

## A Concept Note for a CGIAR Challenge Programme to Combat Desertification (Dryland Degradation)

### **Why desertification?**

One-third of humanity lives in the drylands, including the poorest nations on earth. The poorest peoples within these areas are agriculturalists (including herders). They struggle valiantly and with great ingenuity to eke out a living from lands that are especially vulnerable to degradation.

These regions urgently need help. The world agreed when 191 nations signed the United Nations Convention to Combat Desertification in the mid-1990s, following the Rio Earth Summit. The call to action was echoed in the World Summit on Sustainable Development, the New Partnership for Africa's Development, the Millennium Development Goals, and the Millennium Ecosystem Assessment.

### **Why the CGIAR is needed**

The UNCCD has been less science-driven than the Climate Change Convention — a weakness that has hindered its progress. CGIAR Centers, meanwhile are making significant research investments in sustainable dryland development, but these efforts are fragmented among the different Centers and submerged within other thematic programs and initiatives, so their contribution to the global fight against desertification is insufficiently coordinated and under-recognized by the world at large.

The CGIAR has been urging Centers to 'elevate their game' by aligning their collective work more visibly with such major global and System imperatives, and broadening their partnerships to solve major, difficult research problems. The CGIAR is seeking Challenge Programmes (CPs) that contribute strongly to the new CGIAR Priority framework in ways that could not be effectively served by Centers working in isolation of each other and of external partners, or apart from global sustainable development priorities and frameworks.

### **Investing in CGIAR Priority 4**

Land degradation, through the poverty and hunger that it induces, is a major concern of the CGIAR, as reflected in CGIAR Priority 4 ("Poverty alleviation and sustainable management of water, land and forest resources"). This dovetails with the interest of the UNCCD, which in Article 1 defines desertification as "land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climate variation and human activities."

The drivers of desertification are especially operative at the landscape scale, yet most past focus has been on the field and plot scale, and on narrow sectoral or disciplinary areas. Oasis intends to especially target CGIAR Priority Area 4A ("Integrated land, water and forest management at landscape level"), but also 4C and 4D. As might be expected from an integrated NRM approach, it will also deliver outputs that contribute to Priority 5 (e.g. improving policies and markets, options to reduce the riskiness of dryland agriculture, and community-led models to increase impact); diversifying cropping systems and agro-biodiversity (Priority Area 3 and 1B), and making use of stress-tolerant germplasm generated by Priorities 2B, 2C, and 2D.

### **Crucial, but difficult research questions**

Intractable research questions have lingered, constraining progress against desertification because of the absence of a coordinated global scientific effort to tackle them. Oasis will bring together the right mix of inter-disciplinary advanced science with on-the-ground

partnerships to make major gains in these areas. Oasis' wide consultations have indicated that the following high-level questions deserve priority attention:

1) How can we effectively assess and quantify dryland degradation at the landscape scale, a problem that includes subtle, long-term changes in natural resource capital and ecosystems function, involving not only biophysical measurements but valuations of ecosystems goods and services relative to the needs of both poor land users and national, regional and global societies that depend on these services?

This need was recently and strongly reiterated by the Millennium Ecosystem Assessment, which concluded in its Desertification Synthesis (p. 19) that “*without a scientifically robust and consistent baseline of desertification, identifying priorities and monitoring the consequences of actions are seriously constrained*” and “*understanding the impacts of desertification on human well-being requires that we improve our knowledge of the interactions between socioeconomic factors and ecosystem conditions.*” The CGIAR holds unique strength in leading-edge land assessment technology, including the interfacing of remote sensing and GIS with agricultural systems models; socio-economic assessment techniques; and ground-truthing through partnerships and participatory analyses at benchmark sites across the drylands of the developing world. By joining with external partners these strengths can be built upon to develop new capabilities. Examples include the development of effective, practical, accurate techniques and verifiable indicators to measure degradation and rehabilitation at landscape scales; methodologies for analyzing the interdependencies between agricultural and natural ecosystems; and methods for the valuation of ecosystem goods and services.

2) How can we quantify the landscape-scale dynamics that lead to losses of precious soil, water, nutrients, and biodiversity, and devise practical approaches to reduce those losses? Dynamic systems modeling, including interactions with climatic variability that interfaces between land degradation and climate change research (an area of study called for by both Conventions) are major research needs. Most past research has been at the field and plot level, while many of these dynamics are driven at the landscape level. Landscape-level analyses have been rare because they are difficult and require an integrated, inter-disciplinary approach. They must address complex and interacting hydrological, nutrient, topographical, and human land-management dynamics. The CGIAR must partner with advanced research institutions to advance in this direction, and the CP mechanism would provide the platform to make this happen.

Research has shown that even in the resource-constrained drylands, there is enormous waste of scarce natural resources. Much of the water that falls on these areas runs off or drains through without being used by crops or livestock, and nutrient flushes are leached into the groundwater because crop roots are too malnourished to capture them. Over-use of rangelands degrades their productivity and biodiversity, losses that could be prevented through community-based land management based on a better scientific understanding and in synch with appropriate policies.

Opportunities to enhance water and nutrient supplies through tighter resource cycling, landscape management (e.g. integrated tree-crop-livestock systems) to buffer variability in natural resource flows and balances (also easing the impacts of climate variability), and the supplementation of resources through water harvesting, smallholder-appropriate irrigation, and judicious fertilizer use, are just a few avenues of opportunity to be addressed.

3) How can policy, market and institutional dynamics that aggravate land degradation be overcome?

Inappropriate policies, market failures, and institutional deficiencies are major bottlenecks to sustainable dryland development, and prime causal factors behind desertification. Yet these policies continue, because of a dearth of understanding, solutions, and means for enacting

change within the policy-making institutions and frameworks of dryland countries. Land tenure insecurity, insufficient infrastructure (from roads to information to research investment), insufficiently-developed human capacities, lack of access by the poor to financial credit and other inputs, public neglect of the drylands, unfair subsidized competition, weak market structures, and other dysfunctions are just a few of many factors creating disincentives to sustainable dryland management.

The political commitments made by nations through the UNCCD process (National Action Plans) create a new entry point for attacking these issues. The UNCCD is working with nations to ‘mainstream’ these plans into national development agendas. However, major policy and institutional changes usually invoke tradeoffs that create both benefits and costs. Oasis will contribute policy analysis and advice to provide a stronger understanding of these tradeoffs, so that policymakers can become confident that they are making the right choices leading to more sustainable dryland management. Oasis’ unique combination of land-use science with world-leading agricultural policy analysis expertise creates a unique and much-needed resource, because policy on land degradation must meld both areas of expertise.

4) What motivates land-degrading vs. land-rehabilitating choices made by dryland users, and how can they be motivated to choose development pathways and livelihood options that lead to more sustainable, diverse, remunerative, and resilient dryland management?

Past attempts to counter land degradation largely overlooked the motivations of land users that ultimately cause, or correct land damage. These poor land users are more than just a means to an end, though; their welfare is the CGIAR’s direct concern. Yet the CGIAR, like others has often examined land-use from the limited perspective of only certain activities (e.g. crops or livestock or forests) rather than from the holistic, integrated lens through which land-users themselves perceive their environment. The challenge is to understand and ensure that the choices available to reduce land degradation are also attractive to land users, both individually and collectively, reconciling tradeoffs while rewarding more sustainable land care with increased, reliable income and other livelihood benefits that they value (employment, security, cultural values, etc).

To address the risk of location-specificity of such investigations, generating international public goods and lead to wide impact, a conceptual framework for understanding dryland development pathways is needed. To meet this challenge, Oasis will analyze the external and exogenous conditioning factors, land-user motives, and livelihood dynamics that influence livelihood change in the direction of more sustainable, less degrading land management. Additionally, the analysis of prior successes and failures will reveal lessons that are likely to be influential in similar target domains elsewhere. This development pathways framework will account for diverse options such as choices between diversification/specialization, intensification/extensification, subsistence/commercialization, rural/urban dynamics, on/off-farm activities, agricultural/environmental services, and others. The framework will help guide investments that provide land-users with choices that generate greater rewards from better land care.

5) How can knowledge-rich land management interventions be successfully shared with disadvantaged, isolated rural communities in ways that can be effectively up-scaled for wide impact?

Natural resource management interventions are often criticized as being inherently location-specific, requiring large investments to benefit small areas. Past approaches, however tended to overlook a large and potent resource for magnifying impact — namely, the knowledge and knowledge-sharing capacities of land-users themselves. Impressive examples of land-user innovation and large-scale impact in natural resource management have been described in all dryland regions, but rarely have scientific institutions analyzed or leveraged such mechanisms to extend their impact. Recognizing the potential in the drylands, the UNCCD within its

Articles repeatedly exhorts all parties to gather and make use of local knowledge through participatory approaches.

Much needs to be learned about ways to maximize effective co-learning between a global scientific team like Oasis and widely-dispersed, poor rural dryland communities faced with limited communications or extension infrastructure. What kinds of relationships and communications channels can be devised not merely to “get the word out”, but to enable and foster rich dialogue? How can good ideas found in one location be shared and understood at the level of principles, methods and tools that can be locally customized by another community to meet their special needs and priorities? How can co-learning bridges be built between policy-makers, scientists and land users that build consensus resulting in agreement on steps to improve land care? How can such intensive co-learning be up-scaled so that substantial impacts can be achieved across regions, including the harnessing of the new possibilities of information technology? How can impacts of such diverse and widespread innovations be assessed so that evidence of gains goes beyond the merely anecdotal to the scientifically-verifiable? Answers to these questions are vital not only for Oasis; they will have broad utility across the CGIAR agenda.

### **Outputs, impacts and exit strategy**

To conform to the Challenge Programme intent, Oasis has been careful to focus on activities that are likely to lead to large-scale impacts within eight years. The paths to impact for the five over-arching research questions are suggested in the discussions above, but to add clarity we list here a few of the main categories of impact expected by year 8:

- Proof-of-concept of much more effective land degradation assessment techniques across strategic landscapes in sub-Saharan Africa, including a standardized methodology and set of indicators; these tools will be in use by a large number of development partners and developing countries, and in ecosystem goods and services valuation studies.
- Practical techniques devised and proven for improving the efficiency of use of, and increasing the recycling of nutrients and water in farming systems and for preserving dryland agro-biodiversity, and for the efficient supplementation of nutrients and biodiversity through external inputs; these techniques in wide testing and utilized on an additional million farms in target and spillover countries in Africa and Asia.
- Policy guidance on key strategic policy interventions and demonstrably influencing policy changes towards better dryland care and investment in target and spillover developing countries.
- Development pathways framework defined and being used by partners to develop livelihood options in target and spillover countries, including income generators such as higher-value market systems..
- New livelihood options for diversified tree-crop-livestock systems, dryland-advantaged high-value crop and livestock products, land care systems and other more sustainable livelihood options developed and being widely tested and implemented by partners on-farm.
- New models for co-learning partnerships between the global Oasis scientific network and the constellation of local, national, regional stakeholders devised and under implementation; models for scaling-up NRM impact through improved knowledge-sharing techniques under test and in pilot scale implementation in target and spillover countries.

Oasis’ exit strategy is to ensure that development partner’s capacities are built to carry the outputs forward to achieve impact continuing long after the eight-year Challenge Programme period is completed. This requires involving those partners from the beginning of the

Programme so that the outputs are conceived in ways that are relevant and readily adoptable. It also involves deployment of the outputs in pilot test studies led by the development partners, with Oasis backstopping, during the CP period to get the development momentum going. In the five research question discussions we explained how these partner capacities will be built: policymaker engagement, learn-by-doing joint research, stakeholder co-learning, and processes that facilitate the customization of basic principles through land-user participation.

### **Partnerships**

Eleven CGIAR Centers that conduct dryland research are engaged in Oasis so far: CIAT, CIFOR, CIMMYT, ICARDA, ICRAF, ICRISAT, IFPRI, IITA, BIOVERSITY, ILRI, and WARDA, with ICARDA and ICRISAT co-convening. These Centers bring a broad, multidisciplinary range of CGIAR capacity, expertise, partnerships, and geographic experience to bear on dryland degradation. They form a nucleus that will attract leading global players and investors to join Oasis.

Oasis Centers have participated in the UNCCD process since its inception in the early 1990s. Oasis has established strong partnerships with all the major actors in the field of combating desertification, such as UNCCD, TerrAfrica, UNEP, UNDP/DDC, UNESCO, OSS, regional NARS bodies, investors (GEF, IFAD, GM, USAID, others), NGOs, and many more.

Parties have been urging the UN Desertification, Climate Change and Biodiversity Conventions to increase their coordination, because many issues intersect all three of them. Oasis will also foster interaction with sister initiatives on climate change and biodiversity in the CGIAR as these develop, and will build linkages and benefit from the knowledge gained by sister Challenge Programmes and other initiatives, for example the lessons in integrated NRM compiled by the CGIAR's INRM Task Force.

Oasis benefits from large regional partnerships already engaged by Centers such as the Desert Margins Program (sub-Saharan Africa), the Mashreq and Maghreb Project (North Africa-West Asia), and the CACILM Project (Central Asia and the Caucasus). Oasis will also benefit from ICRISAT's strong relationships in India, the locus of dryland poverty in South Asia; and relationships being built by ICARDA and ICRISAT in dryland China.