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Enabling poor rural people
to overcome poverty

President's report on proposed grants under the global/regional grants window to CGIAR-supported international centres

Note to Executive Board representatives

Focal points:

Technical questions:

Shantanu Mathur
Coordinator, Grant Programme
Tel.: +39 06 5459 2515
e-mail: s.mathur@ifad.org

Dispatch of documentation:

Liam F. Chicca
Governing Bodies Officer
Tel.: +39 06 5459 2462
e-mail: l.chicca@ifad.org

For: Approval

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Abbreviations and acronyms

ARMP-II	Agricultural Resource Management Project – Phase II
CGIAR	Consultative Group on International Agricultural Research
CIAT	International Center for Tropical Agriculture
CIP	International Potato Center
IB	irrigation board
ICARDA	International Center for Agricultural Research in the Dry Areas
ICT	information and communications technology
IUCN	International Union for Conservation of Nature
IWMI	International Water Management Institute
R&D	research and development
RTC	root and tuber crops
SMS/MMS	short messaging service/multimedia message service
WP	work package
WUA	water users' association

Recommendation for approval

The Executive Board is invited to approve the recommendations for grants under the global/regional grants window to CGIAR-supported international centres as contained in paragraph 7.

President's report on proposed grants under the global/regional grants window to CGIAR-supported international centres

I submit the following report and recommendation on four proposed grants for agricultural research and training to Consultative Group on International Agricultural Research (CGIAR)-supported international centres in the amount of US\$5.725 million.

Part I – Introduction

1. This report recommends the provision of IFAD support to the research and training programmes of the following CGIAR-supported international centres: International Potato Center (CIP); International Center for Agricultural Research in the Dry Areas (ICARDA); Bioversity International; and International Water Management Institute (IWMI).
2. The documents of the grants for approval by the Executive Board are contained in the annexes to this report:
 - (i) CIP: Root and Tuber Crops Research and Development Programme for Food Security in the Asia and Pacific Region
 - (ii) ICARDA: Improving the Food Security and Climate Change Adaptability of Livestock Producers using the Rainfed Barley-based System in Iraq and Jordan
 - (iii) Bioversity International: Reinforcing the Resilience of Poor Rural Communities in the Face of Food Insecurity, Poverty and Climate Change through On-farm Conservation of Local Agrobiodiversity
 - (iv) IWMI: Smart Information and Communications Technology (ICT) for Weather and Water Information and Advice to Smallholders in Africa
3. The objectives and content of these applied research programmes are in line with IFAD's evolving strategic objectives and Policy for Grant Financing.
4. The overarching strategic goal that drives the revised Policy for Grant Financing, which was approved by the Executive Board in December 2009, is to promote successful and/or innovative approaches and technologies, together with enabling policies and institutions, that will support agricultural and rural development, empowering poor rural women and men in developing countries to achieve higher incomes and improved food security.
5. The policy aims to achieve the following outputs: (a) innovative activities promoted and innovative technologies and approaches developed in support of IFAD's target group; (b) awareness, advocacy and policy dialogue on issues of importance to poor rural people promoted by, and on behalf of, this target group; (c) capacity of partner institutions strengthened to deliver a range of services in support of poor rural people; and (d) lesson learning, knowledge management and dissemination of

information on issues related to rural poverty reduction promoted among stakeholders within and across regions.

6. The proposed programmes are in line with the goal and outputs of the revised IFAD grant policy:
 - (a) The goal of the Root and Tuber Crops Research and Development Programme for Food Security in the Asia and Pacific Region is to improve food security, nutrition and income generation potential of rural communities in the Asia and the Pacific region, based on sustainable root and tuber crop production and utilization.
 - (b) The programme for Improving the Food Security and Climate Change Adaptability of Livestock Producers using the Rainfed Barley-based System in Iraq and Jordan contributes to IFAD's overarching goal of empowering small farmers in the two countries by improving food security, livelihoods, and climate change adaptability of poor rural households in rainfed areas dependent on barley and livestock production.
 - (c) The programme on Reinforcing the Resilience of Poor Rural Communities in the Face of Food Insecurity, Poverty and Climate Change through On-farm Conservation of Local Agrobiodiversity will facilitate more effective use, management and conservation of local agrobiodiversity by communities and stakeholders, to benefit resource-poor farmers whose agrobiodiversity livelihood assets are gradually being lost.
 - (d) The Smart ICT for Weather and Water Information and Advice to Smallholders in Africa programme involves innovative approaches and ICT-based technologies for weather, water and crop-related information and advice to relevant end users in Africa for informed decision-making and enhanced negotiation capacity with water- and farm-related service providers. The goal is to empower smallholder farmers in Africa to make informed decisions in managing their land and water resources.

Part II – Recommendation

7. I recommend that the Executive Board approve the proposed grants in terms of the following resolutions:

RESOLVED: that the Fund, in order to finance, in part, the Root and Tuber Crops Research and Development Programme for Food Security in the Asia and Pacific Region, shall make a grant not exceeding one million four hundred and fifty thousand United States dollars (US\$1,450,000) to the International Potato Center (CIP) for a three-year programme upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented to the Executive Board herein.

FURTHER RESOLVED: that the Fund, in order to finance, in part, the Improving the Food Security and Climate Change Adaptability of Livestock Producers using the Rainfed Barley-based System in Iraq and Jordan, shall make a grant not exceeding one million five hundred thousand United States dollars (US\$1,500,000) to the International Center for Agricultural Research in the Dry Areas (ICARDA) for a three-year programme upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented to the Executive Board herein.

FURTHER RESOLVED: that the Fund, in order to finance, in part, the programme for Reinforcing the Resilience of Poor Rural Communities in the Face of Food Insecurity, Poverty and Climate Change through On-farm Conservation of Local Agrobiodiversity, shall make a grant not exceeding nine hundred and seventy-five thousand United States dollars (US\$975,000) to Bioversity International for a three-year programme upon such terms and

conditions as shall be substantially in accordance with the terms and conditions presented to the Executive Board herein.

FURTHER RESOLVED: that the Fund, in order to finance, in part, the Smart Information and Communications (ICT) for Weather and Water Information and Advice to Smallholders in Africa programme, shall make a grant not exceeding one million eight hundred thousand United States dollars (US\$1,800,000) to the International Water Management Institute (IWMI) for a three-year programme upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented to the Executive Board herein.

Kanayo F. Nwanze
President

International Potato Center (CIP): Root and Tuber Crops Research and Development Programme for Food Security in the Asia and Pacific Region

I. Background

1. Root and tuber crops (RTCs) comprise potato, sweet potato and cassava, in addition to a range of crops that are locally important, including several yam and aroid species. They cover a range of agroecologies from cool temperate climates and mountainous regions to lowland humid tropics, and are important components of smallholder farming systems in densely populated rural areas (e.g. Indo-Gangetic plains) as well as in more isolated locations (e.g. Indonesia, Pacific islands, the Philippines). Across this range of locations, RTCs are commonly associated with the poorest farming households, often in less favoured environments. A recent IFAD-commissioned scoping study¹ summarizes the important role of these crops in providing food security through direct consumption of the fresh roots/tubers, as an on-farm animal feed and as a source of income. RTCs are multiple-end-use crops that are often processed on a small scale in rural areas (providing added value products and generating employment), as well as increasingly being used as raw material in a wide range of industries.
2. RTCs are especially important for food security in areas where indigenous communities and ethnic minorities practice traditional smallholder production systems, usually with poor market access, including the more remote areas of South-East and East Asia, tribal areas in South Asia and island communities in the Pacific. In these locations, RTCs not only provide carbohydrates and dietary fibre, but also contribute important micronutrients: vitamins (e.g. A, C) and minerals (e.g. iron, zinc). Consumption of the leaves of some species (e.g. sweet potato, taro) contributes valuable protein and micronutrients. On-farm feeding of roots/tubers to livestock represents another contribution to dietary protein. Potato and sweet potato are short-term crops that fit into intensive smallholder production systems between rice or wheat crops in some of the most productive agricultural areas (China, Indo-Gangetic plains) that are vital to national food security, while cassava is increasingly used as an industrial raw material for animal feed, starch and biofuel industries in East and South-East Asia that are driving production intensification. Given the massive scale of the challenges facing the region in coming decades – demographic and economic growth, environmental stress and climate change – it is vital that the contribution of RTCs to food security and livelihoods at local and national levels is efficiently and sustainably enhanced.

II. Rationale and relevance to IFAD

3. The proposed programme focuses on the important role of RTCs in food security in the Asia and Pacific region. This role has been somewhat neglected due to (i) the emphasis of food security studies and initiatives in Asia and the Pacific on rice, wheat and other grain staples; and (ii) the focus of much food security-oriented root and tuber research and development (R&D) on Africa and Andean Latin America. As a result, the scoping study found that there are many gaps in our knowledge of RTC contributions to food security in the Asia and Pacific region, especially given the dynamic socio-economic context and environmental challenges the region is facing. The lack of systematically gathered, current and high quality information places serious constraints on the efficient and effective targeting of pro-poor investment towards user-defined needs and opportunities for RTCs. On the other hand, there are many research products – from national and international R&D systems – that can potentially contribute to solutions to these challenges, but

¹ Available upon request.

whose optimal application (fit) is as yet uncertain due to these knowledge gaps. These include technological/biological, organizational and policy innovations. The proposed programme will facilitate the establishment of institutional mechanisms to develop, pilot and disseminate interventions to resolve these issues of direct relevance to poor communities that depend on RTCs.

4. **Consistency with the IFAD Strategic Framework 2007-2010.** The proposed programme is in line with the overarching goal of the IFAD Strategic Framework of empowering the rural poor to achieve household food security and income through: (i) local and national policy and programming processes that target populations where RTCs overlay poverty incidence; and (ii) enabling research and development organizations, along with multisector stakeholders, to undertake strategic actions for improving access by poor women and men to knowledge and support services, as well as capacities for learning and innovation on RTCs. The programme focuses on improving the access of the rural poor to improved agricultural technologies and services, input and produce markets, value-addition and employment opportunities, thus enhancing food security and incomes.
5. **Consistency with country-specific IFAD projects.** Several IFAD investment projects in the countries selected for the in-depth research and development actions are likely to benefit. They include, but are not limited to: China: Sichuan Post-Earthquake Agricultural Rehabilitation Project, Inner Mongolia Autonomous Region Rural Advancement Programme, South Gansu Poverty-Reduction Programme, West Guangxi Poverty-Alleviation Project; India: Post-Tsunami Sustainable Livelihoods Programme for the Coastal Communities of Tamil Nadu; Orissa Tribal Empowerment and Livelihoods Programme, Jharkhand-Chattisgarh Tribal Development Programme, North Eastern Region Community Resource Management Project for Upland Areas; Indonesia: National Programme for Community Empowerment in Rural Areas Project; Maldives: Fisheries and Agricultural Diversification Programme; the Philippines: Second Cordillera Highland Agricultural Resource Management Project, Rural Microenterprise Promotion Programme, and the future Integrated Natural Resources and Environmental Management Project (INREMP); Sri Lanka: National Agribusiness Development Programme (NADeP).

III. The proposed programme

6. The goal of the programme is to improve the food security, nutrition and income generation potential of rural communities in the Asia and Pacific region, based on sustainable root and tuber crop production and utilization. Its objectives are to: (i) map and prioritize areas where a high incidence of food insecurity and poverty overlap with RTCs production and consumption; (ii) understand and document the current roles of RTCs in contributing to food security and income generation in the priority target areas and identify opportunities and challenges in enhancing this contribution; and (iii) prioritize and introduce R&D actions and capacity strengthening in target areas, in partnership with IFAD investment projects, including support to local and national policy and programming processes in selected countries, RTCs value chain development, and improving access by poor people to knowledge and support services, as well as learning and innovation on RTCs.
7. The target group is poor rural households for whom RTCs are a major component of livelihood systems and make a significant contribution to food security (either directly or via income generation/employment). Emphasis will be placed on indigenous communities (including ethnic minorities where relevant) and on women, as critical to reaching household food security and nutrition objectives. Research and extension service providers, policymakers and development agents (national agricultural research systems, NGOs, private sector) in selected countries will also benefit from knowledge sharing and management outputs.

8. The programme will be of a three-year duration and will comprise three main components: (i) mapping the RTC/poverty overlap to identify priority target sites; (ii) understanding the RTC systems in those sites and, on that basis, identifying potential innovations and interventions to reduce poverty; and (iii) implementing action research, enhancing capacity and designing follow-up projects for longer term impact.

IV. Expected outputs and benefits

9. Expected outputs and benefits are as follows:
 - (a) **Output 1.** High priority subnational target areas that combine a high incidence of food insecurity and poverty with RTC production and consumption are mapped, and scenarios to 2025 and 2050 are developed that take pro-poor technological and policy innovations and climate change into account.
 - (b) **Output 2.** Opportunities and challenges are identified to enhance the contribution of RTCs to food security and incomes in the prioritized target areas, with an emphasis on: (i) sustainability of crop production, including soil and water management and agrochemical issues; (ii) maintaining diversity of plant genetic resources; (iii) consumption patterns and nutritional value; (iv) market demand trends and policy options; and (v) equitable participation by smallholder producers in value chains.
 - (c) **Output 3.** R&D actions and capacity strengthening needs are prioritized and introduced, implementation processes agreed and collaborative institutional arrangements established to benefit from opportunities and overcome challenges identified in Output 2 for prioritized target areas, taking into consideration the impact of climate change.
10. The benefits of the foregoing are as follows:
 - (a) A more diverse and robust regional food system in the face of possible shocks, through the identification and dissemination of information, higher awareness among decision makers, and investment opportunities for R&D actions that enhance the contribution of RTCs to the food security and social equity of resource-poor producers in Asia;
 - (b) The overlap between RTCs and poverty for the Asia and Pacific region is mapped and widely disseminated to help policymakers, governments and donors such as IFAD take these into account in designing new investment ideas to be embedded in ongoing or new IFAD-funded projects in the region;
 - (c) RTC development opportunities and challenges are identified and incorporated into the implementation of ongoing IFAD-supported projects and in the design of new investments; and
 - (d) Capacity-building of national research institutions in RTC-related issues.

V. Implementation arrangements

11. The lead implementing agency for the programme will be CIP, headquartered in Lima, Peru. CIP will be responsible for the day-to-day implementation of programme activities, although it will subcontract some activities to other national or international research institutions and CGIAR centres. The programme will be managed from CIP-Asia by a regionally posted senior scientist assisted by a full-time regional research fellow/scientist. The Impact Enhancement Division Leader at CIP headquarters will provide scientific oversight to the programme. CIP's R&D responsibilities cover potato, sweet potato and other RTCs, while the International Center for Tropical Agriculture's (CIAT) Asia office (based in Vientiane, Lao People's Democratic Republic) will provide support for cassava-related activities.

12. The activities undertaken in the field research sites (outputs 2 and 3) will be contracted to the most appropriate national (or provincial, in the case of China and India) institution, which will in turn coordinate and subcontract as necessary with other agencies involved in each site. Action-oriented R&D carried out as part of Output 3 will be achieved through partnership with national/local institutions, including capacity-building, and will need to ensure sustainability beyond the lifespan of this programme. A CIP scientist will be assigned as member in the research team for each site.
13. A programme steering committee will be established to be co-chaired by IFAD (represented by the task manager) and CIP (represented by the Director General or her representative), will include representatives from partner institutions in participating countries, as well as CIAT. The Committee will provide overall direction, guidance and coordination among stakeholders, and will have the authority to review and approve annual work plans and budgets, including R&D plans.
14. A programme management information system will be developed for each study site (and the CIP coordination unit itself) including quarterly milestones for the key indicators. It will be managed by the programme coordinator.
15. IFAD's Asia and the Pacific Division and CIP headquarters will jointly supervise programme implementation at least once a year. The IFAD project managers in the countries concerned will be consulted on implementation issues and during such supervision and implementation support missions to strengthen linkages with IFAD-supported investment projects in the countries covered.

VI. Indicative programme costs and financing

16. The estimated total programme cost of US\$2.05 million will be cofinanced by an IFAD grant of US\$1.45 million and contributions from implementing partners totalling US\$600,000, over a three-year period (January 2011-December 2013).

Summary of budget and financing plan^a

(In thousands of United States dollars)

<i>Type of expenditure</i>	<i>IFAD</i>	<i>Cofinancing^b</i>
Personnel (including subcontractors)	245	130
Professional services (consultancies and research contracts)	523	120
Travel costs	120	25
Equipment	25	50
Operational costs, reporting and publications	206	75
Training/capacity-building/workshops/conferences/seminars	180	200
Overheads	151	-
Total	1 450	600

^a Discrepancies in totals are due to rounding.

^b Cofinancing from CIP, CIAT and other partners.

Results-based logical framework

Objectives hierarchy	Objectively verifiable indicators	Means of verification	Assumptions-Risks
Goal. Improved food security, nutrition and enhanced income generation for rural communities in the Asia and Pacific region, based on sustainable root and tuber crop (RTC) production and utilization	-Policy and practice in food security of IFAD assistance in the Asia and Pacific region and recipient governments place greater focus on the role of root and tuber crops	-Government statistics -IFAD/CIP reports -Impact assessments	-Continuing support and participation of IFAD and governments -Quality process documentation and iterative learning processes in place
Objectives The purpose of the programme is to promote the role of RTCs in the farming systems of the Asia and Pacific region in building a more diverse and robust regional food system in the face of possible shocks and climate change	-8 diverse sites in at least 5 countries identified, and joint R&D agenda/programmes on RTCs successfully developed there with stakeholders -50% of sites succeed in disseminating research findings that are picked up by governments and IFAD programmes -At least 4 new R&D investment opportunities are supported by donors which strategically mobilize potential of RTCs	-Publications (journals, conference/workshop and strategy papers) -R&D proposals -Programme reports	-The external environment remains conducive to pro-poor investments -Outcomes convince policymakers and donors of role of RTCs in food security and justify further investments -Target sites are representative of the Asia and Pacific region
Output 1. High priority subnational target areas that combine a high incidence of food insecurity and poverty with RTCs production and consumption are mapped, and scenarios to 2025 and 2050 are developed that take pro-poor technological and policy innovations and climate change into account	-1 Asia and Pacific region wide map showing RTC production overlaid with poverty data is ready -20 potential target areas where RTCs are important are identified of which 8 or more are selected for detailed study -At least 50% of target group are indigenous communities -Scenarios to 2025 and 2050 and models are ready	-Programme reports -Publications -Map	-Information on RTC production, food consumption and poverty levels, climate change, technological/policy innovations is available in sufficient detail to enable models/scenarios to be developed
Output 2. Opportunities and challenges identified that enhance the contribution of RTCs to food security and increased incomes in the target areas	-8 completed diagnostic studies of RTC production systems, consumption and nutrition patterns, and value chains -8 market demand studies completed for RTC produce/products and raw materials -8 policy studies yield data that affect the RTC sector, taking into account gender, social equity, food security and incomes	-Study reports and publications	-Information of desired quality can be obtained from primary and secondary sources to permit identification of accurate and relevant priorities for future R&D
Output 3. R&D actions and capacity strengthening needs are prioritized and introduced, implementation processes agreed and collaborative institutional arrangements established with IFAD and government investment projects	-8 stakeholder workshops and proceedings agree R&D priorities, implementation processes and organizational arrangements on the basis of Outputs 1 and 2 results -8 short and longer term R&D programmes, proposals and other initiatives prepared -8 publications and other information products released	-Publications, proceedings, reports -Proposals for future short- and longer-term R&D	-Active participation of stakeholders in the process -Financial support for new initiatives is forthcoming for follow-up actions

Key Activities (by Output)

- For Output 1:** (a) collection and analysis of datasets on RTC production and consumption; of poverty levels at 8 target areas; and of models and forecasts for RTC production in these areas;
- For Output 2:** For each site: (a) establish a working group, (b) design and implement a series of studies on baseline data, trends in consumption demand, policies, markets, major value chains, opportunities for enhancing equity (including gender and indigenous communities/ethnic minorities), and participation of smallholder producers/processors and their organizations in development activities; (c) develop an inventory of innovations/interventions/technologies to address constraints/opportunities; and (d) results analysis and reporting.
- For output 3:** (a) documentation and dissemination of results of Outputs 1 and 2; and workshops in each target area (or country level) to discuss results and identify/agree priorities for R&D; (b) regional workshop to discuss relevant common investment opportunities for R&D and establish consortia for targeted action research; (c) preparation of proposals for on-going and future R&D programs which seek to integrate RTC innovations; (d) capacity strengthening and technical backstopping to on-going programs which integrate RTC innovations in their respective implementation work plans; (e) preparation of proposals for longer-term R&D actions in target and other areas; and (f) monitoring and evaluation on outcomes of RTC innovations introduced.

International Center for Agricultural Research in the Dry Areas (ICARDA): Improving the Food Security and Climate Change Adaptability of Livestock Producers using the Rainfed Barley-based System in Iraq and Jordan

I. Background

1. Global climatic trends are expected to exacerbate water scarcity and adversely impact cereal crop production in the Near East and North Africa region, which suffers from the highest food deficits among all regions of the world. Global climate projections indicate that cereal crop production in rainfed areas may drop by 30 to 50 per cent and in some countries by up to 80 per cent. Barley production will be particularly affected as it is often grown on the fringes of deserts and steppes or at high elevations with modest or no inputs.
2. Barley-based livestock production systems sustain some of the poorest segments of the rural population in the region. The livelihoods of these poor rural households depend largely on agricultural production and animal-keeping activities, which have proven to be highly resilient under arid conditions with recurrent droughts and erratic and declining rainfall. These systems therefore play an important role in the food security status of poor rural households, who often have little diversification in their livelihoods or skills base to mitigate shocks.
3. Persistent poverty among poor rural households dependent on barley-livestock systems in Iraq and Jordan is predicated by low yields: 0.74 t/ha for Iraq and 0.31 t/ha for Jordan during the period 2005-2008, far below recorded yields in other countries.¹ In Iraq and Jordan, all barley grain and straw is used as animal feed.
4. Global climate variability and climate change pose a serious threat to the environment, natural resources and production systems in areas where rainfed, barley-based livestock systems are practised. The resulting greater terminal heat stress, drier soils and shorter growing seasons all decrease agricultural productivity.
5. Research initiatives and methodological instruments have been implemented by ICARDA and partners to tackle interrelated challenges posed by climate change to rural communities. The proposed programme will capitalize on the results of these initiatives and ensure that they are more easily and more quickly accessible to resource-poor farmers and livestock producers.

II. Rationale and relevance to IFAD

6. The programme contributes to IFAD's overarching goal of empowering small farmers in the two countries who rely mainly on agriculture for their livelihoods, have limited access to technological developments and hence suffer from poverty. In Jordan, the programme will work with and augment ongoing activities related to livestock improvement and natural resource conservation in the Agricultural Resource Management Project – Phase II (ARMP-II), complementing its Global Environment Facility (GEF) component. In Iraq, IFAD and ICARDA have supported the Mashreq/Maghreb Project (M&M)² and the ongoing Integrated Pest Management and Organic Fertilization Programme (IPMOF).³ The programme will utilize the technologies and knowledge generated by the M&M project, which has been

¹ The average yield of barley is close to 3.0 t/ha in developed countries and about 1.7t/ha on average in developing countries.

² Project active in 1995-2007 on adaptive research for crops and livestock in low rainfall areas of West Asia and North Africa.

³ Ongoing until 2011.

effective for several years in both countries, and apply them to targeted communities with a view to providing policy and technical options for climate change responsiveness. The programme will complement the ongoing IPMOF programme in Iraq, which will benefit from the application of conservation agriculture and livestock technologies.

7. In addition, the programme will provide a foothold for IFAD to reengage more directly in providing assistance to its target group in Iraq, and assist in developing its policy and investment programme in the country.

III. The proposed programme

8. The overall goal of the programme is to improve food security, livelihoods and climate change adaptability for poor rural households in rainfed areas dependent on barley and livestock production. The objective is increased productivity and climate change resilience among farming communities in targeted areas of Iraq and Jordan. This will be achieved by focusing on two major areas and their associated outputs: (i) ready-to-use options and technologies to help communities cope with the impact of climate change; and (ii) an enhanced understanding and awareness of the impact of climate change and response options, at the national and community level.
9. Techniques involving zero tillage, optimum sowing dates and seeding rates, management of crop residue, weed and pest dynamics and rotation, will be the main technology used by the programme to mitigate risk in the rainfed barley-based production system. The applicability of zero tillage to the crop production environments of the Middle East is beyond question. Immediate savings can be expected in terms of resource use and fuel efficiency, due to reduced land tillage and application operations, and outlays on seeds with more efficient seeding. This approach also results in improved soil moisture, reduced fertilizer and pesticide applications, and increased yields with improved soil structure and soil moisture conservation.
10. The programme provides an opportunity to adopt optimum barley varieties specifically for use under zero tillage, with the improved seed available in sufficient quantities to accomplish the task. The trade-offs between new and local varieties would be minimal and would maintain the germplasm preservation principle intact. The programme will take an innovative approach in scaling up previously achieved results and technologies, to develop a model that will maximize their impact to help farmers cope with the negative impact of climate variability and change.
11. The issue of climate change adaptability will be addressed by the programme by providing data for policymakers, national agricultural research and extension systems and ministries in the form of downscaled climate maps directly relevant to the barley livestock production system for the target areas in Iraq and Jordan, and by improving climate change awareness and adaptability through activities at the community level. Global circulation models will be downscaled to finer resolution climate change maps that can be used to depict local climate change impacts through changes in agroclimatic zones, growing periods and crop suitability, to provide advice to policymakers and target groups on long-term trends and opportunities. Existing networks, particularly the IFAD/International Development Research Centre (IDRC)-funded KariaNet knowledge network, will be employed to communicate the results of the programme to policymakers in similar dryland areas in the region.
12. The targeted areas are those where rainfall is equal to or less than 350mm and barley is the main source of feed for small ruminant livestock production systems. The main target group is resource-poor farmers and livestock producers in rainfed barley-based system whose livelihoods are dependent on the system and who have limited income or skills diversification and limited access to pertinent information

and technological developments. In addition, emphasis will be placed on targeting the next generation of farmers to ensure intergenerational continuity and knowledge and skills transfer.

13. The programme will have a duration of three years and will comprise two main components:

Component 1: Technologies into use

(i) **Identification, targeting, appropriation and delivery of appropriate technology**

- An assessment of existing crop and livestock husbandry practices will be undertaken, including an assessment of ethnoveterinary practices to select the relevant ready-to-use technologies mentioned in the logical framework.
- Improved extension mechanisms, effective scaling up, dissemination methods and training.
- Extension will be used for information delivery and technology transfer. Trained extension agents, including women, will be identified. Technology transfer activities will utilize ongoing peer learning and visits for farmers, both in-country and in the target area. Information technology tools will be promoted for livestock record keeping, targeting the next generation of farmers.

(ii) **Enabling women to enhance processing**

Extension activities will focus on the delivery of effective technologies to improve processes, which are primarily carried out by women - ration formulation, milk production, hygiene, and processing and product quality.

Component 2: Climate change adaptability

(i) **Downscaling exercise and analysis**

To enhance the awareness of the impact of climate change, this component will focus on ensuring the relevance of downscaling criteria and consequent mapping to the target programme areas, wide dissemination of the results of subsequent analyses, the formulation of recommendations, and their inclusion in policy formulation and community-level adaptation activities.

(ii) **Dissemination, discussion and formulation of information and recommendations**

Once higher precision maps have been generated and analyses produced, a regional workshop will be held with policymakers, researchers, extensionists and relevant stakeholders to further develop and verify recommendations on policy, farming practices and technologies. The workshop outputs will be distributed widely through a broad range of media, including radio, television, the internet, newspapers, journals and policy papers.

(iii) **Community-level climate change adaptation**

Community "living memory" climate change consultations will be undertaken, and the results will be included in workshop recommendations. They will then be shared with the community and used to enhance understanding and awareness of expected future developments with direct relevance to community livelihoods. The workshop recommendations will also help shape simple community climate change plans to be developed and subsequent activities and initiatives.

14. Key principles guiding the programme are:

- **Recording and utilizing endogenous community knowledge.** Gathering local knowledge to feed into programme activities;
- **Engaging communities.** Further involvement of community members will be promoted by holistic treatment of target group as household units and by recognizing that it is the family unit in its entirety – men, women and children – who contribute to the success of the farm enterprise;
- **Policy into practice – making climate change relevant.** Climate change and its effects must be understood by and be relevant to local communities as well as be promulgated at the policy level to effect real change;
- **Peer-to-peer learning.** This will be utilized as a primary method of transferring information and technology;
- **Understanding the supporting environment – support sectors and marketing channels.** Analyses of local support sectors and marketing channels will accompany the programme activities;
- **Efficiency in practice.** Cataloguing available technologies matched to farmer profiles;
- **Adaptation and adoption.** The emphasis will be on technology into use.

IV. Expected outputs and benefits

15. The programme includes the following main outputs:

- (a) **Output 1:** Climate-change proofing technologies for barley-based systems successfully demonstrated;
- (b) **Output 2:** Improved livestock husbandry and processing technologies that enable communities to cope with climate change are demonstrated;
- (c) **Output 3:** Extension agents' capabilities and mechanisms to respond to farmer needs are improved; and
- (d) **Output 4:** Understanding and awareness of the impacts of climate change and adaptation options are enhanced at the policymaker and community levels.

V. Implementation arrangements

16. ICARDA will be responsible for overall programme management and for financial and technical reporting to IFAD and will coordinate programme activities through its regional office in Jordan and in collaboration with the national agricultural research centres, namely: (i) in Iraq, the State Board for Agricultural Research (SBAR); (ii) in Jordan, the National Centre for Agricultural Research and Extension (NCARE). Both SBAR and NCARE have the relevant experience, have led several IFAD-funded projects in the past, including the M&M and Water Benchmarks projects, and are technically capable of successfully executing the programme.
17. A stakeholder consultation will be held at the outset to establish implementation arrangements and agree on the first year's workplan. A programme steering committee will be set up with national coordinators and representatives of IFAD and ICARDA. The steering committee will review and approve annual workplans and budgets.
18. Direct linkages will be maintained with the following projects: (i) in Iraq, the Australian Centre for International Agricultural Research /Australian Agency for International Development (AusAID) Conservation Agriculture Project in Ninevah Province; (ii) in Jordan, ARMP-II and the IDRC-funded Access to Benefit Sharing

and Traditional Knowledge in Jordan project; and (iii) in both countries, the United States Agency for International Development-Middle East Water and Livelihoods Initiative (USAID-WLI).

VI. Indicative programme costs and financing

19. IFAD will primarily fund operations (including surveys, technology transfer activities, inputs, materials and equipment) as well as community consultations and national knowledge sharing workshops. IFAD funds will also cover overall programme coordination and administration provided by ICARDA. Support from national partners would be in kind and would include extension staff time, use of equipment and facilities. ICARDA will track and report on cofinancing and in-kind support to the programme.

Summary of budget and financing plan

(In thousands of United States dollars)

<i>Type of expenditure</i>	<i>IFAD</i>	<i>Cofinancing</i>
Personnel	290	300
Operations ^a	717	700
Equipment	60	200
Meetings, workshops, training and dissemination	260	-
Total direct costs	1 327	1 200
Indirect costs	173	-
Total	1 500	1 200

^a Vehicles' running and maintenance costs to be used by extension staff, and farm and research supplies/inputs such as seeds, fertilizers, subsidized livestock, animal drugs, maps and GIS materials, etc.

Results-based logical framework

	Objectives-hierarchy	Objectively verifiable indicators	Means of verification	Assumptions
Goal	Improved food security, livelihoods, and climate change adaptability for poor rural hh in rainfed areas dependant on barley and livestock production in the drylands	Higher income, better nutrition, for rural women and men dependant on barley/livestock livelihood systems	National statistics and research results. FAO country statistics. IFAD project RIMS data. IFAD project supervision reports	
Objectives	Improved livelihoods and climate change resilience of 1000 barley-livestock farming households in Iraq, and 600 in Jordan.	<ul style="list-style-type: none"> - Improved barley production technologies adopted by at least 250 hh in Iraq and 150 hh in Jordan, with increase in yields of at least 40% - Improved livestock production technologies adopted by at least 250 households in Iraq and 150 hh in Jordan, with increased farmer returns by 20% 	Government reports, MOA/NCARE, MOA /SBAR. ARMP II reports programme reports and publications Technology adoption assessment	Enabling environment for out-scaling and replication in other areas, including Government commitment, resource availability and technical capabilities
Outputs	1. Climate-change proofing technologies for barley-based systems successfully demonstrated with community participation	20 demonstrations on CA packages in Jordan and 30 in Iraq annually; 3 field days per year on CA per country	National programme reports, verified by ICARDA and IFAD during supervision	<ul style="list-style-type: none"> - Security and stability remain constant or improve. - Zero-tillage seeder machines are available in adequate numbers - Extension agents and their institutions are able to adopt improved mechanisms for information delivery - Resources available for extension programme, including extension staff, and transport
	2. Improved livestock husbandry and processing technologies, that enable communities to cope with climate change, are successfully demonstrated	30 demonstrations in Jordan and 40 in Iraq annually; 3 field days per year per country.	National programme reports, verified by ICARDA and IFAD during supervision	
	3. Extension agents' capabilities and mechanisms to respond to farmer needs are improved.	10-15 extensionists in each country trained and have improved competencies Extension material produced	Project documents, training course attendance lists. Completion certificates.	
	4. Understanding and awareness of the impacts of CC and adaptation options are enhanced at the policy-maker and at the community level.	Area specific data produced and disseminated At least 2 CC Community Plans per country; 2 CC community information days held annually; CC action initiated by the community.	-Technical analysis and report by ICARDA GIS Unit Programme reports. -Living Memory' CC Survey document Programme document	CC recommendations and action plans are implemented by policy-makers, institutions and stakeholders
Key Activities	<ol style="list-style-type: none"> 1. Appropriate technologies disseminated 2. Extension agents trained for effective dissemination of information. 3. CC down scaling maps presented. 4. Socio-economic data collected and analysis of programme impacts conducted. 5. CC workshop held and recommendations developed and disseminated in relevant fora. 6. Community information days held 	<ol style="list-style-type: none"> 1. (see output 1 indicators) 2. 4 e-learning modules and 10 training courses with a total of 200 trained individuals in each country 3. CC downscaling maps. 4. Baseline, ethno veterinary, and CC community memory surveys performed. 5. CC workshop held and recommendations widely disseminated. 6. Number of CC info days; 'Living Memory' CC consultation survey. 	<ul style="list-style-type: none"> - Project reports, adoption and impact studies. - extension brochures and modules. - Records and inventory of the visit of extensionists to farmers. - No of training courses and list of participants. - Surveys documents and report, adoption and impact documents - Maps. 	

Note: CC: climate change

Bioversity International: Reinforcing the Resilience of Poor Rural Communities in the Face of Food Insecurity, Poverty and Climate Change through On-farm Conservation of Local Agrobiodiversity

I. Background

1. Agricultural intensification is increasingly focused on a narrow range of crops and people's diets continue to be dangerously reliant upon approximately 30 crops, which provide 90 per cent of the world's plant-based calories. The dependence on this relatively small number of food species raises serious concerns. More than one billion people today suffer from hunger and food insecurity, and the problem of inadequate nutrition is even more dramatic.
2. Traditional local crops, including neglected and underutilized species (NUS), have been highly marginalized by mainstream agricultural research. The reasons for this neglect vary, but typically are not related to questions about the usefulness of the species. Indeed, many organizations involved in research for development have begun to recognize the fundamental role of these species in income generation, adaptation to climate change, nutrition and food security. The work of IFAD and others (such as the International Development Research Centre [IDRC], the McKnight Foundation, the German Agency for Technical Cooperation [GTZ], the Danish International Development Assistance [DANIDA] and the United Kingdom's Department for International Development [DFID]) has also contributed to this growing recognition.
3. The unprecedented loss of agricultural species is documented in the 2009 report on the State of the World's Plant Genetic Resources for Food and Agriculture (produced by the Food and Agriculture Organization of the United Nations [FAO]), which indicates that despite considerable progress made in ex situ conservation of such resources, very limited impact has been recorded in terms of curbing genetic and cultural erosion on-farm. Much greater investment is needed to halt the genetic and cultural erosion that will ultimately affect food and nutritional security.
4. Major national and international efforts are needed to support the on-farm conservation and sustainable use of the local crops and species so poorly represented in ex situ collections. FAO estimates that 75 per cent of the world's agrobiodiversity has been lost in the course of the 20th century. To halt this process, focused research is urgently needed on fundamental aspects such as: the distribution of traditional species and varieties on-farm; the role played by "custodian" farmers and the challenges they face; the threats to crop genetic diversity; and community-based monitoring methods for preventing the loss of diversity on-farm.

II. Rationale and relevance to IFAD

5. Agrobiodiversity is a key asset of rural poor people in developing countries. Improving, or even maintaining, crop yields will depend on combining genetic traits found in a wide range of materials derived from crop relatives in the wild, landraces (native species of plants), breeding lines and established varieties. Scientific efforts over the past 60 years to conserve crop diversity have led to the collection and conservation of more than 7 million samples in genebanks. However, these efforts have been directed predominantly towards major crops, with only limited effort invested in conserving local crop diversity and its associated knowledge, culture and traditions. Today, food crops are mainly conserved not in genebanks, but on farms, thanks to millions of smallholder farmers who maintain crop genetic diversity along with traditional knowledge. However, this is highly risky for both food security and

biodiversity as social, economic and climatic changes are influencing the way people maintain and use diversity.

6. Given the financial, technical and biological limitations faced by genebanks, it is unlikely that they will ever be able to broaden their mandate to cover the sheer diversity of crops present on farms (including an estimated 7,000 species used for food alone). Furthermore, the climate change scenarios and global food crises experienced in recent times are also bringing to the fore the strategic role that agrobiodiversity and, in particular, traditional crops can play in strengthening resilience in local crop production systems and in mitigating the shocks caused by shortages in major staples. On-farm conservation is essential. However, it lacks the approaches, guidelines, methods and tools that are available for ex situ conservation and that would assist farmers both in deriving livelihood benefits and in playing their custodian role more effectively and efficiently.
7. This proposal intends to develop innovative community-based participatory methods for documenting, monitoring and promoting on-farm agrobiodiversity. Case studies in representative regions of three countries (India, Nepal and the Plurinational State of Bolivia) will shed light on how local crops and associated knowledge are currently cultivated and safeguarded, how local populations and individuals carry out their role as custodians, which agrobiodiversity practices result in income generation opportunities and how such work could enhance resilience to such threats as climate change. The programme will identify ways to enhance community-based agrobiodiversity documentation systems that can form the basis of sustainable monitoring systems to ensure that communities value and use traditional crops sustainably and safeguard against their loss.
8. The proposal is fully in line with the revised grant policy, particularly with regard to achieving the outputs described. The proposal is also consistent with the IFAD Strategic Framework 2007-2010 as it will contribute to ensuring that poor rural people have better access to natural resources – and the necessary skills and organization to take advantage of these resources and improved agricultural technologies.

III. The proposed programme

9. The overall goal of the programme is to promote more effective and sustainable use, management and conservation of local agrobiodiversity by communities and stakeholders in order to unlock its potential in the context of food security, nutrition, income-generation and adaptation to climate change. The programme's objectives are to: (i) develop and test, in close partnership with farmers and value chain actors, new methods and tools aimed at enhancing their capacities to sustainably conserve traditional crops and the associated knowledge at the farm level; (ii) explore ways to integrate monitoring mechanisms on-farm, along with use enhancement goals, through interdisciplinary and multisector approaches; (iii) promote a more balanced, complementary conservation agenda in national programmes in order to combat genetic erosion and meet the needs of agrobiodiversity users; and (iv) provide useful findings to guide further research on climate change and its impact on species and varieties found in local production systems.
10. The main target group is made up of resource-poor farmers whose agrobiodiversity-based livelihood assets are being gradually lost. The programme will also enhance the skills of national agrobiodiversity researchers, extension workers and community-based organizations to enhance and monitor the use of on-farm diversity. Women will be prioritized by the programme in view of their unique role in conserving and using agrobiodiversity for the benefit of children and other family members.

11. The programme will be implemented in India, Nepal and the Plurinational State of Bolivia over three years. It will focus on five areas:
- **Area 1: Conceptualization and methodology development.** Research efforts in community-based documentation and monitoring mechanisms for on-farm conservation currently tend to be scattered. Experts in this domain need to be brought together to share experiences and lessons for the development of a methodological approach. A technical conference is planned, with the International Union for Conservation of Nature (IUCN) among the key partners, along with experts from research and development sectors in both developing and developed countries. Close partnerships with both IUCN and the International Treaty on Plant Genetic Resources for Food and Agriculture (the International Treaty) will be sought for programme implementation.
 - **Area 2: National adaptation and framework.** The recommended methodologies emerging from the international conference will be shared and discussed at a national stakeholder workshop to be organized in each partner country, and with IFAD country staff, to identify ways to link with IFAD projects. These meetings will fine-tune general methodology to specific socio-economic settings, governmental guidelines and national conservation priorities and frameworks.
 - **Area 3: Programme implementation.** This will entail testing the methodologies, approaches and tools that are identified during the conference and stakeholder workshops. This work will strengthen the capacity of partners to implement identified methods and tools, and that of poor community members to enhance their use of target species. Community members will attempt to document: the distribution of traditional crops over the territory; who is contributing to their conservation; what the conservation modalities are, how these can be improved, how "custodian farmers" can be better linked through ad hoc conservation networks, what actions can be organized to enhance access to and sharing of diversity among user groups, what the threats are and how successful use-enhancement efforts can be in supporting sustainable on farm conservation. Community biodiversity registers will be developed and tested in programme sites.
 - **Area 4: Data analyses and impact assessment.** It is expected that the programme will gather a great deal of data, which will need solid statistical analysis at the conclusion of the various activities. Two parallel impact pathways for the programme will be developed for assessing both the successful execution of the programme and the impact of community-based documentation and monitoring systems in target areas.
 - **Area 5: Public awareness and policies.** Awareness-raising activities for experts, decision makers and development practitioners will enhance understanding of the importance of on-farm conservation as an essential complementary method to ex situ conservation. Important partners in these campaigns will be the International Treaty and IUCN.

IV. Expected outputs and benefits

12. A number of outputs are expected, including:
- Evidence of better understanding of the distribution of local crops, their competitiveness and the status of threats;
 - Documentation of local/traditional knowledge on best practices for coping with climate change, corroborated with scientific findings, synthesized and made available;

- Capacity to cope with change, enhanced through pro-diversity community-based mechanisms and frameworks;
- Networks and systems developed and/or strengthened for greater access, sharing and conservation of diversity and knowledge;
- Policy options to promote greater use of local diversity addressed and recommended at national and international levels. Raised awareness of the livelihood benefits of local biodiversity and importance of on-farm conservation and monitoring mechanisms.

V. Implementation arrangements

13. A steering committee composed of representatives from Bioversity International and IFAD and a representative from each of the national coordinating agencies will meet annually to help ensure that programme milestones are met and to facilitate the resolution of any problems that arise. The main programme partners are M.S. Swaminathan Research Foundation (India), PROINPA Foundation (Plurinational State of Bolivia), and Local Initiatives for Biodiversity, Research and Development - LI-BIRD (Nepal).
14. The involvement of relevant ministries in target countries will be pursued actively and the adoption of recommended policies will be advocated through policy meetings and debates as well as through the close partnership pursued with the Treaty Secretariat and IUCN. Linkages will also be forged with community-based organizations and grass-roots movements such as Terra Madre, building on existing cooperation between Bioversity and Slow Food.
15. The programme will ensure that results are systematically captured, analysed and disseminated. The dissemination of best practices, methods and tools will be made at the local, national and international level through training courses, workshops, manuals, guides, scientific papers, fact sheets and policy briefs. Opportunities will be created for the global agrobiodiversity community to contribute to the development of the on-farm monitoring framework through workshops, meetings and internet-based discussions. An interactive web page will be developed in collaboration with the Platform for Agrobiodiversity Research and with Crops for the Future, based at the Bioversity International office in Malaysia.

VI. Indicative programme costs and financing

16. The overall estimated programme cost is US\$2.9 million. IFAD's proposed contribution amounts to US\$0.98 million. Co-funding of US\$1.89 million is envisaged, including US\$0.5 million from the European Commission (EC)-IFAD CGIAR Programme. Collaboration will be sought with national research and development agencies in target countries and with various international agencies (including the International Treaty, IUCN, International Foundation for Science [IFS] and Crops for the Future) involved in sustainable conservation and use of agrobiodiversity. Aside from in-kind contributions from participating countries, additional financial support will also be sought from the Treaty.

Summary of budget and financing plan
(In thousands of United States dollars)

<i>Type of expenditure</i>	<i>IFAD^a</i>	<i>Cofinancing</i>
Personnel	226	1110
Consultancies	40	20
Travel	50	180
Research contracts	210	105
Training and fellowships	134	97
Conferences and meetings	100	150
Supplies and services	55	74
Overheads	127	65
Publications	33	87
Total	975	1 f888

^a Discrepancies in total are due to rounding.

Results-based logical framework

	Objectives-hierarchy	Objectively verifiable indicators	Means of verification	Assumptions
Goal	Facilitate more effective and sustainable use, management and conservation of local agrobiodiversity by communities and stakeholders, particularly in the context of food security, nutrition, income-generation potential and adaptation to climate change.	<ul style="list-style-type: none"> Greater levels of preparedness of communities to face climate change in terms of wider availability of agrobiodiversity, tools and methods to enhance resilience of production and use systems. 	<ul style="list-style-type: none"> Impact assessment reports Government reports 	<ul style="list-style-type: none"> Willingness of stakeholder groups to participate
Objectives	<ol style="list-style-type: none"> Develop and test new methods and tools to sustainably conserve traditional crops and associated knowledge at the farm level; Explore ways of integrating the monitoring of diversity on-farm, along with use-enhancement goals; Promote a more balanced complementary conservation agenda in national programmes, based on the need to combat genetic erosion and to meet the needs of agrobiodiversity users; Guide further research related to climate change and its impact on species and varieties deployed in local production systems. 	<ul style="list-style-type: none"> Capacities of stakeholder groups to sustainably conserve traditional crops and associated knowledge at the farm level is enhanced Greater attention by policy makers towards on farm conservation Number of adoptions of recommended policy options for supporting on farm conservation 	<ul style="list-style-type: none"> Availability of data through national databases and relevant publications Scientific publications, project reports 	<ul style="list-style-type: none"> Cost-effective and reliable monitoring systems for NUS can be identified.
Outputs	<ol style="list-style-type: none"> Methods and tools for documenting and monitoring diversity on-farm using community-based approaches Enhanced capacities of researchers, developers in training community members on documenting, monitoring and use-enhancement methods Mapping of diversity/IK, custodian farmers & threats of erosion Networks established and tested in project sites Monitoring systems developed and tested CBRs & central documentation depositories operational in each country and relevant information safeguarded Red List methods for cultivated crops and IK in target sites Diversity Fairs integrated in on-farm conservation monitoring systems PACS approach developed and tested in project sites Awareness raised on-farm conservation needs and policy options for support to on-farm monitoring 	<ul style="list-style-type: none"> Number of stakeholders and community members trained in monitoring and enhancing use of local agrobiodiversity Methods for documentation, monitoring on-farm in use Number of CBRs established in target sites Number and quality of diversity fairs organized by project Number of recommendations adopted for PACS methods related to on farm monitoring Number of recommendations adopted for policy options for on-farm conservation/ monitoring 	<ul style="list-style-type: none"> Scientific publications and projects reports and articles in newspapers Policy fact sheets Notes from the web page/discussion blog maintained by the project 	<ul style="list-style-type: none"> No extremely adverse climate conditions or civil unrest occurs during project implementation.
Key Activities	<ol style="list-style-type: none"> Organizing International Conference Training of partners and community members Survey and document diversity, IK, conservation efforts and threats Establishment of on-farm network of custodian farmers in target areas Establishment of linkages with <i>ex situ</i> conservation Development of documentation system for on farm monitoring systems Development of Red Lists for model species Carrying out use-enhancement actions for target species Testing feasibility of payment for agrobiodiversity conservation services Raising awareness on the importance of on farm conservation and its strategic complementary role with <i>ex situ</i> Explore launching of a global mechanism for promoting on farm networking Exploring policy options for community-based monitoring systems 	<ul style="list-style-type: none"> Soundness of methodologies developed in international workshop and further refined in national meetings Quantity and quality of maps/data generated by surveys Number of courses carried out and personnel trained Number of communities actively involved in the use enhancement activities Degree of participation of women in project activities Number of meetings, discussions covering on farm conservation and its enhancement Raised awareness at national, international levels of importance of community-based approaches Participation and representativeness of relevant stakeholders in policy meetings 	<ul style="list-style-type: none"> Scientific publications and projects reports, fact sheets Notes from the web page/discussion blog maintained by the project 	<ul style="list-style-type: none"> Local level partners and communities motivated to join project. Incentives identified can be provided within project context.

Note: PACS: payment for agrobiodiversity conservation services

International Water Management Institute (IWMI): Smart Information and Communications Technology (ICT) for Weather and Water Information and Advice to Smallholders in Africa

I. Background

1. Climate change, water scarcity and food security are becoming increasingly important topics for the growing population of Africa. Due to a general lack of water resources in semi-arid and arid zones, water is an increasingly scarce input in agriculture. The impact of climate change exacerbates this situation further. Even in areas with abundant water resources, optimal use is hampered by insufficient infrastructure to capture these resources and knowledge on appropriate use. However, agriculture remains of high economic importance as it contributes to exports, employment and livelihood, especially in the rural areas of Africa. With increased demand and competition for limited water resources, the challenge is to increase agricultural production while reducing water consumption ("more crop per drop"). Solutions must be found to enable rural people to overcome poverty, and a start can be made by assisting in food production and water management to combat food insecurity. Local solutions must be adopted to improve rural people's access to new technologies. Therefore, smart and affordable technologies need to be adapted to customize farm management for this group of African farmers. Poor farmers need to access real-time information, and be able to exchange and apply it: smart ICT (e.g. cell phones with internet access) can play a fundamental role in the communication process.
2. Satellite images and remote sensing are increasingly being used to assist commercial farmers and agribusinesses in countries belonging to the Organisation for Economic Co-operation and Development (OECD) and the Brazil, Russia, India and China (BRIC) group. Operational web-based services such as FieldLook (www.fieldlook.com) are provided to farmers in Belgium, the Netherlands and Russia. Similar systems are used in France, Germany and the United States. Now this technology can be used to support the rural poor in Africa. African smallholders can rarely count on appropriate local extension services, and institutions hardly implement their own policies and strategies. Farmers are left with no direction as to how and when to farm, store and sell. Potential transformation into viable entrepreneurial farms is hampered. Initial experiences with cell phones to transfer information in Africa and Asia are encouraging.

II. Rationale and relevance to IFAD

3. The proposed study, and the resulting improvements in access to and use of information, will contribute to achieving "more crop per drop": higher yields with lower water consumption, and the most efficient possible use of available water. However, farmers need guidance on achieving this, and simple text messages for geographically bounded farm plots will be used to send management advice to the farmers. This project envisages developing tools that can monitor plot-specific information from satellite measurements. Rather than providing very general statements on crop growth, detailed and crop-specific information will be provided. Farmers will be able to optimize their farm profits by providing water at the right place, at the right time and in the right quantity. Communication between farmers, water users' associations (WUAs), irrigation boards (IBs) and the public and private sectors will improve when web-based information becomes available in conjunction with instruction messages (SMS/MMS) received on cell phones.
4. Hence the programme will contribute to mainstreaming IFAD's Strategic Framework and objectives into national and international research agendas and brokering

knowledge of such research back to selected national and international decision makers. The programme supports IFAD's first strategic objective, which places emphasis on improved natural resource management and conservation practices, especially secure access to land and water; and second strategic objective, which focuses on improved agricultural technologies and effective production services. These two strategic objectives are relevant for all IFAD operations but call for specific approaches in order to achieve a sustainable impact in challenging contexts.

5. IFAD support will be provided at the following levels:
 - (a) **Corporate.** IFAD's continued drive for innovation, public-private partnerships, resource brokering and empowerment is key, and will be supported by the grant. The programme includes innovative approaches to make better use of information, increase water security and empower end users. IFAD support at this level may take shape during policy dialogue opportunities such as reviews of country strategic opportunities programmes (COSOPs).
 - (b) **Operations.** Direct supervision has now been introduced in the majority of IFAD operations. This grant will strengthen and inform partners in development, especially at farmer level, to improve transparency and empower negotiations. Experiences with grant implementation will strengthen partner project performance and will be considered in the design of new IFAD operations.
6. IFAD's contribution to the grant and its project platform are crucial as this public-private partnership approach to good science is still relatively new for IWMI. The grant will strengthen IWMI in transitioning to the operational phase of the CGIAR reform and fits very well with Best Bet 8 on information of the Consortium Research Program 5, and with the participation of 13 other Consultative Group Centers, including the International Rice Research Institute (IRRI).

III. The proposed programme

7. The overall goal is to empower smallholder farmers in Africa to make informed decisions to better manage their land and water resources. The objectives are to promote innovative approaches and ICT-based technologies for timely transfer of weather-, water- and crop-related information and advice to relevant end users in Africa for informed decision-making and enhanced negotiation capacity with water- and farm-related service providers.
8. The target groups are:
 - Individual smallholder farmers
 - Contract farm managers
 - Water users' associations (WUAs)
 - Irrigation boards (IBs) and irrigation block inspectors
 - (Rainfed and irrigated) agricultural extension service providers
 - Crop and livestock insurance companies
 - Commodity stock cooperatives and commercial traders
 - Federal or State departments of agriculture and/or irrigation
 - Regional agricultural research stations
9. Beneficiaries of the IFAD projects to be targeted are: in the Egypt Delta area, over 10,000 households; in The Sudan, over 60,000 families farming in the Gash area alone; in Mali, 12,000 households; and in Ethiopia, over 30,000 households. Since this is a pilot innovation, a smaller number of beneficiaries from these target groups

will be engaged in delivering tangible results. A needs assessment conducted early in programme year one will better determine the scope and magnitude of these innovator clients. The International Institute for Communication and Development (IICD) (as local partner/NGO) may be invited to expand the programme to additional countries.

10. The programme will have a three-year duration and will comprise six work packages (WPs) or main components:
 - WP1: Programme management and coordination: project leader, project implementation and capacity-building
 - WP2: Tool development: survey, lessons learned, using needs assessment, verification of market coverage
 - WP3: Pilot studies: Egypt, Mali, assigning local agents for field work
 - WP4: Capacity-building: farmer to farmer, farmer to farmer organization
 - WP5: Rollout feedback and priority-setting: from 100 innovators to several thousand innovators (evaluation)
 - WP6: Plan for outscaling and sustainability: private sector, presentations, outscaling plan.

IV. Expected outputs and benefits

11. The benefits for smallholder farmers lie in being able to better manage their farms, livestock and crops. Farmers will be able to optimize their farm profits by providing water at the right place, at the right time and in the right quantity. Farmers and farm managers will also be able to reduce their input costs. In selected countries (Egypt and The Sudan) crop yield monitoring and farmer-to-farmer exchanges of information on crop diseases and ways to deal with them will be supported by smart ICT. As water supply and water consumption requirements are better matched, conflicts over allocation, input costs and water fees may be reduced.
12. Irrigation advisors (from WUAs and IBs) and agricultural extension workers in general will be able to do their work more effectively, overseeing irrigation conditions and the performance of all farm land by comparing timely and equitable access to land and water. IBs will be able to oversee the entire irrigation scheme, while advance information to block inspectors will make the management of their irrigation blocks easier.
13. The IBs will benefit from being able to more accurately estimate water requirements over time, and thus have a better overview of irrigation water requirements and (rotational) allocations. Ministerial agencies will have access to a sustainable water utilization advisory tool providing near real-time information on weather and water consumption in relation to permitted volumes and crop response to water.
14. WUAs will be empowered (at different levels within irrigation schemes) to better negotiate the terms of delivery of irrigation-related services and fees, and to monitor agency performance.
15. Insurance companies (or rural financial service providers) will be approached to provide farmers with incentives to invest more securely in their farm plots. This grant will capitalize on IFAD experiences with weather index-based insurance.
16. If included as a module by a project client, cooperatives will be better informed on expected yields following certain weather and water availability patterns and hence will be empowered to conduct more successful negotiations on terms of trade (supporting forward trading) with middlemen and (parastatal) commodity boards.

17. All stakeholders will benefit from mutual agricultural knowledge generation, knowledge exchange and capacity-building. New knowledge will be generated by improved crop and water management, and training and workshops will add to capacity-building. All stakeholders will have access to advanced water resources management knowledge.
18. The main outputs are:
 - Cell-phone and web-based information systems tested in pilot areas;
 - Different stakeholders and end users able to understand and make use of information and advice for better decision-making, negotiation and accountability;
 - Context-specific priorities for weather-, water- and crop-related information agreed and successful, and affordable modes of communication identified; and
 - Agro-industry and other service providers interested in supporting further expansion and continued services.

V. Implementation arrangements

19. The programme will be managed by IWMI, which will set up a multidisciplinary programme team of researchers at its regional offices in Africa and Asia and at its headquarters in Sri Lanka. As the implementing organization, IWMI will work with three main partners: WaterWatch, Basfood and DLV-Plant. The four organizations will jointly execute the programme and work together with local research and extension service providers and IFAD partners and staff. IWMI is the main contractor for the programme, responsible for administrative and financial management. IWMI will appoint a programme leader. WaterWatch, Basfood and DLV-Plant are programme partners, jointly responsible for its technical development and supervision. A principal investigator will be responsible for technical content and for scientific and practical challenges.

VI. Indicative programme costs and financing

20. The proposed programme will be implemented over a period of three years with a total programme cost of US\$3 million. The programme will be financed mainly by IFAD (US\$1.8 million) with matching contributions. Matching funds in support of the programme and its outputs will be provided by IWMI, WaterWatch, Basfood and DLV-Plant.

Summary of budget and financing plan
(in thousands of United States dollars)

<i>Type of expenditure^a</i>	<i>IFAD</i>	<i>Cofinancing^b</i>
Personnel	300	300
Travel – regional and international	46	
Local partner services	166	
Supplies and operations	232	80
Knowledge management	892	700
Administrative costs	164	120
Total	1 800	1 200

^a **Personnel:** IWMI staff for programme management and scientific inputs including staff at regional offices included in the IFAD finance component while cofinancing will include in-kind partner contributions from IWMI, WaterWatch, Basfood and DLV-Plant.

Travel - regional and international: Economy class return tickets, per diems and lodging for IWMI staff and local partners.

Local partner services: Staff costs, local travel and operational costs for partners in the four programme countries.

Supplies and operations (including local travel and field costs); purchase of remote sensing images; cell phones/smart phones and SMS services provision.

Knowledge management includes the cost of workshops and exchange visits; capacity-building for all stakeholders; publications and dissemination; tool development; website and data portal. Cofinancing will include in-kind partner contributions from IWMI, WaterWatch, Basfood and DLV-Plant in terms of product development.

^b Contributions in kind (totaling US\$400,000 each year for a three-year period) will be from IWMI, WaterWatch, Basfood and DLV-Plant.

Results-based logical framework

	Objectives-hierarchy	Objectively verifiable indicators	Means of verification	Assumptions
Goal	Empower smallholder farmers in Africa to make informed decisions in managing their land and water resources better	<ol style="list-style-type: none"> 1. Increased farm incomes 2. Improved management of water and land resources 	Secondary data	
Objectives	<ol style="list-style-type: none"> 1. Test and pilot innovative approaches and technologies to provide relevant info and affordable advice in a timely manner to end users 2. Develop capacity of different stakeholders to make use of the info and advice for better decision making, negotiation and accountability 3. Define priorities for information provision and identify early successes in timely and affordable transfer of information and advice 4. Develop interest of agri-industry and other service providers in supporting further expansion and continued services 	<ol style="list-style-type: none"> a. Tested system b. Changes in decision making c. Interested service providers 	Secondary data Interviews Project documents	Technological developments (with respect to telecommunications and satellites) in Africa and globally continue
Outputs	<ol style="list-style-type: none"> 1. Cell-phone and web-based information systems tested in pilot areas 2. Different stakeholders/end users able to understand and make use of info& advice for better decision making, negotiation and accountability 3. Context specific priorities for specific weather, water, crop related info agreed and successful and affordable mode of transfer identified 4. Agri-industry and other service providers interested in supporting further expansion and continued services 	<ol style="list-style-type: none"> 1. Cell phone and web-based system 2. System used by pilot users 3. Interested service providers 4. Plan for outscaling 	<ol style="list-style-type: none"> 1. System available 2. User feedback documented 3. Minutes of meetings with service providers 4. Project reports 5. Outscaling document 	Technological developments (with respect to telecommunications and satellites) in Africa and globally continue
Key Activities	<p>WP1: Project Management</p> <p>WP2: Tool Development</p> <ul style="list-style-type: none"> • Survey of lessons learnt & synergies • Investigate user needs and priorities • Investigate different communication channels • Development of toolset <p>WP3: Pilot Studies</p> <ul style="list-style-type: none"> • Piloting with interested end users • Intensive monitoring of information use • Centralized data sharing <p>WP4: Pilot Studies</p> <ul style="list-style-type: none"> • Capacity building of users <p>WP5: Roll out, Feedback and priority setting</p> <ul style="list-style-type: none"> • Roll out to 4 countries • Collect and discuss feedback from users • Evaluate technology options <p>WP6: Outscaling plan</p> <ul style="list-style-type: none"> • Identify interested service providers • Present results and future opportunities • Develop outscaling plan 	<p>WP1: Well-managed project</p> <p>WP2: (a) Lessons documented; (b) User needs and priorities documented; (c) Communication options documented; (d) Toolset developed</p> <p>WP3: (a) Cell phones distributed; (b) Local (extension) agent assigned; (c) Cell phone and website used; (d) Feedback documented</p> <p>WP4: (a) Capacity building programs; (b) Feedback documented; (c) Farmer exchange</p> <p>WP5: (a) Interaction with users in 4 countries; (b) Feedback documented; (c) Document with technology options</p> <p>WP6: Discussions service providers documented; (b) Presentation at seminars, etc.; (c) Outscaling plan</p>	<p>WP1: Annual workplans, financial & technical reports</p> <p>WP2: (a) Project documents/reports; (b) website with system</p> <p>WP3: (a) Website; (b) Cell phone logs; (c) Project documents</p> <p>WP4: (a) Project documents; (b) Participation in training and farmer exchange</p> <p>WP5: (a) Website; (b) Cell phone logs; (c) Project documents</p> <p>WP6: (a) Minutes of meetings; (b) Programs of workshops; (c) Project document</p>	<p>Suitable RS imagery continues to be available at expected costs</p> <p>IFAD and project team agree on pilots and support mechanisms</p> <p>Condition in countries is suitable for roll out (stability)</p> <p>Relevant service providers interested</p>