

# CGIAR NEWS

CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH ■ MARCH 2000

## AT THE DAWN OF A NEW MILLENIUM

by Ismail Serageldin

**Water is life. Yet this precious resource is widely mismanaged. Unless we change our ways of managing water we will face serious crises in the near future. Let me explain why:**

Within the next two generations, an additional three billion people are predicted to have joined the population of the planet, mostly in developing countries. Assume that the amount of food consumed per person will not increase, a very conservative assumption as all models forecast a growth in consumption with rising incomes and dietary changes. Assume also that the contribution of irrigation to that increment in food productions is equivalent to the contribution of irrigation to all food production, about 40 percent. This is another very conservative assumption, as in the last spurt of agricultural production in Asia, the Green Revolution, irrigation accounted for about 80 percent of this increment.

Finally, let us suppose that all irrigation will achieve a water-use efficiency of 70 percent at the basin level, which would be a remarkable achievement. Assuming all this, we would still need 17 percent more water in irrigation to meet food demand. Relaxing any of these assumptions results in forecast increases of 50 percent or more. Yet due to a variety of factors, the amount of water used in irrigation is unlikely to increase. Urban populations in the developing world will triple; industry will only increase, as will pollution. We ignore the needs of water in the ecosystem at our



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own peril. So to make a long story short, unless we change our ways, we will soon be facing a very serious water crisis.

Consequently, competing claims to water between users within countries and between countries will have to be managed in a cooperative rather than a confrontational fashion. The needs of the poor and of future generations must be secured and issues of quantity and quality of water must be addressed.

In August 1998, the World Water Council convened the World Commission on Water for the 21st Century in order to look squarely at the

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## IRRI CELEBRATES 40 YEARS OF DISCOVERY

In April, the Philippines-based International Rice Research Institute (IRRI) will celebrate 40 years of scientific effort aimed at easing hunger and alleviating poverty in the rice eating regions of the world. The theme of the anniversary is "Rice Research for the New Millennium."

A special anniversary program will be held on 4 April, with His Excellency President Joseph Ejercito Estrada invited to give a keynote address. Dr. Ismail Serageldin, the CGIAR Chairman and a wide range of leading scientists, top policy makers, and major donors will also attend.

Established by the Ford and Rockefeller Foundations in 1960, IRRI has developed into one of the world's best known international research institutions.



"Since it was established, IRRI has become the center of a worldwide family of rice scientists and in the process helped transform a small research initiative into a global movement for improved agriculture in the developing world, not to mention the ways it has bettered the lives of millions of poor rice farmers and consumers," said Dr. Ronald Cantrell, IRRI Director General.

Over the coming decades, IRRI hopes

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## DAWN OF THE MILLENNIUM

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challenges and create a shared Vision for Water, Life and the Environment. Since then, sector-specific and regional consultations have been held across the globe to arrive at this Vision. The Global Water Partnership is simultaneously preparing a Framework for Action to achieve the Vision. Thousands of persons and hundreds of organizations have been

involved in this enterprise. Special outreach efforts are being mounted to reach specific constituencies, especially women and youth. All of this influences the preparation of the Vision Report and the Framework for Action.

The Vision Report and the Framework for Action were presented during the Second World Water Forum & Ministerial Conference in March in the Hague. This event provides a tremendous opportunity for all of us to pledge our

efforts to creating a better future for ourselves, for our children and for the planet. 

For more on the Hague events and outcomes see: [www.worldwaterforum.org](http://www.worldwaterforum.org)

*Ismail Serageldin is Chairman of the World Commission on Water for the 21st Century, Chairman of the Global Water Partnership, Chairman of the CGIAR, and Vice President of the World Bank.*

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Issued by the CGIAR Secretariat  
1800 G Street NW, Washington DC, 20433, USA  
Tel: (1-202) 473-8951 • Fax: (1-202) 473-8110  
E-mail: [cgiaar@cgiar.org](mailto:cgiaar@cgiar.org)  
Editor: David Kinley  
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## TAC Charts Course for System Change

CGIAR's Technical Advisory Committee (TAC) convened a special meeting at FAO, Rome in January 2000 to debate alternative scenarios for a new CGIAR "2010 Vision and Strategy." Participants considered background documentation prepared by the TAC Secretariat for constructing alternative scenarios of what objectives the CGIAR should be pursuing in 2010, with which partners, and through what means. The key documents upon which this discussion was based may be found on the CGIAR website.

TAC worked to refine the elements of a future scenario for the CGIAR taking into account the views of meeting participants and other stakeholders, including inputs received via an Electronic Open Consultation, conducted during December 1999 to January 2000. A "Synthesis of Selected Strategic Documents" was prepared covering many principal concerns including biotechnology, genetic resources, ecoregional approaches, relations with NARS, and marginal lands development. The Standing Committee on Priorities and Strategies (SCOPAS) is preparing a draft of a new CGIAR "2010 Vision and Strategy" for consideration at TAC 78 and subsequently for consideration by the CGIAR Consultative Council at a special meeting on 10-11 April 2000 at FAO, Rome, and finally by the CGIAR at MTM2000.

TAC plays a central role in many key activities and programs of the CGIAR. It provides intellectual leadership to the CGIAR on scientific matters by providing independent advice and judgments on strategic issues and on the quality of the scientific programs supported by the CGIAR. It ensures the quality of research supported by the Group and its relevance to the CGIAR's goals and objectives; and recommends research priorities and strategies to the CGIAR. TAC also recommends allocation of resources among centers in the context of CGIAR-approved priorities and strategies.

TAC is composed of distinguished scientists and experts from developed and developing countries, and acts either upon reference from the Group or on its own initiative. It has 14 members – appointed by the Group after wide consultation among its members – who serve in their personal capacities. Usually half of the members come from developing countries and half from industrialized countries. The TAC Chair, presently Dr. Emil Javier of the Philippines, has continuing responsibility for TAC's operations, and reports to the CGIAR.

For more on the TAC discussions and papers and the Vision and Strategy processes see: [www.cgiar.org/tac/tac2010.htm](http://www.cgiar.org/tac/tac2010.htm)

## IRRI *Continued from page 1*

to continue to reap the gains of cutting-edge science for the benefit of all those involved in rice. "The institute will also continue to build information networks, and strengthen its partnerships with various research institutions, especially in areas such as biotechnology and hybrids. In all these efforts, IRRI will focus on sustainability as one of a number of key issues," said Dr. Cantrell.

In addition to the main anniversary celebrations, IRRI will also host the following events:

### The 23rd International Rice Research Conference (IRRC)

From 31 March to 3 April, IRRI will host the 23rd IRRC. Organized every five years, IRRC 2000 will be held at the Institute's Los Baños headquarters with the theme, "Rice Research for Food Security and Poverty Alleviation." The conference will focus especially on irrigated ecosystems and provide a forum for rice scientists to present research results and exchange ideas.

During the conference, the first biennial Senadhira Rice Research Award will also be presented to an Asian rice scientist. The 1995

IRRC focused on less-favored and fragile environments – the rainfed lowland, upland, and flood-prone rice ecosystems.

### The Fourth International Rice Genetics Symposium

From 22-27 October, the Fourth International Rice Genetics Symposium will also be held at IRRI. Participants in the symposium will discuss the latest developments in rice systematics and evolution, cytogenetics, classical genetics, tissue and cell culture, genetic engineering, and genomics. There will also be plenary sessions, oral presentations, and poster sessions.

The First International Rice Genetics Symposium was held in 1985. It led to the birth of the Rice Genetics Cooperative (RGC) for promoting international cooperation in rice genetics. The same year, the Rockefeller Foundation organized the International Program on Rice Biotechnology, which has played a major role in advancing the frontiers of rice science, international collaboration, and human resource development in rice.

"We have witnessed major advances in the genetics and molecular biology of rice during the past 15 years," said Dr. Gurdev Khush, IRRI's principal plant breeder. These develop-

ments have opened new frontiers in rice molecular biology, particularly for understanding the genetic architecture of traits and their manipulation, modifying gene expression, genome sequencing, functional genomics, and gene discovery. Researchers are using these breakthroughs to develop rice varieties with higher yield potential and yield stability for feeding 50 percent more rice consumers by 2025.

The conference will also mark one of the last major events at IRRI organized by Dr. Khush before his retirement. A winner of the World Food Prize, among many other major awards and achievements, Dr. Khush has been at the Institute for more than 30 years and is recognized as one of the leading scientists in agricultural research and development in the world today. 🌱

For additional information, contact Duncan Macintosh, IRRI, MCPO Box 3127, Makati City 1271, Philippines; Telephone (63-2) 845-0563 or (63-2) 844-3351 to 53; Fax: (63-2) 891-1291 or (63-2) 845-0606; Email: [d.macintosh@cgiar.org](mailto:d.macintosh@cgiar.org)  
Web (IRRI): [www.cgiar.org/irri](http://www.cgiar.org/irri)  
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## Leading CGIAR Scientists Killed in Tragic Air Crash

Colleagues at the Consultative Group on International Agricultural Research (CGIAR) were shocked and saddened to learn that four CGIAR scientists were among those killed in the January 30 crash of Kenya Airways #431 off Côte d'Ivoire.

"This is a most tragic loss and I want to convey, from myself and all in the CGIAR, condolences and deepest sympathies to our colleagues at the CGIAR Centers, and to all members of the affected families. Words are of little consolation at times like this, but our thoughts and prayers are with you," said CGIAR Chairman Ismail Serageldin.

The scientists are **Dirk Vuylsteke**, **Paul Speijer**, and **John Hartman** from the International Institute for Tropical Agriculture (IITA) in Nigeria, and **Abdou Salam Ouedraogo**, regional director of Sub-Saharan Africa for the International Plant Genetic Resources Institute (IPGRI). They all leave young families.

The three eminent IITA scientists were working on what is considered among the most promising of all CGIAR research in Africa, a banana improvement project at IITA's Regional Center for Eastern and Southern Africa in Uganda. Dr. Vuylsteke was the project leader, Dr. Speijer the nematologist, and Dr. Hartman a banana breeder. They were on their way to a planning meeting at IITA headquarters in Ibadan. Their research focused on developing improved technologies for sustainable production, including strategies for integrated pest and disease management, improved high-yielding varieties with strong disease resistance and desirable fruit quality, and sustainable resource and crop management practices.

Dr. Ouedraogo, a distinguished scientist in the field of forestry and bioforestry, had served as IPGRI's Regional Director since last October and was based in Nairobi. Before moving to Africa, he led IPGRI's forest genetic resources program in Rome. Prior to joining IPGRI, Dr. Ouedraogo was the founding Director of the Forest Tree Seed

Centre in Ouagadougou and Coordinator of the FAO/CILSS regional forest genetic resources program. His many contributions were recognized throughout Africa. A deeply religious individual, he was on his way to a church conference in Nigeria.

Developing new varieties of banana is a painstaking task, which is technically extremely challenging. However, by adopting a patient and systematic approach John, Dirk, Paul and their colleagues were well on the way to making significant advances in breeding improved matooke bananas with the potential to significantly raise the levels of banana production in Eastern and Central Africa.

Due to the tragic way in which these scientists were lost, IITA is still making preparations for the memorial services. Friends, colleagues and well-wishers are being invited to sign books of condolence and send flowers to the IITA Kampala office, Plot 7 Bandali Rise, Bugolobi, where there is a specially prepared condolence room to honor these three special people.

# “GREEN MUSCLE” ZAPS LOCUSTS AND GRASSHOPPERS

Locusts and grasshoppers have devastated crops across Africa since Biblical times. When rains are exceptionally good, desert locusts multiply near the Red Sea and swarm across Sudan to West Africa and all the way to Mauritania on prevailing easterly winds. They then return across North Africa on later westerly winds to repeat the process in greater strength the following year. While swarming across the continent the locusts devour virtually all the crops they find in their path. Once established, it usually takes a particularly dry year or two to put an end to the locust cycle. By contrast, grasshoppers form a more chronic problem causing serious crops yield losses in most years.

Major locust outbreaks have typically occurred at intervals of 10 to 20 years from time immemorial. During the last such Desert Locust outbreak in 1986-89 donors spent US\$300 million and 1.5 million litres of pesticides were applied.

Once the crisis was over, there was extensive debate about the detrimental effects on the long term food chain of using chemical pesticides in such quantities. A better way had to be found through attempting to find a natural enemy of the locust on which to base a targeted biopesticide. To this end, a consortium of research institutes was established including the Centre for Agriculture and Biosciences International (CABI) in the UK and the International Institute of Tropical Agriculture (IITA) with its Biological Control Centre for Africa in the Benin Republic. Funding was provided by donors from Canada and the United States, and from the UK and Holland.

A young British scientist, Chris Lomer, began working on this project with CABI in 1991. The first task was to identify a rare pathogen which would effectively kill locusts and grasshoppers. Lomer organized the testing of some 160 likely fungi in laboratories in both CABI and IITA, and by 1992, the winning fungal pathogen known as *Metarhizium flavoviride* had emerged.

To permit crop spraying, an oil-based formulation was developed; this has been dubbed “Green Muscle” for its powerful,


yet environmentally-friendly effectiveness. To a locust or a grasshopper, Green Muscle is vicious; it kills the insect and then its spores multiply in the dead body. Indeed, this is the only way that the pathogen can reproduce, so it is very selective in its viciousness.

Next, Green Muscle was fully tested to confirm its effectiveness in various climatic zones, and to make absolutely certain that it could have no deleterious effect on any other living creature. This necessitated building a small factory at IITA's Biological Control Centre to generate sufficient quantities of Green Muscle for large scale field testing by the national agricultural research systems and by IITA itself.

Field tests confirmed that Green Muscle is satisfyingly effective against all grasshopper pests even though it does not kill the insects as immediately as chemical pesticides do. Stringent tests were also carried out to ensure that it had no effect on other life forms. This included injecting Green Muscle into the stomachs of wasps and bees to present a maximum challenge. Through these tests it has won formal FAO approval, which is expected to lead to acceptance by the registration authorities in sub-Saharan Africa.

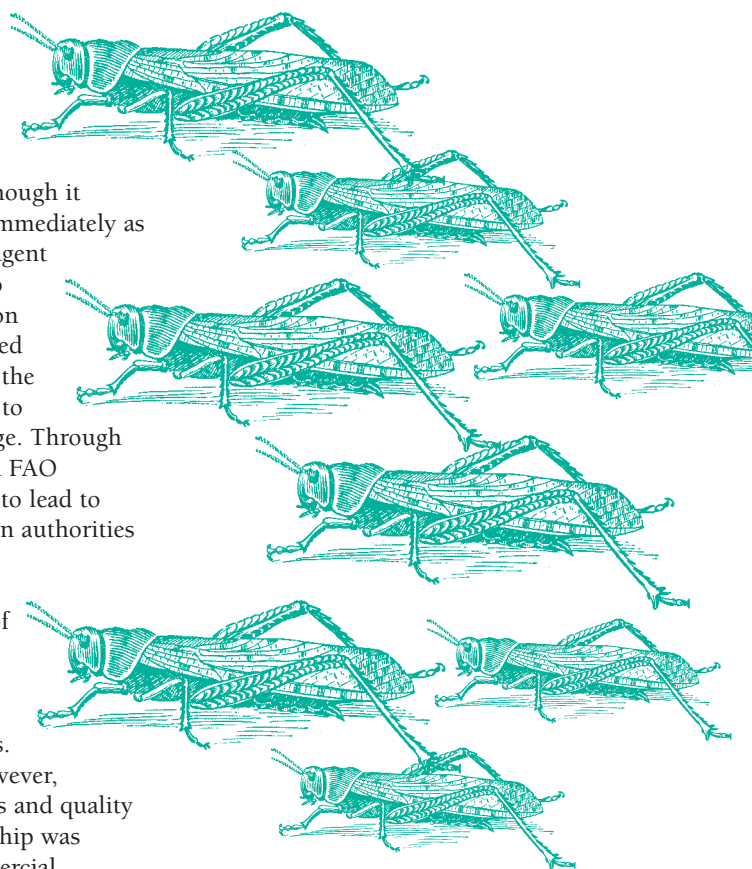
It was originally hoped that commercial quantities of Green Muscle could be manufactured under control of the several national agricultural research systems. The production process, however, demanded specialist facilities and quality control procedures. Partnership was therefore sought with commercial enterprises willing to establish Green Muscle production facilities on a scale required to service not only the countries in northern Africa, but also in southern Africa where additional locust and grasshopper species attack crops.

Two such enterprises have been identified: National Plant Protection (NPP) in France and Biological Control

Products (BCP) in South Africa. The know-how acquired by IITA in establishing its relatively modest production facility in Benin has been passed on to these companies. Once NPP and BCP are in volume production, an environmentally acceptable and highly effective weapon will be widely available to combat these voracious pests that have ravaged African farmers' crops for centuries. 

For more:

[www.cgiar.org/iita/research/Lubilosa](http://www.cgiar.org/iita/research/Lubilosa)





## SAVANNA SHEDS NEW LIGHT ON WILDLIFE-HUMAN BALANCE

A computer model that can project changes in the complex environment of East Africa will make valuable data available to citizens trying to cope with land-use questions and the management of wildlife. The computer model, dubbed SAVANNA and funded by the U.S. Agency for International Development, has been 15 years in the making.

Researchers in Kenya and the United States are now feeding data into the system that will help project ecosystem changes from five to 15 years for the vast plains of Kenya and Tanzania where Maasai cattle herders have co-existed with elephants, wildebeest and lions for centuries. SAVANNA is the first model capable of tackling the full range of land-use options and policies facing such government-protected areas.

Information on expected rainfall, population growth, public spending, and tax revenues in Africa have seldom been available to the average citizen. Lack of access to reliable information cuts many people out of decisions that have direct impact on their future, according to Robin Reid, a systems ecologist at the Nairobi-based International Livestock Research Institute (ILRI), where the SAVANNA model is being pioneered.

Reid is co-author of a recently released report titled *"The SAVANNA Model: Providing Solutions for Wildlife Preservation and Human Development in East Africa and the Western United States."*

"Unless we have some good, objective information to put in front of decision-makers so that they can have another source to base their decisions on, then you'll never have anything beyond the politics in a given situation," said Reid.

Threats to government-protected areas in East Africa include population growth, urbanization, poverty, poaching and political greed. Those factors have contributed to an 85 percent decline in Kenya's elephant population between 1975 and 1990 to about 20,000 head.

Reid said a Maasai leader in Tanzania told her his community's most vital need

is "the same information that everybody else has, that government ministries have, so that we actually can come to the table and have a conversation."

Now Maasai herders will be able to sit down with game ranchers, safari operators and owners of lodges and tented camps in the Maasai Mara and Amboseli game reserves, turn on the computer and observe the short and long-term effects of using more of the land around the reserves to grow corn.



SAVANNA also would tell the Maasai that the human population around the Maasai Mara reserve, which straddles Kenya and Tanzania, is growing by about 7 percent a year and that cultivated land increased 1,000 percent in 20 years. That type of growth automatically means poorer and reduced grazing for cattle – and a reduction in wildlife outside the reserve.

While poverty is placing the greatest burden on the fragile lands around the Maasai Mara, Amboseli and the Ngorongoro Conservation Area in Tanzania, affluence is the problem affecting wildlife conservation areas in the western United States, which SAVANNA also addresses.

The building of resort homes and golf courses and the increased population in areas around Yellowstone National Park in Wyoming, Rocky Mountain National Park in Colorado and Pryor Mountain Wild Horse Range in Montana is being simulated by SAVANNA to determine future policy toward bison, elk, and wild horses.

ILRI is holding training programs for Kenyans, Tanzanians and Ugandans to demonstrate the range of policy and management scenarios SAVANNA can tackle.

## IWMI Appoints Next Director General

The International Water Management Institute (IWMI) Board of Governors has selected Dr. Frank Rijsberman to succeed Dr. David Seckler as Director General, from September 1, 2000. Rijsberman, a Dutch citizen, is currently Deputy Director of the World Water Vision Unit of the World Water Council, and a part-time professor in the water resources and environment group at the International Institute for Hydraulic, Infrastructure and Environmental Engineering (IHE) in Delft, The Netherlands.

He brings to IWMI 20 years' experience as a natural resources planner, working on projects for fresh water resources, coastal zones, soil erosion, environmental management and climate change/sea level rise. He has worked on projects across Europe, Africa, the Middle East and Asia.

Rijsberman says that he will help IWMI build on its strong scientific work, to make the Institute the international center of excellence for integrated water resources management – with a specific focus on the scientific aspects of water for food and rural development in poor countries.

"The challenge for IWMI over the coming five years is to establish itself as The Global Water Center. The fact that the Institute has the expertise and a reputation for scientific excellence in integrated water resources management, makes it the ideal player to take this place," he says. "We will focus research on how the water needs of expanding populations can be met while maintaining environmental quality and biodiversity."

"IWMI's strategic thrust will be to lead the debate on irrigated agriculture, by forming strong partnerships with the environmental sector and others to address the problem of water for food and rural development in harmony with nature," adds Rijsberman. "The objective is to agree on directions that all sides are comfortable with."



# COMMUNITY-BASED FISHERIES MANAGEMENT IN BANGLADESH

Over 100 million people live in rural areas of Bangladesh and a third of the country is comprised of floodplains and wetlands where about 80 percent of households catch fish as a source of food or income. Such fisheries contribute about 50 percent of the total production, but it is widely recognized that catches, especially of large higher value species, have been declining due to flood control, drainage, and overfishing. It is believed that 99 percent of such fish never survive a full year.

Past government policies have stressed revenue collection from some 12,000 fisheries (jalmohals) rather than sustainable production. The system of leasing out fishing rights to the highest bidder has favored short-term exploitation and concentration of fishery wealth. Since 1987, ICLARM, with Ford Foundation support, has been conducting experiments and action research to improve management of these fisheries. Initially, this was to test a licensing system for provided individual fishers rights. Since late 1995, the focus has changed to community-based management.

## So what does Community-Based Fisheries Management (CBFM) look like, and what is its impact?

ICLARM, Department of Fisheries (DOF) and five Bangladeshi NGOs have worked as a partnership in 19 waterbodies comprising lakes, areas of open floodplain (beels) with both permanent and seasonal water, and rivers. Action research focused on developing local management arrangements, on the fishing communities deciding and taking up management actions, on monitoring to assess impacts, and on documentation and comparative institutional assessment. The outcomes are naturally diverse and are best illustrated by examples:

- About 400 households living around Ashurar, a largely seasonal beel in the north-west, depend on fishing for part-time incomes. In the mid-1990s the government stocked it with carp, but local people were unhappy as the fish escaped, they had not been consulted but were required to pay part of the costs. As part of the CBFM project, Caritas, a large NGO, working in partnership with ICLARM and DOF organized all of these households into groups represented in a management committee. The committee decided to protect

the deepest part of the beel where dry season water is retained as a year-round fish sanctuary and to ban fishing in the rest of the beel in the early monsoon. Monitoring indicates that total catch was 54 percent higher in 1998 than in 1997 following these measures.



- CBFM can also result in enhancements. The traditional fishing community of some 90 households living around Rajdhala Beel in northern Bangladesh was forced to work on a share basis for an outsider who leased the fishery. After initial awareness raising by Caritas, these fishers started a non-cooperation movement with the leaseholder and, after lobbying by the fishers, NGOs, ICLARM and DOF, the fishers eventually got use rights to the beel. They have continued management by annual stocking of carp. The fishers now jointly invest in stocking carp (using NGO credit), guard the fish, and share equally the returns, which were over three times higher in the second year of group management (there were few fish left in the first year).

Similar management arrangements have also been developed working with BRAC (the largest NGO in Bangladesh), in all such cases the lakes involved are closed so that the stocked fish cannot escape, and the community of fishers is defined by group membership. Community management experience has shown the need for flexibility and a range of institutional arrangements, all based on user participation, to match the diversity found within inland fisheries.

## ICLARM's experience in Bangladesh has highlighted some common elements of CBFM:

- Empowerment of people who depend on fisheries by formation of local fishery management committees representing key stakeholders.

- NGO support for fisher organizations, human resource development and credit for both fishery and additional livelihoods.
- Fishery improvements – enhancement, restoration, conservation, access limits – decided by local stakeholders who set rules and comply themselves.
- Government support by recognizing local decisions and helping enforce them.
- Local recognition of subsistence fishing access for other households in the community that do not fish for an income, provided they respect sanctuaries and bans.

Partnership between ICLARM, NGOs and government has made this possible. Research has assessed the different models of fishery management that evolved and the appropriate institutional arrangements (sets of rules and rights). Most importantly, the emphasis in fishery management has been on property rights, participation and local decisionmaking. Local conflicts do often occur over fisheries. However, communities, with their diverse stakeholders, have shown that they can cooperate to protect and enhance important economic assets that are a major source of food for poor and rich alike.

ICLARM recently co-hosted a workshop with the Ministry of Fisheries and Livestock where the results of the project were presented. This process coupled with other recent projects has influenced formation of new strategies for inland fisheries. The Government has decided on gradually transferring administrative responsibilities to DOF for sustainable management by local communities rather than just revenue collection. 🌿

## ICLARM Relocated to Malaysia

ICLARM has relocated its headquarters from Manila, Philippines to Penang, Malaysia. ICLARM's permanent facilities in Penang are getting ready and until then ICLARM will be located at the address given below:

ICLARM

No. 10, Lower Level 6

Equatorial Hotel Office Block

1 Jalan Bukit Jambul, Bayan Lepas

11900 Penang, Malaysia

Telephones: (604) 641 4623; (604) 641 4652; (604) 641 4655; (604) 641 4729.

# FloraMap: New Tool for Conserving Biodiversity

A newly released computer tool on CD-ROM, called *FloraMap*<sup>™</sup>, will cut much of the guesswork, legwork, and costs typically involved in tracking down and conserving plant species and other potentially useful organisms in the wild. This new Windows-based geographic information system (GIS) is the product of more than two decades of research and testing by agricultural geographer Peter Jones and colleagues at CIAT.

"FloraMap is designed specially for situations where a wild plant or other organism has already been collected from various sites but where little or nothing is known about the specimen's physiology," says Jones.

All that's needed to run the program is the latitude, longitude, and altitude of each site from which the original set of specimens (or "accessions") was collected. These are the raw data that FloraMap uses to produce probability maps showing where else in the tropical world the species might be found and preserved.

Agricultural scientists are keenly interested in wild plants mainly because most of the world's crop-based food, whether for people or livestock, is based on a very shallow gene pool. Just a handful of species – notably rice, wheat, maize, potatoes, common beans, cassava, and soybean – account for the great bulk of global food consumption. And within most of those species, genetic diversity in farm fields has shrunk in recent decades as a rising proportion of arable land is planted to a small number of commercial high-yielding varieties.

In trying to breed better crop varieties of different food and forage species, scientists increasingly look to wild plants as a source of new genetic material. The trick is to identify those genes that might confer desirable traits on cultivated species – traits like resistance to disease, pests and drought. But agricultural scientists are also interested in other organisms in the wild such as insects, fungi and viruses. Studying their physiology, life cycle and genetic makeup can furnish important clues as to how such organisms help or hinder crop growth and health.

CIAT distributed a pilot version of FloraMap, covering Latin America and the

Caribbean, to 23 selected professionals for evaluation early in 1999. The most recent version, released in late 1999, expands the tool's geographic coverage to most of the world's tropical areas and some temperate areas. It also has an improved user interface.

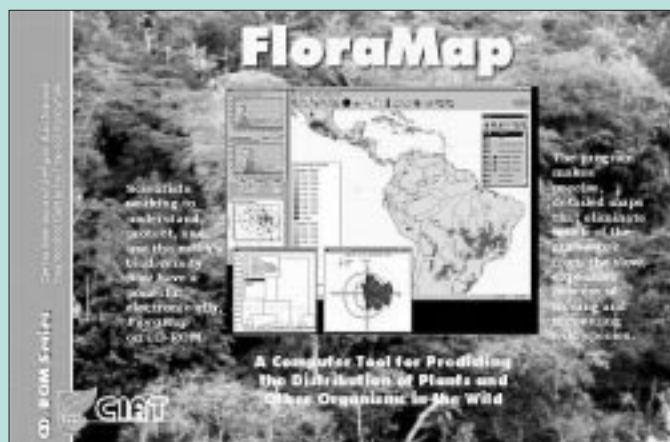
IPGRI is keenly interested in FloraMap for its conservation work and as a potentially useful tool for plant genetic resources programs. IPGRI has provided some assistance to CIAT, and is expected to extend the use of the software to national programs and to IPGRI's regional staff around the world.


This will be done during 2000 through training workshops involving both IPGRI international staff and researchers from selected developing countries. FloraMap will be a "first key component in a tool kit for national agricultural research organizations to help them analyze and add value to their genetic diversity data."

In the meantime, IPGRI staff in East Africa have been using FloraMap to map the potential distribution of five species of wild rice. The hope is that these relatives of cultivated rice will give a boost to breeding work.

"You're relying on the past work of germplasm collectors and herbarium botanists," says Guarino. "FloraMap gives you a first approximation of where else you might find the target species. This is a powerful thing to be able to do, especially when research funds are limited."

"FloraMap is built on the assumption that climate is a robust indicator of the environmental range of wild plants and many other organisms," explains Jones. Likely alternative sites for finding a particular species, then, are those whose climate profiles closely match those of the original locations where the wild accessions were collected.



FloraMaps may have other uses, such as identifying suitable locations for cultivating promising wild species or conducting field trials. In addition, biodiversity specialists can use the maps to plan more efficient *in situ* conservation programs, that is, to determine which natural habitats could serve as living gene banks. By overlaying probability maps for various wild plant species, specialists can select those sites that have a climate compatible with the largest number of species targeted for conservation. Other potential users of this new GIS tool include entomologists, mycologists, virologists, plant pathologists, and wildlife conservationists. 

The FloraMap CD-ROM and a printed manual are available from CIAT for US\$100. Hardware and software requirements are:

- Windows 95® or Windows NT®
- CPU-486 DS, 66 Mhz or better (Pentium® recommended)
- 32 Mb RAM
- 200 Mb of free space on the hard-disk
- CD-ROM drive
- 15-inch monitor capable of displaying 256 colors and 1,024 by 768 pixels
- Color printer or plotter for maps and graphics (Postscript preferred).

# IFPRI'S 25TH ANNIVERSARY CELEBRATION

On February 29, 2000, the International Food Policy Research Institute (IFPRI) celebrated its 25th anniversary at a reception and dinner in Arlington, Virginia. IFPRI opened its doors on August 15, 1975 in Washington, DC, with just a few staff and a small budget. The CGIAR began financially supporting the institute in 1979, when IFPRI joined the Consultative Group. Today, with a staff of about 150 and an annual budget of over US\$20 million, IFPRI has positioned itself as a world leader on food policy research.


IFPRI's founding director and several of its original staff attended the gala event, together with the institute's current and former staff, Board of Trustees, friends, and members of the Washington media corps. Director General Per Pinstrup-Andersen and his wife Birgit welcomed the 250 guests at a reception serenaded by an Andean pan flute band. A one-hour program followed the reception, with Dr. Gordon Conway, President of the Rockefeller Foundation, providing the keynote remarks.

Dr. Conway lauded IFPRI's quarter century of research dedicated to better understanding

the world food situation and its implications for developing countries. He also praised the pioneering work of Sir John Crawford and David Hopper, whose experiences laid the groundwork for IFPRI's foundation. Dr. Conway emphasized his belief that IFPRI's food policy research not only contributed directly to many policy improvements around the globe, but it has also helped debunk some pervasive contentions, such as the one that claims that world food shortages can be attributed simply to inequitable distribution. He spoke highly of Dr. Pinstrup-Andersen's leadership and IFPRI's important contribution to the CGIAR as a whole. Dr. Conway also noted that the international community has benefited greatly from IFPRI's continuous and objective projections of food supply and demand in the developing world.

The evening program included speeches by Martin Piñeiro, the outgoing chairman of IFPRI's Board, and Dr. Pinstrup-Andersen. Dale Hathaway, the founding director of IFPRI, and August Schumacher, Jr., Undersecretary for Farm and Foreign Agricultural Services at the U.S. Department of Agriculture, congratulated

IFPRI in their informal remarks. Stanley Wood, a senior scientist at IFPRI, amused the guests when he recited an epic poem he wrote to commemorate the occasion.

To mark the occasion IFPRI provided the evening's guests with copies of two booklets that look back on the institute's first quarter century: "25 Years of Food Policy Research: Reflections," by Per Pinstrup-Andersen, and "IFPRI's First 10 Years," by Curt Farrar (which can be downloaded from [www.ifpri.org](http://www.ifpri.org)). 



## CGIAR at the World Book Fair, India – February 2000


Inaugurating the World Book Fair in New Delhi at Pragati Maidan the Prime Minister Mr. Atal Behari Vajpayee said "Books will survive the cyber age."

Among the various dignitaries participating in this inaugural function were Professor Milton Israel, reputed historian from Canada. The CGIAR Secretariat and five Centers – ICRISAT, IPGRI, ISNAR, IWMI, and WARDA – displayed some of their major research publications at the World Book Fair.

Despite bad weather, a large number of book lovers visited the CGIAR Center's display. Dr. Bruno Dorin, on his visit to the CGIAR stall on inauguration day, said, "The CGIAR Center's booth at the International Book Fair at New Delhi permits a person to understand at a single glance the importance of their mission in the world and the quality of their work and publications." Dr. Dorin is the Head of Economic Department, French Centre for Human Sciences (CSH) in New Delhi.

A 13-year old student, Apoorva Shukla, said, "The CGIAR Center's display is very good. There are many books which give information to farmers and help them to increase their production." Purnima Joshi, Editor at Tulika Publishers observed, "The range, quality, and number of publications

brought out by the CGIAR is very impressive."

More than 1200 publishers displayed their books at the Fair including participants from Colombia, France, Israel, and Japan. It attracted approximately 500,000 visitors. Coinciding with the Fair, a number of seminars and literary programs were organized by the National Book Trust of India. 





## GOLDEN RICE FOR WORLD'S POOR: NEW STRAINS MAY RELIEVE VITAMIN A AND IRON DEFICIENCIES

Scientists in Switzerland have produced a new “golden rice” strain that could save millions of lives and improve maternal and child health in developing countries by increasing the iron and Vitamin A content of the rice grain, Science magazine has reported.

The new rice, developed by the Swiss Federal Institute of Technology's Institute for Plant Sciences, could significantly improve vitamin uptake in poverty stricken areas where supplemental pills are costly and difficult to distribute. The International Rice Research Institute (IRRI) is working with the Swiss scientists to adapt the new “golden rice” to developing country conditions. Vitamin A deficiency causes more than 1 million childhood deaths each year and is the single most important cause of blindness among children in developing countries. Rice plants do produce carotenoid compounds (that our bodies can convert into vitamin A) – but only in the green parts of the plant, not in the grain, which is the part eaten.

Researchers from the Swiss institute inserted genes from a daffodil and a bacterium

into rice plants to produce the modified grain, which has sufficient beta-carotene to meet total vitamin A requirements in a typical Asian diet. To double the iron content in rice, the research team added a gene from a French bean.

IRRI is currently working on transferring the genes required for beta carotene biosynthesis into the popular tropical *indica* rices preferred by most Asian consumers and suited to tropical growing conditions, using traditional breeding techniques. Consistent with the CGIAR's policy, the new rice will be made freely available for poor farmers once it has been comprehensively tested.

“Any research that could help improve the diets, and therefore the health, of the world's millions of poor should be given every opportunity to succeed. It has always been CGIAR's policy to distribute the results of such work free of charge once it is shown clearly to be safe to produce and eat,” said Dr. Swapan Datta, the CGIAR biotechnologist heading the “golden rice” project at IRRI.

IRRI has also developed a rice high in iron and zinc using traditional plant breeding

techniques. This rice is currently being tested by novitiates at a convent in the Philippines, to see how well the nutrients are absorbed. Iron-deficiency anemia is the most widespread nutrient deficiency in the world, affecting an estimated 2 billion people worldwide. Between 40 and 50 percent of children under the age of five in developing countries are iron deficient, and iron deficiency accounts for up to 20 percent of all maternal deaths. It also impairs immunity and reduces the physical and mental capacities of people of all ages.

The Swiss research was conducted with funding from governments and the Rockefeller Foundation. 🌱

*Helpful links: Visit the website of the International Rice Research Institute (IRRI) at [www.cgiar.org/irri](http://www.cgiar.org/irri)*

*Also visit Future Harvest at [www.futureharvest.org](http://www.futureharvest.org)*

*To learn more about the CGIAR, go to [www.cgiar.org](http://www.cgiar.org)*



## TAKING THE “PUFF” OUT OF WHEAT RUSTS

Leaf and stem rusts are the major biotic stresses limiting both wheat production and the longevity of high-yielding varieties in Egypt, Ethiopia, Sudan and Yemen. The diseases are a truly regional problem because rust infection is easily spread by spores carried in winds over long distances within and between countries.

Rust diseases don't recognize national boundaries and their threat to wheat crop yields has been increasing. Cross-border cooperation between scientists is the weapon ICARDA is using to fight the destructive disease.

A wheat rusts regional network was established in which Egypt plays the leading technical role, and Ethiopia, Sudan, Yemen, ICARDA and CIMMYT are partners. This is one of six problem-solving networks within the Regional Networks Project established under ICARDA's Nile Valley and Red Sea Regional Program.

To deal directly with the rust threat, Burkard mechanical spore traps were installed at a number of locations across the region. Rust trap nurseries were also established on 22 sites where monitoring could be carried out on the status of leaf and stem rust pathotypes and on spore movement. The nurseries included wheat rust monogenic lines, wild relatives, check varieties, and high-yielding promising lines and cultivars.

As a result of the monitoring program, 28 leaf rust races and 30 stem rust races were identified between 1995/96 and 1998/99, and their frequencies of occurrence in the respective countries and across the region were recorded. The performance of leaf and stem rust isogenic lines was tested and effective resistant genes for each country and the region were identified. These genes are now being incorporated into high-yielding but previously-susceptible cultivars in each country.

A breeding program is also under way in all four countries to develop high-yielding, adapted, resistant cultivars. Five commercial wheat cultivars and advanced lines were found to be resistant to the prevailing leaf rust races in Egypt, 16 in Ethiopia, 18 in Sudan, and 25 in Yemen,

while 15 cultivars had good resistance to stem rust. Monitoring from 1993 to 1999 found nine cultivars performing well against both rusts in the region. In 1998/99, out of the 48 tested cultivars and lines against leaf and stem rusts, 18 cultivars showed multiple disease resistance.

Much more is also now known about the way in which the rusts spread, thanks to the spore traps. For example, leaf rust inoculum in Egypt is exogenic and its pathway is from north to south, while in Ethiopia it is endogenic. In Sudan, it also seems that the primary inoculum comes from outside the country, possibly from Yemen, given the presence of spores all year round, or from other African neighboring countries.



The Regional Networks Project aims through complementary efforts to utilize expertise, human resources, and infrastructure efficiently in the member countries and from ICARDA. A multi-disciplinary and multi-institutional approach is used to strengthen basic and applied research on problems arising from biotic and abiotic stresses facing the production of food legumes and cereals in the four countries. Research is jointly planned but conducted and reported by national scientists.

Each network is headed by a lead country based on that country's scientific comparative. Basic research is conducted in that country, and the outcome of research is verified through adaptive research under local conditions in the other participating countries. ICARDA provides technical support, germplasm, and training, and facilitates research coordination, logistic support and administration. 🌱

For more on ICARDA and the Regional Networks Projects see: [www.cgiar.org/icarda](http://www.cgiar.org/icarda)

## Water Resources Management, Use and Policy in Dry Areas

ICARDA, in collaboration with the Ministry of Agriculture and the Ministry of Water and Irrigation of Jordan and the International Water Management Institute (IWMI), with financial support from the Islamic Development Bank (IDB), organized an international conference on “Water Resources Management, Use and Policy in Dry Areas.” The conference was held in Amman, Jordan, under the Patronage of His Majesty King Abdullah II, King of the Hashemite Kingdom of Jordan. Over 140 participants from 28 countries as well as those from eight regional and international organizations attended the conference.

The Conference was inaugurated by His Royal Highness Prince Faisal Bin Al-Hussein with opening statements from H.E. Mr. Hashem Shboul, the Minister of Agriculture, and the Director General of ICARDA, Prof. Adel El-Beltagy.

The Conference included six major sessions in which 44 papers were presented, covering water supply and demand beyond 2000; management of water under scarcity; water-use efficiency; alternative water resources; water harvesting; and water scarcity and poverty. The presentations highlighted a number of key influences on the way in which water will be managed in the future: high population growth; poor public perception of the potential crisis in water availability; lack of proper management mechanisms; and inadequate cooperation at regional and international levels.

The Conference called for creating a high level council for dealing with water scarcity in the dry areas. It emphasized the right of all people to have enough water for essential uses and for food production and called upon ICARDA to lead the follow-up action on its recommendations. 🌱



# ANNOUNCEMENTS

## ICRISAT Scientist Receives Vietnam Medal

Dr. Chris Johansen, Principal Scientist (Agronomy) at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), was conferred the Medal for Agriculture and Rural Development “for his distinguished contributions to groundnut development in Vietnam.” Dr. Johansen was given the medal and citation by Dr. Tran Dinh Long, Deputy Director General, Vietnam Institute of Agricultural Science, in a simple ceremony on 8 December 1999 at the Patancheru campus of ICRISAT. Dr. Johansen is the second ICRISAT scientist to win this award. Dr. C.L.L. Gowda was awarded the Vietnamese medal in 1997.

Thanking the Ministry of Agriculture and Rural Development Dr. Johansen said that he was accepting the award “on behalf of a large team of dedicated scientists.”

Dr. Johansen, an Australian national, was cited for his role in on-farm research to increase groundnut production. “He has been responsible for training many Vietnamese scientists in different areas of agronomy research and Geographical Information Systems,” the citation said. Dr. Johansen has been closely involved in ICRISAT-initiated work on groundnut in Vietnam, which began in 1990 under the Asian Grain Legumes On-farm Research (AGLOR) project funded by the United Nations Development Programme (UNDP), and the Food and Agriculture Organization (FAO).

## Golden Love Ball Award

Two ICRISAT scientists of the Genetic and Enhancement Program, Drs. L. J. Reddy and K. B. Saxena, were awarded the Jin Xiu Qiu Jiang (Golden Love Ball) award for 1999 by the Guangxi Provincial Government of China for their contributions to research and development of pigeonpea in that province of south China.

ICRISAT and China have been cooperating on pigeonpea research and development in Guangxi for the past three years. Drs. Reddy and Saxena provided improved varieties, exchanged research information, and trained Chinese scientists and government staff. The Golden Love Ball is a traditional folk symbol of love and friendship. The tradition has gradually been extended to express the highest appreciation to foreign scientists who have contributed significantly to research and development in Guangxi.

In their letter to Director General Dar announcing the award, Dr. Zong Xuxiao and Dr. Yang Shiyong of Guangxi Province, said:

“... we feel that the introduction of pigeonpea in China will help farmers to improve their quality of life. On behalf of our government, we thank ICRISAT for supporting this program. Congratulations to you and to your outstanding scientists.”

## Biotech Book Released on Web

“*Agricultural Biotechnology and the Poor: An International Conference on Biotechnology*” is now available in full text on the CGIAR web site. The 230-page text includes contributions from many of the world’s leading authorities on the ethical, legal scientific, social, and environmental ramifications of biotechnological developments in agriculture. The international conference was held in October 1999 at the World Bank and was convened by the CGIAR and the U.S. National Academy of Sciences. View the text at: [www.cgiar.org/biotech](http://www.cgiar.org/biotech)

## Award-winning Annual Report

The CGIAR’s 1998 annual report – *The Impact of Knowledge* – has won the 1999 Premier Print Award from the Printing Industries of America. The award was presented to the CGIAR and designer Staci Daddona for “demonstrating a unique ability to create a visual masterpiece.”

The theme running through the report is that the CGIAR is a knowledge catalyst for development. This concept tells of the importance of disseminating CGIAR knowledge, using visual metaphors derived from nature. The cover photo shows water rippling from a recent impact, conveying the far-reaching importance of the effect of scientific research. The second photo shows a tree ring, symbolizing how knowledge endures. The third photo shows a spider web, conveying the importance of networking both among the Centers and among the greater agricultural community. The final photo, a solar system spinning from its center, conveys the idea that the core of knowledge is a powerful and creative energy, whose force spins outward without end.

The award was sponsored by Anchor, Heidelberg, Impresse Corporation, Kodak Polychrome Graphics, Primesource Corporation, MSAS Skyking, Sun Chemical Corporation, Utica National Insurance Group, Westvaco Corporation, and Xerox Corporation.

The 1999 annual report is available electronically on the CGIAR web site: [www.cgiar.org](http://www.cgiar.org)



# THE CGIAR

## CGIAR Chairman

Ismail Serageldin

## CGIAR Executive Secretary

Alexander von der Osten

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### Foundations

Ford Foundation, Kellogg Foundation, Rockefeller Foundation

### International and Regional Organizations

African Development Bank, Arab Fund for Economic and Social Development, Asian Development Bank, European Commission, Food and Agriculture Organization of the United Nations, Inter-American Development Bank, International Development Research Centre, International Fund for Agricultural Development, Opec Fund for International Development, United Nations Development Programme, United Nations Environment Programme, The World Bank

## CGIAR CENTERS

- **International Center for Tropical Agriculture (CIAT)**  
Cali, Colombia  
Phone: (57-2) 4450000  
Web: <http://www.ciat.cgiar.org>
- **Center for International Forestry Research (CIFOR)**  
Bogor, Indonesia  
Phone: (62-251) 622 622 (operator)  
Web: <http://www.cgiar.org/cifor>
- **International Center for the Improvement of Maize and Wheat (CIMMYT)**  
Mexico City, Mexico  
Phone: 52 5804 2004  
Web: <http://www.cimmyt.mx>
- **International Potato Center (CIP)**  
Lima, Peru  
Phone: (51-1) 349-6017  
Fax: (51-1) 349-5638  
Web: <http://www.cipotato.cgiar.org>
- **International Center for Agricultural Research In the Dry Areas (ICARDA)**  
Aleppo, Syrian Arab Republic  
Phone: (963-21) 2213433  
Web: <http://www.cgiar.org/icarda>
- **International Center for Living Aquatic Resources Management (ICLARM)**  
Penang, Malaysia  
Phone: (604) 641 4623  
Web: <http://www.cgiar.org/iclarm>
- **International Centre for Research in Agroforestry (ICRAF)**  
Nairobi, Kenya  
Phone: (254-2) 521450  
Web: <http://www.cgiar.org/icraf>
- **International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)**  
Patancheru, Andhra Pradesh, India  
Phone: (91-40) 3296161  
Web: <http://www.cgiar.org/icrisat>
- **International Food Policy Research Institute (IFPRI)**  
Washington, DC, United States  
Phone: (1-202) 862-5600  
Web: <http://www.cgiar.org/ifpri>
- **International Institute of Tropical Agriculture (IITA)**  
Ibadan, Nigeria  
Phone: (234-2) 2412626  
Web: <http://www.cgiar.org/iita>
- **International Livestock Research Institute (ILRI)**  
Nairobi, Kenya  
Phone: (254-2) 630743  
Web: <http://www.cgiar.org/ilri>
- **International Plant Genetic Resources Institute (IPGRI)**  
Rome, Italy  
Phone: (39-06) 518921  
Web: <http://www.cgiar.org/ipgri>
- **International Rice Research Institute (IRRI)**  
Los Baños, Philippines  
Phone: (63-2) 8450563  
Web: <http://www.cgiar.org/irri>
- **International Service for National Agricultural Research (ISNAR)**  
The Hague, The Netherlands  
Phone: (31-70) 3496100  
Web: <http://www.cgiar.org/isnar>
- **International Water Management Institute (IWMI)**  
Colombo, Sri Lanka  
Phone: (94-1) 867404  
Web: <http://www.cgiar.org/iwmi>
- **West Africa Rice Development Association (WARDA)**  
Bouaké, Côte d'Ivoire  
Phone: (225) 634514  
Web: <http://www.cgiar.org/warda>