Global Knowledge for Local Impact

Agricultural Science and Technology in Sustainable Development

CGIAR Annual Report 2001

The year 2001 marks 30 years of Consultative Group on International Agricultural Research (CGIAR) work for development. Our achievements in mobilizing science for development; forging scientific partnerships; and strengthening human, technical, and institutional capacities would not have been possible without the support of our donors, matched with the energy, enthusiasm, and commitment of the many thousands of partners who form the CGIAR alliance.

Tribute to the CGIAR

Science, by definition, is a collaborative enterprise. We take this opportunity to acknowledge the scientific, technical, and financial support of our partners. We recognize the enormous contributions of our developing country partners and their national agricultural research systems. Our achievements result from the active involvement of farmers, more than 300 non-governmental organizations (NGOs), members of the private sector, and outstanding individual scientists and staff whose long-term commitment to agricultural research has made a difference in the lives of many millions of poor people worldwide.

CGIAR Members

African Development Bank

Arab Fund for Economic and Social Development

Asian Development Bank

Australia

Austria

Bangladesh

Belgium

Brazil

Canada

China

Colombia

Commission of the European Community

Côte d'Ivoire

Denmark

Arab Republic of Egypt

Finland

Food and Agriculture Organization of the United Nations

Ford Foundation

France

Germany

India

Indonesia

Inter-American Development Bank

International Development Research Centre

International Fund for Agricultural Development

Islamic Republic of Iran

Ireland

Italy

Japan

Kellogg Foundation

Kenya

Republic of Korea

Luxembourg

Mexico

Netherlands

New Zealand

Nigeria

Norway

OPEC Fund for International Development

Pakistan

Peru

Philippines

Portugal

Rockefeller Foundation

Romania

Russian Federation

South Africa

Spain

Sweden

Switzerland

Syrian Arab Republic

Thailand

Uganda

United Kingdom

United Nations Development Programme

United Nations Environment Programme

United States of America

World Bank

Tribute to the CGIAR

Photo Credits Cover: WARDA. Page 2: CIAT. Page 4: CIMMYT. Page 5: Embrapa. Page 7: World Bank. Page 8: CIP. Page 11: CIP. Page 13: CIP. Page 14: CIP. Page 16: CIAT. Page 17: CIFOR. Page 18: CIMMYT. Page 19: CIP. Page 20: ICARDA. Page 21: ICLARM. Page 22: ICRAF. Page 23: ICRISAT. Page 24: World Bank. Page 25: IITA. Page 26: ILRI. Page 27: IPGRI. Page 28: IRRI. Page 29: ILRI. Page 30: IWMI. Page 31: WARDA. Page 42: WARDA.

Design Patricia Hord.Graphik Design

Printed by Automated Graphic Systems, Inc.

Partners

CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH

CGIAR Alliance at a Glance

Created in 1971, the Consultative Group on International Agricultural Research is a 58-member strategic alliance (including 22 developing and 21 industrialized countries) supporting a network of 16 Future Harvest Centers that mobilize cutting-edge science to promote sustainable development by reducing hunger and poverty, improving human nutrition and health, and protecting the environment.

As a strategic alliance, more than 8,500 CGIAR scientists and staff are working in more than 100 countries. Their research generates global knowledge that is focused on local impact. It is targeted to the special needs, crops, and ecologies of poor farming communities worldwide.

CGIAR research addresses almost every component of the agricultural sector—agroforestry, biodiversity, food, forage and tree crops, environmentally sound farming techniques, fisheries, forestry, livestock, food policy, and agricultural research services, to name a few. Improvements in these areas promote growth and provide pathways out of poverty for poor people.

A far-reaching reform program launched in 2001 is helping increase the relevance and impact of CGIAR research for achieving the Millennium Development Goals, expanding scientific partnership through the launch of innovative Challenge Programs, and creating new mechanisms to ensure that the quality of science continues to meet the highest international standards. Research at the CGIAR-supported Centers is helping launch a rice revolution in West Africa through the release of New Rices for Africa (NERICA), and a new corn variety bred for high-quality protein is being planted on one million hectares in 20 countries. Efforts to improve food policies won the 2001 World Food Prize, a first for the field of agricultural economics.

As a signal of growing confidence in the system, several developing and industrialized countries have expressed interest in joining the CGIAR alliance. In 2001, the Rome-based International Fund for Agricultural Development (IFAD) became a CGIAR Cosponsor, joining key multilateral development institutions in that role: the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP), and the World Bank.

Advocating science-based approaches to solving some of the world's most pressing development problems lies at the heart of the CGIAR's mission. All benefits of CGIAR research are kept within the public domain, freely available to everyone. CGIAR research supports the Millennium Development Goals, including those laid out in the Convention to Combat Desertification, the Convention on Biological Diversity, the International Treaty on Plant Genetic Resources for Food and Agriculture, and the Framework Convention on Climate Change.

In 2001, CGIAR partners contributed $337 million, representing the single largest investment in mobilizing science for the benefit of poor people.

Message from the Chairman and Director
Global Knowledge for Local Impact

Ian Johnson visits CIMMYT

In a world in which 75 percent of people living in poverty depend on agriculture to survive, investment in building agricultural growth must be a priority. Agriculture remains the single most important sector in the economies of most developing countries, accounting for up to 50 percent of gross domestic product.

In 2001 we began to see some indication that agriculture was back on the international agenda. There was renewed recognition that the creation of global public goods, in the form of science and technology, has a history of creating agricultural growth and benefiting poor populations and, most important, has enormous capacity to do so in the future.

Studies indicate that in many countries with dynamic, growth-oriented agricultural sectors, science and technology have been pivotal to development. The evidence is clear that research plays a significant role in generating new agricultural information, products, and technologies that support these healthy agricultural sectors.

Past investments in the application of science to solving problems of agricultural development have yielded 20 percent average rates of return, with much higher returns for some crops. The development of high-yielding green revolution crop varieties, which began in the late 1960s, increased real incomes for small farmers in southern India by 90 percent between 1973 and 1994. In addition, it is estimated to have preserved over 300 million hectares of forests and grasslands, thus conserving biodiversity and reducing carbon releases. The valuable role of the Future Harvest Centers of the CGIAR in the generation of the green revolution has been acknowledged widely.

But there is much more to the Centers and partners of the CGIAR System. The System's outstanding achievements include developing quality protein maize (QPM), which contains twice the amount of lysine and tryptophan of regular maize. Currently, QPM is being planted on one million hectares in 20 countries, thereby boosting food, nutrition, and income security. New Rices for Africa, which combines the ruggedness of local African rice species with the high productivity traits of Asian rice, is transforming agriculture in the humid West Africa region where rice imports top 3.5 million tons at a cost of $1 billion per year. In Guinea alone, these rice varieties, planted on 90,000 hectares, saved $10 million in rice import bills in 2001.

The development of integrated aquaculture and agriculture techniques and the adoption of no- or low-till farming practices are boosting both farm incomes and productivity in Africa and Asia. All of these initiatives, which were conducted in partnership with national programs, provide real benefit to poor people and to the planet.

Most recently, CGIAR scientists have developed new wheat, derived from a cross between wheat and goat grass, that is delivering 30 percent yield increases in dryland conditions, and test plantings indicate positive potential for Maize ZM251, developed with South Africa. No- and low-till farming alternatives promoted by a consortium of researchers are being increasingly well received across South Asia.

Recognition of the critical importance of market security—fair access to fair markets—motivated scientists and civil society organizations to work together to enable African producers to capitalize on international pigeonpea markets. In another example of successful collaboration, CGIAR scientists and local community organizations in Indonesia developed a project in which villagers farm trees that yield enough charcoal to enable them to establish successful businesses.

In a sign of the growing recognition of the importance of sound policies, CGIAR agricultural economist and Director General of the International Food Policy Research Institute (IFPRI), Per Pinstrup-Andersen, won the 2001 World Food Prize for his contributions to the improvement of agricultural research and food policy. We are proud to have won this prestigious award consecutively for two years.

But many challenges remain. Sustainable food security requires intensification of agriculture, not extensification—intensification that is both socially and environmentally responsible. The green revolution failed to take hold in Africa and yield differentials between

Francisco Reifschneider on a biodiversity expedition in the Atlantic Forest, Brazil, with botanist Luciano Bianchetti

African and Asian countries indicate unrealized potential. It is imperative that we ensure access to information and new technologies for those who have so frequently failed to benefit from new knowledge—rural poor people.

And new challenges continue to arise. Climate change, widespread deforestation, and the spread of HIV/AIDS have a major impact on agriculture and require our attention. The need for major investment in the generation of global knowledge continues. But modern science is expensive. New alliances, new institutions, new public–private partnerships are required to properly address the challenges of funding and to apply cutting-edge science for the benefit of all people.

Recognizing the need to continuously re-evaluate and strengthen its alliances, in 2001 the CGIAR initiated a reform program designed to increase positive impact on the developing world, reposition the organization as a 21st century institution, strengthen both science and governance, and design new mechanisms to attract potential funds for innovative and cost-effective global public goods research. The establishment of the Executive Council and the Science Council will ensure the CGIAR System has access to world-class governance and science advice and that Members have real opportunities to influence the alliance. The establishment of the System Office will bring together in a cohesive and efficient manner the eight units that serve the alliance and ensure effective exchange of information and knowledge. Most importantly, the Challenge Programs, an innovative programmatic element designed to address regional and global issues of worldwide relevance by mobilizing knowledge, technology, and resources, were initiated. Open to all stakeholders, the Challenge Programs will facilitate collaborative research and potentially attract additional funding to the System.

The transformed CGIAR System is well positioned to foster the creation of new alliances and the generation of new knowledge.

This edition of the CGIAR Annual Report includes contributions from partners who reflect the broad alliance. In particular we are delighted to include contributions from the Rt. Hon. Clare Short, member of Parliament and secretary of state for international development, United Kingdom, and Eliseo R. Ponce, director, Bureau of Agricultural Research, Department of Agriculture (Kagawaran ng Pagsasaka), Philippines, both of whom provide valuable perspectives on the reform process.
In recognition of our 30-year anniversary, Robert McNamara, former World Bank president and founding father of the CGIAR, generously agreed to share some reflections from his long association with the CGIAR. Contributions from both the private for-profit and not-for-profit sectors reflect the importance of partnerships in ensuring that research results have practical local impact.

The outstanding contributions from each of the CGIAR-supported Centers highlight the practical achievements of 2001 and demonstrate the effect that new, global knowledge is having every day at the local level.

We would like to acknowledge the invaluable support of the CGIAR partners who contribute so much to the alliance. The work of the CGIAR would be impossible without the participation and support of its Members, Cosponsors, national agricultural institutions, farmers' organizations, members of civil society, and members of the private sector. Their contributions go far beyond the critical financial support that funds our work. Contributions in time, energy, and intellectual commitment make our work possible.

We all know that the work of agricultural science is never complete. We know that we must constantly strive for more efficient and effective ways of working. Most of all, we know that "business as usual" is not acceptable.

We look forward to continuing to work together with all of our partners to build a healthier, wealthier, and greener world.

Ian Johnson,
CGIAR Chairman

Francisco J. B. Reifschneider,
CGIAR Director

Thirty Years of the CGIAR

by Robert S. McNamara
Former President, World Bank, and
founding father of the CGIAR

Robert McNamara visits an agricultural research station at Bambey, Senegal, 1969

Thirty years ago, I was glad to be associated with a group of farsighted colleagues in creating the CGIAR. David Bell of the Ford Foundation, John Hannah of the United States Agency for International Development (USAID), George Harrar of the Rockefeller Foundation, and Frosty Hill of the Ford Foundation were foremost among them. Today I am happy to note the fruits of our efforts. Unquestionably, broadening the impact of research into tropical agriculture has greatly helped reduce hunger and poverty.

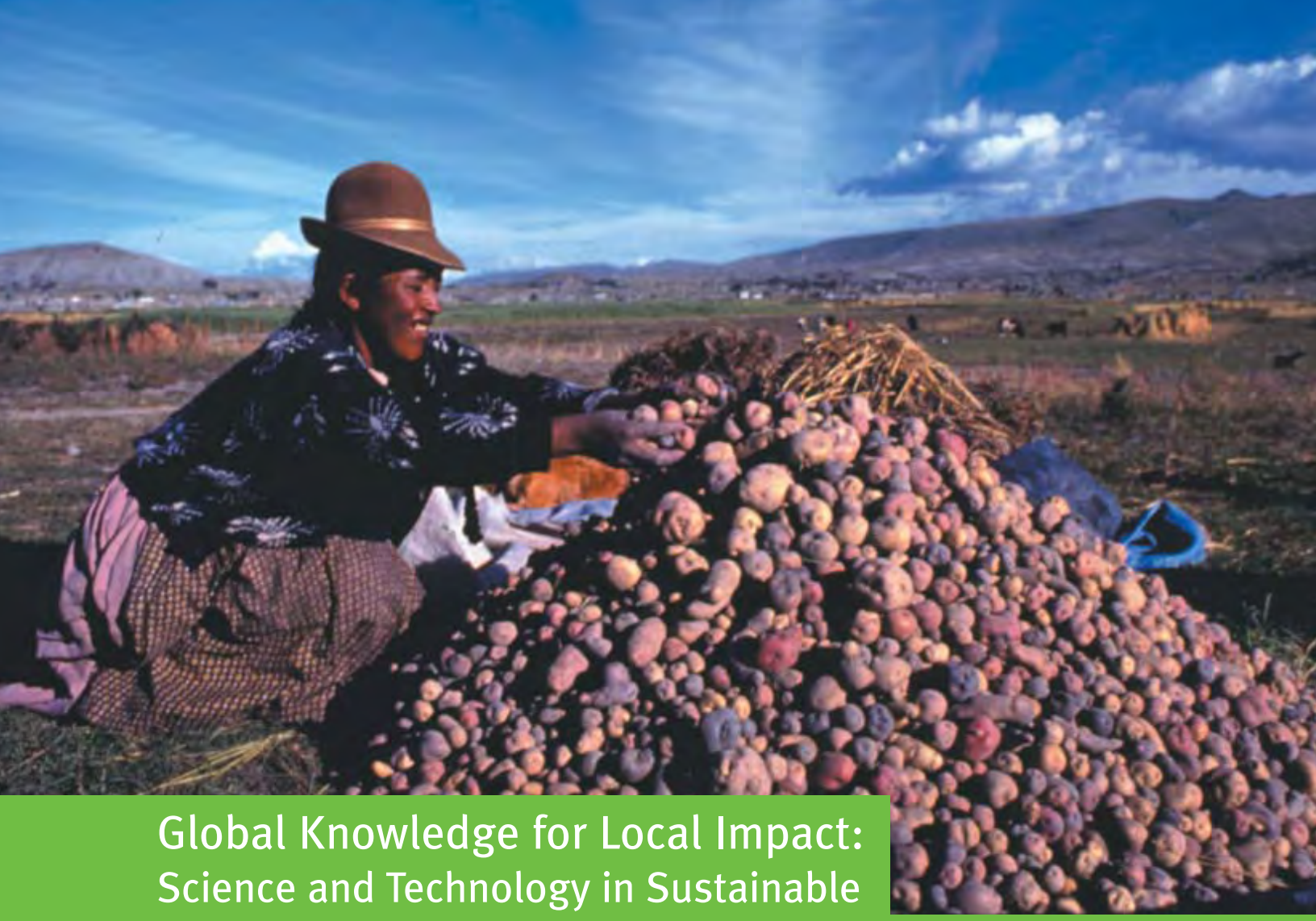
Green revolution technologies, developed by the Future Harvest Centers of the CGIAR and their partners in developing countries, have transformed agriculture in Asia and much of Latin America. Center scientists are widely acknowledged for the excellence of their research and the significance of its impact. Norman Borlaug, whose work on high-yielding wheat made a major contribution to the green revolution, is a Nobel laureate. The CGIAR itself received the King Baudouin International Development Prize. Nine out of fourteen World Food Prize laureates are from the CGIAR.

The Economist has reported that the green revolution's toolkit probably saved a billion people from starvation. Numerous studies show that the new technologies helped reduce poverty by fueling economic growth and resulted in the conservation of land and biodiversity. CGIAR-supported research has expanded beyond the original goal of increased productivity to encompass natural resource management, capacity building, and policy research. Alliances among the Centers, national research institutions, and others have grown. The vitality and relevance of the CGIAR System have thus been renewed periodically.

All of those involved in this enterprise deserve honor and praise: farmers, international and national scientists, managers, and donors. The World Bank has anchored the CGIAR System in association with other Cosponsors. Founding Members, including the Ford and Rockefeller Foundations and USAID, continue to provide important support. Twenty-two developing countries (out of a total of 58 Members) have validated the CGIAR by joining it.

Past successes, however worthy, are not enough. In our age of plenty, too many people are victims of absolute poverty, hunger, conflict, and environmental degradation. The CGIAR must therefore intensify its effectiveness within its own special niche. Countries in which agricultural research has made a significant impact will need the fruits of agricultural research for many more years. But the greatest need is in Sub-Saharan Africa. Poverty is pervasive in most of the 47 countries of that region. A third of the people are undernourished. Life expectancy is low. It is here, therefore, that the CGIAR confronts its major challenges.

The tasks ahead are difficult and complex—in some ways, more so than they were 30 years ago. So I urge the CGIAR not to forsake its mission. Your efforts are needed. You must stay the course.



Global Knowledge for Local Impact: Science and Technology in Sustainable Development

by The Right Honourable Clare Short, Member of Parliament
United Kingdom Secretary of State for International Development

Although the world's population has grown dramatically over the last 30 years, from under four billion in 1970 to over six billion in 2000, increases in food production have largely outpaced it.

This amazing success in increased food production resulted in large part from the green revolution, which applied science and technology to the problems faced by farmers in developing countries. The new varieties of wheat, rice, and other crops developed by international research institutes in partnership with national research systems increased yields substantially and had a major impact in reducing poverty in a number of developing countries.

Despite this success, however, nearly a billion people around the world who are largely dependent on agriculture for their livelihoods live on less than $1 a day. Twice that number survive on less than $2 a day and go hungry. In Africa, about a third of the population is undernourished and the numbers are increasing. This is unacceptable. We must drastically improve the livelihoods of rural poor people if we are to achieve the key Millennium Development Goals of halving the

proportion of people living in extreme poverty and reducing child mortality by two-thirds by 2015.

Most of the rural poor populations live in the semi-arid areas of South Asia and Sub-Saharan Africa. These are ecologically diverse regions with little or uncertain rainfall, complex farming systems, and limited opportunities for irrigation. The green revolution technologies succeeded in more favorable environments in developing countries. The challenge we now face is to ensure that agriculture plays its full role in reducing poverty among people living in semi-arid environments.

How is this to be done? A broad approach is needed, one that encompasses improved trade, rural roads and infrastructure, governance, and marketing systems. But we also urgently need to help poor farmers access new technologies to improve their current practices and enhance their livelihoods. Some of these technologies already exist, but they need to be adapted to local conditions; others must be developed using modern scientific approaches.

In recent years, the CGIAR has begun to focus on the needs of poor farmers in more difficult environments. Two examples:

- The CGIAR is now devoting more than 40 percent of its resources to Africa and the results are becoming evident: better varieties of millets, maize, sorghum, beans, and cassava; improved animal husbandry; multipurpose crops and trees; short-duration leguminous shrubs that improve soil fertility; rotations that permit permanent cropping on difficult soils in West Africa; varieties of rice, maize, and sweet potato that have enhanced nutritional value; seed treatment, fertilizer application, and pest management approaches. These are the first fruits of efforts that must be adopted more widely.
- In India, the International Rice Research Institute (IRRI) and the national agricultural research system have been using participatory approaches in selecting improved varieties of crops. Poor farmers—men and women—are involved in the research process, with excellent results in terms of new varieties suited to drought-prone environments. Elsewhere in South Asia, joint research by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and UK scientists focused on seed priming of short-duration varieties of rice and legumes, offering the prospect of poor people growing two crops on millions of hectares where only one crop grew before.

Good work is being done, but we need to do more to remove the barriers between scientists and poor farmers and to enhance the focus of international and national research systems on reducing hunger and poverty.

Looking ahead, rapid global change inevitably will affect poor people in developing countries most seriously. Changes may include widespread deforestation and land degradation, increased pressures on coastal and marine ecosystems, and losses in biodiversity. New approaches to research and extension will be forced by global warming, water scarcity, the privatization of research, globalization, HIV/AIDS, and advances in information and communications technologies and biotechnology. The CGIAR's strategic thinking must consider how each force for change will affect progress toward the 2015 Millennium Development Goals. Some forces may have a significant impact on poverty reduction before 2015 (for example, HIV/AIDS, globalization); others, such as climate change and loss in biodiversity, may be felt only over the longer term.

The CGIAR is uniquely placed to turn rhetoric into reality, to assist with practical action. But it will not do this if it continues with "business as usual." Success will require change and adaptation to change, and a sense of urgency. The CGIAR will need to strive for maximum impact of science and technology on poor populations in the short, medium, and long term. All of this change and urgency points to the need for a balanced CGIAR strategy that combines research having rapid payoffs in poverty reduction with strategic research into medium- and long-term problems, which will help sustain

progress in poverty reduction beyond 2015. And there are other dimensions, including the need to balance food production for poor consumers and direct assistance to help eliminate hunger among poor rural people.

The key elements for success appear to be the following:

- Greater clarity about the needs of poor people, about their livelihood systems and priorities. This means improving our understanding of who poor people are, where they live, and what their priorities are; efforts to ensure that scientists work closely with poor farmers and focus on pro-impoverished farming systems; and more emphasis on such issues as the links between soil and water conservation and food security, integrated aquaculture/agriculture systems, and under-utilized crops used by poor people.

- Strengthened knowledge-delivery mechanisms to ensure that poor people gain access to new technologies.

- Evidence to support policies aimed at helping poor populations.

- More inter-Center collaboration and working in partnership with others, including the private sector, to address the problems faced by poor people.

- More effective teamwork, greater input by social scientists, and recognition for effective delivery of pro-impoverished technologies.

The CGIAR has undertaken reform with a clear statement of its goals: productivity, poverty reduction, environmental sustainability, and the strengthening of national research systems. It has new Executive and Science Councils, a System Office, and Challenge Programs. I welcome these developments.

The challenges now are to work with greater effectiveness and lower transaction costs, and through partnership to apply global science and technology to produce major reductions in poverty.

We must drastically improve the livelihoods of rural poor people if we are to achieve the key Millennium Development Goals of halving the proportion of people living in extreme poverty and reducing child mortality by two-thirds by 2015.

A View from a Southern Partner

By Eliseo R. Ponce, Director,
Bureau of Agricultural Research,
Department of Agriculture (Kagawaran ng Pagsasaka), Philippines

The Philippines' partnership with the CGIAR has a history that dates back to the establishment of IRRI in 1960. The Philippines formally joined the CGIAR alliance in 1980. We look at the added value of this membership in helping us address our national objectives of achieving a food-secure Philippines and eliminating poverty in the countryside.

The country recognizes that the national and global landscape on agricultural research has dramatically changed during the last three decades. The scenario has become more complex owing to such factors as globalization of trade, increased private sector investment alongside declining public investment, advances in biotechnology and information technology, greater decentralization, and heightened public concern with food safety and the environment.

The sobering fact remains: despite the advancement of modern technology, the world continues to face the twin challenges of food insecurity and rural poverty, and newer challenges, such as the threat of terrorism, are a reality. Then and now the Philippines believes that, as a global partnership on agricultural research, the CGIAR has a continuing critical and catalytic role to play, albeit in a different way given the drastic changes taking place in the world.

The year 2001 was a watershed year for the CGIAR as it launched fundamental reforms aimed at achieving greater relevance and efficiency.

The Philippines views the Challenge Programs as the cornerstone of the System's reform. They represent perhaps the most important management innovation of the CGIAR System. It is still early to judge its impact; essentially, it is work in progress. However, the process and the framework of the reforms have made a significant impact on the perspective of the Philippines, both as a partner and as an investor.

The Philippines felt itself to be a true partner in the process of designing the System's reform, which involved strong participation from southern Members. These Members were on an equal basis with those from the north. The Philippines felt privileged to represent the south, particularly Asia, on the Steering Committee and later as cochair of the Challenge Programs.

The Challenge Programs are opening new opportunities and modalities of science partnerships, which the Philippines hopes will lead to stronger participation from the southern countries, will promote south–south collaboration, and will raise additional support for agricultural research for development.

The Philippines sees its financial contribution to the CGIAR, although modest, primarily as an investment in its own interest and secondarily in the interests of the world. It is an investment built on the assumption that together with our various partners, from both the south and the north, we can do more to achieve our common goal of a food-secure and peaceful world.

A View from the Private Sector

Modernizing agriculture is essential for growth and for helping millions of farmers make the transition from subsistence to commercial farming. For such growth to be sustainable it must meet the triple bottom line of economic, social, and environmental responsibility. Rapid advances in science, largely occurring in the private sector, are opening up new opportunities. In looking to the future, new and innovative public–private partnerships are needed to help accelerate the search for farming solutions that foster growth. These solutions are key to creating a stream of benefits that positively affects farms and allied enterprises, such as food-processing industries, marketing, supply of inputs, and development of consumer products and services. For poor farming communities worldwide, that is the surest pathway out of poverty.

The story of Papalotla Seeds shows how the private sector can make meaningful contributions by helping smallholder farmers produce more, expand their opportunities, and participate in the global economy. It is just one example of the growing number of public–private partnerships with which the CGIAR System is involved.

Papalotla Seeds: Planting for the World

By Eduardo Sterne, Director General, Papalotla Seeds

Papalotla Seeds began as a family business in 1992 to promote improved pastures in Mexico. We chose the name Papalotla, which in the indigenous Nahuatl language means "butterfly," to highlight the metamorphosis we hoped to bring about in rural areas.

Our mission is to introduce new forage seeds into the global livestock market. In this market we see a unique opportunity to build a sustainable and profitable enterprise. And we see huge potential for improving the livelihoods of livestock producers and helping reverse environmental degradation in the tropics.

Toward these ends we offer products and services that better enable livestock producers to compete in the global economy. One of these products is *Brachiaria* hybrid cv. Mulato, the first in a series of research products under varietal protection that has resulted from our strategic alliance with the International Center for Tropical Agriculture (CIAT). We were granted the production rights as the result of an open, transparent selection process.

The alliance with CIAT is proof of our determination to be at the forefront of research in tropical agriculture. In fact, Papalotla is helping finance CIAT's search for innovative solutions to today's farming problems. Working with CIAT has been vital for Papalotla, and has triggered a radical transformation of our company. By taking up the challenge of producing, evaluating, and disseminating new forage varieties worldwide, we have set an entirely new trend in the tropical forage seed industry.

We believe that vast areas of the tropics can be transformed socially, economically, and environmentally. This may sound ambitious, but we believe it is possible. And we are convinced that productive new hybrid forages, able to withstand diseases, drought, and poor soils, can play an important role by improving livestock nutrition, lowering production costs, and protecting natural resources.

Unlike a lot of other seed companies, Papalotla evaluates new hybrids with livestock producers. This is an essential part of our strategy for introducing and marketing new varieties, and it has proved fundamental to our success. Livestock producers are convinced by evidence, not by advertising. It takes time for them to change their practices. They need to be directly involved in comparing pastures so they can measure for themselves the productivity of different varieties. This approach has helped position Mulato in the market and has generated large demand for this first *Brachiaria* grass hybrid.

We are just beginning to fully grasp the biological and commercial potential of improved pastures. In deforested areas, for example, these new species not only have provided sustainable vegetative coverage, but have also substantially increased the potential for animal production. Continued support of research in the public and private sectors is essential for fully realizing the potential of new forages to transform the livestock culture and economy.

The challenges seem overwhelming. But we believe there are "pathways out of poverty," to borrow a phrase from CIAT. And we are opening one of these pathways through sustainable intensification of livestock production.

A View from Civil Society

For agricultural research to be meaningful, it must focus on improving human well-being, creating wealth, and protecting the earth's natural resources. In addition to scientific and technical excellence, the hallmarks of such research are participatory approaches, bottom-up planning, and strategies that actively engage farmers and stakeholders in problem identification and the search for solutions.

Civil society involvement in agricultural research for development has had a long history, and NGOs have made important and impressive contributions in these development endeavors, especially in the areas of organizing at the community level, providing inputs and services, and testing, adapting, and disseminating new technologies.

The story of the Vitamin A for Africa (VITAA) partnership demonstrates the importance of broad-based partnerships in helping tackle a silent scourge—vitamin A deficiency—and the value of partnerships with civil society.

VITAA Partnership Seeks Large-Scale Adoption of Orange-Fleshed Sweet Potatoes: A Food-Based Approach to Vitamin A Deficiency in Africa

By Ed Sulzberger of the VITAA Initiative

On May 9, 2001, an international group of 70 agriculturists, health experts, and nutritionists, convened by Centro Internacional de la Papa (CIP), launched what is believed to be the first crop-based initiative to attack the tragic consequences of vitamin A deficiency in Sub-Saharan Africa.

The VITAA initiative provides a platform for 40 partner agencies from the health, nutrition, and agricultural sectors to extend the impact of a new series of orange-fleshed sweet potatoes. The new varieties are expected to have a major impact over the next five years on one of Sub-Saharan Africa's most important public health problems.

Vitamin A deficiency is a leading cause of early childhood death and a major risk factor for pregnant and lactating women. VITAA varieties are high in beta-carotene, which the body uses to produce vitamin A.

According to recent estimates, 50 million African women and children stand to benefit from the new plant types. Beneficiaries would include nearly all children under six years of age in Uganda, Rwanda, and Burundi, and roughly half of the children in Tanzania.

A study by the International Center for Women (ICRW), a VITAA partner agency, has demonstrated that African mothers can be motivated to accept the new varieties, thus dispelling the popular belief that African taste preferences preclude the use of orange-fleshed varieties. The ICRW study also suggests that the addition of less than 100 grams of orange-fleshed sweet potato to the daily diet can prevent vitamin A deficiencies in children, pregnant women, and lactating mothers.

As a result of these findings, representatives from seven VITAA partner countries agreed to promote orange-fleshed sweet potatoes in each of the major production zones where white-fleshed varieties are currently grown. The work, which will be community-based and focused on women decisionmakers, also will emphasize nutrition education and microenterprise development.

"VITAA is drawing a great deal of attention," says project coordinator Regina Kapinga, "because it offers an immediate, common-sense solution to a major public health problem. Our only difficulty is in meeting the demand for planting materials."

Kapinga notes that seed distribution centers will be established at key locations in each VITAA partner country, mainly in collaboration with local NGOs that have programs on household nutrition, child health, and income generation for women.

"Since sweet potato is a woman's crop grown mainly for family use, it only makes sense to channel the new varieties to the people who have a vested interest in their success," she says.

Deployment of the new varieties is scheduled to begin early in 2003.

The Future Harvest Centers of the CGIAR

Scientists at the 16 Future Harvest Centers of the CGIAR are constantly expanding and updating the frontiers of knowledge. Their research draws on the best of global knowledge but is focused on local impacts. Their efforts address virtually every component of the agricultural sector—agroforestry, aquaculture, biodiversity, biotechnology, crops, extension, farming techniques, forestry, livestock, natural resources, and food policies to name just a few.

Each year the CGIAR Science Awards acknowledge the outstanding achievements of scientists throughout the System.

In 2001 the following individuals and teams were recognized:

- **Outstanding Scientist.**
  (ICRISAT): Hari C. Sharma. For research on pest control in chickpea, sorghum, and pigeonpea production to increase farm productivity while cutting the use of pesticides, thereby reducing environmental pollution.

- **Promising Young Scientist.**
  (ILRI): Alex Kahi. For research combining genetic and economic analysis with simulation models to assess alternative options in livestock breeding.

- **Outstanding Partnership for Sustainable Land Management of Acid Soil Savannas.**
  (CIAT): For characterizing the agroecology of acid soil savannas, and developing land quality indicators and land management practices for sustainable agropastoral systems.

- **Outstanding Scientific Support Team.**
  (IRRI): Carlos Casal, Reynaldo de la Cueva, Luisito Caracuel, Julito Talay, Rodolfo Toledo, Alejandro Manio, Juan Alzona, Oscar Gonzales, and Leonida Nazarea. For work on hybrid rice breeding.

- **Outstanding Scientific Article.**
  (IRRI): Zhu Youyong, Chen Hairu, Fan Jinghua, Wang Yungyue, Li Yan, Chen Jianbing, Fan Jinkiang, Yang Shisheng, Hu Lingping, Hei Leung, Tom Mew, Paul Teng, Wang Zonghua, and Christopher Mundt. For their article, "Genetic Diversity and Disease Control in Rice," published in *Nature* 406, 17 August 2000.

In the following summaries, the Centers highlight further examples of their achievements and demonstrate the impact their work is having on the lives of poor farming communities.

New Forages Enhance Rural Livelihoods in Southeast Asia

Through the early morning mist, two Hmong women can be seen cautiously negotiating the steep slope that rises above a narrow, rocky canyon in northern Laos. From time to time, they halt at a spot where succulent native vegetation is growing. Then, with sure, rapid strokes of their scythes, they cut leaves and stems, toss them over their shoulders into straw baskets on their backs, and continue the arduous ascent.

A Laotian extension officer remarks, "They can easily spend several hours a day gathering feed for their pigs. You wonder sometimes whether the women own the animals or it's the other way around."

In these remote hillside areas of Southeast Asia, livestock is poor people's best bet—sometimes the only option for building sustainable livelihoods. Yet, as soon as upland farmers expand production, they quickly discover the limits of local feed resources for sustaining larger livestock populations.

To overcome such obstacles, Centro Internacional de Agricultura Tropical (CIAT) scientists are working with national institutes in six countries to offer farmers a full range of forage options. This effort builds on nearly three decades of international research that demonstrates the effectiveness of tropical grasses and legumes for intensifying small-scale livestock production while protecting and improving the soil. Drawing on 22,000 forage samples maintained at CIAT, scientists have conducted extensive research on key species in tropical Africa, Asia, and Latin America. The result is a huge storehouse of knowledge about the multiple uses and adaptations of these forage species in different climates and soils.

The challenge is to incorporate superior forages into complex farming systems on a large scale. Doing so, in turn, requires that knowledge from formal science be combined with farmers' insights, using participatory approaches. CIAT scientists and their national partners have been pursuing such approaches since the mid-1990s with support from the Australian Agency for International Development and the Asian Development Bank. Through intensive training and networking, project staff are building teams of national professionals skilled at involving farmers in adaptive research, developing networks to promote information exchange, and creating attractive manuals in different languages to spread new knowledge.

Clippings of the forage legume *Stylosanthes guianensis* collected for feeding to pigs

The benefits of the research are beginning to show. In four countries, farmer-leaders conducted the research and disseminated their findings at regular farmer meetings. CIAT provided technical options, assisted the research process, and trained field workers. Within five years, 1,700 farmers had begun experimenting with improved forages. A follow-up project in six countries is building on this experience, with farmer-leaders as extension agents with responsibility for multiplying the new planting systems. Today the forage innovations are benefiting some 4,000 farm families.

In East Kalimantan, Indonesia, CIAT scientists studied the effects of new forage technologies on farmers' livelihoods before and after technology adoption. Cash income from the sale of livestock and manure increased 62 percent as a result of improved ruminant productivity. Furthermore, farmers achieved labor savings of 20 percent. This savings amounts to a 31 percent increase in income from livestock, assuming that the time saved is invested in off-farm employment. Case studies in Indonesia and Vietnam show that the new technologies reduce the drudgery of fodder collection, especially for women.

Centro Internacional de Agricultura Tropical (CIAT)
Headquarters: Cali, Colombia
www.ciat.cgiar.org

Forests for the Future

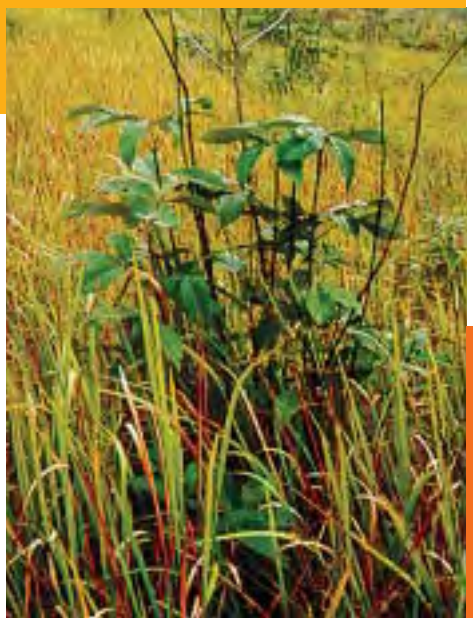
Tropical forests are being destroyed at an alarming rate all over the world. But despite the constant stream of bad news, the people involved with forests have been working hard to make laws, create parks, fund projects, and plant trees. The problem is that many of their actions have not provided the hoped-for results. By generating new ideas, providing high-quality analysis, promoting dialogue, and encouraging learning, the Center for International Forestry Research (CIFOR) aims to respond directly to the needs identified by forest stakeholders.

In West Kalimantan, Indonesia, local villagers are now producing valuable charcoal from trees that grow untended in abandoned areas. *Vitex pubescens*, a tree that springs up on land after fires or after farms have been abandoned, yields a charcoal that is as good as that obtained from mangrove trees. Rice does not grow well on the land and farmers find weeding the rough fields too labor intensive. But establishing small local industries to grow *Vitex* for charcoal offers a way of making the land productive again.

The idea of developing a *Vitex* industry originally came from a local NGO, Yayasan Dian Tama (YDT), which collaborated with Tanjungpura University in Pontianak to explore how local farmers could best profit from the grasslands. The collaboration capitalized on the strengths of each partner for maximum impact. YDT was the pivotal organization; it conducted research with the University and CIFOR providing scientific input. YDT used its good rapport with local people and their contacts in the regional government while CIFOR made connections to outside parties. USAID initially sponsored this research and the Australian Center for International Agricultural Research has been funding it in 2001 and 2002.

The technology needed to produce the charcoal is relatively simple and inexpensive; at most, communities have to invest in constructing kilns. After four years, one hectare of *Vitex pubescens* yields up to 18 metric tons of charcoal, which earns farmers several hundred dollars when sold to charcoal factories in Pontianak, the closest city.

Four villages are participating in field trials, helping researchers answer questions about planting methods, seed stock, fertilizer, and labor requirements.



A *Vitex* sapling growing on burnt-over land that has a flourishing cover of Imperata grass

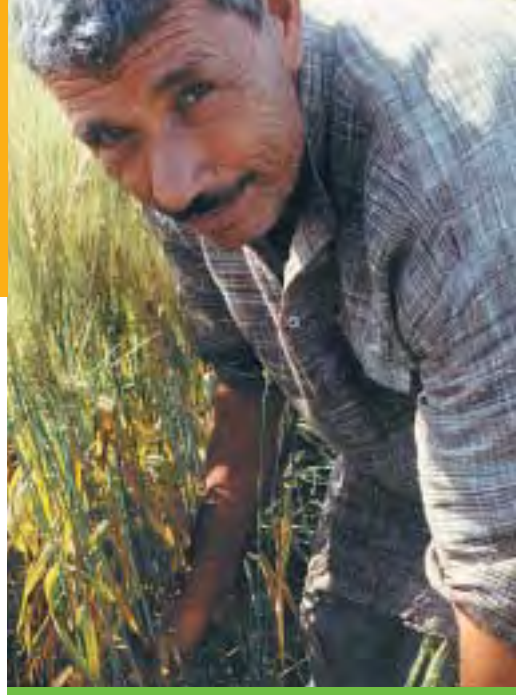
Recognizing the strong market potential, farmers are working with researchers to identify the best methods for cultivating trees on small plantations and for producing charcoal.

The activity is very attractive to swidden farmers in West Kalimantan because they can grow the tree alongside their regular fields without extra labor. *Vitex* also tolerates fire more than many other tree crops, thus reducing the risk that farmers will lose their investment. The trees actually form a barrier to the wildfires that plague the area. Because the YDT is making an effort to disseminate information about the positive effects of these activities to a large number of parties, OXFAM UK has expressed interest in supporting similar work in Yogyajakarta. Its interest was piqued by the project's high level of community involvement and the direct benefits reaching local communities.

Apart from local impact, the collaboration has wider potential because grasslands are common in Indonesia and other countries. In 2001 CIFOR was approached by the private sector and by development agencies from New Zealand which expressed interest in the project. CIFOR is now working with YDT to apply the process more widely.

Center for International Forestry Research (CIFOR)
Headquarters: Bogor, Indonesia
www.cifor.cgiar.org

Drought-Tolerant Maize and Wheat and Reduced Tillage Put More Food on the Table and More Drops in Farmers' Buckets



Sudesh Pal Singh, of Sultanpur village in Uttar Pradesh, India, tests reduced-tillage farming.

New, hardy bread wheats being tested at the International Maize and Wheat Improvement Center (known as CIMMYT, its Spanish acronym) are producing up to 30 percent more grain than one of their high-yielding parents under tough, dryland conditions. Their secret? The new wheats are descended from crosses between different types of wheat and goat grass (one of wheat's wild relatives), which have given them drought tolerance. These promising genotypes were identified from the many crosses of wheat and wild grass made at CIMMYT. The new wheats are meant for dry locations where farmers are changing farming practices to make better use of scarce water, control soil erosion, and maintain soil fertility.

Water scarcity is growing and in coming decades is expected to affect hundreds of millions of farmers across South Asia who derive their food and livelihoods from rice-wheat crop rotations. The Rice-Wheat Consortium for the Indo-Gangetic Plains (RWC), a CGIAR Systemwide initiative convened by CIMMYT, is helping farmers test and adopt resource-conserving practices based on reduced tillage. The savings are substantial: zero tillage for wheat requires around one million liters less water per hectare than do conventional practices. One method—the direct seeding of wheat into paddy fields just after rice harvest—was used on some 300,000 hectares in the region in the 2001—02 growing season, and its use is spreading practically as fast as manufacturers can make the tractor-drawn seeder. An additional benefit: an average reduction from eight to one tractor passes cuts diesel and labor costs, allows earlier planting for higher yields, and reduces carbon dioxide emissions. Building on this success and the relationship of trust developed with farmers, the RWC is guiding experimentation with innovations such as sowing on raised soil beds, a practice that is even more water-efficient than zero tillage, as well as new cropping patterns.

In 2001, CIMMYT released two new, open-pollinated maize varieties designed for use by smallholder farmers in the drought-prone region of southern Africa. Both varieties were developed jointly with South African researchers and other partners. The variety ZM521 yields 30–50 percent more than do traditional varieties under conditions of drought and low soil fertility. The second variety, named "Grace," is early maturing (and thus can escape late-season drought), resists local diseases, and has the flinty grain type preferred by farmers. Seed of the open pollinated variety is usually cheaper than hybrid seed, and that enables farmers to plant their saved grain if they do not have the means to buy fresh seed.

International Maize and Wheat Improvement Center (CIMMYT)
Headquarters: Mexico City, Mexico
www.cimmyt.org

Partnerships for Impact

In 2001, as the International Potato Center (CIP, for its initials in Spanish) celebrated its 30th anniversary, Center scientists estimated the annual benefits from its research at US$150 million—more than seven times CIP's annual budget. This impact is channeled through carefully prioritized projects that are built on accumulated expertise and solid partnerships. A few examples follow.

Harvesting potato, in Yunnan, China

Vital Partnership

An expanding network of partners convened by CIP is using orange-fleshed, beta carotene–rich sweet potato to alleviate vitamin A deficiency in Sub-Saharan Africa, where lack of this critical micronutrient in the diet is a leading cause of early childhood death and a major risk factor for pregnant women. In May 2001 representatives from partner institutions in Ethiopia, Kenya, South Africa, Tanzania, and Uganda formally launched Vitamin A for Africa (VITAA). VITAA works through community and women's groups in the region in preparing the sweet potatoes for large-scale deployment. In Kenya and Uganda, these groups are conducting on-farm trials on promising cultivars that include both traditional varieties and improved breeding lines.

Urban Harvest

In 1999 the CGIAR launched the Strategic Initiative on Urban and Peri-urban Agriculture (SIUPA) in response to the growing reliance on farming among city dwellers in developing countries. Meeting in Hanoi in June 2000, members created a research framework called Urban Harvest and identified critical issues. Among these were serious waste problems associated with starch-processing and pig-raising enterprises in Hanoi. A year later, a collaborative project between CIP and IWMI had developed effective strategies for minimizing the environmental impacts of the waste while utilizing its nutrient content as fertilizer.

Health First

CIP and its collaborators are helping potato-farming families in El Carchi province, Ecuador, to reduce health risks associated with pesticide use. Studies published in 2001 showed that pesticide poisoning is widespread and severe in El Carchi affecting most of the rural population. A modeling tool known as "tradeoff" analysis is helping farmers balance diverse and sometimes conflicting objectives. Meanwhile, potato growers are learning to handle chemicals safely and are applying integrated pest management measures that reduce pesticide use.

Models for Mountains

The CIP-led Global Mountain Program (GMP) works to increase knowledge about mountain ecosystems, to promote integrated watershed development, and to generate better livelihood opportunities. CIP scientists are developing powerful tools to study fragile highland production systems, and more than 200 local professionals have been trained to use them. The program also has studied eight "model" watersheds in the Andes and the Himalayas, and in 2001 it produced CD-ROMs describing each watershed and the options for its development.

China's Cooperation 88

A CIP cross, known as Cooperation 88, is delivering massive yield gains over previously favored potato varieties in China, producing up to 60 tons per hectare. Its uniformly large tubers and shallow eyes make it ideal for processing, an important characteristic in regions that are moving from subsistence to a market economy. By the end of 2001, less than seven years after its release, Cooperation 88 covered an estimated 20 percent of the area devoted to potato in Yunnan province and spilled over into neighboring Sichuan and Chongqing provinces. Its seeds are being traded across China's borders into Vietnam and Myanmar.

Centro Internacional de la Papa (CIP)
Headquarters: Lima, Peru
www.cipotato.org

Vetch Finds Favor in Dryland Syria

Sheep grazing on vetch in the community of Al Bab, northeastern Syria

When a technology spreads beyond the boundaries of research stations and pilot development projects, it can be said to have achieved success. Such is the experience of the International Center for Agricultural Research in the Dry Areas (ICARDA) in promoting common vetch (*Vicia sativa*) in Aleppo governorate, northeastern Syria, where in 2001 vetch area increased sevenfold over the previous year.

In many marginal rainfed areas in Syria, population growth is leading to unsustainable production practices. More sheep are being put to graze, and the traditional practice of leaving farmland fallow between barley crops is giving way to continuous barley cultivation to feed sheep. The results are degraded range and cropland, erosion, loss of biodiversity, and a consequent loss of income for farmers.

ICARDA scientists and their partners in Syria's national agricultural research system felt that if farmers learned about the benefits of vetch in rotation with barley, they would surely adopt it. Vetch is a nutritious feed crop that improves soil fertility by fixing nitrogen from the air. It provides additional feed, eases pressure on rangeland, improves livestock health, reverses soil degradation, and increases farmers' incomes.

In 1986 eight farmers in the community of Al Bab in Aleppo governorate were provided with seed and guidance in managing rotation trials. The results were convincing. Barley planted after vetch yielded about 50 percent more than barley grown after barley. One serious problem remained. Hand harvesting was expensive and labor was often unavailable. Left in the fields too late, vetch seed pods shatter and can cause a weed problem in the subsequent barley crop. While ICARDA works to develop non-shattering cultivars, the immediate problem was solved with the introduction of a tractor-mounted cutterbar mower. ICARDA demonstrated a mower and some progressive farmers soon invested in mowers of their own. They save up to US$100 per hectare in labor cost and rent out their mowers for a tidy profit.

Barley planted after vetch yielded about 50 percent more than barley grown after barley.

Hundreds of farmers now grow vetch in the Al Bab area and this accounts for some of the 7,000 hectares of the crop grown throughout Aleppo governorate. The technology also is spreading to other provinces, with help from ICARDA and its community approach to research for development. In this approach, a list of 10 potential options is developed with the participation of farmers. Subsequently, farmers and other stakeholders select five options to investigate. From those five, the community selects two "best-bet" options and develops an action plan. The community approach helps ensure that the right strategy is pursued, helps avoid costly erroneous assumptions that might hinder adoption, and gives the farmers a sense of ownership. After that, a good crop, like a good idea, sells itself.

International Center for Agricultural Research in the Dry Areas (ICARDA)
Headquarters: Aleppo, Syrian Arab Republic
www.icarda.org

Community-Based Rice-Fish Culture on the Floodplains of South and Southeast Asia

Sampling of fish in a communally managed concurrent deepwater rice-fish plot in the Red River Delta, northern Vietnam

In the rainy season in Asia, floods inundate vast areas in an annual cycle. The inhabitants of these floodplains are among the poorest people in Asia. Their lives and livelihoods depend on the yearly floods to water the rice fields and yield harvests of fish. The green revolution brought immense gains in productivity to irrigated farming systems where production quadrupled. Other farming systems have not achieved their full potential. In the flood-prone system, there were "hungry" periods when the land was submerged beneath the floodwaters.

In traditional rice cultivation in floodplains, two varieties of rice are sown at the beginning of the dry season. The first, dry season rice, is harvested before the next flood arrives. The second, deepwater rice, may be harvested but also continues to grow or regrow as the floodwaters rise, thus providing a second, smaller crop at the end of the wet season. Indigenous fish that migrate into the rice fields with the floods also are harvested.

In the 1980s, the introduction of irrigation, flood control schemes, and high-yielding irrigated rice varieties led to sixfold increases in rice yields. But farmers abandoned deepwater rice and let the land lie fallow after the irrigated rice had been harvested because there was not time before the rains began to establish the deepwater rice. The fish catch declined because of pesticides and flood control structures obstructed fish migration.

Scientists at the World Fish Center saw opportunities to increase food production in these flooded conditions. The goal was to improve productivity while maintaining ecosystem balance and protecting biodiversity. More productive methods of fish farming in deep-water rice systems had proven to be too expensive for individual farmers. A community-based management approach was now adopted. Very poor farmers and fishers in these flooded ecosystems are largely landless and survive on less than US$0.50 a day. Fishing is an occupation of last resort, a means whereby even the poorest have customary rights to catch fish in the common waters of each monsoon flood.

The community-managed rice-fish systems divide the benefits proportionally among those who own land, those who both own land and contribute to the operating costs of raising fish, and those who contribute their labor. The landless population falls in the last category. In many communities there is agreement that landless people may continue to catch the small native fish species but will leave cultured fish to grow for the benefit of landowners. These native species are critical to their day-to-day survival.

Productivity in these flood-prone ecosystems has increased dramatically. Each hectare yields between 250 and 1,500 kilograms of fish. Rice yields have been maintained, and because fewer pesticides and less weeding and plowing are required, the costs of rice production have dropped by 10 percent. The rice-fish culture systems are environmentally nondestructive and there is no reduction in the catch of wild fish species.

In field trial sites in Bangladesh, annual per capita income increased by about 16 percent in three years, and fish consumption rose by about 2 percent. Many fish also were sold. Communities neighboring the trial and demonstration sites have copied the technology.

In Vietnam, the provincial government in the Red River delta is supporting the widespread application of the concurrent deepwater rice-fish technology as a consequence of the trials conducted by the World Fish Center and its partners at the Research Institute for Aquaculture No. 1 in Hanoi. The Bangladesh Department of Agricultural Extension is bringing the technology to farmers in project areas in two districts. The NGO Proshika is planning to disseminate the technology to 30 subdistricts. Forty thousand hectares in Bangladesh are suitable for the technology with the potential to produce an estimated 400,000 tons of fish per year worth some US$300 million.

The World Fish Center (ICLARM)
Headquarters: Penang, Malaysia
www.iclarm.org

Tree Diversity on African Farms: The Good News

A young farmer near the city of Kisumu, in western Kenya, transports tree seedlings to his farm.

One of the key goals of the International Center for Research in Agroforestry (ICRAF) is to intensify on-farm tree diversity. Increasing diversity on farms gives farmers additional ways to improve their livelihoods and improves the health of their ecosystems. Although the need to increase tree diversity on farms and in landscapes is widely accepted, little is really known about the existing degree of diversity on farms. Nor is much known about effective and practical methods for gauging the extent of diversity.

To redress this lack of knowledge—and with an eye toward promoting diversification—in 2001 the Center completed a detailed study designed to measure the current diversity of tree species at the farm and village level in four important African agroecosystems. In an era of rapid deforestation, improving tree diversity is a challenging goal, but the study provides a strong start—and some much needed good news: species diversity on African farms in the four study areas is significantly greater than was previously thought.

Hundreds of farmers were interviewed in order to learn why they planted the trees they did and what they remembered about how individual trees came to be on their farms. Very often, the history of a particular tree on a given farm was as individual as the farmer's own family history, with planting material brought in from as far away as the farmer had ventured for off-farm employment.

On-farm diversity provides farmers with a range of options they cannot get from a single species: Farmers need strong poles and flexible branches for construction, and thus need several types of trees for this purpose. The medicinal efficacy of certain species is higher when used in mixtures. Some trees used for timber or boundary demarcation grow faster, whereas others are heartier. On-farm tree diversity means fruit, firewood, and charcoal are available year-round. Interestingly, the study revealed that, as far as farmers are concerned, they have not reached a saturation point for diversity. Those with wide diversity on their farms want more.

The study showed that many farmers are experimenting with new species on their farms. Wider distribution of information could result in more rapid diversification. Farmers who had experience with the performance of many species opted for diversity. By diversifying their tree populations, farmers are less vulnerable to changes in market dynamics and a more diverse tree population is less vulnerable to pest and disease epidemics. Whereas farmers want diversity mainly for differentiation among and within products and services, ecological research indicates that there is a positive relationship between ecosystem diversity and ecosystem stability and productivity.

ICRAF promotes landscape management strategies that successfully combine the objectives of improving the livelihoods of farmers and conserving biodiversity. The study demonstrates that in the tree agroecosystems studied, there is more diversity on African farms than previously was thought and farmers are willing to further increase diversity when they see the value in doing so. And that is very good news indeed.

World Agroforestry Centre (ICRAF)
Headquarters: Nairobi, Kenya
www.icraf.org

Peas for Prosperity

Rose Frateru, a Tanzanian farmer who is successfully growing wilt-resistant varieties of pigeonpea

Pigeonpea is no longer an exotic crop in eastern and southern Africa—it has been there too long. But now the crop is becoming more important to farmers than ever before, and its importance is increasing every year. It all has to do with money. Farmers are tired of being poor and many of them view pigeonpea cultivation as their best bet for prosperity.

Close rapport between the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) scientists and their counterparts in the national programs of the region, particularly Tanzania's Department of Research and Development and the Kenya Agricultural Research Institute, and NGOs such as TechnoServe and Catholic Relief Services, is largely responsible for the success of this new, demand-driven approach to research. The initiative is enthusiastically supported by various donors, notably the African Development Bank and the Danish Agency for Development Assistance (DANIDA). By serving as a catalyst between farmers and the private sector, ICRISAT scientists have made significant contributions in the development of public–private partnerships.

Recognizing the importance of cash income to farmers, ICRISAT scientists set about identifying the demands of end-users of pigeonpea. Through consultation with private-sector traders and processors, ICRISAT identified varieties that satisfied different market niches, notably the export of processed pigeonpeas to international markets. These included European health food shopkeepers seeking bold cream-colored seeds as well as fresh vegetable exporters who prefer large green seeds with good storage life.

The result? Some of the most impoverished farmers in Africa are making real money from pigeonpea. Exports from the region exceed 100,000 tons per annum, and in a major new development further south, a joint venture has been established in Mozambique for exporting pigeonpea to international markets. In eastern Africa, pigeonpea is no longer an emerging crop. It has arrived.

Some of the most impoverished farmers in Africa are making real money from pigeonpea.

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
Headquarters: Patancheru, Andhra Pradesh, India
www.icrisat.org

Evaluating Policy Impact

Schoolchildren in Bangladesh

In 2001 the International Food Policy Research Institute's (IFPRI) in-depth evaluation showed that Mexico's antipoverty program, PROGRESA (Programa de Educación, Salud, y Alimentación), which combines education, health, and nutrition interventions in one package, can dramatically improve families' ability to reverse the cycle of intergenerational poverty. PROGRESA raised the rate of school enrollment for girls by 14 percent and for boys by 8 percent. PROGRESA students enter school at younger ages and experience less grade repetition, better grade progression, and lower dropout rates. The program's effects on health, household food consumption, and nutrition are striking both for children (12 percent lower incidence of illness) and for adults (19 percent decrease in sick or disability days). IFPRI's rigorous impact assessment was instrumental in persuading the Inter-American Development Bank to loan the Mexican government US$1 billion to expand PROGRESA.

IFPRI researchers evaluated Bangladesh's innovative Food for Education (FFE) program, which distributes staple foods to families in return for their children's school attendance. FFE improved household food security, raised girls' enrollment significantly, and boosted children's educational levels by increasing overall school enrollment, promoting attendance, and reducing dropout rates. To make the program more effective, IFPRI recommended ways for the government to raise the quality of FFE schools, target poor households through more reliable means testing, and adopt a distribution system that would reduce diversion of food grains to the black market.

Demonstrating how food programs and policies succeed or fail in benefiting target populations is a central concern of IFPRI researchers and of donors who support the research. Policy research plays a vital role, informing, persuading, and influencing decisionmakers about the merits of policy change. Impact assessment is an important part of IFPRI's work.

Beyond the project or country level, however, it is more difficult to attribute policy changes to a specific research project, public policy, or program. Often there are time lags between the release of research information, the formulation of new policies, and their implementation. In November 2001 the Netherlands Ministry of Foreign Affairs and IFPRI convened a group of researchers to consider how better to measure the impact of policy-oriented research. Participants identified a number of ways for social scientists to increase their impact on policy, and prescribed innovations like incorporating communications strategies into study design, and field postings for researchers to better analyze policy processes and responses. The lessons from this symposium are helping donors, governments, and research institutions make policy-oriented social science research more effective in improving the lives of poor people.

PROGRESA students enter school at younger ages and experience less grade repetition, better grade progression, and lower dropout rates.

International Food Policy Research Institute (IFPRI)
Headquarters: Washington, D.C., United States of America
www.ifpri.org

The Witch Weed of Africa: Integrated *Striga* Control in Northern Nigeria

IITA
Research to Nourish Africa

The single most severe biological constraint to cereal production in Sub-Saharan Africa now can be better managed, thanks to new technologies developed by the International Institute of Tropical Agriculture (IITA) and its research partners. Using integrated pest management and participatory research approaches, IITA scientists are able to greatly reduce crop damage, and many farmers participating in field trials are reporting 80 percent yield increases in affected cereal crops.

Striga (commonly called "witch weed") is a parasitic plant that leaches nutrients from the roots of cereals (for example, maize, sorghum, millet, and rice), leaving them stunted with almost no grain. These crops are an important part of the diets and incomes of poor farmers. In Sub-Saharan Africa the witch weed infests about 21 million hectares of land and affects 100 million people.

IITA and its research partners used a multidisciplinary approach to attacking the *Striga* problem. An integrated pest management approach empowers farmers by enabling them to choose from a basket of technologies those best suited to their particular circumstances while providing the required level of weed management. Some of the most innovative technologies build on the strengths of existing farming systems. For example, many farmers in northern Nigeria grow legume crops either in rotation or intercropped with a cereal. This helps maintain soil fertility by using the nitrogen-fixing capability of the legume. But some varieties of legumes also cause a higher proportion of *Striga* seeds to germinate. The *Striga* that attacks cereals like maize, however, cannot parasitize the legumes and so it dies. This process is rather colorfully called "suicidal germination" and the technology is called "trap cropping." The discovery that the high genetic diversity of *Striga* requires screening of legumes to find effective trap crops for different locales is one of IITA's important research contributions, and has made it possible to recommend legume varieties targeted to specific locations.

In a major research breakthrough, IITA's breeders also have succeeded in developing varieties of *Striga*-resistant maize. This is an important achievement because trap cropping alone is not enough. *Striga*-resistant cereals improve the control system. Seed cleaning to remove *Striga* seed, crop rotations, and weeding *Striga* plants before they set seed all enhance the package.

Another important project innovation is defining "impact pathways" that permit identification of the best-bet options that farmers are adopting, the modifications and amendments they make, and the ways in which technologies and knowledge are spreading.

In one pilot village the impact pathway showed that use of *Striga* management technologies spread on its own, from 6 farmers in 1999 to 112 farmers in 2001. The participatory technology development approach in which team members see themselves as facilitators of farmer learning, is leading to learning, adaptation, and adoption of a complex but valuable system.

Example of *Striga hermonthica* parasitizing a maize plant in a research field at Mokwa, west-central Nigeria

The challenge is to develop an extension approach that encourages the scaling up of such tried-and-tested approaches, but at a lower cost. With support from the UK government, IITA and its partners are promoting adoption of integrated *Striga* control and suitable strategies for its extension among local, state, national, and international institutions. In this way, IITA ensures that research knowledge goes from global to local to global again.

International Institute of Tropical Agriculture (IITA)
Headquarters: Ibadan, Nigeria
www.iita.org

ILRI
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

Redressing Raw Deals: Enhancing Milk Markets Vital to the Poor

Brisk trade in raw milk provides a steady source of cash income for three million dairy producers in East Africa

By supporting "informal" dairy producers and sellers with policies better suited to their circumstances, developing countries are taking advantage of the historic opportunity that livestock now offers to lift millions of people out of poverty.

With demand for foods of animal origin expected to double over the next 20 years in developing countries, the dairy cow is fast becoming one of the smartest investments a farmer can make. Small-scale African farmers are already doing a brisk trade in dairy products. Particularly in East Africa's three million dairy households, dairying acts as a cash crop, generating more regular household income and jobs for the unskilled than do other enterprises.

Traditional milk markets—which handle unpasteurized, or "raw" milk—are behind the dairy boom in many developing countries. In Kenya, for example, where per capita consumption of liquid milk totaled 85 kilograms in 1999, traditional milk markets supply more than 80 percent of the milk sold. Compared with their commercial competitors, small-scale dairy agents provide cheaper milk to consumers and pay better prices to producers. Despite these benefits, public officials concerned about the possible health risks of unpasteurized milk actively have discouraged the country's indigenous milk markets. Kenya's dairy development authorities urgently needed more reliable information to make more judicious policies.

A Smallholder Dairy Project (SDP) conducted a series of risk analyses needed to safeguard both public health and dairy livelihoods. Starting in 1999 with funds from the United Kingdom's Department for International Development, staff from the Kenya Ministry of Agriculture and Rural Development, the Kenya Agricultural Research Institute, and the Nairobi-based International Livestock Research Institute (ILRI) forged partnerships with the Kenya Dairy Board, Nairobi and Egerton Universities, the Kenya Medical Research Institute, and the Kenya Ministry of Health. These institutions provided the breadth of scientific expertise needed (in bacteriology, immunology, economics, epidemiology, and clinical medicine) to better analyze the risks to poor people posed by alternative dairy policies.

As the market for dairy products grows, dairy cows prove to be a good investment.

In 2001 the project's policy recommendations were broadly adopted thereby enhancing milk marketing by and for poor populations. The recommendations provide more "carrots" (licensing, training) than "sticks" (policing) to small-scale operators. A new dairy development policy and revised dairy legislation now explicitly recognize the predominance of the raw milk trade in Kenya, its importance to the poor population, and the need for regulations and technologies to optimize the quality of raw milk.

Lessons from this research are being applied in other African countries through joint projects conducted by African institutions, ILRI, and the FAO. These projects aim to build a framework suitable for all traders—small and large, formal and informal—that will provide the public with safe milk and protect dairy livelihoods and foods that are vital to poor people.

International Livestock Research Institute (ILRI)
Headquarters: Nairobi, Kenya; Addis Ababa, Ethiopia
www.cgiar.org/ilri

Agrobiodiversity Partnerships Against Poverty

On-farm conservation: woman farmer from Taounate, Morocco, describing agromorphological traits of a local faba bean

The International Plant Genetic Resources Institute (IPGRI) works exclusively in partnership, often through multicountry and multiregional activities. The following examples show how IPGRI's unique modus operandi offers local focus and impact complemented by broad application through adaptation and adoption of know-how from one country to another.

In Situ Conservation of Agricultural Biodiversity On-Farm

Despite the benefits of improved varieties in many farming systems, in other systems seeds purchased from the formal sector can represent only a minority of those planted in farmers' fields in any one year—less than 3 percent of rice in Nepal, 5 percent of sorghum in Burkina Faso, and 13 percent of durum wheat in Morocco. IPGRI is working with farmers, NGOs, and community-based organizations in nine countries to establish and apply a knowledge base to support on-farm conservation of local crop varieties as a key component of agricultural biodiversity. Drawing on an understanding of the effect of management practices and the important role played by gender, age, and ethnic grouping, the project has strengthened the survival of local varieties. It has generated a portfolio of development options to enhance the benefits of local crop diversity to rural livelihoods and ecosystem health. The project's output has been instrumental in setting up the Convention on Biological Diversity's new work program on agricultural biodiversity and thus has vastly expanded its reach.

Sharing Improved Banana Varieties

The International *Musa* Testing Program (IMTP) joins the International Network for the Improvement of Banana and Plantain (INIBAP), national agricultural research systems (NARS), and the world's five major *Musa* breeding programs, including that of IITA, in evaluating trials in 22 countries in Africa, Asia, and Latin America. INIBAP plays a pivotal role, harmonizing evaluation procedures and facilitating access to improved material indexed to ensure freedom from disease. Varieties that perform well over a range of environments and disease pressures are identified and recommended for further distribution. These improved varieties now are enhancing the livelihoods of farmers in countries as far apart as Cuba and Tanzania through three- to five-fold productivity increases.

Enriching Diets with Tropical Fruits

Asia's tropical fruits are important sources of supplementary food. They offer a nutritionally balanced diet, enhance household incomes, and earn export revenue. IPGRI is coordinating a 10-country project on the conservation and use of native tropical fruit biodiversity in which national partners are conducting research on mutually agreed priority species—mango, citrus, rambutan, jackfruit, litchi, and mangosteen. To date, collections with approximately 2,500 accessions have been identified or established, and 1,000 new accessions have been collected. The project has significantly enhanced the level of research and information sharing among countries and has raised awareness of the importance of indigenous fruits, thereby providing partner countries with a strong base for genetic improvement and long-term production increases.

Coconuts for Combating Poverty

Ninety-six percent of the world coconut crop is produced by smallholder farmers who earn $200 or less per year. A major reason for this poverty is a lack of research support and access to usable research results. The International Coconut Genetic Resources Network (COGENT), which is coordinated through IPGRI, works with 38 countries to support coconut-growing communities. COGENT is collaborating with partners in 15 of the countries to develop a package of income-generating, village-level industries based on multiple uses of coconut genetic diversity. The strategy has the potential to increase incomes up to ten-fold by introducing high-value varieties via community-managed nurseries; by developing value-added products from the kernel, husk, shell, water, wood, and leaves; and by promoting improved intercropping systems that include livestock and fodder production.

International Plant Genetic Resources Institute (IPGRI)
Headquarters: Maccarese (Fiumicino) Rome, Italy
www.ipgri.org

A Cleaner, Greener Rice Industry

Women pulling rice seedlings for a field experiment on cultivar mixture in Gejiu, Yunnan Province, China

Rice feeds almost half of the world's population and covers about 11 percent of the earth's arable area, so it has great potential to affect human health and the environment. Working closely with partners in several national programs, scientists from the International Rice Research Institute (IRRI) have been able to get thousands of farmers to reduce their insecticide use in the Mekong River delta of Vietnam, and have provided new methods to help rice growers in China cut back on chemical use while boosting incomes. The innovations in Vietnam this year won one of the world's major environmental awards, the $25,000 Saint Andrews' Environmental Prize.

First launched in 1994 in the Mekong delta—one of the great rice bowls of Asia—the research and subsequent campaign marked a milestone in rice production for two reasons. First, it clearly identified the damage caused by insecticide overuse that kills off friendly insects and encourages pests that otherwise would have been kept in control. Second, it developed a completely new way of communicating important information to farmers.

After testing their campaign in the Mekong delta, where almost two million rice growers were persuaded to cut back on using harmful and unnecessary farm chemicals, the research partners launched a similar campaign in northern Thailand's Sing Buri province on World Environment Day 2001. The Saint Andrews' prize money is being used to extend the campaign to another million rice farmers in Vietnam's Red River delta.

Meanwhile, in southern China, in what the *New York Times* has described as a "stunning success" in one of the "largest agricultural experiments ever," IRRI scientists found in 2000 a new way to control a major disease in rice without using any chemicals. By planting different types of rice alongside each other, they found they could almost completely control the spread of rice blast, a disease that reduces harvests and costs the rice industry millions of dollars a year. Known in scientific circles as "exploiting biodiversity for sustainable pest management," the idea is hardly new to many farmers. But what was new was the cutting-edge science involved in finally showing farmers how to use this strategy to achieve maximum effect.

By the end of 2001, about 60 percent of the rice farm households in the *indica* rice area of Yunnan Province had adopted the mixed planting of rice varieties and the area under mixtures had expanded to 102,667 hectares. In 2001, in Sichuan Province the technique was evaluated on more than 3,000 hectares. In addition to cutting back on the need for chemicals, mixture plantings yielded an average of 0.7 ton per hectare more than hybrid rice alone. The diversification concept also has been extended to control diseases and insect pests in other major crops in Yunnan, particularly wheat and broad beans. As part of a rice-wheat cropping system, wheat and broad beans are planted during winter on more than 250,000 hectares in Yunnan.

In the Philippines, field trials have shown that varietal mixtures could reduce the incidence of tungro, a serious rice virus disease in the tropics. In the Mekong delta and central Vietnam where disease resistance has become ineffective in commonly grown varieties, diversification experiments are being planned to control rice blast.

Responding to growing demand, IRRI released an interactive CD-ROM on tropical rice, titled RiceIPM that provides a comprehensive source of information and training material for improving the management of rice pests, diseases, and weeds.

Other features of RiceIPM include a diagnostic key that assists in shortlisting the likely causes of observed rice disorders; a series of interactive, multimedia keys that lead to help in identifying insects found in rice; and a customized search engine that provides a rapid means of directing the user to specific topics to be found on the CD and to links to Web sites that offer additional topical information. There also are sections on pest ecology; crop checking; fact sheets on major insect pests, rats, diseases, weeds, nutrient deficiency, and toxicity; crop growth and pest damage; pest management options; and decisionmaking and economics.

International Rice Research Institute (IRRI)
Headquarters: Los Baños, Philippines
www.irri.org

Supporting and Enhancing Biosafety Systems

Modern agricultural biotechnology poses enormous challenges to industrial and developing countries alike. The decision to tackle these challenges, to what extent, and how can only be made on the basis of a thorough understanding of the technology and its implications (particularly for environmental health and safety). The decision becomes all the more pressing as the opportunities to use genetically modified organisms (GMOs) increase. Working with the Virginia Polytechnic Institute and Virginia Tech, and supported by funds from the governments of Japan, the Netherlands, Switzerland, and the United Kingdom, the International Service for National Agricultural Research (ISNAR) continued to strengthen its expertise in biosafety during 2001 and to make that expertise available to developing country institutions as part of the ISNAR Biotechnology Service (IBS). The timing could not have been better.

International consensus on biosafety (the environmentally safe application of modern biotechnology) was reached under the Cartagena Protocol in 2000. From its unique perspective of linking international and national agricultural research, ISNAR has been assisting countries in taking a strategic and systematic approach to the design and implementation of efficient biosafety systems. The analysis of wider issues, such as the impact on poor farmers, international trade, the environment, and consumer acceptance, should guide the development and implementation of legal frameworks, biosafety measures, and regulatory systems. No country should be pressured into establishing piecemeal biosafety procedures simply because an application to import GMOs has been made by powerful groups and a response is urgently required. Nonetheless, such is often the case and so the importance of the systematic focus being undertaken by ISNAR is increased.

An equally important element relates to people. Clearly, the quality of biosafety review and decision-making and the safe and appropriate handling of GMOs are linked directly to the training and experience of the people involved. During 2001 ISNAR constructed a framework for biosafety capacity building under the Cartagena Protocol and, in collaboration with the Global BioDiversity Institute, developed training courses on biosafety for countries in Sub-Saharan Africa. A total of 500 participants from 43 countries attended five regional training courses.

ISNAR has been assisting countries in taking a strategic and systematic approach to the design and implementation of efficient biosafety systems.

With a long-term approach to biosafety and a reputation for objective, balanced reporting, ISNAR is making a significant contribution to the development of biosafety systems worldwide—a role it expects to expand further in future. This expansion will occur by increasing collaboration with African and Asian NARS, FAO, and other international organizations in IBS's work on decision-support tools, training, capacity building, and research.

International Service for National Agricultural Research (ISNAR)
Headquarters: The Hague, Netherlands
www.isnar.cgiar.org

Strategic Partnerships Maximize Research Impact

Bucket and drip irrigation kits being promoted in Sub-Saharan Africa prevent shallow pools of water from forming on fields

In 2001 the International Water Management Institute (IWMI) focused on forming new strategic partnerships that tap its expertise and feed the Institute's research output into broader networks in the development and research communities.

In India, the IWMI-Tata Water Policy Program draws on the skills and experience of a range of partners to identify and analyze promising approaches to the country's water management challenges. This research is synthesized for maximum policy impact in the *Water Policy Briefing* series.

In Africa, IWMI is an active participant in the African Water Task Force, which brings together the leaders of regional institutions and agencies concerned with water to shape a shared agenda. The group's priority is to synthesize African positions and programs on water to be presented at the World Summit on Sustainable Development. IWMI provides strategic advice and secretariat functions to the task force. IWMI is also a new member of the Agricultural Research in Eastern and Central Africa initiative and a partner in the initiative's Soil Water Management Network (SWMNET). IWMI is committed to providing intellectual and practical support to SWMNET by designing collaborative research projects.

IWMI is a founding partner in a number of new international initiatives, including the CGIAR Comprehensive Assessment of Water Management in Agriculture; the Dialogue on Water, Food, and Environment; and the CGIAR Systemwide Initiative on Malaria and Agriculture (SIMA).

SIMA represents a unique partnership among communities, researchers, and the health and agriculture sectors formed to better understand the multiple interactions between agricultural production systems and malaria. This innovative initiative seeks to control malaria by combining improved agricultural practices, proper management and use of natural resources, and existing antimalaria approaches. SIMA is providing development practitioners with a good example of how knowledge-sharing communities can help create an international agenda in a cost-effective, rapid, and practical way. Follow-up activities include seminars in Arusha, Tanzania, and Montreal, Canada.

IWMI is an active participant in the African Water Task Force, which brings together the leaders of regional institutions and agencies concerned with water to shape a shared agenda.

International Water Management Institute (IWMI)
Headquarters: Battaramulla, Sri Lanka
www.cgiar.org/iwmi

New Rice for Africa Marches On

In April 2001 the West Africa Rice Development Association (WARDA) launched the NERICA Consortium for Food Security in Sub-Saharan Africa. Subsequently, the African Rice Initiative was launched to boost dissemination of NERICA in 7 pilot countries in West and Central Africa and 18 countries throughout Sub-Saharan Africa. NERICA were developed by interspecific crossing of African and Asian cultivated rices, and the research drew on farmers' knowledge of their farming environments and their opinions about the varieties best suited for each upland-rice region through participatory varietal selection (PVS).

Digbeu Ori Elise, a farmer from Saioua, Central Côte d'Ivoire, has benefited from NERICA. All six of her children attend school.

It is estimated that in 2001 NERICA covered almost 4,000 hectares in West and Central Africa, yielding production of about 15,000 tons worth approximately US$1.5 million in rice import substitution value. More than 58,000 farmers have begun using NERICA throughout the subregion, with an estimated adoption rate of 20 percent. Adopting farmers grew NERICA on 15 percent of their rice land, on average. The NERICA philosophy is not to *replace* existing varieties, but to *increase* on-farm biodiversity and farmers' varietal options.

Community-Based Seed Systems Deliver Adapted Varieties to Farming Communities

The Participatory Rice Improvement and Gender/User Analysis (PRIGA) network for West and Central Africa, coordinated by WARDA, delivers adapted rice varieties to farmers throughout the subregion. As the news spreads and demand grows among neighboring farmers, PRIGA coordinators increasingly are turning to community-based seed systems (CBSS) to meet the surging demand for seed. CBSS starts with farmers' existing seed harvesting and conservation practices, which are refined on the basis of research-generated knowledge on improved seed management. CBSS activities are going on in most of WARDA's 17 member states. For example, in Benin several farmers were trained in 2001 to multiply the three most popular varieties selected in the PVS trials; seeds were sold, exchanged, or given as gift to 110 non-PVS farmers. In Burkina Faso, three varieties were multiplied in three locations by a total of 11 farmers. From 7 hectares, 14 tons of seed were produced. In The Gambia, five varieties were multiplied on 0.1 hectares each, and additional seed was taken from the ratoon (regrowth) crop to produce 2 tons of seed. In Togo, seven varieties were multiplied by 54 farmers in three villages.

Integrated Rice Management in Inland Valleys

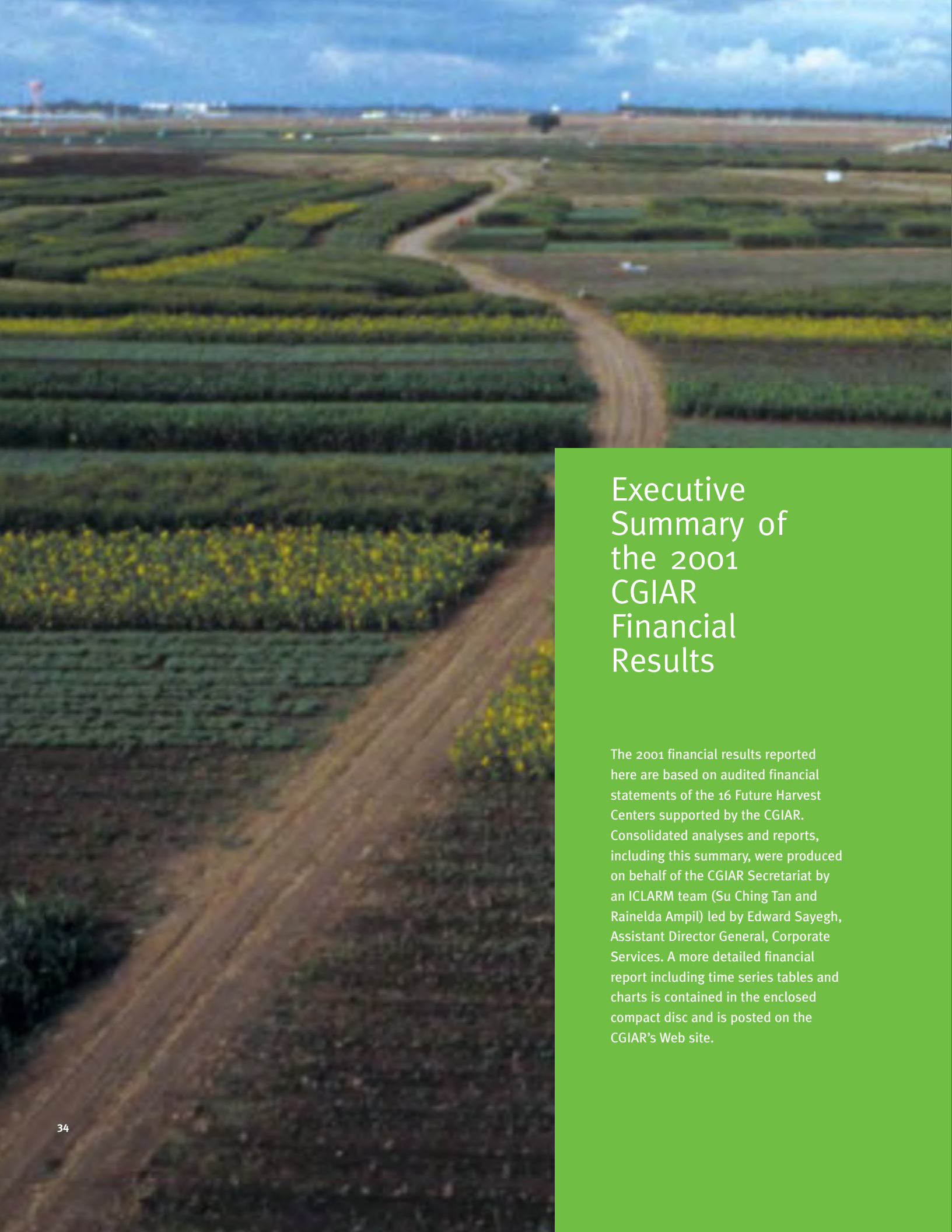
After the success of integrated crop management in Sahelian irrigated systems, the WARDA-hosted Inland Valley Consortium began a campaign to promote integrated rice management (IRM). Participatory learning and action research (PLAR) was used to build 70 farmers' capability to observe, analyze, and make decisions relative to production constraints and opportunities. The knowledge base is a combination of known IRM components (from the research and extension side) and farmers' own knowledge of their cropping systems. In 2001, the first year, application of IRM increased farm yields by 0.7 tons per hectare. Moreover, each participating farmer shared at least one component of the IRM with an average of two (nonparticipating) neighbors. Four of the 70 farmers were trained as farmer-trainers to extend the PLAR-IRM concept to neighboring inland valley lowlands. The methodology is being delivered to six more countries. Four lowland communities near Bouaké, Côte d'Ivoire, have asked WARDA to implement the program for them.

West Africa Rice Development Association (WARDA)
Headquarters: Bouaké, Côte d'Ivoire
www.warda.org

Future Harvest Centers of the CGIAR

CGIAR


ICARDA
Aleppo,
Syrian Arab Republic
ICRISAT
Patancheru,
India
IWMI
Battaramulla,
Sri Lanka
IRRI
Los Baños,
Philippines
ICLARM
Penang,
Malaysia
ICRAF
Nairobi,
Kenya
ILRI
Nairobi,
Kenya
CIFOR
Bogor,
Indonesia



Executive Summary of the 2001 CGIAR Financial Results

The 2001 financial results reported here are based on audited financial statements of the 16 Future Harvest Centers supported by the CGIAR. Consolidated analyses and reports, including this summary, were produced on behalf of the CGIAR Secretariat by an ICLARM team (Su Ching Tan and Rainelda Ampil) led by Edward Sayegh, Assistant Director General, Corporate Services. A more detailed financial report including time series tables and charts is contained in the enclosed compact disc and is posted on the CGIAR's Web site.

CGIAR Members support the Future Harvest Centers and programs of their choice, and each Center directly receives and expends these funds. Thus, the CGIAR financial results presented here are a consolidation of the financial results of the 16 international Centers. The results are reported in US dollars.

CGIAR's 2001 Financial Goals

As in past years, the CGIAR's financial goals in 2001 were to attract sufficient resources to enable it to implement its approved work program for the year and to maintain its strong financial position. The financial targets for 2001 approved at International Centers' Week 2000 (ICW00) were

- to raise $340 million in funding from Members, which would be supplemented by $15 million in Center income to implement a work program of $355 million
- to maintain the same levels of financial position and operating ratios as in the previous year.

Overall Financial Outcome

The overall 2001 result confirms that the CGIAR was successful in achieving its financial targets. The system registered a modest operating deficit ($2 million) in 2001 on total resources of $353 million against total expenditures of $355 million. Total resources consisted of $337 million in Member funding (1 percent below the goal set at ICW00) and $16 million in Center-generated income. The CGIAR was in a strong financial position at the end of the year: net assets totaled $189 million, compared with $203 million in 2000; and liquidity indicators, such as cash, working capital, and current ratio, remained healthy. Highlights of the Group's 2001 financial performance are shown in table 1, with comparative information for the previous four years.

Contributions

For the Centers supported by the CGIAR, 2001 marked another year of stable financial support.[1] The overall level of support of $337 million in 2001 compares with $331 million in 2000, and with an average level of approximately $332 million for the 1997–2001 period. In 2001, 55 of the 58 Members[2] contributed $314 million ($312 million in 2000); the remaining $23 million came from a broad range of sources, including nonmember foundations and developing countries. Table 2 lists the contributions for 1997–2001 by contributor.

The increase in total contributions from 2000 to 2001 is illustrated by Member group in figure 1. Contributions were higher from North America, from foundations, and from the European group, and they partly offset the substantial decline in contributions from the Pacific Rim. Contributions by nonmembers increased by $3.9 million, from $19.2 million in 2000 to $23.1 million in 2001.

Contributions from North American Members increased by $3.5 million, or 7 percent, largely as a result of higher contributions from the United States, which contributed $45.4 million in 2001 compared with $42.1 million in 2000. Contributions from Canada remained stable at the 2000 level. Foundations increased their support in 2001 by $2.6 million. The Rockefeller Foundation's contribution grew from

Table 1. CGIAR Program and Resource Highlights, 1997–2001

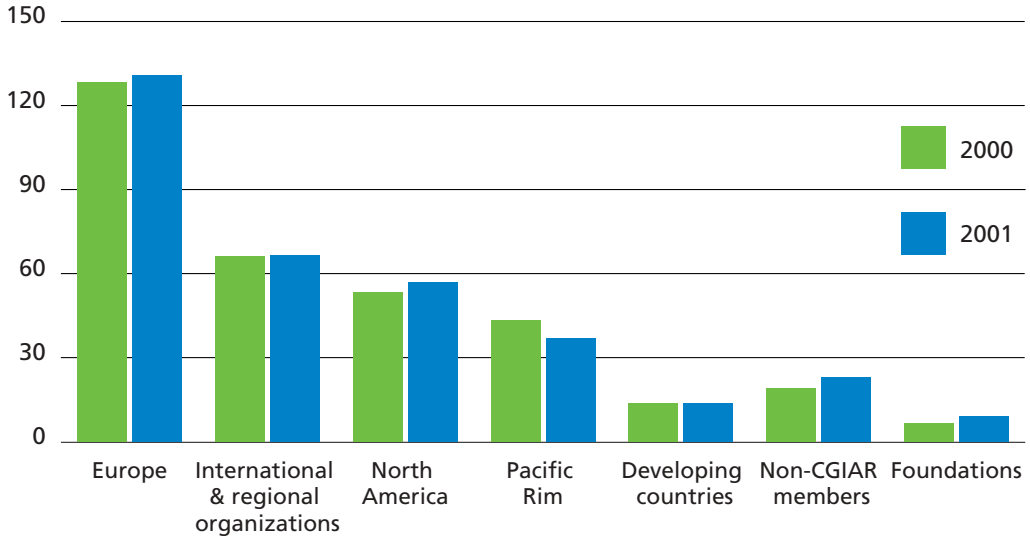
ACTUAL	1997	1998	1999	2000	2001
Center income (millions of US dollars)					
Agenda funding	319	338	328	331	337
(percent of which is unrestricted)	64%	61%	54%	50%	42%
Center earned income	13	13	13	14	16
Other income (nonagenda, and so on)	14	0	0	0	0
Advance/draw on reserves					
TOTAL	345	351	341	345	353
Membership agenda support (millions of US dollars)					
Europe	141	148	126	128	131
Pacific Rim	40	44	49	44	37
North America	51	53	52	54	57
Developing Countries	11	13	15	14	14
International and Regional Organizations	63	62	66	66	67
Foundations	6	7	6	7	9
Nonmembers	7	12	15	19	23
TOTAL	319	338	329	331	337
Top three contributors	World Bank United States Japan	World Bank United States Japan	World Bank Japan United States	World Bank United States Japan	United States World Bank Japan
Staffing (number)					
Internationally recruited staff	862	893	907	955	958
Support staff	8,016	7,458	7,721	7,583	7,527
Agenda program expenditures (percent)					
Increasing productivity	40%	37%	34%	36%	35%
(percent of which is germplasm enhancement/breeding)	19%	18%	18%	18%	18%
Protecting the environment	17%	19%	20%	18%	19%
Saving biodiversity	11%	11%	10%	10%	9%
Improving policies	11%	12%	13%	14%	14%
Strengthening NARS	21%	21%	23%	22%	23%
(percent of which is training)	8%	8%	9%	9%	9%
TOTAL (millions of US dollars)	333	337	347	338	355
Object expenditures (percent)					
Personnel	51%	50%	50%	49%	49%
Supplies/services	36%	37%	38%	39%	40%
Travel	7%	7%	7%	7%	7%
Depreciation	6%	6%	5%	5%	4%
Regional expenditures (percent)					
Sub-Saharan Africa	41%	41%	42%	42%	43%
Asia	30%	32%	32%	32%	32%
Latin America and the Caribbean	17%	18%	17%	17%	16%
Central and West Asia and North Africa	12%	10%	9%	9%	9%
Result of operations	12.4	13.6	(6.4)	6.6	(1.7)
Center financial information					
Net assets	316	323	263	203	189
Unappropriated net assets	43	52	44	62	79
Appropriated net assets	273	271	219	141	110
Annual Center cost change (percent)	0	0	0	0	0
Short-term liquidity indicator					
Working capital (days expenditure)	114	127	122	112	129
Current ratio	1.72	1.8	1.63	1.74	1.88
Longer-term sustainability indicator					
Operating fund/revenue (percent)	13%	15%	13%	18%	22%
Fixed asset indicators					
Capital expenditure (millions of US dollars)	21.7	22.2	17.9	14.9	15.9
Capital expenditure/depreciation (percent)	105%	110%	100%	93%	104%

Table 2. CGIAR Contributions to the Research Agenda by Member Group 1997–2001

(millions of US dollars)

MEMBERS	1997	1998	1999	2000	2001
Europe					
Austria	1.8	2.3	2.3	1.8	2.1
Belgium	5.5	6.0	6.8	4.7	4.5
Denmark	19.1	17.7	14.0	11.0	10.6
European Commission	23.1	24.9	6.0	22.3	21.7
Finland	2.1	2.1	1.5	1.5	1.5
France	4.9	5.9	5.9	6.0	6.0
Germany	16.6	16.3	15.5	10.2	12.3
Ireland	0.8	1.0	0.9	0.8	1.5
Italy	4.0	3.0	3.2	3.2	3.7
Luxembourg	0.7	0.7	0.7	1.3	0.8
Netherlands	14.5	14.7	11.6	13.7	12.2
Norway	7.2	8.3	8.9	7.7	8.3
Portugal	0.3	0.3	0.5	0.4	0.3
Spain	1.8	1.1	0.9	1.2	1.2
Sweden	7.1	9.3	10.3	9.4	9.2
Switzerland	20.9	22.7	22.8	18.3	15.7
United Kingdom	10.2	11.5	13.9	14.9	19.2
Subtotal	**140.6**	**147.6**	**125.8**	**128.3**	**130.8**
North America					
Canada	12.9	12.3	12.3	11.4	11.6
United States	38.3	40.5	39.4	42.1	45.4
Subtotal	**51.2**	**52.8**	**51.7**	**53.5**	**57.0**
Pacific Rim					
Australia	6.6	7.8	8.1	8.5	7.2
Japan	33.5	35.3	40.0	34.6	29.2
New Zealand		0.4	0.4	0.5	0.7
Subtotal	**40.0**	**43.5**	**48.5**	**43.5**	**37.1**
Developing and transition economies					
Bangladesh	0.1	0.1	0.3	0.3	0.2
Brazil	0.5	0.7	0.4	0.4	0.4
China	0.5	0.5	0.7	1.0	0.9
Colombia	2.6	2.5	2.7	2.3	2.5
Côte d'Ivoire	0.2	0.1	0.1	0.1	0.1
Egypt, Arab Republic of	1.1	1.4	1.4	1.4	1.3
India	0.8	0.8	0.7	0.8	0.8
Indonesia	0.5	0.1	0.4	0.2	0.3
Iran, Islamic Republic of	1.5	2.0	1.8	1.7	1.7
Kenya		0.5	0.4	0.1	0.3
Korea, Republic of	0.6	0.9	0.8	0.9	1.1
Mexico	0.5	0.6	1.7	1.8	1.3
Nigeria	0.1	1.0	1.6	1.0	0.0
Pakistan	0.5	0.2	0.0	0.2	0.6
Peru		0.4	0.3	0.2	0.6
Philippines	0.4	0.7	0.3	0.4	0.2
Russian Federation					0.0
Saudi Arabia					0.0
South Africa	0.5	0.6	0.5	0.6	0.5
Syria			0.5		0.5
Thailand	0.5	0.3	0.1	0.1	0.1
Uganda				0.3	0.3
Subtotal	**10.8**	**13.4**	**14.7**	**13.7**	**13.6**
Foundations					
Ford Foundation	3.2	3.1	2.6	2.6	2.7
Kellogg Foundation	0.3	0.3	0.1	0.0	0.2
Rockefeller Foundation	2.1	3.4	3.5	4.0	6.3
Subtotal	**5.6**	**6.8**	**6.2**	**6.6**	**9.2**
International and regional organizations					
ADB	1.8	3.8	4.4	6.0	6.9
AFDB	1.0	0.8	2.3	1.2	0.3
Arab Fund	1.0	1.5	1.9	1.7	1.6
FAO	0.3	0.6	0.2	0.2	0.4
IDB	4.5	2.1	1.5	1.4	0.5
IDRC	2.4	2.4	3.0	2.3	2.5
IFAD	3.1	4.0	6.9	5.8	6.6
Opec Fund	0.2	0.2	0.2	0.2	0.4
UNDP	4.5	3.2	2.1	1.8	1.6
UNEP	0.2	0.1	0.2	0.7	0.7
World Bank	45.0	45.0	45.0	45.0	45.0
Subtotal	**64.0**	**63.7**	**67.7**	**66.3**	**66.5**
Other Donors	8.1	11.9	15.0	19.2	23.1
Total	**320**	**340**	**330**	**331**	**337**

Figure 1 Contributions to CGIAR
Millions of US dollars



$4 million in 2000 to $6.3 million in 2001. Contributions from nonmember foundations were stable at $5 million.

Contributions from European Members increased by $2.5 million, or 2 percent. In particular, higher contributions were received from the United Kingdom ($19 million), Germany ($12 million), and Norway ($8.3 million). Stable contributions from most other European Members, including the European Commission, more than offset modest exchange-related declines in other cases.

Contributions from Pacific Rim Members declined from $43.5 million in 2000 to $37.1 million in 2001, largely as a result of Japan decreasing its contribution by $5.4 million, or 8 percent. Half of that decrease reflects an actual reduction in the contribution and the other half resulted from exchange losses. Contributions by Australia and New Zealand remained stable at the 2000 level.

The 21 developing countries that are Members of the CGIAR maintained their support at $13.6 million—the same level as in 2000—providing approximately 4 percent of the total. Colombia maintained its position as the largest contributor among the developing countries. Support from international institutions was stable at $66.5 million, representing 18 percent of total contributions.

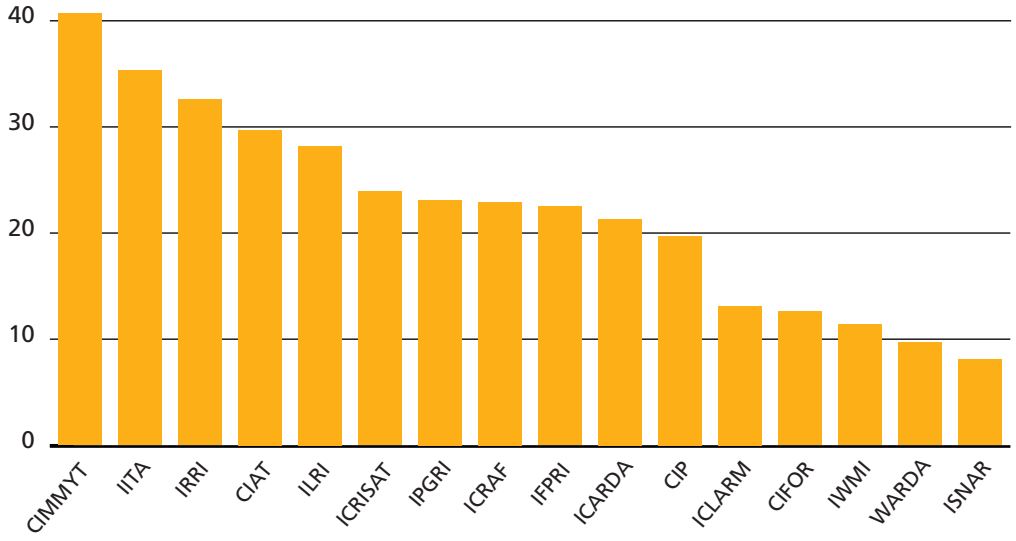
Disbursements

There was a slight improvement in the disbursements picture in 2001 when only 12 percent of funds remained outstanding at the end of the year, compared with 18 percent at the end of 2000. When compared with the normative schedule, however, the pace of disbursement continues to present a challenge to the Centers' cash flow, a situation that could become more difficult as targeted funding increases as a percentage of total funding.

Resource Allocation

In overall terms, expenditures in 2001 amounted to $355 million, 4 percent higher than those in 2000. Resource allocation at the Center level is governed largely through research projects established in the context of CGIAR activities. These allocations are summarized at the system level by Center and by object of expenditure, and are illustrated by activity and developing region.

Figure 2 Expenditures by Center
Millions of US dollars



Distribution of Expenditures among Centers: Figure 2 shows the distribution of expenditures by CGIAR Centers in 2001. The distribution remained broadly in line with expenditures by Center in 2000.

Expenditures by Object: The trend toward reduced personnel spending continued in 2001. Personnel costs amounted to 49 percent of the total costs in 2001, compared with an average of 55 percent in the mid-1990s. The total number of staff continued to decline as well: there were 8,485 in 2001 compared with 8,638 in 2000. Approximately 958 staff members were recruited internationally, a number essentially unchanged from 2000. A significant reduction in internationally recruited staff (IRS) by several Centers was offset by a similar increase at IWMI, which almost doubled its IRS complement from 26 to 49. Expenditures by object are indicated in figure 3.

Allocations by Activity: Amounts allocated in 2001 to the five principal CGIAR activities—increasing productivity, protecting the environment, saving biodiversity, improving policies, and strengthening national agricultural research systems—are shown in figure 4. These allocations are broadly congruent with those of the last several years.

Figure 3 Expenditures by Object

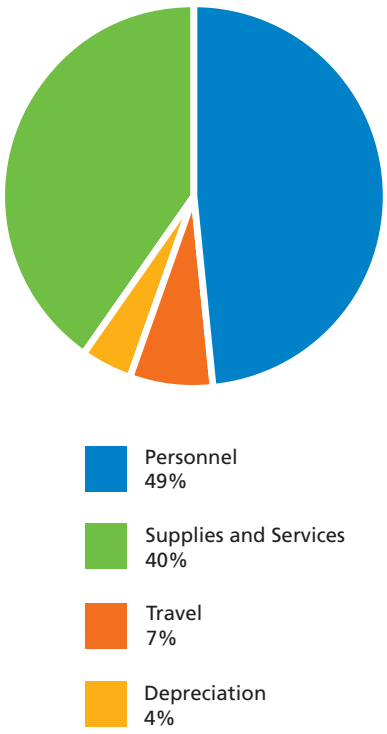


Figure 4 Allocations by Principal Activity

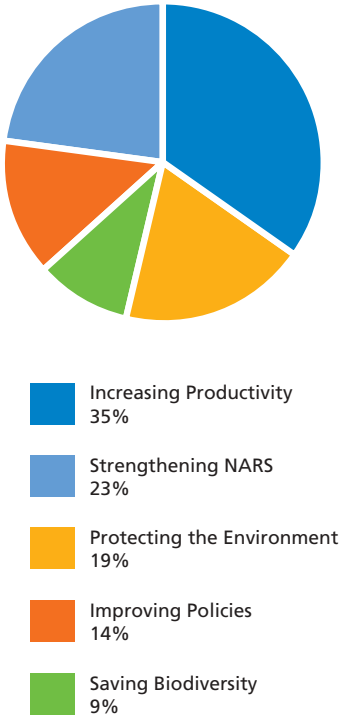
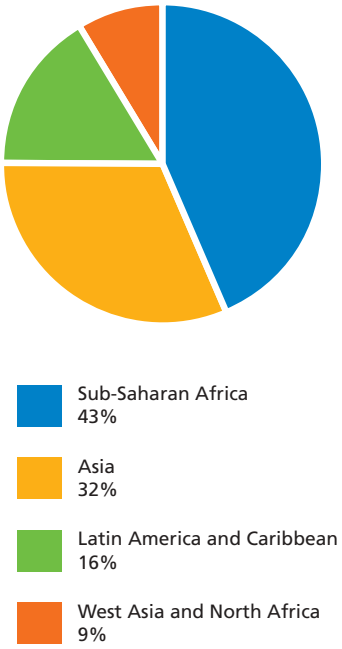


Figure 5 Allocations by Developing Region



Allocations by Region: Allocations by region are shown in figure 5. The CGIAR's investment in Sub-Saharan Africa increased from 42 percent in 2000 to 43 percent of total investment in 2001. Investment in Asia remained at 32 percent. Allocations targeted to Latin America and the Caribbean decreased from 17 percent to 16 percent. Investment in West Asia and North Africa remained at 9 percent of the total amount allocated.

Center Perspectives

The stability noted at the system level reflects a range of outcomes at the individual Centers. Funding for eight Centers was within 4 percent (plus or minus) of funding levels in 2000. Three Centers were funded at 6 percent or higher levels, and funding for the remaining five Centers contracted by approximately 7 percent.

Following a continuing decline in unrestricted support, unrestricted funding levels ranged from 31 percent to 45 percent at most Centers, and averaged 42 percent (compared with approximately 50 percent in recent years). As a consequence, during 2001 Centers initiated precautionary cost reduction measures, such as expenditure curtailment and staff separations. These measures, which are continuing in 2002, are somewhat concentrated at Centers with large field operations (for example, ICRISAT, IITA, ILRI, IRRI, CIP, and CIMMYT). These circumstances led to deficit spending at eight Centers, with deficits ranging from $0.5 million to $2 million.

Conclusion

The 2001 results confirm the continued stability of CGIAR finances in the aggregate. As in the last several years, however, there is wide variability in financial performance among the 16 Centers, and that suggests a need for continued vigilance at the Center level. Furthermore, Members need to address the system-level issue of slow disbursements.

Compliance with Financial Guidelines

The Centers are independent institutions governed by their respective boards of trustees. In the interest of transparency and consistency in financial practices and the presentation of financial information, the Centers

follow financial guidelines issued by the CGIAR Secretariat. In the following finance-related areas, these guidelines seek to promote "best practices" in the CGIAR: financial management, accounting, budgeting, internal audit, and procurement. Developed with the input of Center finance personnel, external financial experts, and Secretariat staff, the guidelines are amended as required to reflect changing practices and to ensure that the CGIAR's practices are in conformity with those generally accepted worldwide. Guidelines covering accounting policies and the preparation of externally audited annual financial statements are particularly relevant in this regard. The most recent update of these guidelines took effect in 1999 and brought CGIAR practices up-to-date with the current practices of not-for-profit organizations.

As part of the annual review of the substantive financial performance, PricewaterhouseCoopers (PwC) is reviewing the externally audited 2001 Center financial statements to ensure compliance with CGIAR policy and reporting guidelines. PwC will verify Center compliance with existing policy and reporting guidelines and ensure that any departures have resulted in no material misstatement of the financial information.

The CGIAR's financial goals in 2001 were to attract sufficient resources to enable it to implement its approved work program for the year and to maintain its strong financial position.

Endnotes

1. This report does not include a discussion of the World Bank's support allocated to the CGIAR Secretariat and the Technical Advisory Committee/Interim Science Council Secretariat. In 2001 this support amounted to $5 million.
2. For presentation purposes, these 58 Members are divided into four distinct groups: industrialized countries (21), developing countries (22), foundations (3), and international and regional organizations (12). Industrialized countries can be further divided along geographical lines into three subgroups: Europe, North America, and the Pacific Rim.

Who's Who in the CGIAR in 2001

CGIAR Members

COUNTRY	KEY REPRESENTATIVE	KEY COOPERATING INSTITUTION
Australia	Robert J. Clements	Australian Center for International Agricultural Research
Austria	Walter Rill	Federal Ministry of Finance
Bangladesh	Zahurul Karim	Ministry of Agriculture
Belgium	Luc Sas	Ministry of Foreign Affairs
Brazil	Alberto Duque Portugal	Ministry of Agriculture and Food Supply, Embrapa
Canada	Iain C. MacGillivray	Canadian International Development Agency
China	Longyue Zhao	Ministry of Agriculture
Colombia	Luis Arango-Nieto	Ministry of Agriculture and Rural Development
Côte d'Ivoire	Kassoum Traore	Ministry of Agriculture and Animal Resources
Denmark	Klaus Winkel	Ministry of Foreign Affairs, DANIDA
Arab Republic of Egypt	Youssuf Amin Wally	Ministry of Agriculture and Land Reclamation
Finland	Anna-Liisa Korhonen	Ministry of Foreign Affairs
France	Gilles Saint-Martin	Ministry of Foreign Affairs
Germany	Hans-Jochen de Haas	Federal Ministry of Economic Cooperation and Development
India	Panjab Singh	Ministry of Agriculture, ICAR
Indonesia	Abdul Fattah	Ministry of Agriculture and Forestry
Islamic Republic of Iran	Behzad Ghareyazie	Ministry of Agriculture
Ireland	Brendan Rogers	Department of Foreign Affairs
Italy	Gioacchino Carabba	Ministry of Foreign Affairs
Japan	Toshinori Mitsunaga	Ministry of Foreign Affairs
Kenya	Wilfred Mwangi	Ministry of Agriculture and Rural Development
Republic of Korea	Kyung-Han Ryu	Ministry of Agriculture
Luxembourg	Georges Heinen	Ministry of Finance
Mexico	Jorge Kondo-Lopez	Ministry of Agriculture
Netherlands	Adrian Koekoek	Ministry of Foreign Affairs
New Zealand	Keneti Faulalo	Ministry of Foreign Affairs and Trade
Nigeria	Olatunde Oloko	Ministry of Agriculture and Natural Resources
Norway	Aslak Brun	Ministry of Foreign Affairs
Pakistan	Zafar Altaf	Ministry of Food, Agriculture, and Livestock
Peru	Ricardo Sevilla Panizo	Ministry of Agriculture
Philippines	Eliseo R. Ponce	Department of Agriculture
Portugal	Armando Trigo Abreu	Ministry of Finance
Romania	Ilie Sarbu	Ministry of Agriculture and Food
Russian Federation	Vicktor Dragavtsev	Russian Academy of Agricultural Sciences
South Africa	Bongiwe Njobe	Ministry of Agriculture and Land Affairs
Spain	Adolfo Cazorla	Ministry of Agriculture
Sweden	Eva Ohlsson	Ministry of Foreign Affairs, SIDA

COUNTRY	KEY REPRESENTATIVE	KEY COOPERATING INSTITUTION
Switzerland	Dora Rapold	Swiss Agency for Development and Cooperation
Syrian Arab Republic	Issam El-Zaim	Ministry of Agriculture and Agricultural Reform
Thailand	Somsak Singholka	Department of Agriculture
Uganda	Joseph Mukiibi	Ministry of Agriculture, Animal Industry, and Fisheries
United Kingdom	Andrew J. Bennett	Department for International Development
United States of America	Emmy M. Simmons	United States Agency for International Development

FOUNDATION	REPRESENTATIVE
Ford Foundation	Michael E. Conroy
Kellogg Foundation	Rick Foster
Rockefeller Foundation	Robert W. Herdt

INTERNATIONAL AND REGIONAL ORGANIZATION	REPRESENTATIVE
African Development Bank	Akililu A. Afework
Arab Fund for Economic and Social Development	Mervat Wehba Badawi
Asian Development Bank	Joseph B. Eichenberger
Commission of the European Community	Uwe Werblow
Food and Agriculture Organization of the United Nations	Jacques P. Eckebil
Inter-American Development Bank	Ruben Echeverria
International Development Research Centre	Peter Cooper
International Fund for Agricultural Development	Rodney Cooke
OPEC Fund for International Development	Y. Seyyid Abdulai
United Nations Development Programme	Alvaro Umaña
United Nations Environment Programme	Shafqat Kakakhel
World Bank	Robert L. Thompson

CGIAR REGIONAL REPRESENTATIVES	
Africa	Seyfu Ketema (Ethiopia)
Asia	S.D.G. Jayawardene (Sri Lanka)
Pacific	Samison Ulitu (Fiji)
Europe	Ervin Balazs (Hungary)
LAC	Compton Lawrence Paul (Dominica)
MENA	Osman A. A. Ageeb (Sudan)

The CGIAR

CGIAR Chairman: Ian Johnson, Vice President,
Environmentally and Socially Sustainable Development,
The World Bank
CGIAR Director: Francisco J. B. Reifschneider
CGIAR Executive Secretary: Alexander von der Osten
(until January 31, 2001)
Cosponsors and Their Representatives:
Food and Agriculture Organization of the United Nations, Jacques P. Eckebil
International Fund for Agricultural Development, Rodney Cooke
United Nations Development Programme, Alvaro Umaña
The World Bank, Robert L. Thompson

Executive Council (from October 2001)

Chairman: Ian Johnson
Cosponsors:
Jacques P. Eckebil, FAO
Robert L. Thompson, World Bank
Rodney Cooke, IFAD

CDC: Meryl Williams
CBC: John Vercoe
TAC/iSC: Emil Javier
GFAR: Rajendra Paroda

OECD/DAC
Americas: Jonathan Conly (United States)
Asia-Pacific: Toshinori Mitsunaga (Japan)
Europe: Gilles Saint-Martin (France), Ruth Haug (Norway), Klaus Winkel (Denmark)

Developing Countries
Americas: Alberto Duque Portugal (Brazil)
Sub-Saharan Africa: Bongiwe Njobe (South Africa)
Asia-Pacific: Longyue Zhao (China)
CWANA: Issam El-Zaim (Syria)

Regional Fora: Mustafa Yaghi (AARINENA)

Foundations: Robert W. Herdt (The Rockefeller Foundation)

Civil Society:
Ann Waters-Bayer, NGOC
Sam Dryden, PSC

Executive Secretary:
Francisco J. B. Reifschneider

Interim Executive Council (from May to October 2001)

Chairman: Ian Johnson
CGIAR Director:
Francisco J. B. Reifschneider
Cosponsors:
Jacques P. Eckebil (FAO)
Frank Pinto (UNDP)
Robert L Thompson (World Bank)
Membership:
Guda Abdullah (Nigeria) (deceased)
Luis Arango-Nieto (Colombia)
Andrew J. Bennett (United Kingdom)
Ian Bevege (Australia)
Rodney Cooke (IFAD)
Christine E. Grieder (Switzerland)
Hans-Jochen de Haas (Germany)
Ruth Haug (Norway)
Iain C. MacGillivray (Canada)
Toshinori Mitsunaga (Japan)
Bongiwe Njobe (South Africa)
Alberto Duque Portugal (Brazil)
Gilles Saint-Martin (France)
Emmy M. Simmons (United States)
Robert L. Thompson (World Bank)
Carl-Gustaf Thornström (Sweden)
Longyue Zhao (China)
CBC Chair: Kurt Peters (ICLARM)
CDC Chair: Hank Fitzhugh (ILRI)
TAC Chair: Emil Javier
NGOC Chair: Ann Waters-Bayer
PSC Chair: Sam Dryden
GFAR Chair: Rajendra Paroda
Secretary: Selçuk Õzgediz

Advisory Committees

Technical Advisory Committee
(TAC was phased out on December 31, 2001, and was replaced by an Interim Science Council in early 2002)
Emil Q. Javier, *Chair*
Shellemiah O. Keya, *Executive Secretary*
Michael Cernea
Elias Fereres

Hans Gregersen *(ex-officio)*
Richard R. Harwood
Alain de Janvry
Maria Antonia Fernandez Martinez
Oumar Niangado
Hirofumi Uchimiya
Lucia de Vaccaro
Joachim F. von Braun
Vo-Tong Xuan
Usha Barwale Zehr

TAC Standing Panel on Impact Assessment (SPIA)
Hans Gregersen, *Chair*
Ruben Echeverria
Christina David
(until February 2001)
Frans L. Leeuw
(until February 2001)
Hermann Waibel

Genetic Resources Policy Committee
M. S. Swaminathan, Chair
Robert Bertram
Ronald P. Cantrell
José T. Esquinas-Alcazar
Carmen Felipe-Morales
(left in 2001)
Christine E. Grieder
Geoffrey C. Hawtin
Bernard Le Buanec
Marcio de Miranda Santos
Godwin Y. Mkamanga
Timothy Reeves
Renato Salazar
Carl-Gustaf Thornström

Partnership Committees

NGO Committee
Ann Waters-Bayer, *Cochair*
Monica Kapiriri, *Cochair*
Christian Castellanet *(left in 2001)*
Julian Francis Gonsalves
Assétou Kanouté
Dwi R. Muhtaman *(left in 2001)*
Mutizwa Mukute
Patrick Mulvany
Antonio Quizon
Peter Rosset
Juan Sanchez
Jean Marc von der Weid
(left in 2001)

Private Sector Committee
R. N. Sam Dryden, *Chair*
Claudio Barriga
Badrinarayan R. Barwale
Wallace D. Beversdorf
Robert Horsch
Seizo Sumida
Barry Thomas
Florence Wambugu

Science Partnership Committee
(dissolved in May 2001)
Werner Arber, *Chair*
R. James Cook
Mouïn Hamzé
Lydia Makhubu
Sudha Nair
Satohiko Sasaki
Jose Israel Vargas

Center Committees

Committee of Board Chairs (CBC)
John E. Vercoe, ILRI, *CBC Chair*
Kurt J. Peters, ICLARM
(CBC Chair until November 2001)
Sjarifuddin Baharsjah, IRRI
Klaas Jan Beek, IWMI
Lucie Edwards, ICRAF
Robert D. Havener, ICARDA
Lauritz Broder Holm-Nielsen, CIAT
Lindsay Innes, WARDA
David R. MacKenzie, CIP
Jagmohan S. Maini, CIFOR
Alex McCalla, CIMMYT
(Walter P. Falcon until April 2001)
Moise C. Mensah, ISNAR
Geoff Miller, IFPRI
Marcio de Miranda Santos, IPGRI
Enrico Porceddu, IITA
Martha B. Stone, ICRISAT *(Ragnhild Sohlberg until February 2001)*

Center Directors Committee (CDC)
Meryl Williams, ICLARM,
CDC Chair
Stein W. Bie, ISNAR
Ronald P. Cantrell, IRRI
William D. Dar, ICRISAT
Adel El-Beltagy, ICARDA
Hank Fitzhugh, ILRI
(until December 31, 2001)
Dennis Garrity, ICRAF
(Pedro A. Sánchez until September 30, 2001)
Peter Hartmann, IITA
(Lukas Brader until November 2001)
Geoffrey C. Hawtin, IPGRI
David Kaimowitz , CIFOR
(Jeffrey A. Sayer until March 2001)
Kanayo F. Nwanze, WARDA
Per Pinstrup-Andersen, IFPRI
(CDC Chair until October 2001)
Timothy Reeves, CIMMYT
Frank Rijsberman, IWMI
Joachim Voss, CIAT
Hubert Zandstra, CIP
(CDC Executive Secretary: Jean-Pierre Jacqmotte)

Public Awareness and Resource Mobilization Committee
William Dar, *Chair*
Klaus Leisinger
Iain C. MacGillivray
Alex F. McCalla
Kanayo Nwanze
Ruth Raymond
Timothy Reeves *(left in 2001)*
Francisco J. B. Reifschneider
John Riggan
Ebbe Schioler
Robert L. Thompson

Alexander von der Osten
(left January 31, 2001)
Meryl Williams
Hubert Zandstra
(Chair until October 2001)

Standing Committees (dissolved in May 2001)

CGIAR Oversight Committee
Andrew J. Bennett, Chair,
United Kingdom
Mervat W. El Badawi, Arab Fund
Juan L. Restrepo, Colombia
Gilles Saint-Martin, France
Ruth Haug, Norway
Emmy M. Simmons,
United States of America
Bongiwe Njobe, South Africa
Longyue Zhao, China

CGIAR Finance Committee
Robert L. Thompson, *Chair,*
World Bank
Robert Clements/Ian Bevege,
Australia
Francisco J. B. Reifschneider, Brazil
Bruce Howell, Canada
Hans-Jochen de Haas, Germany
Rodney Cooke/Shantanu Mathur,
IFAD
Umaru Al Kaleri, Nigeria
Hiroaki Isobe/Tetsushi Kondo,
Japan
Carl-Gustaf Thornström, Sweden
Christine E. Grieder, Switzerland

CGIAR 1971–2001

CGIAR Chairs, 1971–2001
Ian Johnson, 2000–
Ismail Serageldin, 1994–2000
V. Rajagopalan, 1991–1993
Wilfried Thalwitz, 1990–1991
W. David Hopper, 1987–1990
S. Shahid Hussain, 1984–1987
Warren Baum, 1974–1983
Richard H. Demuth, 1971–1974

CGIAR Director, 2001–
Francisco J. B. Reifschneider, 2001–

CGIAR Executive Secretaries, 1972–2001
Alexander von der Osten, 1989–2001
Curtis Farrar, 1982–1989
Michael Lejeune, 1975–1982
Harold Graves, 1972–1975

TAC Chairs, 1971–2001
Emil Q. Javier, 2000–
Donald Winkelmann, 1994–1999
Alex McCalla, 1988–1994
Guy Camus, 1982–1987
Ralph Cummings, 1977–1982
Sir John Crawford, 1971–1976

TAC Executive Secretaries, 1971–2001
Shellemiah Keya, 1996–
Guido Gryseels, 1995–1996
John Monyo, 1985–1994
Alexander von der Osten, 1982–1985
Philippe Mahler, 1976–1982
Peter Oram, 1971–1976

Acronyms and Abbreviations

ADB	Asian Development Bank
AFDB	African Development Bank
CBC	Committee of Board Chairs
CBSS	community-based seed systems
CDC	Center Directors Committee
CIAT	International Center for Tropical Agriculture (Centro Internacional de Agricultura Tropical)
CIFOR	Center for International Forestry Research
CIMMYT	International Maize and Wheat Improvement Center
CIP	International Potato Center (Centro Internacional de la Papa)
COGENT	International Coconut Genetic Resources Network
CWANA	Central and West Asia and North Africa
DAC	Development Assistance Committee (of the OECD)
FAO	Food and Agriculture Organization of the United Nations
FFE	Food for Education
GFAR	Global Forum on Agricultural Research
GMO	genetically modified organism
GMP	Global Mountain Program
IBS	ISNAR Biotechnology Service
ICAR	Indian Council of Agricultural Research
ICARDA	International Center for Agricultural Research in the Dry Areas
ICLARM	World Fish Center
ICRAF	World Agroforestry Center
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ICRW	International Center for Women
IDB	Inter-American Development Bank
IDRC	International Development Research Centre
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
IMWI	International Water Management Institute
INIBAP	International Network for the Improvement of Banana and Plantain
IPGRI	International Plant Genetic Resources Institute
IPM	integrated pest management
IRM	integrated rice management
IRRI	International Rice Research Institute
IRS	internationally recruited staff
iSC	Interim Science Council
ISNAR	International Service for National Agricultural Research
NARS	national agricultural research systems
NERICA	New Rices for Africa
NGO	nongovernmental organization
NGOC	NGO Committee
OECD/DAC	Organisation for Economic Co-operation and Development/Development Assistance Committee
PLAR	Participatory Learning and Action Research
PRIGA	Participatory Rice Improvement and Gender/User Analysis
PROGRESA	Programa de Educación, Salud, y Alimentación
PSC	Private Sector Committee
PVS	participatory varietal selection
PwC	PricewaterhouseCoopers
OECD	Organisation for Economic Co-operation and Development
OPEC	Organization of Petroleum-Exporting Countries
QPM	quality protein maize
RCW	Rice-Wheat Consortium for the Indo-Gangetic Plains
SDP	Smallholder Dairy Project
SIMA	Systemwide Initiative on Malaria and Agriculture
SIUPA	Strategic Initiative on Urban and Peri-urban Agriculture
SPIA	Standing Panel on Impact Assessment
SWMNET	Soil Water Management Network
TAC	Technical Advisory Committee
USAID	United States Agency for International Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
VITAA	Vitamin A for Africa
WARDA	West Africa Rice Development Association

CGIAR Secretariat
The World Bank
1818 H Street, NW
Washington, DC 20433
USA

Telephone ■ 1 202 473 8951
Fax ■ 1 202 473 8110
Email ■ cgiar@cgiar.org or cgiar@worldbank.org

Consultative Group on International Agricultural Research

www.cgiar.org

Printed on environmentally friendly paper