

PARTNERSHIP INITIATIVES INFORMATION SHEET

Name of the Partnership/Initiative

A GCIAR Challenge Program: **'Biofortified Crops for Improved Human Nutrition'**

Expected date of initiation: 2003

Expected date of completion: 2013

Partners Involved:

Intergovernmental organizations:

Future Harvest Centers of the CGIAR (Consultative Group on International Agricultural Research), in particular

- CIAT (co-coordinator)
- IFPRI (co-coordinator)
- IRRI
- CIMMYT
- CIAT
- CIP
- IITA
- ICRISAT
- ICARDA

Major groups:

National Agricultural Research & Extension Systems (NARES), for example:

- EMBRAPA, Brasil
- KARI, Kenya
- Bangladesh Rice Research Institute
- Cu Long Delta Rice Research Institute, Vietnam
- Indonesian Institute for Rice Research
- Philippine Rice Research Institute

Advanced Research Institutes in developed countries, in particular

- University of Adelaide, Australia
- Plant, Soil & Nutritional laboratory USDA-ARS, USA
- Nutritional Genomics Team (USA & Germany)

Leading Partner:

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Main objectives of the Partnership/Initiative

Please provide a brief description:

The CGIAR System is itself a non-negotiated partnership formed by aprox 60 countries, international organizations and private foundations. In addition to providing general funds and very specific funds for research directed to food security, poverty eradication and protection of the environment, with an emphasis on the rural areas in developing countries, the members of the CGIAR want to support targeted

large participatory research initiatives: **Challenge Programs**. Challenge programs focus research, knowledge development and capacity building on major challenges to sustainable agriculture, with a clear emphasis on developing countries or countries in transition.

'Biofortified Crops for Improved Human Nutrition':

The goal of the proposed Challenge Program is to improve the health of poor people by breeding staple food crops that are rich in micronutrients, a process referred to here as "biofortification." The Biofortification Challenge Program seeks to bring the full potential of agricultural and nutrition science to bear on the persistent problem of micronutrient malnutrition. Micronutrient malnutrition, primarily the result of diets poor in bioavailable vitamins and minerals, affects more than half of the world's population, especially women and preschool children. The costs of these deficiencies in terms of lives lost, forgone economic growth, and poor quality of life are staggering. To reach the Millennium Development Goal's target of halving the proportion of undernourished people by 2015, new technologies and approaches are needed to help address the problem.

The Biofortification Challenge Program will focus on three micronutrients that are widely recognized by the World Health Organization (WHO) as limiting: iron, zinc, and vitamin A (beta-carotene). Full-time breeding programs are proposed for six staple foods for which feasibility studies have already been completed and which are consumed by the majority of the world's poor in Africa, Asia, and Latin America: rice, wheat, maize, cassava, sweet potatoes, and common beans. Pre-breeding feasibility studies are proposed for eleven additional staples: bananas, barley, cowpeas, groundnuts, lentils, millet, pigeon peas, plantains, potatoes, sorghum, and yams.

Please also provide a brief description of the relationship of the Partnership/Initiative with the objectives of Agenda 21 as well as relevant goals and objectives of the United Nation Millennium Declaration:

This partnership will contribute to both the realization of Agenda 21 and the MDG's. More specifically to the objectives as set out in chapters 6 (Health) and 14 (SARD) of Agenda 21, and to MDG 1 (Poverty), MDG2 (Primary education), MDG4 (Child Mortality), MDG5 (Maternal Health), MSDG6 (HIV/ AIDS, malaria & other diseases) and MDG 7 (Environment).

Expected results:

In the first place the partnership aims to:

- Select and breed nutritionally improved varieties of six major staple food crops with superior agronomic properties that make them attractive to farmers to grow;
- Demonstrate convincingly in the short to medium term the nutritional efficacy of the biofortification strategy;
- Develop efficient, accelerated mechanisms for testing materials on farms, including in areas among the most nutritionally disadvantaged, in order to identify varieties with superior agronomic, socioeconomic, and farmer-acceptable traits;
- Undertake activities to promote the adoption and dissemination of these varieties efficiently and rapidly in selected developing countries in Africa, Asia, and Latin America among the nutritionally disadvantaged; and
- Measure the nutritional and other impacts of these nutritionally improved varieties in community-based studies where these varieties have been adopted.

Complementary objectives are to:

- Initiate prebreeding studies to determine the feasibility of undertaking full-scale breeding programs for an additional eleven food staple crops;
- Understand better how dietary factors determine the bioavailability of micronutrients in malnourished populations in developing countries, especially interactions among micronutrients, anti-nutrients such as phytates, promoter compounds, and physiological status; and

- Inform decisionmakers in developing countries about cost-effective strategies to reduce micronutrient malnutrition through food-based approaches and policies to improve dietary quality among the poor.

Specific targets of the Partnership/Initiative and timeframe for their achievement:

Deliverable	Period 1 (Years 1-4)	Period 2 (Years 5-7)	Period 3 (Years 8-10)
Trends in dietary quality of the poor and factors affecting these trends analyzed; projections of food consumption by the poor undertaken	X	X	
<i>In vitro</i> and animal studies of the bioavailability of Fe, Zn, and beta-carotene in promising plant materials	X		
Bioefficacy studies conducted to determine effects on micronutrient status of human subjects		X	
Nutritional effectiveness studies, including identification of factors affecting adoption, impacts on household resource allocation, and welfare of individuals			X
Plant germplasm screened for high Fe, Zn, and beta-carotene levels	X		
Genotype by environment interactions understood, including effects of cultural practices and processing on micronutrient content	X		
Genetics of high Fe, Zn, and beta-carotene levels determined and breeding programmes started to transfer these traits to other lines	X		
Farmer participatory breeding initiated		X	
High-yielding, conventionally bred, micronutrient-dense lines developed that are well adapted to South Asia, East Africa, Central America, Brazil		X	
Several gene systems identified with potential for increasing nutritional value (Fe, Zn, and beta-carotene) beyond limits posed by conventional breeding		X	
Transgenic lines produced at experimental level and screened for high Fe, Zn, and beta-carotene levels, in full accordance with biosafety regulations and conventions		X	X
Adapted, nutritious, transgenic cultivars field tested to determine if they meet biosafety regulations as well as food quality standards		X	X
Conventionally-bred (non transgenic) seed multiplied and distributed to farmers		X	X
Social marketing programs undertaken to promote consumption of nutritionally improved varieties		X	X
Nutritionally improved varieties adopted on 1.5 million hectares or each crop			X

Coordination and Implementation mechanism

Please provide a brief description of expected coordination/implementation mechanism of the Partnership/Initiative.

An International, Interdisciplinary Collaborative Effort

Activities will be undertaken by an international alliance of Future Harvest centers, national agricultural research and extension systems (NARES), departments of human nutrition and plant science at

universities in developing and developed countries, advanced research institutes (ARIs) with expertise in micronutrients in plants and animals, and genomics, nongovernmental organizations (NGOs), farmers' organizations in developing countries, and private-sector partnerships. The Future Harvest Centers involved in the Biofortification Challenge Program are world renowned for their plant breeding expertise and extensive germplasm banks, strong ties to national agricultural extension programs, and links to the human nutrition community. Thus, they are well placed to coordinate the proposed activities. However, close collaboration with institutions that offer complementary scientific expertise, skills, and experience not found within the Future Harvest Centers, is critical to a successful outcome. To achieve the goals and objectives of the Program, new ways of working together, both within the CGIAR system and with external partners, are needed.

Program Governance and Oversight

A governance and oversight mechanism, led by CIAT and IFPRI, is intended to facilitate the complex collaborative arrangements. An external, inter-disciplinary Program Advisory Committee (PAC) of experts from developing and developed countries is being formed to recommend strategic research priorities, oversee project progress, and implement a transparent competitive grants process. A program leader, a breeding and biotechnology coordinator, and a nutrition coordinator, comprising a three-person Program Management Team (PMT), will coordinate the overall project and assist the PAC in carrying out its responsibilities. Program activities will be organized by crop, under crop team leaders responsible for coordination. Regional and cross-crop coordination will be facilitated by the PMT and the relevant crop team leaders.

Arrangements for funding

Please describe available and/or expected sources of funding for the implementation of the Partnership/Initiative (e.g. donor government(s); international organization(s)/financial institution(s); foundation(s); private sector; other major groups, etc.)

The Biofortification Challenge Program is seeking US\$46,000,000 for an initial 4-year period. The CGIAR and its partners are developing a system to make available funds for Challenge Programs like this one, which is likely to involve donor governments, financial institutions and foundations. Several potential donors have expressed preliminary interest to support Challenge Programs in general, and this one in particular. It is furthermore expected that the participation of developed country partners will be supported from non development targeted financial resources.

Arrangements for capacity building and technology transfer

Please include information if the Partnership/Initiative provides for training, informational support, institutional strengthening and/or other capacity building measures:

Please also provide here a brief description of expected arrangements for technology transfer (if applicable).

Since the subject of this partnership is research for development, capacity building and technology transfer are an integral part of the partnership. This will be achieved in the following manner:

- Through collaboration and advanced training of scientists.
- An extended global network of CGIAR Centers, NARS, public ARIs, and private institutes established for effective deployment of advanced technologies for improving micronutrient status for developing countries.
- Deployment of information and material derived from this partnership in research in the public domain.
- Delivery of improved, biofortified varieties to end-users will be assured through an alliance of international centers, NARES, ARIs, NGOs, and farmers' organizations and the use of participatory breeding techniques. The biofortification breeding strategy is envisioned as a complement to other successful ongoing approaches, including supplementation and fortification.

Links of Partnership/Initiative with on-going sustainable development activities at the international and/or regional level (if any)

Please provide a brief description:

The Challenge Program builds on the existing collaboration between the CGIAR System and research organizations in developed countries and countries in transition, but differs from these in the fact that the CP is strongly focused and targeted, time bound and provide for a wider partnership.

The CP is closely linked to the work of FAO, WHO and to GFAR at the international level, and to both national research systems and civil society initiatives at the regional levels.

Monitoring Arrangements

Please describe expected arrangements for monitoring of progress in the implementation of Partnerships/Initiative after it will be launched at the WSSD:

(e.g. frequency/modalities of preparation of progress reports; electronic updates, news-letters, etc)

Each year, the program team will present the program's work plan priorities to the PAC for review and approval. The PAC can approve the priorities as they stand or request that the program team make modifications. Funding priorities for both commissioned research and competitive grants for the coming year will be driven by the approved strategic priorities.

An annual coordination meeting will be held to bring together the entire group of collaborating organizations and review progress on work plans, align and coordinate goals and objectives for the coming year's work, identify obstacles, and suggest solutions or course corrections. The PAC will meet during or following this annual meeting to review the results and make recommendations on strategic priorities and directions for the coming year, assessing the scientific rigor of the planned and executed program work.

It is expected that program component satellite meetings will be arranged around significant global or regional meetings attended by numbers of program collaborators. These meetings will also serve an outreach purpose as they represent opportunities to involve and inform a broader scientific and development community in the program's progress. This model has been successfully employed in the past six years to raise awareness about the potential of a biofortification approach to address problems of micronutrient malnutrition.

The Biofortification Challenge Program is a multi-national, multi-sectoral, multi-disciplinary, multi-crop, multi-nutrient, and multi-partnered undertaking. For this reason an information web is envisioned with a communications hub at its center and independent communication activities taking place among partners and outside stakeholders .

Other relevant information:

Web-site (if available): www.cgiar.org

Name and contact information of the person filling in this table:

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