Enhancing the contribution of neglected and underutilized species to food security, and to incomes of the rural poor

Project Proposal

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International Plant Genetic Resources Institute
Via delle Sette Chiese 142, 00145 Rome, Italy
I. BACKGROUND

Global food security has become increasingly dependent on only a handful of crops. Over 50% of the global requirement for proteins and calories are met by just three, maize, wheat and rice; only 150 crops are commercialized on a significant global scale. Yet, humankind has, over time, used more than 7,000 edible species. The narrowing base of global food security is limiting livelihood options for the rural poor, particularly in marginal areas. Addressing their needs requires that we broaden the focus of research and development to include a much wider range of crop species. Many of these species occupy important niches, adapted to the risky and fragile conditions of rural communities. They have a comparative advantage in marginal lands where they have been selected to withstand stress conditions and contribute to sustainable production with low-cost inputs. They also contribute to the diversity-richness and hence the stability of agroecosystems. These species have a strategic role in fragile ecosystems, such as found in arid and semi-arid lands, in mountains, steppes and tropical forests.

Ethnobotanic surveys indicate that hundreds of such species are still to be found in each country, representing an enormous wealth of agrobiodiversity with potential to contribute to improved incomes, food security and nutrition, combating “hidden hunger” caused by micronutrient (vitamin and mineral) deficiencies. However, these locally important species are frequently neglected by science. Lack of attention by research and development has meant that their potential value is underexploited. This neglect places them in danger of continuing genetic erosion, further restricting development options for the rural poor.

Sustainably improving rural livelihoods is a complex endeavor. Coping with climatic change, urbanization and greater competition for natural resources will require a broader portfolio of crops to meet new environmental conditions and new markets. Some key resources to meet these challenges are already in the hands of the rural poor in the form of the wide range of neglected crop species that they use on a regular basis to meet household needs. Research to increase the value of these crops and make them more widely available would broaden the resource base and increase the livelihood options for rural communities.

II. RATIONALE

Neglected and underutilized species are considered “minor” in terms of global trade and the research attention that they have received. They are often, however, far from minor in the lives of the rural poor. As well as playing significant, if not crucial roles in household food security and income generation, many are important in local food cultures. Such is the case for taro and buckwheat in Asia, fonio and bambara groundnut in Sub-Saharan Africa or quinoa, oca and ulluco in the Andes. These genetic resources and associated cultural characteristics are important assets of the rural poor that need to be safeguarded. They are also strategic for broadening the portfolio of crops and foods that can improve the livelihoods and food security of poor communities around the world.

Because agricultural research has paid little attention to these species, there are major gaps in our knowledge and capacity to conserve and improve them. We do not know enough about their agronomy and the improvement of their yield and quality. Little has been done to identify the most effective commercialization, marketing and policy frameworks to promote their use and maximise their economic value. All of these factors represent, at various levels, bottlenecks for successful promotion.

The international community has made clear calls for greater support for development of neglected and underutilized species in agriculture. It is an agreed priority of the Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture (FAO 1996), and its importance has been recognized by Agenda 21 and the Global Forum for Agricultural Research (GFAR). This was reaffirmed at the IFAD-supported Consultative Workshop on Enlarging the Basis of Food Security, organized by the
Whilst acknowledging the ongoing work of several CGIAR Centers, the Chennai meeting recognised that, despite the evident demand, research and development activities on neglected species have been sporadic and lacking in a coherent framework and strategy. Thus the meeting called for greater attention to the area and recommended establishment of a platform to address work at the international level.

IPGRI is requesting funds to implement a global project to exploit the potential contribution of neglected and underutilized species to rural livelihoods. The project would have three regional components (in Asia and the Pacific, Central and West Asia and North Africa, and Latin America and the Caribbean). A global approach is essential to maximize impact and benefit to the poor in marginal areas by identifying and adapting the best material to the needs and uses of communities in diverse environments, and by sharing knowledge and tested procedures. A series of related pilot projects will be carried out on priority species. Possible candidate species include sesame and buckwheat (for Asia and the Pacific region), Andean and Mesoamerican grains (for Latin America and the Caribbean) and spices and vegetable species (for Central and West Asia and North Africa). The ultimate selection will rest on the contribution of the species to sustainable agricultural systems, their potential for increased use, levels of threats of genetic erosion and their local or regional importance for food security, nutrition and income generation. Partners will work with IPGRI to identify both the species and the activities needed for their full valorization and maintenance.

Producers and researchers will participate in networking to secure the genetic resource base, and improve the quality and availability of planting materials for farmers. Options for strengthening marketing and income generation will be identified. Key players in the processing and marketing chains will be brought into the networks. Action research will be designed to produce (i) direct impact of the pilot projects through enhanced use of the genetic resources and identification of specific investment opportunities, and (ii) global lessons that can be generalised to other species and regions. Thus, IPGRI will identify opportunities for inter- and intra-regional exchange of germplasm, information and techniques. Public awareness will also be a key element of the work, as will protecting the rights of farmers and local communities.

**IPGRI’s Experience and Partnerships**

**Conservation technology and genetic diversity research:** IPGRI has many years of experience in the science and technology of plant genetic resources conservation and use, and has pioneered the development of complementary conservation strategies that take a genepool-based approach to optimal application of *ex situ* and *in situ* conservation methods.

**Information:** IPGRI has carried out a global project to document botanical, agronomic, and genetic resource information on 25 neglected and underutilized crops with high potential. A series of monographs dedicated to these crops has been published and distributed to scientists in developing countries. IPGRI has also produced and disseminated descriptors and crop genepool surveys of many other neglected species.

**Commodities:** Whilst much of IPGRI’s research and development work is generic in nature, the institute does give attention to specific commodities and has extensive experience in coordinating network-based research on the genetic resources of banana and plantain, coconut and cacao, including genetic improvement aspects. The institute has also recently been awarded funds to work on tropical fruits and on date palm. All of these examples and the latter in particular involve a strong economic and marketing dimension. IPGRI is also active in the area of genetic resources policy and is giving attention to national policies favouring conservation and use of minor species. The institute’s competence to address the conservation to consumption spectrum is reflected in GFAR’s requesting IPGRI to develop concept notes on commodity chains including for underutilized crops (*The Role of Underutilized Plant Species in the 21st Century.* GFAR, 1999).
**Participatory Priority Setting:** IPGRI has worked with countries on a regional basis to develop participatory priority-setting methods to identify species with high potential to contribute to livelihoods, food security and broadening the use of biodiversity in agriculture (*Priority Setting for Underutilized and Neglected Plant Species of the Mediterranean Region*. IPGRI, 2000). These methods involve the main stakeholders from rural households that know and use the crops, researchers who can contribute to improving the availability and quality of germplasm, and processors and marketing agents. IPGRI has produced a Technical Bulletin on *Participatory Approaches to the Conservation and Use of Plant Genetic Resources* (IPGRI, 2000). The institute has also worked with women producers and sellers of traditional leafy vegetables in Africa, to identify priority species and design steps to enhance their germplasm and contribution to nutrition and incomes (*The Biodiversity of Traditional Leafy Vegetables*. IPGRI 1999).

**Partners:** IPGRI has extensive experience of working with partners concerned with neglected and underutilized crops in the three selected regions. Partners include farmers and local institutions in areas where these crops are central to livelihoods and to national plant genetic resources conservation. IPGRI’s expertise comes from its work on conservation on farm and in partnerships such as the coconut genetic resources network COGENT, and includes a concern with user perspectives and needs. The main partners in the proposed work will be national plant genetic resources programmes. Implementing the development research from the users’ perspective will also involve local organizations concerned with promoting and adding value to neglected crops with high potential. Processing, marketing and economics expertise will be employed to identify and mobilise actors within countries to add value to priority species. IPGRI will also work with key international organisations including other CGIAR Centres, the International Centre for Underutilized Crops (ICUC) and the M.S.Swaminathan Research Foundation. The latter is interested in promoting neglected and underutilized species as part of its community-based biodiversity management and development strategy. Additional partners in the donor community will be sought, including the Netherlands Ministry of Foreign Affairs, Development Cooperation, which funded the first phase of IPGRI’s work on African leafy vegetables. Support of the Asian Development Bank has been obtained for work on tropical fruits. Given the central and overriding concern with resources and livelihoods for the rural poor and particularly poor communities in marginal lands with limited access to other resources, the role of IFAD is central to the successful launch and implementation of this global effort.

**III. GOAL AND OBJECTIVES**

**Goal:** The project’s goal is to contribute to raising the incomes and strengthening the food security of small farmers and rural communities around the world through securing and exploiting the full potential of the genetic diversity contained in neglected and underutilized species.

**Purpose:** The project aims to redress the neglect of valuable plant genetic resources of crops managed by the rural poor through development-oriented research and action in Asia and the Pacific, in Central and West Asia and North Africa, and in Latin America and the Caribbean, to tackle the major causes of the crops’ under-use and genetic erosion.

Specific objectives include:

- increasing the demand and use of neglected and underutilized species through development and application of appropriate processing technologies, commercialization and marketing strategies;
- enhancing the genetic diversity, improving the quality, and increasing the availability of germplasm of the most promising species and varieties;
- securing the genetic resource base and expanding the distribution of priority crops through development and application of integrated conservation strategies.
IV. KEY PROGRAMME ACTIVITIES

IPGRI will act as coordinator of a global project that will be implemented through linked regional pilot project components, each focused on 2-3 priority species, taking a conservation-to-consumption approach. Two to three countries per region will serve as primary partner countries, while other countries with interests in the chosen crops will be invited to participate in dissemination activities. The results at the regional level will be shared using the global mechanisms provided by the project and linked to those from other relevant activities on neglected and underutilized species supported by IPGRI or other main players. In this way, specific action at the local and national level can have maximum impact in securing the resource base and improving production and marketing options for those communities living in marginal areas. The mechanism used will also ensure that the knowledge obtained and approaches developed have maximum added value.

The regional components will undertake the following activities for each of the selected crops. These activities will be carried out in close partnership with the users, primarily in poor farming communities using appropriate participatory approaches.

1. Establish or support operational networking arrangements linking all appropriate partners (including genebank curators, producers, researchers, NGOs, community representatives, processors, marketing agents).
2. Survey and secure the resource base through analysis of patterns of germplasm distribution and use, and through collecting, characterization and evaluation of available genetic resources.
3. Develop adequate seed production systems to meet user needs.
4. Undertake participatory studies of constraints and opportunities in existing crop production systems.
5. Implement participatory variety selection and participatory plant breeding programmes.
6. Support development of improved processing, distribution and marketing actions.

Global project activities resulting from regional crop based work will include the synthesis and distribution of information from project components, annual planning and review meetings and development of general protocols. A synthesis meeting will be held at the end of the project (under the auspices of a partner such as the M.S. Swaminathan Research Foundation) and the proceedings published.

The bulk of the genetic resources of neglected and underutilized species remain largely in the hands of local communities. They constitute the primary biological assets of poor farmers and the work must recognize this and be based on a participatory and bottom-up approach. Moreover, women are the primary managers and sources of knowledge for many neglected species, making gender-sensitive approaches essential to the successful implementation of the programme. The proposed approach will:

- focus on the local value, indigenous knowledge and uses of the crops, in order to link and promote cooperation between stakeholders;
- identify and overcome the socioeconomic and technical constraints to the conservation and use of the diversity;
- analyze and enhance the demand using market oriented strategies;
- empower the rural poor to retain access to these resources as their value increases;
- mainstream gender-sensitive approaches to genetic resources management and use;
- establish an operating framework for managing plant genetic resources that can provide a safety back-up for conservation and use.

The participation of target beneficiaries will be pursued from the outset of the project through meetings at local, country and regional level. Involvement of women farmers will be emphasized in recognition of their role as main users and custodians of neglected and underutilized species.
V. OUTPUTS

Both organizational and technical outputs will result from the project. The major organizational outputs will be:

- networks that provide participatory systems and procedures to support the improved production and use of the selected crops;
- operational alliances formed among selected network partners to implement actions that overcome production and marketing constraints (e.g. seed supply systems, processing groups, distribution cooperatives);
- linkages to existing rural and economic development projects where the neglected and underutilized crops could make contributions to incomes, nutritional well being and the resource base of rural communities;
- Increased capacity of marketing associations and producer groups to use improved materials of neglected and underutilized crops increased and more stable demands;
- raised awareness among policy-makers of issues and options for improved policy and legal frameworks impacting on neglected and underutilized crops.

Technical outputs will come both from the regional components and the global project itself. Outputs from the regional components will include:

- integrated conservation of selected crop genetic resources;
- information on available crop materials - their distribution, variation and potential for improvement, and for contributing to nutritional well being and income enhancement;
- seed and other planting materials available for use by local communities and strengthened local seed production systems;
- improved crop materials made available to rural communities through participatory variety selection and participatory plant breeding;
- information on major production and use constraints throughout the producer to consumer chain;
- improved processing and marketing opportunities identified, leading to specific investment and income generation opportunities through greater demand for the selected crops and their products;
- enhanced national capacity to work with neglected and underutilized crops and to support rural community needs for these crops.

Global outputs will include:

- a secure resource base for the selected crops for use in global development initiatives including deployment in marginal areas in other regions;
- knowledge of effective procedures to integrate neglected and underutilized crops into development actions;
- publications including technical guidelines, information on specific crops and an overall synthesis;
- global experience linking plant genetic resources research with local institutions for managing crop resources.

A Logical Framework for the proposed work combined with a problem analysis is provided in Attachment I.

VI. IMPLEMENTATION ARRANGEMENTS, MONITORING AND SUPERVISION

IPGRI will be the executing agency of the project and will provide the secretariat for coordinating the regional components and for monitoring and impact assessment. Low-cost networks will be established (or supported where they already exist) to bring together stakeholders. Each regional component will be launched through a stakeholder meeting to agree on species and areas covered, activities and time-frame for implementation. A participatory priority-setting approach will be followed in these meetings. An IPGRI senior scientist will coordinate the global project from IPGRI’s Office in Aleppo, Syria, working with
staff in IPGRI's other Regional Groups, maximizing economies of scale and operational synergies.

Global meetings of key partners will be held when appropriate and at the end of the project to synthesize the outputs. IPGRI will provide inputs at the senior scientist level on social science methodologies and participatory approaches to ensure the full and equitable participation of the resource users, particularly women producers, processors and marketers in the development of the project. IPGRI will obtain additional economics expertise and provide expertise in genetic resources development and promotion on a regional basis. Links with existing national, regional and international initiatives on neglected and underutilized species will be pursued and cooperation sought on areas of common interest.

### VII. PRELIMINARY COST TABLE PER YEAR (for 3 years) in US$,000

<table>
<thead>
<tr>
<th>Cost Category</th>
<th>IFAD</th>
<th>IPGRI</th>
<th>Other Co-financing*</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research contracts and information dissemination</td>
<td>170</td>
<td>200</td>
<td></td>
<td>370</td>
</tr>
<tr>
<td>Network operations</td>
<td>100</td>
<td>50</td>
<td></td>
<td>150</td>
</tr>
<tr>
<td>Training and technology transfer</td>
<td></td>
<td></td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>Supplies and services (including costs of project management)</td>
<td>80</td>
<td>100</td>
<td></td>
<td>280</td>
</tr>
<tr>
<td>Staff</td>
<td>50</td>
<td>200</td>
<td></td>
<td>300</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
<td>350</td>
<td>550</td>
<td>1300</td>
</tr>
<tr>
<td>Total over 3 years</td>
<td>1,200</td>
<td>1,050</td>
<td>1,650</td>
<td>3,900</td>
</tr>
</tbody>
</table>

- Other co-financing anticipated includes Asian Development Bank supported work on tropical fruits, Netherlands-supported work on neglected leafy vegetables in Africa. Additional co-financing is being sought from USAID and from Germany (DSE) for training activities.
**Attachment 1: Problem Analysis and Logical Framework**

**Goal:** To contribute to raising the incomes and strengthening the food security of small farmers and rural communities around the world through securing and exploiting the full potential of the genetic diversity contained in neglected and underutilized species.

**Purpose:** Redress the neglect of valuable plant genetic resources of crops managed by the rural poor through development-oriented research and action in Asia and the Pacific, in Central and West Asia and North Africa, and in Latin America and the Caribbean, to tackle the major causes of the crops’ under-use and genetic erosion.

<table>
<thead>
<tr>
<th>Problem Area</th>
<th>Narrative Summary</th>
<th>Indicators</th>
<th>Means of verification</th>
<th>Risks and Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of genetic material</td>
<td>Improved availability of seed and other planting materials</td>
<td>Seed and planting material quality, quantity and availability</td>
<td>Surveys of material availability in participating communities</td>
<td>National and community participation are maintained</td>
</tr>
<tr>
<td></td>
<td>Crop improvement programmes</td>
<td>Numbers of plant improvement activities</td>
<td>Yields and quality of products</td>
<td>Unforeseen environmental or other disasters do not occur</td>
</tr>
<tr>
<td></td>
<td>Improved planting materials derived from traditional varieties</td>
<td></td>
<td></td>
<td>Agricultural policies are not discriminatory</td>
</tr>
<tr>
<td></td>
<td>Set up local germplasm supply systems among rural communities</td>
<td></td>
<td></td>
<td>Materials are located</td>
</tr>
<tr>
<td>Loss of germplasm and traditional knowledge</td>
<td>Resource base of selected species secured through ex situ and on farm conservation</td>
<td>Ex situ accessions and on farm maintenance</td>
<td>Records and surveys of numbers of accessions held in genebanks and of areas involved in on farm conservation</td>
<td>Genebanks are prepared to maintain materials supplied</td>
</tr>
<tr>
<td></td>
<td>Appropriate traditional knowledge documented and shared among stakeholders</td>
<td>Traditional knowledge maintenance systems (e.g. databases)</td>
<td>Information held in databases or published</td>
<td>Farmers maintain interest in target crops</td>
</tr>
<tr>
<td></td>
<td>Assess distribution of species and genetic erosion threats</td>
<td></td>
<td></td>
<td>Farmers and others are prepared to communicate traditional knowledge</td>
</tr>
<tr>
<td>Lack of knowledge on uses, constraints and opportunities</td>
<td>Identify and collate traditional knowledge using participatory procedures based on informed consent (including e.g. recipes on uses)</td>
<td>Increased availability and use of information for decision making by stakeholders</td>
<td>Published and unpublished reports</td>
<td>Work of sufficient quality is undertaken and effective analyses can be supported</td>
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<tr>
<td>Enhanced information on production levels, use constraints and opportunities Knowledge of gender and other socially significant factors identified</td>
<td>Participatory surveys on uses, constraints and opportunities with communities and other levels of the “filieres” Analysis of survey data for gender and other socially significant factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limited income generation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategies for adding value and increasing rural incomes using target crops Enhanced competitiveness of selected crops</td>
<td>Development of value adding strategies (through processing, marketing, commercialization etc.) Investigate and identify improved agronomic and production procedures</td>
<td>Documented strategies for adding value Changes in production practices Reduced variation in production statistics Changes in crop choices by growers</td>
<td>Published and unpublished reports Surveys of production methods and practices Production statistics</td>
<td>Added value products are identified Marketing opportunities are maintained Production improvements continue to be relevant in production situations</td>
</tr>
<tr>
<td>Market, commercialization and demand limitations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enhanced working alliances among stakeholders in “filieres” Improved processing and marketing opportunities identified Improved capacities of marketing associations and producer groups</td>
<td>Strengthen operational links in the “filieres” between seed supply system, processing and distribution stakeholders Develop improved low-cost processing techniques Analyze and identify market opportunities</td>
<td>Operational networking and communication arrangements Low-cost technologies available</td>
<td>Documentation of networking activities and meetings Published and unpublished reports</td>
<td>Participants are able to continue involvement Resources for participation and additional operating costs are secured Expertise from key sectors (economics, marketing etc.) is engaged</td>
</tr>
</tbody>
</table>
| Lack of research and development activities and weak national capacities | Enhanced national capacities to work with neglected and underutilized crops  
Enhanced information and knowledge on the selected neglected and underutilized crops  
Methods to improve nutritional values developed and documented | Carry out short training courses for researchers  
Develop and undertake community-based participatory courses  
Characterize crops for agronomic, nutritional and market related traits  
Study formal and informal classification systems  
Investigate methods of maintaining and enhancing nutritional value  
Investigate new areas of crop growth | Numbers of trained national staff and community participants  
Published information in reports and documents  
Documentation of methods | Training statistics and personnel records  
Review of published and unpublished documents | Facilities for training can be mobilized  
Farmers and communities can find time (and other resources) to participate  
Trained personnel are retained by institutes  
Trained national staff and community members apply knowledge gained  
Research work of sufficient quality is undertaken |
| Lack of links across conservation and production to consumption “filieres” | “Filieres” established or strengthened  
Participatory networking procedures established | Hold planning workshops for all stakeholders  
Establish and strengthen operational links between stakeholders | Identified networking arrangements in place | Network activities, communications, meeting documentation | Participants interests are retained and sufficient support/time available  
Communication systems are operational |
| Inappropriate (inadequate) policy and legal frameworks | Raised awareness among policy-makers of issues and options for improved policy and legal frameworks  
Links to existing rural and economic development projects enhanced | Identify inappropriate policy/legal elements  
Undertake public awareness actions among policy-makers  
Establish close partnerships with extension workers and others involved in agricultural development | Public awareness materials are produced and reach targets  
Policy-makers react to raised awareness  
Interest of extension workers and other project personnel | Reports in press and radio  
Discussions in policy making bodies  
Documented reports on policies  
Surveys and activities in development projects | Interest of media is engaged  
Appropriate policy arenas exist |