



A Partnership for Research and Development Brazil and the CGIAR



Brazil and the CGIAR

Together on the Frontiers of Tropical Agriculture

Brazil and the Consultative Group on International Agricultural Research (CGIAR) have built a strong and fruitful partnership over the last three decades, resting on a solid platform of cooperation and commitment to mobilizing science for development.

Brazil formally joined the CGIAR in 1984 but had begun working with the international agricultural research Centers supported by the Group in the early 1970s. This mainly involved training for Brazilian researchers, their participation in CGIAR meetings and exchange and testing of crop germ-plasm. Over the years Brazil has come to be a key partner of the CGIAR, collaborating with many of the CGIAR Centers, influencing its policies and directions and projecting the country's own scientific strengths internationally.

Brazil supports the CGIAR and its Centers through the Empresa Brasileira de Pesquisa Agropecuária (Embrapa), whose strong and extensive network of research centers is actively engaged in collaborative research with the CGIAR Centers. In recognition of this important relationship, Embrapa

hosted the CGIAR's 1998 Mid-Term Meeting. Currently, seven CGIAR Centers maintain research activities in Brazil, and eleven collaborate closely with Embrapa.

Embrapa is linked to the Brazilian Ministry of Agriculture, Livestock and Food Supply. It coordinates the country's national agricultural research system, which includes most public and private entities involved in agricultural research in Brazil. Embrapa's main goal, which coincides with the objec-

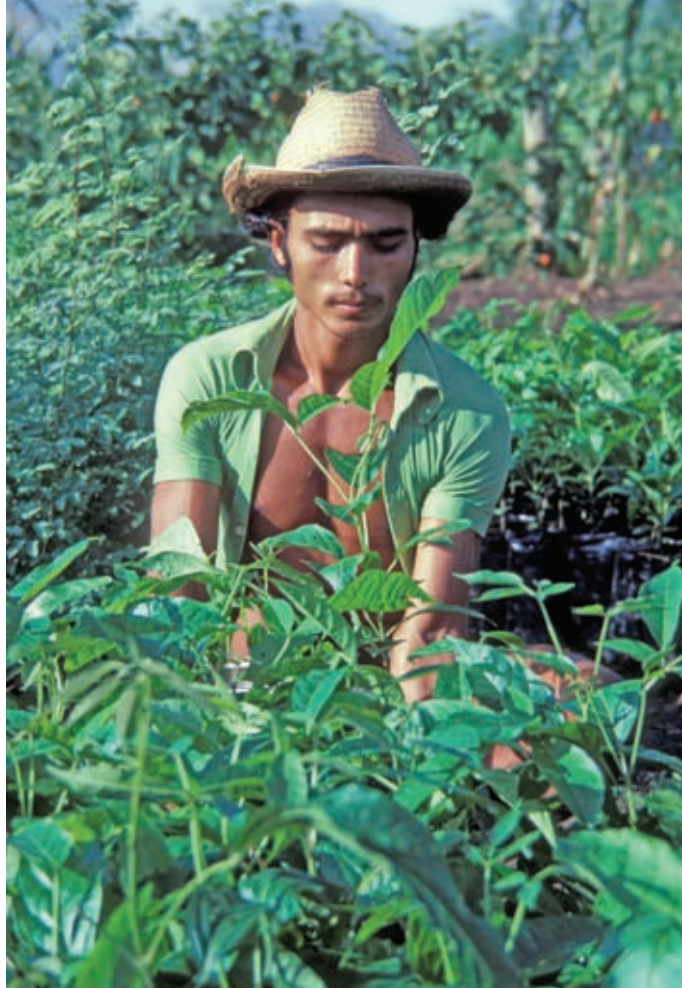
tives of the CGIAR, is to provide "feasible solutions for the sustainable development of Brazilian agribusiness through knowledge and technology generation and transfer." Embrapa places particularly strong emphasis on international cooperation as a means of gleaning technical and scientific knowledge from around the world and sharing its own knowledge and technology with other countries facing challenges similar to those of Brazil.

A snapshot of the Brazil-CGIAR partnership in 2006 shows two Brazilian nationals serving as members of the Boards of Trustees of two of the CGIAR Centers. Two others have chaired Center Boards, one at the Center for International Forestry Research (CIFOR) and the other at the International Plant Genetic Resources Institute (IPGRI). In addition, the Director of the CGIAR is a Brazilian national.



Following are a few examples of collaborative research which illustrate the value of the Brazil-CGIAR partnership in mobilizing knowledge to reduce hunger, poverty and environmental degradation.

- **Soils research in the Cerrados.** In less than 30 years, the Brazilian Cerrados—a tropical savanna region of about 204 million hectares—have become the country’s most dynamic agricultural frontier. But the benefits of expansion are accompanied by environmental perils, such as soil erosion, overuse of agrochemicals, loss of biodiversity, and degradation of pastures. In recent years, Embrapa and CGIAR scientists have developed new technologies that make it possible to intensify agricultural production while conserving soil and water. The new alternatives integrate grass-legume pastures with crops, increasing livestock production by as much as half, while improving soil fertility and reducing erosion. Surveys show that grain producers are eagerly accepting the new system. (www.ciat.cgiar.org)
- **Adding value to cassava.** Cassava provides food and a livelihood for about 500 million people in the tropics. Because of its tolerance to drought, low soil fertility and other stresses, the crop has proved fundamental to food security in many parts of the tropics, especially Africa. Nonetheless, limited genetic variation in key root traits has made it difficult to develop alternative uses for cassava and thus offer producers new market opportunities, specifically in the feed and starch industries. To overcome this limitation, Brazilian scientists have been working since 2004 with colleagues at the International Center for Tropical Agriculture (CIAT) to introduce inbreeding in cassava, making it possible to design outstanding hybrids that possess high-value traits of interest to industrial cassava users. The feed industry, for example, seeks clones with increased nutritional value, while for the starch industry, novel starch types are relevant. (www.ciat.cgiar.org)
- **Longstanding collaboration in maize and wheat research.** Brazil and the International Maize and Wheat Improvement Center (CIMMYT) have worked together for decades in maize and wheat breeding, agronomy research, biotechnology, and capacity building. In the latter, hundreds of Brazilian researchers have benefited from participation in CIMMYT training courses or as visiting scientists at the Center. During 1994–2000, CIMMYT helped Embrapa to organize five crop management research training courses that drew more than 50 participants from Latin America, the Caribbean, and Portuguese-speaking nations of Africa. Cultivars generated through Brazil’s use of CIMMYT semidwarf wheats to develop acid soil-tolerant varieties cover more than half the country’s wheat area. In the mid-1980s, Embrapa scientists introduced 23 populations of quality protein maize (QPM) from CIMMYT into their breeding programs, and the country’s leading varieties of QPM are derived from those sources. (www.cimmyt.org)



- **Common bean.** Brazil is the world's largest consumer of beans and is also one of its major bean producers. The crop provides an important source of protein in the diets of Brazilian consumers. But it is also susceptible to diseases, low-fertility soils and drought, placing at risk the food security of people who depend on the common bean. Brazilian scientists, in partnership with CIAT, are working to increase bean productivity. Improved varieties with multiple disease resistance have reduced crop losses and lowered production costs, helping provide a steady supply of beans at lower prices. Improved varieties have also had positive environmental impacts, mainly by reducing the need for pesticides. Brazilian scientists, as partners with the CGIAR Centers in the HarvestPlus Challenge Program, are helping improve the micronutrient content of beans. This will reduce iron deficiency anemia, which is prevalent in northeast Brazil. (www.ciat.cgiar.org)
- **Seeking alternatives to slash-and-burn agriculture.** The Amazon Basin—which encompasses about 7.5 million square kilometers and accounts for more than 40 percent of the South American continent—contains the world's largest remaining tracts of tropical rainforest. Under pressure from agriculture, cattle ranching and logging, the region also suffers greater absolute annual loss of tropical forests than any other place in the world. In support of efforts to reduce deforestation, the global Alternatives to Slash and Burn (ASB) Program conducts research in the western Amazon, focusing on the causes and consequences of smallholder slash-and-burn agriculture.

Embrapa scientists are incorporating insights derived from this collaboration into Brazil's agricultural research agenda. They are also working with government officials to set national priorities for sustainable agricultural development and collaborating with Brazil's Ministry of Forestry in the design of a new Forest Code, which has far-reaching implications for land use policies in the country.

(www.asb.cgiar.org,
www.cifor.cgiar.org and
www.worldagroforestry.org)

- **Plant genetic resources education in Africa and Brazil.** IPGRI and the

Federal University of Santa Catarina in Florianopolis established a partnership in 2003 to strengthen research, education and professional development in the field of plant genetic resources. One of their shared strategies is to support genetic resources programs in Lusophone countries of Africa. For this purpose they have created a new scholarship program called "Linking Africa and Brazil in plant genetic resources education," which is open to professionals working in Angola, Cape Verde, Guinea Bissau, Mozambique, São Tomé and Príncipe. The first scholarship was awarded in 2005 to a scientist with the Angolan Plant Genetic Resources Center, who is characterizing varieties of cowpea. (www.ipgri.cgiar.org)



Together, Brazil and the CGIAR are unlocking the power of genetic resources, building new knowledge on crop and land management and translating scientific gains into practical measures. By pushing forward the frontiers of technological, institutional and policy innovation, they are better enabling rural people across the developing world to transform their livelihoods on the dynamic frontiers of tropical agriculture.





***Nourishing the
Future through
Scientific
Excellence***

The Consultative Group on International Agricultural Research

The Consultative Group on International Agricultural Research (CGIAR) is a strategic alliance of countries, international and regional organizations, and private foundations supporting 15 international agricultural research Centers that work with national agricultural research systems, civil society organizations and the private sector. The alliance mobilizes agricultural science to reduce poverty, foster human well-being, promote agricultural growth, and protect the environment. The CGIAR generates global public goods that are available to all.

Agriculture, the key to development

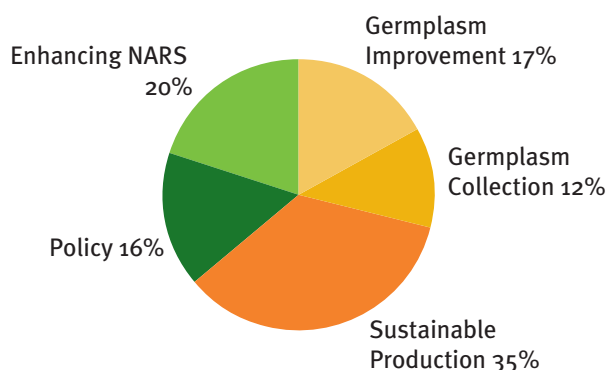
In a world where 75 percent of poor people depend on agriculture to survive, poverty cannot be reduced without investment in agriculture. Many countries with strong agricultural sectors have a record of sustained investments in agricultural science and technology. The evidence is clear—investment in agricultural research for development generates growth, reduces poverty and protects the environment.

Agricultural research benefits people and the planet

Agricultural research for development has a record of delivering results. The science that made possible the Green Revolution of the 1960s and 1970s was largely the work of CGIAR Centers and their national agricultural research partners. The scientists' work not only increased incomes for small farmers, it enabled the preservation of millions of hectares of forest and grasslands, conserving biodiversity and reducing carbon releases into the atmosphere. CGIAR's research agenda is dynamic, flexible, and responsive to emerging development challenges. The research portfolio has evolved from the original focus on increasing productivity in individual critical food crops. Today's approach recognizes that biodiversity and environment research are also key components in the drive to enhance sustainable agricultural productivity. Our belief in the fundamentals remains as strong as ever: agricultural growth and increased farm productivity in developing countries creates wealth, reduces poverty and hunger and protects the environment (see graphic, CGIAR's Evolving Research Agenda, page 6).



CGIAR Priority Investments 2004



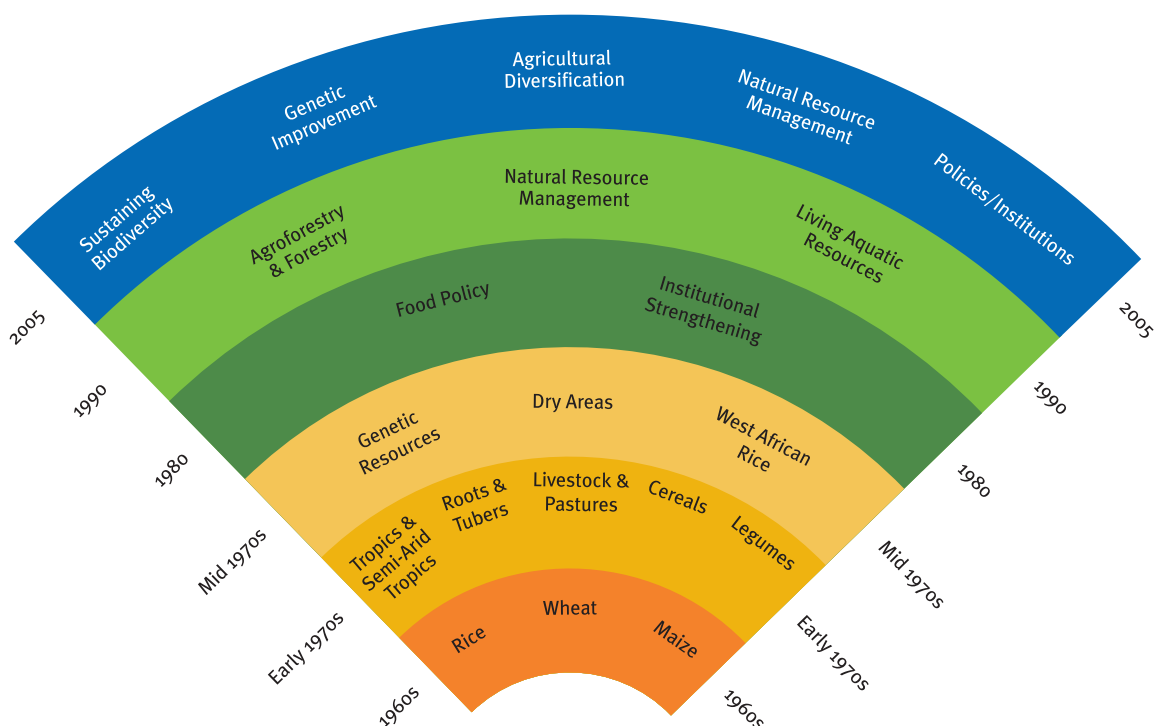
Agricultural research is delivering results

The CGIAR's more recent outstanding achievements include:

- Releasing Quality Protein Maize (QPM) varieties in 25 countries. QPM are currently grown on more than 650,000 hectares
- Transforming agriculture in East and West Africa through the release of New Rices for Africa (NERICAs). It is estimated that NERICAs are planted on 130,000 hectares across Africa, including approximately 60,000 hectares in Guinea and about 10,000 hectares in Uganda
- Selectively breeding a GIFT strain of tilapia which shows an approximate growth rate gain of 70%
- Training over 75,000 developing country scientists and researchers
- Reducing pesticide use in developing countries by promoting integrated pest management and biological control methods
- Adopting low-till farming practices in Asia on 1.2 million hectares across the Indo-Gangetic plains, boosting farm incomes and productivity
- Enabling African producers to access international pigeonpea markets
- Releasing over 45 bean varieties, developed from CGIAR germplasm across Latin America
- Improving forage grasses developed by CGIAR researchers and partners which are currently grown on over 100 million hectares in Latin America
- Planting fodder shrubs in Kenya and increasing smallholder dairy farmers' income by US\$166 per annum



CGIAR's Evolving Research Agenda



These successes notwithstanding, future challenges are daunting. World population is expected to reach 9 billion people by 2050. Food demand is expected to more than double in a similar time frame. Some 30 percent of irrigated lands are already degraded, and water use is expected to increase by 50 percent over the next 30 years. Science-based solutions for sustaining productivity increases while protecting ecosystems are key to addressing these challenges.

Increasing sustainable productivity, strengthening science-for-development partnerships, protecting the environment

The CGIAR was created in 1971. Today more than 8,500 CGIAR scientists and staff are working in over 100 countries. CGIAR research addresses every critical component of the agricultural sector including—agroforestry, biodiversity, food, forage and tree crops, pro-environment farming techniques, fisheries, forestry, livestock, food policies and agricultural research services. Thirteen of the Centers are located in developing countries.

Africa continues to be a priority for CGIAR research. CGIAR research partnerships help achieve the Millennium Development Goals and support major international conventions (Biodiversity, Climate Change, and Desertification).



The CGIAR has five areas of focus

- Sustainable production (of crops, livestock, fisheries, forests and natural resources)
- Enhancing National Agricultural Research Systems NARS (through joint research, policy support, training and knowledge-sharing)
- Germplasm Improvement (for priority crops, livestock, trees and fish)
- Germplasm Collection (collecting, characterizing and conserving genetic resources—the CGIAR holds in public trust one of the world's largest seed collections available to all)
- Policy (fostering research on policies that have a major impact on agriculture, food, health, spread of new technologies and the management and conservation of natural resources)

Forging New Partnerships: CGIAR Challenge Programs in action

Challenge Programs are new high-impact, research for development programs that tackle major global development challenges through expanded partnerships. Four Challenge Programs are being implemented since 2004:

- “Generation” is unlocking crop genetic diversity through the application of comparative biological knowledge in 11 crops. There are 14 partner institutions involved. Program updates for the first year include genotyping a composite germplasm set representing global genetic resources for a first tier of eleven crops; development of a common phenotyping framework of techniques, plant development stages and parameters to enable cross-species comparison; validation and development of pre-existing markers for drought tolerance and the establishment of molecular breeding communities of practice; design of Generation CP information platform system for genetic resources, genomic and crop information systems and internal project workshops. (www.generationcp.org)



- “HarvestPlus” is an international alliance of over 40 institutions breeding crops with improved micronutrient content. Progress during the first phase of the project focused on: exploring the genetic variation for iron, zinc and B-carotene in rice, wheat, maize, cassava, beans and sweetpotato germplasm; applied breeding; testing the stability of micro-nutrient expression; and dissemination of seed of basic breeding materials and advanced lines to collaborators. New initiatives include the feasibility of a HarvestPlus China program, similar to HarvestPlus and to be funded by the Chinese government and other donors. (www.harvestplus.org)

- “Water and Food” is improving water productivity in agriculture in nine river basins (Andean system, Indo-Gangetic, Kharheh, Limpopo river, Mekong river, Nile river, Sao Francisco, Volta, Yellow river). In its first year,

33 research projects led by 18 different institutions involving over 150 partners have been launched with a total investment of \$60 million. A diverse set of activities are underway, including research programs on coastal management in Bangladesh and Vietnam; exploring and evaluating supplemental irrigation techniques in Syria, and improvements in rain water and nutrient use efficiency in Niger. (www.waterandfood.org)

- The Sub-Saharan Africa Challenge Program (SSA CP) developed by a CGIAR partner, the Forum for Agricultural Research in Africa (FARA), is focusing on jumpstarting agricultural development in Sub-Saharan Africa. Fully supported by the CGIAR, this is the first Challenge Program with responsibility for implementation assigned to a partner institution in Africa. The SSA CP

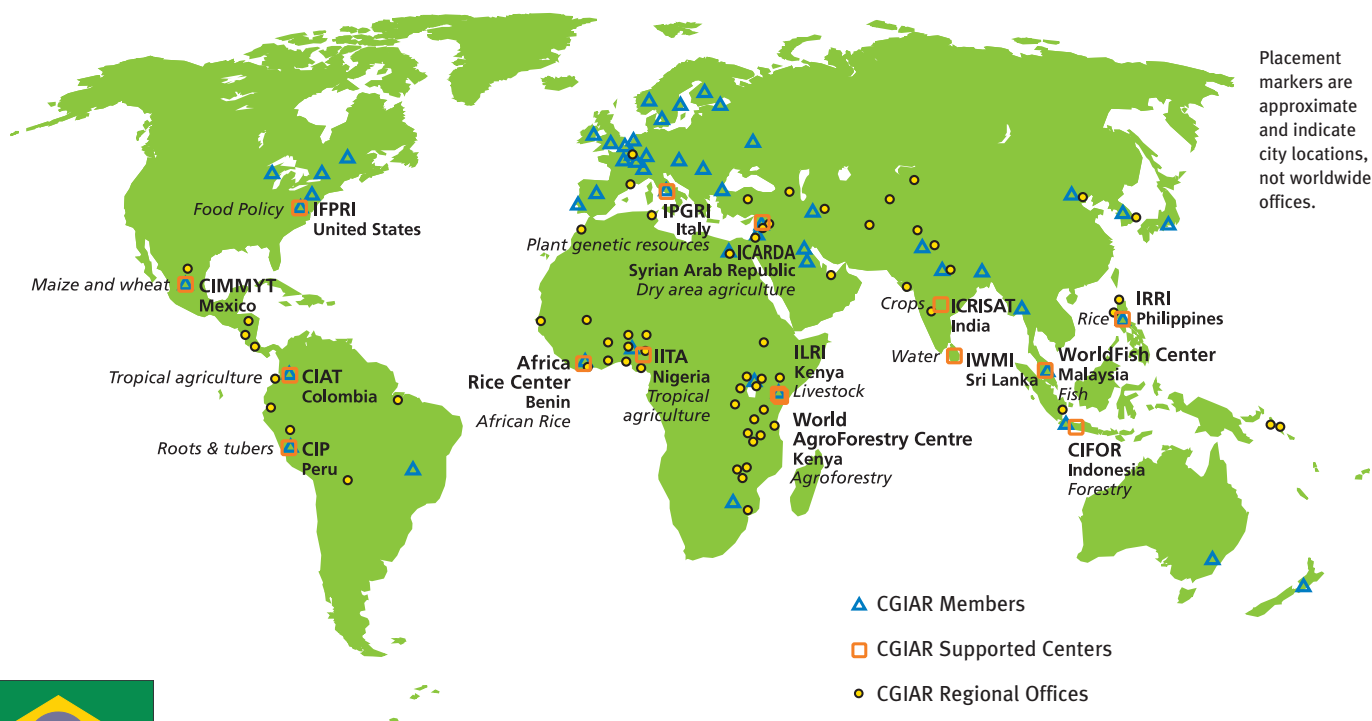
is promoting research that will provide options for smallholders to improve input and output markets for smallholder and pastoral produce, to intensify use of limited resources while maintaining food security and the use of natural resources in a sustainable way. The research will be conducted by Pilot Learning Teams with the communities at different Pilot Learning Sites, which have been already selected through a participatory process. (www.fara-africa.org)

The CGIAR alliance is open to all countries and organizations sharing a commitment to a common research agenda and willing to invest financial support, and human and technical resources. From twelve members in 1971, today's membership of sixty-four includes a majority of developing countries. Membership is poised to grow further.

CGIAR members contributed US\$450 million in 2005, the single-largest public goods investment in mobilizing science for the benefit of poor farming communities worldwide.



A Global CGIAR



Future Harvest Centers of the CGIAR

Africa Rice Center (WARDA)
www.warda.org

International Center for Tropical Agriculture (CIAT)
www.ciat.cgiar.org

Center for International Forestry Research (CIFOR)
www.cifor.cgiar.org

International Maize and Wheat Improvement Center (CIMMYT)
www.cimmyt.org

International Potato Center (CIP)
www.cipotato.org

International Center for Agricultural Research in the Dry Areas (ICARDA)
www.icarda.org

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
www.icrisat.org

International Food Policy Research Institute (IFPRI)
www.ifpri.org

International Institute of Tropical Agriculture (IITA)
www.iita.org

International Livestock Research Institute (ILRI)
www.ilri.org

International Plant Genetic Resources Institute (IPGRI)
www.ipgri.org

International Rice Research Institute (IRRI)
www.irri.org

International Water Management Institute (IWMI)
www.iwmi.cgiar.org

World Agroforestry Centre (ICRAF)
www.worldagroforestry.org

WorldFish Center
www.worldfishcenter.org

Research is a collaborative enterprise

The CGIAR's achievements would not be possible without the support and commitment of the 64 members and many hundreds of partner organizations who together form the growing CGIAR alliance.

CGIAR Members

African Development Bank	Inter-American Development Bank	Portugal
Arab Fund for Economic and Social Development	International Development Research Centre	Rockefeller Foundation
Asian Development Bank	International Fund for Agricultural Development	Romania
Australia	Islamic Republic of Iran	Russian Federation
Austria	Ireland	South Africa
Bangladesh	Israel	Spain
Belgium	Italy	Sweden
Brazil	Japan	Switzerland
Canada	Kellogg Foundation	Syngenta Foundation for Sustainable Agriculture
China	Kenya	Syrian Arab Republic
Colombia	Republic of Korea	Thailand
Commission of the European Community	Luxembourg	Turkey
Côte d'Ivoire	Malaysia	Uganda
Denmark	Mexico	United Kingdom
Arab Republic of Egypt	Morocco	United Nations Development Programme
Finland	Netherlands	United Nations Environment Programme
Food and Agriculture Organization of the United Nations	New Zealand	United States of America
Ford Foundation	Nigeria	World Bank
France	Norway	
Germany	OPEC Fund for International Development	
Gulf Cooperation Council	Pakistan	
India	Peru	
Indonesia	Philippines	





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