Megaproject 3: Improved Land Management to Combat Desertification

Rationale

Desertification has been defined as land degradation in arid, semi-arid and sub-humid areas resulting from various factors, including climatic variations and extreme events and human activities. The drylands that comprise ICARDA's mandate eco-region cover some 41% of the global surface area and house around 2.1 billion people. More importantly 72% of drylands are in developing countries and approximately half of the world's poor live in these areas. Although estimates vary, a conservative figure of 10–20% of land already affected by desertification means that the number of people affected by desertification is larger than any other environmental problem. World-wide, lost income has been estimated at about US$42 billion annually in areas directly affected by desertification.

In the 1980's desertification was associated with the image of advancing deserts and encroachment onto once fertile land in the desert margins. This image has largely been shown to be incorrect with the desert margins influenced by fluctuating patterns of rainfall. Rather the more pressing problem of desertification is land degradation due to human mismanagement in regions that are often far from the desert margins. This includes degradation radiating from centers of population and resulting from intensification of land use. Thus, the true challenge is not so much to stop the desert at the edge of a semi-arid region as to protect the entire region from internal abuse of its vegetation and soil and water resources.

Definitions of desertification failed to emphasize that desertification is a development problem and not specifically an environmental problem. Land degradation of dry areas is often considered as a reinforcing vicious downward spiral of population growth, poverty, over-use, degradation of resources, and decline of productivity, etc. Although there are many examples that confirm such a pessimistic scenario, it overlooks farmers' and pastoralists' capacity to respond to resource decline. There are many examples where farmers and pastoralists have started to invest in their land as a result of increased population pressure and land degradation. This shows that the simple pessimistic and deterministic land degradation scenarios are not always applicable, and that there is a need to look at mechanisms for both land degradation and resource resilience.

Given the complexity of causal factors of land degradation, an integrated approach including broad stakeholder participation is essential if the livelihoods – and security needs – of the people inhabiting drylands are to be improved without further degrading their environments. Technology, institutional and policy options are required to prevent further land degradation and build viable livelihoods.

Target ecoregions

The project targets non-tropical dry areas globally, with a geographic focus on the Central and West Asia and North Africa and Nile Valley regions. The CWANA region encompasses a range of agro-ecosystems including drylands, irrigated lands, rangelands, mountains and deserts, that have evolved as a result of climatic extremes and a long history of human occupation and management. The land area of CWANA covers some 1.7 billion hectares and an estimated 45% of the total area of irrigated and rainfed arable land together with the vast areas of rangeland is subjected to some degree of land degradation with consequent reductions in biological productivity. Some degradation occurs naturally, but in many areas the dominant processes are accelerated degradation resulting from human activities. They include overgrazing of rangeland, inappropriate land management that encourages soil erosion by wind and water, inappropriate irrigation management leading to salinization and, more insidiously, diminution of the natural vegetative diversity.

Project Description

The project goal, purpose, outputs, output targets and associated expected outcomes and impacts are provided in the attached "Project Impact Pathway" matrix. Assumptions and external conditions associated with outputs, outcomes and impacts are listed in the introduction to the project portfolio.

The project is consistent with the CGIAR Priority Area 4 on 'sustainable and equitable management and intensification of water and land resources' and will focus mainly on the semi-arid regions where infant mortality and hunger have greatest incidence in dryland eco-zones and where vulnerability to degradation and population pressures are intermediate across the dryland eco-regions. The project aims to identify options for rehabilitating degraded land resources and, at the same time, to improve and strengthen systems of land management to control degradation and sustain future production in ways compatible with human livelihood improvement and/or maintenance.

Close links exist with the UNCCD and a comprehensive research agenda for combating desertification has been developed with leading experts. This research agenda forms the basis for the systemwide consortium on *Desertification, Drought, Poverty and Agriculture (DDPA)* that was a candidate challenge program within the CGIAR and is currently seeking funding for implementation.

Major elements of MP3 comprise:

- Development of a holistic Integrated Natural Resources Management (INRM) approach for combating desertification.
- Understanding the causes and driving forces of land degradation including regional assessments of the location, extent, impacts and consequences of actual and impending desertification.
- Development, testing and evaluation, with participation of end users, of 'best-bet' technologies for the management of land and water resources, vegetation and rangeland resources that prevent and reverse land degradation and improve household livelihoods and security.
- Development, testing and evaluation, with participation of land users, of community-based land management practices, particularly the communal management of rangeland resources and the livestock grazing systems they support.
- Policy and institutional research to create an enabling environment that supports the dissemination and adoption of technologies and management practices for combating desertification.
- Institutional strengthening and capacity building in integrated approaches to sustainable land management.

The project encompasses intra-Center linkages as follows:

- Research on land management and vegetative cover, especially in rangelands, links with research in MP2 (integrated gene management) on *in situ* conservation and habitat management.
- Research on watershed management is conducted together with MP2 (water management).
- MP3 links with MP4 (crop and livestock production systems) in improving integrated crop-range-livestock systems.
- MP3 links with MP5 (poverty and livelihoods) in assessing the impacts of natural resource management research on rural livelihoods and environmental sustainability.
- Results from MP3 research are up-scaled and out-scaled through MP6 (knowledge management and dissemination).

Users and Beneficiaries

Users: The main users are national research and extension programs, development agencies, policy-makers and others concerned with land degradation issues in dry areas, as well as regional and international organizations and development agencies in dry areas. Users also include land users and communities participating in pilot projects and sites who will directly use research outputs.

Beneficiaries: The ultimate beneficiaries are farm households and communities in areas affected by or prone to land degradation in rainfed, irrigated, rangeland and mountain areas in dry areas.

Collaborators

- *National Programs:* National research and extension programs in Central and West Asia, North Africa, sub-Saharan Africa (Eritrea, Ethiopia, Mauritania, Sudan), and Asia (Pakistan).
- *International and Regional Organizations:* UNCCD Secretariat and Global Mechanism, and Regional and Sub-regional Action Programs (RAPs and SRAPs) of the UNCCD; FAO; UNESCO and UNEP.
- *Advanced Research Institutes:* United Nations University; Laboratory of Experimental Geomorphology (LEG), Catholic University of Leuven, Belgium; CIRAD, France; University of Bonn, Germany; WOCAT Consortium; Wageningen University, Netherlands; and Atomic Energy Commission of Syria.

System Linkages

- **Challenge Programs:** The project participates in the Challenge Program on Water and Food through a project on *Strengthening Livelihood Resilience in Upper Catchments of Dry Areas by Integrated Natural Resources Management,* in cooperation with CIAT.
- **Systemwide Programmes and other CG Consortia:** The project participates in:
  - Ecoregional Program for Central Asia and the Caucasus (*see separate narrative attached*).
  - Systemwide Program on Collective Action and Property Rights (CAPRI).
  - Alliance Executive Task Force on Integrated Natural Resources Management (INRM).
  - The Desertification, Drought, Poverty and Agriculture (DDPA) consortium (led by ICARDA and ICRISAT).

MTP 2006–2008: Project Impact Pathway

Project	**MP3: Improved Land Management to Combat Desertification and Increase Productivity in Dry Areas**
Goal	Viable and resilient rural livelihoods in areas affected or prone to land degradation
Purpose	Sustainable, efficient and equitable management of natural resources in areas affected or prone to land degradation

	Outputs	**Intended Users**	**Outcomes**	**Impact**
OUTPUT 1	A holistic Integrated Natural Resources Management (INRM) approach for combating desertification developed and delivered to partners	NARS, NGOs, community-based organizations (CBOs), universities	NARS adopt, adapt and use the INRM framework and selected tools from the toolbox NARS develop INRM projects and develop greater cross-disciplinary and inter-departmental working practices and relations	More demand-driven and livelihood-based sustainable NR management practices and policies
Output Targets 2006	An INRM framework and toolbox for use by NARS and other partners in 3 countries (Syria, Morocco, Iran)	NARS	INRM approach utilized in one project in each of the 3 countries	Change in research agendas of NARS that incorporate integrated approaches to NRM
Output Targets 2007	NARS adopt and adapt the INRM tools in projects of NRM	NARS, CBOs, NGOs.	INRM tools used in research and development projects in CWANA	Better co-management of natural resources in targeted communities and areas
Output Targets 2008	NARS adopt and adapt the INRM framework	NARS, CBOs, NGOs	NRM approach mainstreamed into NARS research agendas	
OUTPUT 2	Assessment of land degradation and development of multi-scale tools & methods to assess land degradation, (location, extent, driving forces, causes, impacts and consequences of desertification in dry areas)	NARS, NGOs, community-based organizations, land users and associations, universities, concerned with land degradation	NARS and land users use improved methods to assess/monitor land degradation. Clearer definition of causes, extent and impacts of land degradation by NARS	Increased public awareness of land degradation. Extent of land degradation better known and mainstreamed into national poverty reduction strategies

	Outputs	Intended Users	Outcomes	Impact
Output Targets 2006	Five multi-scale tools and methods for assessing causes and extent of land degradation developed, tested and available to users	Research organizations, policy-makers, CBOs	Greater focus of combating desertification efforts on hot and bright spots Better capacity for, and assessment of, land degradation processes Better capacity for, and understanding of, cause-effects of land degradation	
Output Targets 2007	Assessments of causes, extent and risks of land degradation in six pilot areas in CWANA Satellite-based system for CWANA to estimate land degradation and early warning of drought	Research organizations, policy-makers Researchers, policy-makers	Better localization of risk of land degradation. Increased drought preparedness. Better capacity for, and assessment of, the economic valuation of land degradation Better management of rangeland through better institutional arrangements	Countries are better prepared for droughts
Output Targets 2008	A multi-level framework and set of multi-thematic indicators of desertification.	NARS, NGOs, CBOs, land users and associations, universities concerned with land degradation.	Better capacity for and assessment of desertification.	Land degradation is recognized at local, regional and national scales and measures are introduced to prevent/reverse it.
OUTPUT 3	'Best-bet' technologies and practices developed for the sustainable management of land, vegetation and rangeland resources	NARS, NGOs, CBOs, land users and associations	Improved technologies and practices promoted by NARS and adopted by land users in the dry areas	Prevention and reversal of land degradation and improvement of agricultural productivity, household livelihoods and food security
Output Targets 2006	Identification of local innovations and improved technologies in additional two degraded areas Additional three 'best bet' technologies identified and used via the participation of end users	NARS, NGOs, CBOs, land users and associations	Local innovations documented Improved land productivity and reduced land degradation Increased share of legumes in rotations and farmer income	Reduction of land degradation. Improvement of legume and rangeland productivity.
Output Targets 2007	Adoption and *ex ante* impacts of proven technologies on reversing land degradation completed in Karkheh River Basin, Iran	NARS, NGOs, CBOs, land users and associations	Local innovations documented and disseminated	Reduction of land degradation and raised awareness about its causes. Increased farmer resilience in marginal areas.

	Outputs	Intended Users	Outcomes	Impact
Output Targets 2008	Guidelines for assessing the economic and environmental impacts of improved land management options made available to NARS in at least two CWANA countries	NARS, NGOs, CBOs, land users and associations	Improved sustainable land management options implemented by farmers	Improved productivity of agricultural systems and conservation of natural resources
OUTPUT 4	Community-based land management practices	Local communities and organizations, NARS	Greater co-management of natural resources	Better collective management of natural resources, prevention and reduction of land degradation and improvement of agricultural productivity, household livelihoods and food security
Output Targets 2006	Model of rangeland management options in one agro-pastoral community	Rangeland community, NARS, policy-makers	Model used as basis for designing community-based management strategies and identifying necessary supporting policy and institutional measures	Better collective management of rangelands, prevention and reduction of rangeland degradation and improvement of livestock productivity and household livelihoods
Output Targets 2007	Community-based approaches to rangeland management	NARS, policy-makers, CBOs	Community-based management strategies and supporting policy and institutional measures	Better collective management of rangelands, prevention and reduction of rangeland degradation and improvement of livestock productivity and household livelihoods
Output Targets 2008	Outscaling strategies for land management practices developed for project areas	NARS, local authorities, policy-makers, development agencies, NGOs and CBOs	Recommended land management practices transferred more widely	Better collective land management, prevention and reduction of land degradation and improvement of agricultural productivity and household livelihoods
	Guidelines for watershed management in dry areas	NARS, policy-makers, watershed CBOs	Recommended watershed management practices adopted	Better collective watershed management, prevention and reduction of land degradation and improvement of agricultural productivity and household livelihoods

	Outputs	Intended Users	Outcomes	Impact
OUTPUT 5	Improved policy and institutional options for developing enabling environments to enhance private and public investment in dryland development and to combat desertification	Government departments, UNCCD focal points, policy-makers, NARS	Better enabling environment for sustainable land management through improved policies and institutional arrangements	Enhanced private and public investments to prevent/reverse desertification and to sustain livelihoods of dryland populations
Output Targets 2006	Collaborative linkages with partners through national action programmes, regional action programme, and country pilot programmes established Role of property rights and communal management policies in land degradation analyzed for two CWANA countries	UNCCD focal points and associated ministries, conveners of UNCCD action programmes Research organizations, policy-makers	Information and knowledge on land degradation disseminated to all parties interested in land degradation including community-based organizations	Better exchange of information on land degradation shared with all parties with interest in land degradation Desertification receives greater attention in poverty reduction strategies
Output Targets 2007	Impact of policies and institutional settings on desertification and the welfare of rural people evaluated and alternative institutional and policy options to prevent/reverse desertification identified	NARS, government ministries, research organizations	Institutional and policy options to prevent/reverse desertification adopted	Enhanced private and public investments to prevent/reverse desertification and to sustain livelihoods of dryland populations
Output Targets 2008	Regional workshops/seminars on impact of policies and institutional arrangements on land degradation	NARS, government ministries, research organizations	Regional cooperation in establishing transboundary policies and institutions to prevent/reverse desertification	Enhanced private and public investments to prevent/reverse desertification and to sustain livelihoods of dryland populations

	Outputs	Intended Users	Outcomes	Impact
OUTPUT 6	Training and human capacity building to manage natural resources in areas affected/prone to land degradation	NARS, universities, NGOs, CBOs, civil society organizations (CSOs), land users	Improved adaptive capacity for sustainable land management	Improved land management
Output Targets 2006	Demand-led training guidelines, materials and courses to combat desertification and manage land degradation developed with the NARS of CWANA	NARS, universities, NGOs, CBOs, CSOs, land users	Efficient training system for better land management capacity Information relevant to management of land degradation and desert compaction readily accessible to concerned parties Improved interaction and exchange of research outputs between various stakeholders	Improved capacity to manage land degradation and conserve the natural resource base Wider dissemination and adoption of land management strategies in CWANA and increased awareness of the importance and impacts of land management Improved land management and enhanced capacity to combat desertification
Output Targets 2007	Training of national programs in CWANA on INRM approaches, impacts and importance of land degradation, participatory and action research methodologies	NARS, universities, CBOs, CSOs, land users, local schools, extension workers	Improved capacities of NARS and extension workers, land users, CBOs, and students for land management	Improved research capacity and INRM approaches developed in CWANA
Output Targets 2008	Guidelines for up-scaling successful technological, institutional and policy options developed	National programs and communities in CWANA, governments, policy-makers, national and international organizations concerned with land degradation	Adoption of successful technologies and options for effective management of land degradation	Institutionalization and implementation of relevant technologies and polices for improved land management and desertification control

NGO: non-governmental organization; CBO: community-based organization; CSO: civil society organization