the Comprehensive Assessment is a continuation from the CGIAR Systemwide Initiative on Water Management (SWIM)- and is also referred to as SWIM-2.

For full details, point your browser to: www.iwmi.org/assessment



tered around water use in agriculture and environmental/ecosystem management.

IWMI's knowledge base contribution is a major international research initiative-

IWMI Integrates IBSRAM's Sustainable Land Management Research

IWMI has added sustainable land management expertise to its research portfolio, with the integration of the research program of IBSRAM-the International Board for Soil Research and Management-into the IWMI research themes.

The integration of the 15 years of land management research, tools, and extension networks across Asia, strengthens IWMI as a natural resources research center and brings new skills and useful knowledge into the CG System.

The networks bring with them a range of new partners' which extend the Institute's reach and provide new sources of data and experiences that are fed into the IWMI research themes.

- The **Catchment management network** is a consortium for research on catchment management, composed of stakeholders in water catchments-in Indonesia, Laos, Malaysia, Nepal, Philippines, Thailand, and Vietnam, together with 20 national partners, and three advanced research organizations.

- **Soil conservation on sloping lands** is a seven-country network (China, Indonesia, Laos, Malaysia, Philippines, Thailand, and Vietnam) which brings together researchers' and farmers. Research findings are being introduced on a large scale through demonstration and extension programs.
- The network for **acid and infertile soil management**, seeks ways to better manage acid and infertile soils, with particular attention to phosphorus management- in Indonesia, Myanmar, Philippines and Vietnam.

- **Nutrient recycling in urban and peri-urban areas-** a regional consortium for research and capacity building.

Other research being integrated into IWMI is: projects to determine nutrient balances of farms on marginal lands; providing practical land management information for farmers and their children through the Internet (Indonesia, the Philippines, and Thailand); and a training program on land and water legislation to give NARES examples of best practice from which they can build their policies.

5-Basin Study

Meeting the challenges faced by water-sector institutions

In five river basins in Asia, IWMI researchers have been studying how water-sector institutions can more effectively deal with the growing problems of water scarcity and inter-sectoral competition for water. This research is creating a better understanding of the problems in water-short basins, and documenting how these countries are addressing them. The basins studied are the Fuyang (North China), East Rapti (Nepal), Lembang/Sumpur/Ombilin (Indonesia), Pampanga (the Philippines) and Deduru Oya (Sri Lanka). In-depth field studies, which were completed in 2000, included analysis of: physical characteristics, water accounting, socioeconomic conditions and performance assessment of the selected basins. An important goal of this work is to encourage policy makers and water planners to look at their water situations from a new perspective—that of the river basin. "We are working to better understand what policies are in place in each country to ensure the water needs of its poor people, and analyzing which approaches work and why," says Tissa Bandaragoda, the IWMI researcher leading this project. *Funding is provided by the Asian Development Bank.*

IWMI-IUCN Cooperation

How does irrigation development impact natural ecosystems?

One perceived impact of large-scale agricultural development is the harm caused to local plant and animal species, and the disruption of food chains and webs that maintain the ecological balance. Unfortunately, scientific assessments of the ecological impacts of agricultural expansion are generally based on limited knowledge of the ecosystem's original state. The Uda Walawe Irrigation Extension Development Project in Sri Lanka has provided IWMI researchers with a rare opportunity to assess biodiversity before and after irrigation development. IWMI scientists, in collaboration with IUCN Sri Lanka, have begun taking an inventory of plant and animal species within the area to be developed. One outcome of this initial stage of the study, will be the identification of habitat types and natural resources zones within the extension area whose conservation could particularly benefit stakeholders.

Tools and Concepts for Improved Water Management

IWMI's tools for water resources management have been developed and validated through research done over the past six years. These tools provide data, methods and practices useful to water managers and food security planners in developing countries, and the development and agricultural research community.

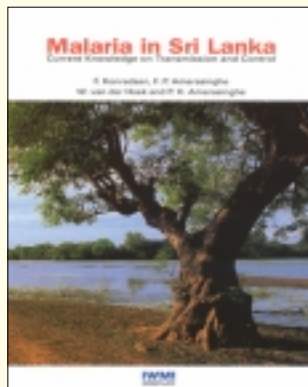
The final version of the **World Water and Climate Atlas**, compiling 30 years of climate data for 130 countries, is now complete. Over 500 CDs were distributed during the last quarter of 2000 and some 600 copies were downloaded from the institute's web site. A rapid query service which delivers Atlas data to users on-line is also now available. *Funded by Official Development Assistance, Japan and the United States Agency for International Development.*

Research on **practical, low-cost remote-sensing tools** for water management is now being developed into a Users Manual, with the goal of encouraging as many developing countries as possible to make use of this research.

The IWMI **Water Accounting System** was applied in ten river basins. This tool, which encourages an integrated approach to water management, has provided input on the multiple uses of water to discussions on the role and responsibilities of river basin institutions.

The IWMI **Policy Dialogue Model, PODIUM**, was used to explore potential impacts of the water and food security scenarios developed for the Second World Water Forum (2000). It was also used to generate discussion in the eight regional dialogues held as part of the Vision 2025 exercise.

IWMI researchers are currently working on testing and refining a **gender performance indicator for irrigation**. This useful, generic gender mapping and equity tool helps to measure poor women's equitable access to water for farming and other basic needs. Early versions of the indicator have been presented in national policy workshops in South Africa, and international conferences. The indicator has provided direct input to South Africa's gender policy on the revitalization of smallholder irrigation. *Funded by the Swedish International Development Cooperation Agency (SIDA).*



Reviewing a century of water-malaria research in Sri Lanka

It is now generally accepted that for malaria control measures to be effective, they must be based on knowledge of the local situation. A new book, *Malaria in Sri Lanka*, identifies the current state of knowledge-encompassing 100 years of malaria research and experience in Sri Lanka. The book brings together IWMI research

findings and the work of Sri Lankan and international researchers. This knowledge can form the basis for adaptation of the global malaria-control strategy to the Sri Lankan situation. Although epidemiological and transmission patterns vary greatly from one country to the next, the book, which

documents the successes and failures of control efforts in Sri Lanka, will also be of interest to the international community engaged in research on and control of malaria. *This book is a product of IWMI's Health and Environment research, funded by the Governments of Japan and Denmark.*

Focusing Research on the Most Water-Scarce areas



Interview with Vilma Hornikova, Director, IWMI Regional Office for Pakistan, Central Asia and Middle East.

Are there common water resources problems across the region covered by your office?

Yes. All these countries are faced with an alarming level of water scarcity. Each of them is having increasing difficulty meeting its population's water needs-for agriculture, domestic uses and other vital activities, such as fishing, river navigation and hydropower.

This chronic lack of water creates a host of problems that IWMI research is addressing. These include soil salinization, waterlogging, groundwater overdraft, and the health and environmental impacts of irrigating with wastewater. The knowledge generated through our research is helping the affected countries scrutinize their policies and improve organizational arrangements for managing water resources more sustainably.

Our priority for this region is to forge closer partnerships with National Agricultural Research and Extension Services (NARES). This will give us a better understanding of the specific needs of each country where we work and transfer knowledge and expertise to local communities.

IWMI's research activities are growing in Central Asia; what are the pressing water problems on which research needs to focus here?

Many issues need attention in this region, among them: institutional deficiencies, such as laws, rules and regulations; the absence of water management strategies and planning; and environmental crises, such as the severe ecological deterioration in the Aral Sea basin-due to saline irrigation water. Our research is helping to address these problems through practical guidelines and tools for governments, irrigation organizations and farmers. These help determine how much water is available to them, and see ways of changing irrigation management practices and organizational arrangements for more sustainable water use.

Our Central Asian research-coordinated from a new Tashkent office-focuses partially on the Ferghana Valley-a water-stressed area at the intersection of Uzbekistan, Kyrgyzstan and Tajikistan-that was traditionally home to the most productive and fertile lands in the region. Here we are assessing water productivity and how to use satellite remote sensing and geographical information systems to improve water management. The region also presents us with a unique opportunity to work on institutional arrangements and required changes for optimal water management across national boundaries.

NEW OPPORTUNITIES FOR Young Researchers from Asia and Africa

IWMI has launched a new program for postdoctoral researchers, with two goals: to strengthen its research expertise and to include in the Institute's ranks more young scientists from the South. The first wave of new researchers was hired in late 2000.

Dr. Jinxia Wang (China), Agricultural Economics, Chinese Academy of Agricultural Sciences.

Dr. Abdul B. Kamara (Sierra Leone), Agricultural Economics, University of Geottingen, Germany. He will be based in South Africa.

Dr. Mohammed Mainuddin (Bangladesh), Water Engineering & Management. He will be based in Pakistan.

Dr. Madhusudan Bhattarai (Nepal), Applied Economics, Clemson University, USA.

Dr. Shrinivas Badiger (India), Soil and Water Resources Engineering, University of Illinois, USA.

Two more waves of recruitment will be held in 2001. The target is to recruit 30 post doctoral fellows in the next five years.

New India Office and Policy Research Program

IWMI-Tata water resources policy research program



The year ended with the signing of a \$1 million grant from Sir Ratan Tata's Trust for the launch of the IWMI-Tata Water Resources Management Policy Research Program in India. This research will raise the importance in policy makers minds of making water resources management a strategic priority, across India. Acting as a catalyst to drive this process, IWMI is bringing together a coalition of Indian institutes that have completed important research on water resources over the past 10 years. The goal is to help them translate this technical knowledge into policy tools that policy makers will understand and make use of. 100% of this grant is earmarked for Indian partners; IWMI core funding and contributions from donors will cover IWMI research costs and follow-on activities. This program is coordinated by IWMI Principal Researcher, Tushaar Shah, from the research office in Anand Gujarat. It will be staffed by some 10 young Indian researchers (economists, hydrologists, social scientists, engineers), who will link with their colleagues in the other IWMI offices.

New regional office for India

The Institute has opened a new regional office for India, to bring the five IWMI research themes closer to the country's water resources problems. The office will be located in the complex of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in Hyderabad. Further development of IWMI's research in India will be done through partnerships with the Indian Council of Agricultural Research (ICAR).