



Livelihood diversification through market gardening (Cabbage, salad, and onion) in Aguié, Maradi region, Niger

Increased productivity, better income for families

A first wave of Dryland Systems projects demonstrates promise for smallholders. In the Target Regions, a range of projects are showing promise for communities. The challenge for Dryland Systems is to understand how they can be scaled-up and to encourage learning and sharing of expertise across regions.

Treesilience – assessing the resilience of trees in the drylands of Eastern Africa:

Practitioners and policymakers now have up-to-date information on the resilience-enhancing potential of trees in dryland areas – trees are a significant contributor to rural livelihoods, enhancing resilience during periodic 'shocks.' This package of practical information is now guiding development efforts and raising awareness about the importance of managing these valuable resources sustainably.

Equitable management of East African rangelands:

A pastoralist-policy-maker dialogue has enhanced understanding and generated mutual benefits for both groups: pastoralists are given a forum to articulate their needs, and decision-makers now understand the livelihood choices made by pastoralists and the impacts their policies have on rangeland environments. The dialogue is enhanced by scientific and cross-border comparative analyses of biophysical and socio-ecological ecosystems in Ethiopia, Kenya, and Tanzania.

Improved wheat varieties – a solution to Africa's import dependence:

Three wheat value chain platforms were established in Kano State, Nigeria, where the successful introduction of improved, high-yielding wheat varieties is convincing policymakers that the answer to their country's growing dependence on wheat imports is domestic production – the new varieties are yielding 5-6 tons/hectare, significantly higher than the 1-2 t/ha generated by traditional varieties.

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Dryland Systems' research: Why the systems approach is critical for rural communities?

What is a 'Systems approach' for agricultural development and how does it work? And more importantly, why is a systems focus critical to improving the livelihoods of millions of people living in the world's dry areas and marginal lands?

Smallholder communities and farmers, who are living in drylands food production systems address a complex set of decisions and situations every day to ensure food security for their families – facing issues such as unpredictable climate patterns, access to water, and options for improving nutrition and income. A community's perspective is a world away from the view of researchers – where the focus has too often been vertical, looking at one type of crop or a small set of farming practices, not adapted to the specific situation of drylands communities.

Dryland Systems is working to change this. To deliver research that responds to the needs of drylands communities, the program partners have chosen the Agricultural Livelihood System as the framework to integrate research, learning and sharing knowledge across the regions and tracking progress.

Agricultural livelihood systems	West African Sahel & Savannas	North Africa & West Asia	East & Southern Africa	Central Asia	South Asia
Pastoral Systems	*		*		*
Agro-pastoral systems	*	*	*	*	*
Intensive rain-fed systems	*	*	*	*	*
Irrigated crops systems	*	*		*	*
Tree-based systems		*		*	
Home garden systems				*	
Traditional Subsistence	*				

Legend: * refers to activities on-going

Led by:



Partners:



Bridging the gender gap

To involve women more productively in farming their current role must be better understood



An increased number of rural women get involved in farming and participate in agricultural production, gender activities in Malawi

A recent report by the FAO reveals that women account for more than 70 percent of the agricultural labor force in some developing countries. In this light, the focus on women's issues and the involvement of women in decision making and their role in positions of responsibility in the food production system needs to be far more explicit. And this is the goal of the Drylands Systems' gender team, as it puts the program's gender strategy into action.



harvest in Malawi: Husband and wife engaging in conservation agriculture.

The strategy guides the increased involvement and empowerment of women in the program – for research activities and in the project sites. To put the strategy into action, some 20 gender specialists from across the program's partners and regions, are addressing research questions and practical approaches to mainstream and track the involvement of women across all research regions and sites.

Past research suggests that gender-related challenges in dry areas emerge from social norms (religion, tradition, and social norms), which govern rights to ownership and access to technology and markets. In response to these challenges, Dryland Systems' researchers have conducted several activities to collect baseline information – an initial step that will inform subsequent activities.

A range of gender-related activities is now in progress. In India, an agro-biodiversity assessment is being done. In Mali, gender-related interventions are being designed into projects, including: focus group discussions involving men and women, an inventory of diverse plants and animal species, ethno-biological surveys, village household surveys to assess women's roles and the potential for further involvement in agriculture. Other analyses focus on food security, food consumption behavior of mothers and children, and their adaptability to dry areas.

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Richard Thomas,
Dryland Systems program director

Innovative Dryland Systems research approaches

Linking new science with indigenous knowledge; tapping the power of the private sector

Dr. Richard Thomas, the incoming Director of the Dryland Systems Program, shares his thoughts on challenges and opportunities for improving livelihoods for people in the world's dry areas.

The challenges facing dryland communities are well known. What positive aspects do you see in the years ahead?

Dryland communities do face harsh realities. But, it is also true that we can learn a lot from the ingenuity and resilience of these communities – something that will become critical for developing solutions in the future. An innovative aspect of the program is its aspiration to effectively integrate new science with indigenous knowledge.

What do you see as unique about the Dryland Systems program?

Science programs like ours are bridging the science-policy and science-practitioner divides, and adopting more inclusive, inter-disciplinary approaches to research for development. We are helping to create new innovations, and successfully adapting them to specific contexts – this is a unique approach in the sector. Our 'systems' approach offers great potential, providing a combination of interventions that can effectively deal with the myriad problems facing dryland countries.

What are some of the challenges that may affect the Program's development in the years ahead?

A key challenge is convincing the private sector to invest in drylands. The private sector plays a key role in providing investments that both create and improve the livelihoods of smallholder farmers. It is also a critical actor in efforts to scale-up successful interventions. This potential has not yet been tapped.

How can we encourage the private sector to play a bigger role?

The private sector will be reluctant to act without clear and encouraging signs from the public sector. This could mean, for instance, new markets for ecosystem services, more accessible data, or subsidy schemes that help farmers shift to sustainable land management practices. This is one area where the Program can provide evidence to convince private investment in drylands development.

What is your vision for the future?

A number of our current activities demonstrate the Program's comparative advantage, such as: trans-disciplinary integrated approaches that are driven by countries or communities; a credible evidence base for sustainable land management interventions (technical, financial, political and social aspects); the design and testing of new approaches and technologies that include the private sector or capacity building for national partners to develop their problem-solving skills in finding solutions to drylands and climate change issues.

This interview is based on an opinion article written for the World Day to Combat Desertification by Richard Thomas, incoming Director of the CGIAR Research Program on Dryland Systems, who is currently at the United Nations University-Institute for Water, Environment, and Health. For the full article, see: <http://drylandsystems.cgiar.org/content/degraded-drylands-productive-systems#sthash.dSpNZ7O0.dpuf>

Innovation platforms: partnerships that encourage research with communities

The past six months have seen considerable progress on the ground as the Dryland Systems program tests integrated approaches to reduce vulnerability for people living in low-potential dryland production systems, and supports sustainable intensification and diversification of food production for those in higher-potential rain-fed regions.

An important milestone is the creation of 15 innovation platforms in the target regions, which bring together the partners needed to link research to use at the policy and community levels – researchers, NGOs and community based organization, relevant local and national authorities and line agencies, academia, farmers' organizations and extension agencies. While the overall concept is the same, each platform has its own unique character, shaped by the specific needs of the location and partners, and framed in an agreement.

North Africa and West Asia – crop-livestock and improved olive production

Three innovation platforms were established in Tunisia, Morocco, and Jordan in community dialogues where researchers demonstrated technology packages and communities were given the opportunity to raise their needs, to understand their specific needs. In Karak, Jordan, crop-livestock solutions, improved crop varieties, and olive production will be pursued, and in the Nile Delta and Meknes action sites, the benefits of integrated pest management will be explored.



Mixed crop-tree-cactus system and supplemental irrigation

Central Asia – improved varieties for disease and pest resistance

Research teams in Central Asia concentrated on improved coordination between local agencies and communities to explore and agree on integrated solutions. In workshops researchers and development partners presented and discussed the potential of new technologies: higher-yielding disease and pest-resistant crop varieties, diversified cropping options, pest management, and increasing irrigation efficiency. Central Asian innovation platforms, focused on productivity improvements, are located in Uzbekistan, Turkmenistan, Tajikistan, and Kyrgyzstan.

East and Southern Africa – stimulating value chains, creating markets for crop livestock products

Innovation platforms in East and Southern Africa form an on-going dialogue between all stakeholders in the research-to-market value chain, investigating constraints to improved livelihoods and targeting technologies, practices and policies to community needs. The overall goal is to achieve effective crop-livestock integration for all participating communities. Some examples of the value chains being researched: goats, groundnuts, maize, beef cattle marketing, and crop-livestock integration. Particular emphasis is being placed on market access – a common concern voiced during community consultations.



Enhancing livestock productivity through breeding, feed diversity, and monitoring

Case Study: Bridging the yield gap in India – engaging nearly 4 million farmers impacting 5 million hectares

In India, a consortium of State Agricultural Universities, Krishi Vigyan Kendras and government agencies led by ICRISAT has reached millions of farmers to enhance productivity. During the 2013 crop season, some 5.1 million hectares were introduced to new integrated technologies (improved soil, water, seeds, pest management, etc.) affecting 3.6 million farmers in 30 districts of Karnataka State, India. Participatory trials with soil-based nutrient management and other improved technologies such as improved variety seeds, soil water management options and seed treatment. Farmers evaluated the approaches and in many areas recorded increased yield for cereals and legume crops of 21% in paddy to 43%, in pearl millet, 28% for soybean to 37% in pigeon pea. Similarly, oilseed crops like sunflower and groundnut recorded increased crop yield from 24% to 56%, and 31% to 48% respectively.

These improved management practices will provide a gross value of increased agricultural production of some US\$ 75 million with a 21-56% increase in crop yields. During the season, 38 training courses at district level engaged 4050 participants, 184 training courses engaged 13,448 trainees, and 6,966 village level sessions trained 495,700 farmers. In addition, nearly 2300 field days were organized in 30 districts and 141,541 farmers were exposed to science-led improved technologies to enhance crop productivity on drylands including 39,385 women farmers.

East and Southern Africa – stimulating value chains, creating markets for crop – livestock products

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Soil-test-based nutrient management: Trials in Karnataka, India.

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In South Asia, a 'farmer facilitator' approach specifically targets female farmers, providing training on appropriate land, water, and soil management. "Engaging a larger number of women farmers is extremely important, as – once they are better informed – they show more dedication in the field," says KH Anantha, a Dryland Systems team member of the Bhoochetana Program in India. He adds that some ten percent of the facilitators we hired are women. "They appreciate other women's situations better and improve the circulation of information to other women active in smallholder farming.

In Southern Africa's Chinyanja Triangle, gender studies examine which farming technologies are currently used by men and women. A baseline survey pinpoints specific requirements and technology preferences of male and female farmers.

Survey data reveals that most of the technologies are provided to men and women without looking into specific requirements of how they use these technologies differently, explains Everisto Mapedza, team leader of gender research in East and Southern Africa. "Technologies need to be gendered. Today there are more women working in farming than before, as men are migrating to other regions to seek higher paying work opportunities." Analysis in east and southern Africa shows that, while the percentage of women with access to land and other resources is relatively high - with men working and living in other locations for most of the year. But men continue to retain responsibility for key decisions as they return home for planting and harvest activities, which limits the influence of women and benefits to them.

Upcoming activities in Central Asia will analyze gender roles and access to knowledge for communities on marginal lands – for example, knowledge on the availability of quality seed and stress-tolerant crop varieties – and assessing the impact of gender involvement on water management.

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Linking sheep and goat producers to world markets:

Two research-for-development partnerships are successfully linking rural communities in Central Asia with high-value, global markets for wool and yarn. The impact: increased incomes for villages and households, particularly rural women, and business models that can be applied to dryland communities worldwide.

High-value medicinal plants: Applying experience shared from research and development projects in Afghanistan, Morocco, and Turkey, women in Jordan are cultivating medicinal plants in their home gardens as a means of reducing land degradation, protecting biodiversity, empowering them, and increasing household income. The harvesting of wild thyme is a traditional practice – but over-exploitation is reducing populations and increasing degradation on marginal soils. Researchers and development specialists are mentoring local women in the benefits of cultivating thyme, a year round cash crop for household income and a way to reduce environmental degradation of over-harvesting of wild plants.

Case Study: Creating local equipment markets is the key to expanding conservation agriculture

Decades of research have been done on conservation agriculture. So why are its benefits not recognized in many drylands areas and low income countries? The Dryland Systems team in North Africa and West Asia have learned that market mechanisms and locally adapted seeders are the primary obstacle to wide scale use of zero-tillage practices – along with a flexible and non-proscriptive approach that is developed with farmers.

Conservation agriculture practices are expanding over 39,000 ha serving some 5080 farmers in the North Africa West Asia region (Jordan, Syria, Tunisia, Morocco, Iraq, and Algeria). The driving force for this continued growth is the design and production of locally-made low-cost zero-till seeders in partnership with the local private sector. Commercially available seeders are made in high-income countries that have vast areas of conservation tillage, such as the US and Brazil. They typically cost \$50,000-60,000 or more – a cost that is out of reach for smallholders in developing countries. In its partnerships in Syria and Iraq (2007-2009), ICARDA worked with local equipment producers and farmers to develop prototypes of low-cost seeders that can be profitably manufactured and sold for \$2,000-6,000. Smaller models measure 2.3 meters across, larger ones 4 meters. Seeders manufactured locally in Syria cost \$1,500 for 2.3-meter models and \$4,500 for the 4-meter models. Seeder modification costs \$1,250 in Iraq. In Iraq, farmers developed modification kits to adapt local 3.6-meter seeders at even lower costs. This farmer-led effort to develop, test, demonstrate and promote modified seeders at even lower costs was a surprise success and produced major outcomes.

Savings in energy cost and reduced time spent on crop labor were the immediate benefits noted by farmers. They registered savings of up to 40 liters of fuel per hectare and reduced labor and seed expenses. Local manufacturing of no-till seeders can also enhance private capital investments to stimulate adoption. Recently developed national strategies for Moroccan agriculture encourage the cooperation of small farmers around an aggregator in a production chain. The practice also brings environmental benefits to dry areas – including improved soil fertility, water and energy saving. Atmospheric benefits – less carbon dioxide emissions, dust storms and smoke – are yet to be monitored.