

An aerial photograph of a mountainous region. The foreground shows terraced agricultural fields with various shades of green and brown, indicating different crops or stages of growth. The middle ground features a valley with more fields and some small structures. The background consists of large, rugged mountains under a clear sky. A semi-transparent orange banner is overlaid across the middle of the image, containing the text "CGIAR Alliance at a Glance".

# 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

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.



Ian Johnson visits CIMMYT

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

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



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

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-impooverished 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-impooverished 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

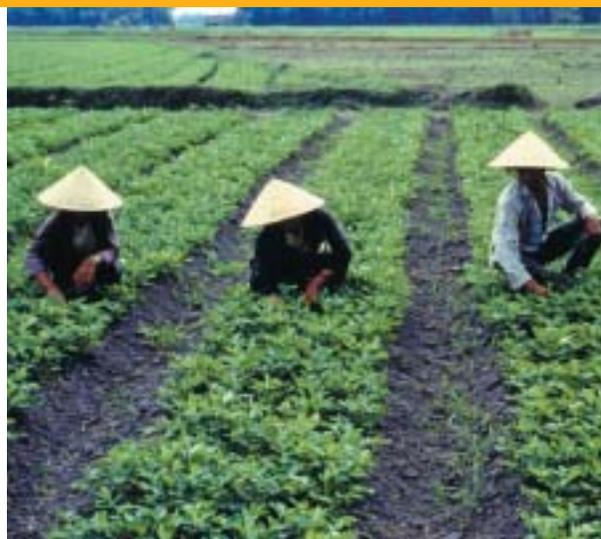
The Philippines' partnership with the CGIAR has a history that dates back to the establishment of IRRI in 1960. The Philippines formally joined the CGIAR alliance in 1980. We look at the added value of this membership in helping us address our national objectives of achieving a food-secure Philippines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

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.