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REPORT AND RECOMMENDATION OF THE PRESIDENT

TO THE EXECUTIVE BOARD ON PROPOSED

TECHNICAL ASSISTANCE GRANTS

FOR

AGRICULTURAL RESEARCH AND TRAINING

BY

CGIAR-SUPPORTED INTERNATIONAL CENTRES

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ABBREVIATIONS AND ACRONYMS

CDP	Community Development Plan
CIMMYT	International Maize and Wheat Improvement Center
DFD	Diversity Field Fora
ICARDA	International Center for Agricultural Research in the Dry Areas
ICRAF	World Agroforestry Centre
IITA	International Institute of Tropical Agriculture
IPGRI	International Plant Genetic Resources Institute
NARS	National Agricultural Research Systems
NGO	Non-Governmental Organization
TAG	Technical Assistance Grant
TIPOs	Technical, Institutional and Policy Options

**REPORT AND RECOMMENDATION OF THE PRESIDENT OF IFAD
TO THE EXECUTIVE BOARD ON PROPOSED TECHNICAL ASSISTANCE GRANTS
FOR AGRICULTURAL RESEARCH AND TRAINING BY
CGIAR-SUPPORTED INTERNATIONAL CENTRES**

I submit the following Report and Recommendation on five proposed technical assistance grants in the amount of USD 5 100 000 for agricultural research and training to international centres supported by the Consultative Group on International Agricultural Research (CGIAR).

PART I – INTRODUCTION

1. This report recommends the provision of IFAD support to the research and training programmes of the following international centres assisted by CGIAR: the International Maize and Wheat Improvement Center (CIMMYT), the International Plant Genetic Resources Institute (IPGRI), the World Agroforestry Centre (ICRAF), the International Center for Agricultural Research in the Dry Areas (ICARDA)

2. The documents of the technical assistance grants (TAGs) for approval by the Executive Board are contained in the annexes to this report:

- I. International Maize and Wheat Improvement Center (CIMMYT): Project for Developing and Disseminating Stress-Tolerant Maize for Sustainable Food Security in East, West and Central Africa – Phase II
- II. International Plant Genetic Resources Institute (IPGRI): Programme for Empowering Sahelian Farmers to Leverage their Crop Diversity Assets for Enhanced Livelihood Strategies
- III. World Agroforestry Centre (ICRAF): Diversification of Smallholder Farming Systems in West and Central Africa through Cultivation of Indigenous Trees – Phase II
- IV. International Center for Agricultural Research in the Dry Areas (ICARDA): Programme for Developing Sustainable Livelihoods of Agropastoral Communities of West Asia and North Africa

3. The objectives and content of these applied research projects and programmes are in line with the evolving strategic objectives of IFAD and the policy and criteria of its TAG programme for agricultural research and training.

4. The strategic objectives of IFAD's support for technology development relate to: (a) IFAD's target groups and their household food-security strategies, specifically in remote and marginalized agro-ecological areas; (b) technologies that build on traditional knowledge systems, are gender-responsive and enhance and diversify the productive potential of resource-poor farming systems by improving productivity and addressing production bottlenecks; (c) access to productive assets (land and water, financial services, labour and technology, including indigenous technology) and the sustainable and productive management of such resources; (d) a policy framework that provides the rural poor with an incentive to reach higher levels of productivity, thereby reducing their dependence on transfers; and (e) an institutional framework within which formal and informal, public and private-

sector, local and national institutions provide services to the economically vulnerable according to their comparative advantage. Within this framework, IFAD also intends to develop commodity-based approaches to rural poverty reduction. Finally, the establishment of a consolidated network for knowledge-gathering and dissemination will enhance the Fund's capacity to establish long-term strategic linkages with its development partners and to multiply the effect of its agricultural research and training programme.

5. The TAGs proposed in this document respond to the foregoing strategic objectives. The Project for Developing and Disseminating Stress-Tolerant Maize for Sustainable Food Security in East, West and Central Africa – Phase II, responds to the strategic objectives, especially (a), (b), and (c). The project will support strategic partnerships between advanced research centres and national agricultural research systems and strengthen their capacity, as well as that of development projects and farming communities, to adapt and validate maize varieties and crop management practices with increased tolerance to drought, poor soil conditions and weeds. The IPGRI TAG programme addresses all five strategic objectives of IFAD's support for technology development, in particular: (a) the availability of a higher quality and a wider range of seeds will strengthen the resilience of the livelihood strategies of farmers; (b) the enhancement of in-situ conservation and the experimentation skills of farmers mainly builds on local knowledge; (c) seed diversity fields and seed fairs improve the access to seeds and strengthen the management of diversity, including economic and socio-cultural incentives for in-situ conservation; (d) policy change is to be promoted through policy analysis research to identify factors influencing the access to and management of plant genetic resources at various levels; and (e) institutional development and transformation are clearly targeted since the programme will promote new learning modes, institutional values, functions and modes of interaction as farmers rely on different village-based, inter-village, regional and national entities. Diversification of Smallholder Farming Systems in West and Central Africa through Cultivation of Indigenous Trees – Phase II, responds to all the strategic objectives since it promotes innovative strategies needed for poverty reduction and environmental sustainability in resource-poor areas of West and Central Africa. The Programme for Developing Sustainable Livelihoods of Agropastoral Communities of West Asia and North Africa responds to strategic objectives (a), (b) and (c). The programme will consolidate and scale out the community approach and support the implementation of pastoral and agropastoral community development plans. It will also support targeted action research to test and adapt 'best bet' technical, institutional and policy options and thus provide the community with access to appropriate technology so as to promote sustainable natural resource and environmental management and open up opportunities for improved production and the marketing of surpluses.

PART II – RECOMMENDATION

6. I recommend that the Executive Board approve the proposed TAGs in terms of the following resolutions:

RESOLVED: that the Fund, in order to finance, in part, the Project for Developing and Disseminating Stress-Tolerant Maize for Sustainable Food Security in East, West and Central Africa – Phase II, shall make a grant not exceeding one million three hundred thousand United States dollars (USD 1 300 000) to the International Maize and Wheat Improvement Center (CIMMYT), upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented to the Executive Board in this Report and Recommendation of the President.

FURTHER RESOLVED: that the Fund, in order to finance, in part, the Programme for Empowering Sahelian Farmers to Leverage their Crop Diversity Assets for Enhanced Livelihood Strategies, shall make a grant not exceeding one million three hundred thousand United States dollars (USD 1 300 000) to the International Plant Genetic Resources Institute (IPGRI), upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented to the Executive Board in this Report and Recommendation of the President.

FURTHER RESOLVED: that the Fund, in order to finance, in part, Diversification of Smallholder Farming Systems in West and Central Africa through Cultivation of Indigenous Trees – Phase II, shall make a grant not exceeding one million two hundred thousand United States dollars (USD 1 200 000) to the World Agroforestry Centre (ICRAF), upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented to the Executive Board in this Report and Recommendation of the President.

FURTHER RESOLVED: that the Fund, in order to finance, in part, the Programme for Developing Sustainable Livelihoods of Agropastoral Communities of West Asia and North Africa, shall make a grant not exceeding one million three hundred thousand United States dollars (USD 1 300 000) to the International Center for Agricultural Research in the Dry Areas (ICARDA), upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented to the Executive Board in this Report and Recommendation of the President.

Lennart Båge
President

**INTERNATIONAL MAIZE AND WHEAT IMPROVEMENT CENTER (CIMMYT): PROJECT FOR
DEVELOPING AND DISSEMINATING STRESS-TOLERANT MAIZE FOR SUSTAINABLE FOOD
SECURITY IN EAST, WEST AND CENTRAL AFRICA – PHASE II**

I. BACKGROUND

1. Among the many challenges faced by African maize farmers, the most common and difficult are drought, low and declining soil fertility, insect pests, the parasitic weed *Striga* and maize streak virus. Across the region of West, Central and East Africa, maize continues to be one of the most important subsistence food crops, covering approximately 21% of the cultivated area in West and Central Africa and about 38% of the cultivated area in East Africa. Farm holdings are mainly small scale, with a high proportion of women performing much of the farm labour.

2. Maize is grown almost entirely under rainfed conditions, and farmers have limited access to cash for purchased inputs. Yields are well below their potential of 4.5-7.0 t/ha, due to a combination of low-yielding varieties, suboptimal agronomic practices and multiple abiotic and biotic stresses. The International Maize and Wheat Improvement Center (CIMMYT), the International Institute of Tropical Agriculture (IITA) and the national agricultural research systems (NARS) in Africa have invested considerable effort in the development of germplasm with resistance to these stresses, but a boost is still required to adapt the germplasm to the requirements of farmers and accelerate the adoption process. The Africa Maize Stress Project was conceived as a technology bridge between the advanced research centres and the African farmers. Phase I of the project (1997-2000) aimed at helping African NARS build capacity and infrastructure and learn methods of abiotic and biotic maize stress breeding, as well as involving farmers more directly in the evaluation of currently available cultivars and agronomic practices to mitigate stresses. Phase I received a highly favourable review in the 2001 project evaluation, which stated, “the project is in the top three among projects currently funded by UNDP [the United Nations Development Programme] worldwide”.

II. RATIONALE/RELEVANCE TO IFAD

3. It is no longer sufficient to focus only on increasing the **quantity** of maize produced in Africa. Because of the widespread existence of malnutrition on the continent and the growing incidence of HIV/AIDS, new ways need to be found to ensure the adequate **quality** of diets as well, especially for the resource poor. Women and children in Africa are at especially high risk of malnutrition. In West and Central Africa, infants are weaned on maize gruel and are particularly susceptible to malnutrition at this stage. In East Africa, maize is the staple food for all population groups, so vulnerability to protein malnutrition is perhaps even greater.

4. Phase II of the Africa Maize Stress Project would be well placed to take on this challenge in two ways: by testing available quality protein maize lines for stress tolerance and by incorporating quality protein maize into the pool of project breeding materials.

5. The current proposal builds on a base of good science and strong collaboration among all partners (donors, international agricultural research centres, African NARS and farmers). Phase I capital investments in NARS experiment station infrastructure have built up an effective network of 19 stress screening sites and 126 testing sites that are shared among the 21 project countries. Thousands of maize genotypes from the research programmes of the NARS and the two international centres have been evaluated for stress tolerance, and excellent source material has been identified. Farmers, mostly women, have been actively involved in selecting and experimenting with project technologies. Regional partnerships among NARS, IITA and CIMMYT are rapidly evolving into

genuine maize research teams. The benefits can be seen in greater trust among all collaborators, more efficient research and ever accelerating rates of technology generation.

6. The nature of maize stress breeding and the complexities of the adaptation of new technologies to the circumstances of African farmers make this a long-term endeavour. Phase II of the Africa Maize Stress Project will continue to adapt varieties to the circumstances of farmers, while increasing the emphasis on complementary crop management processes to manage stresses. More attention will be paid to socio-economic research to improve the understanding of constraints on the farmer adoption of improved technologies. Phase II will also support different approaches to the improvement of the availability of maize seed at the village level. Training, networking and farmer participation in research and technology testing will continue as hallmarks of the project. Phase II is currently designed as a three-year project, with participation from 21 countries in West, Central and East Africa, as well as IITA and CIMMYT. However, its impact will be felt more in five years due to the lag-phase of technology dissemination.

III. THE PROPOSED PROJECT

7. The overall goal of Phase II of the Africa Maize Stress Project remains as stated in the original Phase I proposal: to increase the food security and income generation of African farm families by increasing the productivity and sustainability of maize-based cropping systems subject to drought, low and declining soil fertility, and infestation by Striga spp. and stem borers. The specific objectives of the project are to:

- develop locally adapted cultivars of maize with increased tolerance to drought, low soil nitrogen and Striga and with resistance to stem borers in Phase II; an added aspect of the project's maize germplasm will be nutritional quality in East Africa;
- develop, test and promote farmer use of complementary crop management practices to ameliorate stress conditions;
- strengthen the capacity of NARS to develop stress tolerant maize and complementary crop management;
- accelerate the transfer of research outputs to farmers and promote linkages with development projects.

Project Activities and Milestones

8. The specific components, outputs, activities and milestones are outlined briefly below.

9. **Component I:** The project will develop locally adapted cultivars of maize with increased tolerance to drought, low soil nitrogen and Striga and with resistance to stem borers, as well with improved nutritional content. The output will include maize varieties, lines, synthetics and hybrids with improved yield stability when grown under stress from drought, low soil nitrogen, Striga spp. and stem borers and with greater nutritional quality.

10. **Component II:** The project will develop, test and promote the use of complementary crop management practices to ameliorate stress conditions. The outputs will include cropping practices that complement and exploit stress-tolerant germplasm. It will support the development of complementary crop management practices by national agricultural research and extension systems and non-governmental organizations (NGOs) through competitive grant projects and direct project assistance.

11. **Component III:** This component will strengthen the ability of NARS to develop stress-tolerant maize. The key outputs will include regional screening sites for tolerance to drought, low nitrogen

fertility, Striga, diseases and stem borers in West, Central and East Africa. NARS scientists will be trained in the multiple skills required to execute national-level project activities. As in Phase I of the Africa Maize Stress Project, the training of NARS researchers in a number of topics will remain a priority, including stress breeding and selection methodologies, participatory breeding and on-farm research, data management and report preparation. The project will include short courses and workshops on selection methodologies and on participatory breeding and on-farm research.

12. **Component IV:** The project will initiate the transfer of research outputs to farmers and promote linkages with development projects. Gender-sensitive participatory methods of plant breeding and agronomic research to put aspects of technology generation in the hands of farmers will include the design and implementation of farmer participatory and gender-sensitive approaches to breeding and the development of agronomic practices. An understanding of factors governing technology adoption and of data on potential project impact will be highlighted. Public, private and NGO partners working together to develop improved maize-based farming systems for areas affected with drought, low fertility, Striga and stem borers will participate in a competitive grants programme designed to link research and development activities. The proposed project will also include effective seed distribution systems that will distribute improved varieties to African farmers and foster mechanisms among public, private and NGO partners to produce seeds of improved cultivars for on-farm testing and initial adoption by farmers and for local seeds of the most well adapted cultivars.

IV. IMPLEMENTATION ARRANGEMENTS

13. The implementation of all the components (mentioned above) of the project requires significant technical expertise. This expertise will come from collaborating NARS with considerable backstopping from CIMMYT and IITA. Networking, an effective means to share resources and expertise, will be provided by the two regional networks, the West and Central Africa Collaborative Maize Network and the Eastern and Central Africa Maize and Wheat Research Network, operating, respectively, under the umbrella of the West and Central African Council for Agricultural Research and Development and the Association for Strengthening Agricultural Research in Eastern and Central Africa. Both CIMMYT and IITA will supply germplasm and backstop breeding activities at the existing breeding and screening sites. Both centres will also provide resource persons, as required, for a variety of other activities needed to achieve the project objectives. NARS scientists will lead the in-country activities of the project. They will empower various players in the implementation of project activities. NARS agronomists will formulate and execute or refine on-farm trials in target areas, with support from CIMMYT and IITA economists, where necessary. The NARS breeders will take the lead at the screening and testing sites and will also lead in the training of farmers for community seed production schemes, while the issues of seed pricing and marketing will be the domain of the economists.

V. EXPECTED OUTPUTS, EXPECTED BENEFITS

14. By the end of the project, the following technical outputs are expected to be available.

15. Scores of cultivars, including quality protein maize, with higher yield advantage under controlled drought or low nitrogen stress compared to the best currently available check varieties will have been identified. Several other cultivars with no more than 35% yield loss under heavy Striga infestation and with less than 30% yield loss due to stem borer infestation and comparable yield performance to the best check varieties will be made available. Twenty technicians will be trained through group courses; three national scientists will have completed visiting scientist fellowship assignments. The NARS of at least four countries in West and Central Africa and four countries in East Africa will be regularly using improved selection methodologies to breed for stress tolerance in maize. At least 50 independent research and extension projects will have been funded by the

competitive grant system. On-farm trials conducted in target areas will have demonstrated the benefits of improved technologies in mitigating the effects of maize stresses, and technologies will have been developed or modified to make them suitable for both men and women farmers.

VI. INDICATIVE PROJECT COSTS AND FINANCING

16. This project will support activities and complementary projects in the region backed by other donors. IFAD's grant of USD 1.3 million will leverage USD 405 000 from the Rockefeller Foundation. In addition, an in-kind contribution worth roughly USD 905 000 has been pledged by the two international centres. From their national research budgets, collaborating NARS will provide staff time, land, the use of existing field infrastructure, the upgrading of national testing sites, office space, transport, per diems and logistical support for their staff and will not apply overhead costs for the delivery of services to the project. The minimum value of this in-kind contribution to the screening and testing component of the project is estimated at USD 731 000 over the first three years of the project. This approximation underestimates the total, as it does not include the staff time contributed by NARS partners in crop management research, training activities, farmer participatory research and on-farm research, institution-building activities, or linkage work to promote seed distribution.

FINANCING PLAN

Item	Year 1	Year 2	Year 3	IFAD Grant	Rockefeller Foundation Grant	Total
Staff and consultants	162	163	165	490		490
Travel	17	19	21	57		57
Supplies and materials	31	32	33	96		96
Capital and equipment	58	10	7	75		75
NARS support (research and training)	108	140	143	391		391
Overhead	62	63	66	191		191
IFAD Contribution	438	427	435	1 300		1 300
Rockefeller Foundation Contribution					405	405
Total	438	427	435	1 300	405	1 705

**INTERNATIONAL PLANT GENETIC RESOURCES INSTITUTE (IPGRI): PROGRAMME FOR
EMPOWERING SAHELIAN FARMERS TO LEVERAGE THEIR CROP DIVERSITY ASSETS FOR
ENHANCED LIVELIHOOD STRATEGIES**

I. BACKGROUND

1. Plant genetic resources, including local seeds and the associated knowledge, are key natural endowments of Sahelian farmers, closely linked to their human and social capital. Hence, they constitute crucial entry points for the improvement of the livelihood strategies of farmers. To build on these assets entails a paradigm shift from the transfer-of-technology strategy, based on the identification and promotion of local resources, particularly crop and tree genetic resources that are often those over which farmers have the greatest leverage.

2. In the context of many poor, marginal drought-prone areas of the Sahel, farmers rely on a diversified gene pool kept evolving through networks of exchange and selection shaped often by socio-cultural identities. Relationships of trust and mutual confidence, framed within the extended family, neighbourhood, or beyond, are fundamental to the maintenance of significant levels of diversity through intra-village and inter-village exchanges. The maximization of the contribution of agricultural biodiversity to sustainable livelihoods thus involves the strengthening of human and social capital in ways that support the management of natural capital, including plant genetic resources, particularly through the vehicle of *in situ* conservation.

II. RATIONALE AND RELEVANCE TO IFAD

3. Within the above context, IFAD supported a research programme (TAG 319-IPGRI) in Mali and Zimbabwe from 1999 to 2002 to develop participatory strategies for the *in situ* conservation of millet, sorghum, cowpeas and *bambara* groundnuts. In particular, the following three key functions of diversity were assessed: (a) the important role of diversity in the maintenance of a balanced diet and different culinary practices; (b) the optimization of factors of production such as soil and labour; and (c) the risk management related to variations in rainfall.

4. TAG 319-IPGRI developed modalities for the use of IFAD-financed development projects to identify, conserve, manage, enrich and exchange on-farm crop diversity through diversity field fora (DFF), seed diversity fairs, community gene banks and improved seed storage. The DFF is a combination action-research and training methodology used to strengthen the capacity of farmers to understand, analyse and manage their plant genetic resources. While DFF are mainly implemented at the scale of a single village or community, a seed diversity fair is a festival or ceremony that provides a physical, socio-cultural space where individuals, farmers, or groups from different villages or communities can display varieties and plant materials and exchange them, along with the related knowledge on diversity. DFF implemented within the area of an IFAD-financed development programme in Mali, the Income Diversification Programme in the Mali Sud Area, were adopted and financed by the programme in 2002/2003 as part of its own programme of work. Many needs for further research emerged from the experience of TAG 319-IPGRI, including the strengthening of the training of researchers, extension staff and farmers, especially linked to DFF, with a view to the development of technical, interdisciplinary and methodological capacities for the better understanding of self-help organizations and social innovations among farmers, particularly inter-village relationships, and the need to develop such capacities also in connection with local development initiatives and decentralization processes, as well as to investigate linkages between formal-informal systems and assess the most appropriate institutional framework to provide support for the synergies and complementarities between the two.

III. THE PROPOSED PROGRAMME

5. The goal of the programme is to improve the livelihoods of poor farmers in Burkina Faso, Mali and Niger by strengthening the community-based management of plant genetic resources.

6. **Key programme activities.** The key programme activities will include the building of the social capital of farmers through DFF and seed diversity fairs, the incorporation of DFF and action-research into village dynamics, community participatory action research, the identification of institutional and social networks that determine seed flows and benefit distribution, and better understanding of the genetics of crop varieties and the impact of social, geographical and institutional factors. To this end, investigations of the role of social and geographical factors and of crop management practices on crop diversity will be conducted. Empirical economic research will quantify the market and non-market values of crop diversity to households in varying social and economic situations so as to assist farmers, researchers and development workers in quantifying the value of diversity as a way to strengthen their informed choice or consent.

7. A specific unit within the Institute of Rural Economy (part of the national agricultural research system of Mali) will support the complex documentation requirements of the DFF and carry out research activities with a view to sharing this information with farmers. The close involvement of farmers in this research is expected to contribute directly to the strengthening of the capacity of farmers to evaluate traditional and modern varieties and understand the effect of seed management practices on diversity. Capacity in plant genetic resources research and management will be reinforced by: (a) using a training-the-trainers approach targeted at different categories of development professionals and including technical, interdisciplinary and methodological topics; and (b) the development and testing of new learning modules focused on the creation of facilitation and communication skills through a process of highlighting the value of the concrete experiences of individuals.

8. The reinforcement of training capacities and approaches will be achieved through the development and testing of pilot training modules. Work on the contextualization of curricula and the delivery processes for educational change in universities, closely linked with professional upgrading and retraining, will aim at the identification and testing of possible pathways for the adaptation of formal education to the requirements of the new research and development approaches implemented through the programme. An interuniversity group will be constituted to mobilize students, together with local actors, to write their theses on themes emerging from the DFF. Exchanges among students, lecturers, other researchers and development actors will be fostered.

9. The initiation of a process of personal, attitudinal, behavioural and professional upgrading and adaptation among research and development agents will enable them to offer better support for smallholder, community-based plant genetic resource management systems. Researchers and extension staff will analyse their own professional activity using a four-step transformational self-reflexive cycle that has been successfully tested in the Project for the Promotion of Local Initiative for Development in Aguié in Niger. The programme will assist development organizations and research institutes in the integration of the new modes of learning (evolution towards learning organizations), institutional values, functions, modalities of interaction with farmers and accountability rules that emerge from the programme.

10. The programme will build on existing institutions and the national plant genetic resources committees in each country to create a multi-stakeholder forum with representatives of farmers organizations, the commercial seed sector, national agricultural research organizations and development organizations involved in plant genetic resources management. The forum will have the purpose of promoting policies supportive of the on-farm, community-based management of plant

genetic resources. Policy change will be fostered through policy analysis and research in order to identify factors influencing the access to and management of plant genetic resources in sectoral policies, national strategic plans for poverty reduction, national biodiversity strategies and national implementation plans for the Leipzig Global Plan of Action.

11. **Linkages with IFAD development projects, regional cross-fertilization.** The tight synergies already established with the Income Diversification Programme in the Mali Sud Area during the first phase of the programme will be extended to the Sahelian Areas Development Fund Programme. In Niger, the approach used by the Project for the Promotion of Local Initiative for Development in Aguié has several useful elements that can contribute to the research programme methodology, while that project can, in turn, benefit from the activities of the research programme. Ties will also be established with the new Community Investment Programme for Agricultural Fertility (Burkina Faso).

12. The programme will also involve a pilot initiative to analyse and study successful models of community based *in-situ* conservation in South Asia, including sacred groves and related systems, with the specific purpose of distilling knowledge and good practice that could be relevant to the sub-Saharan Africa context.

IV. EXPECTED OUTPUTS, EXPECTED BENEFITS

13. Within the context of a sustainable livelihood approach, the following outputs are expected.

(a) **Social capital**

- (i) Farmers organizing DFF and seed diversity fairs with the participation of researchers and extension staff.
- (ii) Improved social cohesion within villages through the DFF.
- (iii) Farmers with strengthened linkages to research and extension that enable them to tap into national research and extension systems.

(b) **Natural capital**

- (i) Enhanced-quality adapted seed with preferred traits and the knowledge related to this seed are accessible to farmers in a timely manner.
- (ii) A wider range of seed that is accessible and available, reducing the vulnerability to natural and market fluctuations.

(c) **Human capital**

- (i) Farmers have increased capacity to evaluate traditional and modern varieties and understand the effect of seed management practices on this diversity.
- (ii) A pool of development-oriented researchers and extension staff is available, with the knowledge, skills and attitudes appropriate for supporting the research and development agenda of farmers.
- (iii) Learning plans and training materials to support the preparation of facilitators of DFF are developed and validated for university curricula and incorporated into didactic approaches and vocational training.

(d) **Political capital**

National multi-stakeholder fora for the promotion of policies that support the on-farm, community-based management of plant genetic resources and for the representation of national interests in international fora.

V. IMPLEMENTATION ARRANGEMENTS

14. The programme is a joint IPGRI and Food and Agriculture Organization of the United Nations (FAO) initiative that is managed and coordinated by the IPGRI Office for Sub-Saharan Africa, Nairobi, Kenya, with support from the IPGRI office in Cotonou, Benin. FAO will coordinate the capacity-building components, while IPGRI will focus on the research components. Both organizations will take an active part in all aspects of the programme. A coalition of partners has been built during the programme design stage, including NARS, academic institutions, international and national NGOs, international organizations and farmers organizations. A steering committee will oversee execution of the TAG. The committee will consist of two representatives from IPGRI, one from FAO, one from each of the three countries and one from IFAD. National steering committees will be created in each country and consist of representatives of national project partners, including farmers organizations, national agricultural research institutes, universities, NGOs and IFAD development projects. The assessment of the impact of the programme will be closely linked to the economic research and will be coordinated with the impact assessment units of IFAD investment projects.

VI. INDICATIVE PROGRAMME COSTS AND FINANCING

15. IFAD will support a specific component within a larger initiative costing an estimated USD 2 260 000. An amount of USD 1 300 000 will be covered by IFAD grant financing. IPGRI's in-kind contribution will be equivalent to USD 150 000; in addition, a cash contribution of USD 60 000 in complementary support incremental to the IFAD-specific compact will cover scholarships for doctoral students working on seed systems, while, through the Genetic Resources Policy Initiative, USD 50 000 will support related policy work. A total of approximately USD 700 000 is targeted for direct support for the DFF and seed diversity fairs through the IFAD investment projects in the three participating countries. The amount of USD 100 000 from the IFAD grant, initiated by the Technical Advisory Division and the Asia and the Pacific Division (IFAD), will be targeted to the cross-regional study of community-based genetic resource management systems from Asia to sub-Saharan Africa.

**PRELIMINARY COST TABLE
(IFAD GRANT, USD)**

Categories	Total
Personnel	115 000
Consultancies	215 000
Travel	116 000
Research contracts	393 000
Training and fellowships	98 000
Conferences and meetings	111 000
Equipment	78 000
Overhead	170 000
Publications	4 000
Total	1 300 000

WORLD AGROFORESTRY CENTRE (ICRAF): DIVERSIFICATION OF SMALLHOLDER FARMING SYSTEMS IN WEST AND CENTRAL AFRICA THROUGH CULTIVATION OF INDIGENOUS TREES – PHASE II

I. BACKGROUND

1. The countries in the humid tropics of Africa possess significant natural resources, but many people still remain poor within their local contexts. Perpetual fluctuations in the prices of raw materials on the world market since 1987 have impeded various strategies by the states to achieve substantial economic growth. In Cameroon (considered fairly representative in the region in terms of human development indexes), structural adjustment programmes characterized by decreased state spending on health, education, agricultural research, extension and road maintenance have disproportionately affected the more vulnerable rural poor, among which women, youths and the elderly have been particularly hard hit. Price liberalization, coupled with currency devaluation, has in many cases worsened the economic situation of resource poor farmers.
2. The challenge in the region is to find ways to alleviate the poverty in an increasing number of rural households and extended families. A disproportionate number of women are involved in producing a limited range of products on increasingly less productive land that has been converted from forests for a growing urban population and within an unstable macroeconomic environment. Since 1999, ICRAF, in collaboration with partners (NARS, NGOs, farmers groups, universities) has been developing the tree domestication process, an innovative approach to high-value indigenous fruit tree selection, propagation and marketing with potential to enhance livelihoods and support environmental services.
3. **Continuing role of indigenous trees in rural livelihoods in the region.** Many studies have stressed the importance of trees to rural livelihoods and the resulting positive impacts on both poverty and the environment. Farmers continue to incorporate a range of indigenous tree species into their farming systems, albeit in small numbers and for diverse purposes, all over Cameroon and Nigeria. Indigenous tree products continue to make a significant contribution to the livelihoods of poorer households and their extended families in the region. For example, revenues from the sale of *Dacryodes edulis* fruits coincide with the period when school fees and associated costs are due. The fruiting and harvesting of *Irvingia wombolu* and *Gnetum africanum*, furthermore, peak in the middle of the dry season (a lean period), when main soup-making additives are out of season and there are no major products from the farms to sell for cash. Although indigenous fruit tree products, in particular, continue to play an important role within the portfolio of income-generating activities among women and youth, constant vigilance is needed to ensure that the period of adjustment to the intrahousehold division of roles and responsibilities is addressed and shortened and made less painful (especially for women and youth), because farmers (women, as well as men) often make a (negative) trade-off between food and nutrition security and earning cash and also because men are attracted to ‘women’s activities’ as soon as these become profitable.
4. Indigenous fruit trees provide an essential nutritional input. For example, safou (*Dacryodes edulis*) is an accompaniment to staple foods for three or four months of the year, providing a cheap source of energy, proteins, essential amino and fatty acids and substantial amounts of potassium, phosphorus, calcium and magnesium.

II. RATIONALE AND RELEVANCE TO IFAD

5. Against the background of the continuing role indigenous trees and their products can play in the livelihoods of poor, rural households, considerable capacity and knowledge were developed by ICRAF and partners within the region during Phase I of the programme in order to sustain the development, dissemination and enhanced commercialization of indigenous trees and their products in the region. There have been many accomplishments in the development of low-cost, value-adding tree propagation approaches, the understanding of the markets for high-value fruit and medicinal plants in Cameroon, Equatorial Guinea, Gabon and Nigeria and evaluations of tree cultivation decision-making processes among farmers. These now present excellent opportunities for the integration and management of high-value indigenous trees in farming systems by poor, rural farmers and their extended families, for income, nutrition and health. This could occur via mechanisms that respect farmer logic, specificities and capacities and take advantage of the social organization that complements the process. ICRAF now needs to build on its achievements during Phase I.

III. THE PROPOSED PROGRAMME

6. The overall purpose of the programme is to facilitate the development of productive, simultaneous, diverse and multi-strata agroforestry farming systems, adaptable to the livelihood of resource-poor rural farmers, through the deliberate integration and management of high-value fruit, medicinal, fuel and vegetable species potentially to increase and stabilize annual farm incomes, reduce food, nutritional and health insecurity and contribute to the ecological resilience of the system. To reach these ends, Phase II of the programme will seek to attain six main objectives:

- (a) *To facilitate farmer-livelihood-oriented tree integration and management activities* through a better understanding of existing and model systems and by matching approaches to farmer needs, capacities and land-use systems.
- (b) *To fine-tune and adapt existing work packages for high-value tree propagation and cultivar development* according to the means, capacities and farming systems of grass-roots partners and target groups and establish sustainable, community-based pathways for the improved supply of planting material.
- (c) *To develop an adaptive marketing intelligence system for high-value trees and tree products* by linking the marketing system to the production dynamics of farmer tree-crop systems that result from tree integration activities.
- (d) *To develop, test and monitor mechanisms for the achievement of effective social and geographic targeting* in order effectively to reach vulnerable groups in rural areas and ensure capacity-building, access to assets and benefits sharing and to enhance the participation of these groups and that of other key stakeholders in high-value tree integration and management. Special emphasis will be placed on farmer-to-farmer approaches because these motivate farmers and use their own networks and knowledge systems.
- (e) *To build technical and organizational capacity* in tree propagation, integration and management methods among farmer groups, students, NGOs and extension agents in the region.
- (f) *To implement a systematic monitoring and evaluation mechanism based on socio-economic and livelihood indicators* so as to provide steering to the programme and eventually facilitate the evaluation of potential impact.

IV. ACTIVITIES

7. Tree Integration and Management

- understand existing farmer practices in tree integration (e.g. indigenous knowledge, adaptation and innovation and forms of social organization that support tree cultivation);
- characterize existing tree-based systems and evaluate links with farmer livelihoods;
- facilitate the integration of high-value trees into farming and plantation systems to meet farmer needs and capacities.

8. Germplasm Dissemination Pathways

- scale up tree propagation technology options for high-value fruit trees and medicinal plants;
- customize tree propagation options so as to target the circumstances and capacities of farmer groups;
- facilitate effective delivery pathways for improved germplasm.

9. Processing and Marketing

- facilitate the development of market intelligence systems;
- add value to tree products through the development of post-harvest technologies.

10. Technical Capacity-Building

- train in tree domestication (the training the trainers, farmer-to-farmer training, degree-related training);
- sponsor exchange and study visits;
- sponsor pilot efforts and review small-scale enterprise development.

11. Organizational Capacity-Building

- strengthen partner institutions (legalization, the development of business plans, market linkages);
- facilitate the development of links among actors in product sectors;
- analyse and recommend policy mechanisms that are supportive.

12. Geographical Targeting

- identify areas with the highest tree domestication potential (e.g., levels of poverty, land-use practices, environmental problems).

13. Social Targeting

- develop mechanisms to ensure the equitable access to and the sharing of the benefits from tree domestication within households and extended families;
- develop mechanisms to reach the most vulnerable and poorest groups within target communities and encourage the participation of these people in tree domestication,

V. EXPECTED OUTPUTS, EXPECTED BENEFITS

14. Outputs/Benefits

- the evaluation of tree-crop systems and the integration and management of high-value tree-crops on farmer fields;
- the development and implementation of a high-value tree-crop work package by national partners, NGOs and farmer groups;
- the development of improved harvest and post-harvest methods for high-value tree products and the evaluation of a market intelligence system with partners;
- the building of the capacity of partners to integrate, propagate and market trees and tree products.

VI. IMPLEMENTATION ARRANGEMENTS

15. The programme builds upon existing, ongoing work in the region that is being funded by IFAD, the Department for International Development (United Kingdom), ICRAF, the Federal Ministry for Economic Cooperation (Germany) and the Governments of Cameroon, Equatorial Guinea, Gabon and Nigeria. The marketing component of the programme will be complemented and reinforced by the Farmer Enterprise Development Project (2003-2007) that is funded by the Belgian Directorate-General for Development Cooperation and aims at increasing market opportunities for indigenous fruit and culinary products through improved market skills and strategies. The programme will also address processing and packaging issues not taken into account in this proposal.

16. ICRAF will manage and coordinate the programme, though NGOs and grass-roots organizations will play a prominent role in the empowerment of communities and farmer groups in the process of scaling out and scaling up the technology. To enhance effectiveness, ICRAF will build strategic partnerships with IFAD loan-funded projects such as the Community Development Support Project and the National Microfinance Programme Support Project being run in Cameroon. Moreover, strategic partnerships will be tied with governmental, non-governmental and community-based organizations using a joint partnership appraisal method based on partner history, goals and objectives, organizational structure, reach and resource endowment. Specific roles and contributions of the partners in the implementation of the programme will be established during the programme-launching workshop.

17. The programme will have a strong regional focus. However, country-specific activities and appropriate staffing models will be developed after taking into consideration the diversity both within and among the countries of the region in terms of the attractiveness of the technology to farmers, the strength of markets and the strengths and weaknesses of partners.

18. Funds will be disbursed partly in advance, but staggered to key partners (including NGOs and community-based organizations) according to the completion of an agreed workplan and budget. Each partner will ensure that relevant information is provided in time to enable ICRAF to produce progress reports. Furthermore, the following mechanisms will be put in place to streamline the monitoring and evaluation of programme activities and outputs.

ANNEX III

- Farmers will be assisted in keeping records of production, harvesting, sales, etc. These data will be compiled, inputted and analysed and will be used to measure impact against baseline data.
- All stakeholders will come together once a year to evaluate past activities and orient future work.
- Partners will prepare yearly workplans and budgets in consultation with ICRAF and will report twice a year on progress.
- A steering committee with representatives of the various stakeholders and IFAD will be appointed to examine the relevance and progress of activities.
- ICRAF will provide twice annual progress reports to IFAD. Feedback from IFAD on these reports will help to align the programme objectives to IFAD's mission.

VII. INDICATIVE PROGRAMME COSTS AND FINANCING

Cost Category	ICRAF	DFID	DGDC	USAID	IFAD	NARS	Total
	Secure	Secure	Secure	Secure	in pipeline		
Research staff costs	45 000	180 000	40 000		515 000	100 000	
Travel	15 000	20 000	20 000		170 600	50 000	
Equipment/supplies	60 000	90 000	30 000		197 000	25 000	
Meetings/training	60 000	60 000	50 000		170 000	20 000	
Overhead	120 000	5 000	10 000		147 400	10 000	
Total	300 000	355 000	150 000	500 000	1 200 000	205 000	2 710 000

DFID = Department for International Development (United Kingdom). DGDC = Directorate-General for Development Cooperation (Belgium). USAID = United States Agency for International Development office in the Democratic Republic of The Congo.

**INTERNATIONAL CENTER FOR AGRICULTURAL RESEARCH IN THE DRY AREAS (ICARDA):
PROGRAMME FOR DEVELOPING SUSTAINABLE LIVELIHOODS OF AGROPASTORAL
COMMUNITIES OF WEST ASIA AND NORTH AFRICA**

I. BACKGROUND AND RELEVANCE TO IFAD

Background

1. In the dry areas of West Asia and North Africa, rural livelihoods are based on agropastoral production systems in which small ruminants (sheep and goats) represent the principal source of income. These systems are in transition and vary both within and among countries from nomadic or semi-nomadic rangeland-based systems to mixed crop-livestock smallholder systems, with considerable interaction between the two. The farming systems promoted by past policies are not sustainable from an environmental perspective. Governments are seeking alternative approaches to address land degradation and poverty issues in the dry areas. Participatory approaches that aim at empowering the poor have provided leverage and created new avenues for the promotion of sustainable resource-use practices and livelihood strategies.

Achievements and Lessons Learned from the Mashreq/Maghreb Project

2. The regional Mashreq/Maghreb Project – Integrating Crop/Livestock Production Systems in the Low-Rainfall Areas of West Asia and North Africa, cofinanced by IFAD and the Arab Fund for Social and Economic Development between 1996 and 2003, achieved relevant technical, institutional and policy results. Two external reviews evaluated, in 2002 and 2003, the achievements of the Mashreq/Maghreb Project. Both reviews recommended that the findings of the project be scaled up over a wider geographic area in order to institutionalize the approaches and methodologies and accelerate the diffusion of technical, institutional and policy options (TIPOs). The proposed programme builds on those results to develop and test, at the community level, integrated and sustainable crop-livestock production systems in low rainfed areas of West Asia and North Africa.

3. **Community-based delivery system.** In order to integrate TIPOs, the Mashreq/Maghreb Project developed a community approach that was used to determine community constraints and opportunities and identify agreed action plans so that communities could undertake adaptive research and evaluate technology options.

4. **TIPOs.** With the participation of community members and other stakeholders, considerable progress has been made in the development of packages of ‘best bet’ TIPOs. These include: (a) on-farm feed production for alternative feed sources, with the introduction of fodder shrubs and cactus; (b) feed blocks produced by microentrepreneurs from agro-industrial by-products; (c) new varieties of barley, oat, vetch and triticale that are adapted to harsh environments; and (d) improved small ruminant-management practices to enhance the quality of the breeding, fertility and lambing rates and early weaning. The rehabilitation of rangeland through fodder shrub and cactus plantation has been adopted on private lands. However, on communal rangelands, technology options that require high levels of investments or collective action proved to be difficult without the development of appropriate local institutional support. Property rights (tenure rights and the use and access to land resources) have emerged as a critical factor for investment in common resource management schemes and requires further research.

5. **Community development plans (CDPs).** The project demonstrated that it is possible, through a carefully applied participatory approach, to develop and implement *negotiated community action plans* for participatory adaptive research and the evaluation of technology options. The implementation of these negotiated community action plans helped to identify the best bet TIPOs for

each community. By the end of the project, community members and other stakeholders had agreed on CDPs consisting of a package of ‘best-bet’ TIPOs for implementation at the community level.

6. **Capacity-building.** Multidisciplinary national teams have been established and have developed, through day-to-day experience, expertise in participatory community-based approaches and in the negotiation of plans for community action. These teams represent a highly valuable resource for the extension of the approach within national research and development systems.

7. **Networking and regional integration.** A substantial amount of knowledge has been accumulated among the communities in the region that will assist in guiding future research and development efforts. The coordinated regional approach of the project has facilitated the exchange of knowledge and experiences among the national teams. Individual countries have taken the lead in the development of the specific methodologies, technologies, or institutional options that have then been rapidly transferred to the other national teams in the project.

8. **Dissemination of the project’s results.** Studies of the adoption of some of the technologies tested and promoted through the Mashreq/Maghreb Project have shown high rates of adoption by the participating communities, as well other users outside these communities, with adoption rates ranging from 20 to 46% for most technologies. Analysis of the economic returns to an investment in these technologies has shown that internal rates of return exceeded 70% for all technologies in most countries. The project’s community approach and some of its technology options have been extended to other projects, including IFAD loan projects in Pakistan (the Barani Village Development Project) and in The Sudan (the North Kordofan Rural Development Project).

II. THE PROPOSED PROGRAMME

Objective

9. Building on the above achievements at the community level and the lessons learned, the proposed programme aims to *scale up* the approach by institutionalizing the approach in national agricultural research and extension programmes and *scale out* the approach through its use in development programmes in the dry areas. The programme will be an important interface between research and development.

Approach

10. The programme will be scaled out to cover a wider geographic area and a larger number of communities. It could cover a governorate or district according to the system followed in each country. The programme will continue to take a regional approach and work through the multidisciplinary teams that have been implementing the Mashreq/Maghreb Project. However, not all activities will be run in all countries. Whether the various elements of the programme are implemented will be determined according to the comparative advantages of each country and team, with the regional structure of the project facilitating the exchange of information and the transfer of proven options among the eight countries.

Key programme activities

11. **Consolidate and out-scale the community approach.** The community approach developed in the Mashreq/Maghreb Project has been recognized as a highly innovative and valuable tool. The agro-ecological characterization techniques that rely on new information technologies and geographic information systems and that helped in identifying constraints at the community level will be applied on a larger scale beyond the community to assist in land-use planning, the orientation of production

systems and the evaluation of land degradation. This will facilitate a determination of the communities with similar characteristics and constraints during the out-scaling process.

12. **Implement CDPs.** The CDPs vary according to the different production systems, the priorities and the existing institutional structures of each community and the agencies (research, extension, NGOs, etc.) involved in the implementation of the plans. The implementation of the CDPs will be the responsibility of each of the participating countries. However, the programme will monitor the implementation and identify where the support of national policy and institutions is needed.

Test and Evaluate Specific Research Themes

13. **New TIPOs for agricultural diversification and income generation.** This will include:

- *Water harvesting:* Emphasis will be on the use and dissemination of appropriate water harvesting techniques, including micro-catchments, contour ridges and the collection and storage of rainfall water in cisterns, pits, or earth dams.
- *Alternative cropping systems:* Alternative cropping systems for better soil and water use efficiency will be tested. This will include drought tolerant trees (olive, almond, fig and others) and native plants with medicinal, social and economic value that could play a major role in the diversification of production systems and income generation.
- *Livestock health and milk processing:* For animal health, the programme will link with an ongoing IFAD-supported initiative. In addition, the programme will test opportunities to increase farm incomes by adding value to livestock products, such as the local transformation of milk into ghee, yogurt and cheese. The focus will be on the identification of TIPOs that support the improved quality, processing and marketability of these products through the involvement of women.
- *Identification of market opportunities:* The identification of market opportunities for dryland products and the removal of market constraints are critical to the expansion of the portfolio of income generation options available to poor households. They are also critical to the effort to realize the proper value of these products. The experience and results gained in other projects within the region will also be accessed to support this element.

14. **Options for the communal management of rangeland resources.** Research will focus on the development of the TIPOs necessary for the community management of rangeland resources and for an understanding of the factors that contribute to the sustainability of these resources. In addition, incentive structures that would promote the wider adoption of rangeland technologies will be identified.

15. **Risk management and drought mitigation: drought coping strategies and drought management policies.** To help improve drought management strategies, the programme will analyse existing community livelihood strategies aimed at mitigating drought and evaluate existing national or subnational strategies and policies for drought preparedness and mitigation.

16. **Development of social, environmental and economic indicators.** Utilizing the baseline information collected during the Mashreq/Maghreb Project, the research will develop social, environmental and economic indicators and make them available to decision-makers. Through these indicators, the impact of the proposed programme will be assessed at the household and community levels. The community modelling work will be continued and institutionalized. In addition, the programme will evaluate the impacts of TIPOs using the sustainable livelihoods framework, which has the benefit of looking at household assets and the level of vulnerability of households.

Key outputs

17. The key expected outputs are:

- a consolidated community approach with TIPOs;
- CDPs implemented in target communities;
- an evaluation of factors that hinder collective action and recommendations for institutional and policy measures to promote communal rangeland management;
- TIPOs for risk management and drought mitigation;
- an identified set of TIPOs for the diversification of production and income generation by agro-pastoral communities, including the identification of market opportunities for dryland products;
- an evaluation of the returns to investment in dry areas and their effects on poverty alleviation and community development in the dry areas;
- social, environmental, and economic indicators to evaluate the impacts of the approach and of the proposed TIPOs; and
- strengthened local, national and regional integration and human capacity.

III. IMPLEMENTATION ARRANGEMENTS

18. The implementation of programme activities will be the responsibility of the national programmes. ICARDA will provide technical assistance and training where needed and facilitates regional coordination. The International Food Policy Research Institute (IFPRI) will provide technical support for research on policy and property rights. A programme steering committee will be formed. Each country will designate a national coordinator. These national coordinators, ICARDA's regional coordinator and the ICARDA assistant director general for international cooperation, an IFPRI representative and donor representatives will constitute the members of the steering committee. The committee will meet once a year to review, amend and approve annual workplans and budgets.

IV. INDICATIVE PROGRAMME COSTS AND FINANCING

19. The total cost of the three-year programme is nearly USD 5.0 million. The proposed contribution from IFAD is USD 1.3 million. ICARDA and IFPRI will provide in-kind support of USD 913 000 in personnel and logistics and administrative support. The eight NARS will provide combined in-kind support of USD 1.2 million in personnel, research facilities and support. This is based on the estimated actual in-kind contribution by the NARS to the Mashreq/Maghreb Project. The Arab Fund for Economic and Social Development (AFESD) is expected to cofinance almost USD 1.6 million.

**PROGRAMME COSTS AND FINANCING
(USD)**

Cost Category	IFAD	ICARDA	IFPRI	NARS	AFESD	Total
Personnel (scientific and support staff)	250 000	400 000	68 000	340 000	300 000	1 358 000
Capacity-building and training	225 000			80 000	300 000	605 000
Research/field expenses	575 000				700 000	1 275 000
Equipment/facilities	140 000			600 000	100 000	840 000
Logistics, administrative backstopping	110 000	430 000	15 000	180 000	150 000	885 000
Total	1 300 000	830 000	83 000	1 200 000	1 550 000	4 963 000