Scientific Networking to Combat Desertification – Creating Interdisciplinary and Participatory Bonds to Sustain Rural Livelihoods

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Abstract

Drylands cover 41\% of the global land surface and are subjected to recurring droughts and desertification. The Millenium Ecosystem Assessment (MA, 2005) estimates with medium certainty (65-85\% probability) that about 10-20\% of the drylands is currently degraded. Desertification is still proceeding, enhancing the risks of rural poverty, conflicts and human displacement. The four scenarios developed by the MA underscore that desertified areas are likely to increase. Hereby, poverty and unsustainable land use systems will remain the driving forces for triggering land degradation up to the point of desertification. In order to develop implementable tools for preventing, combating and rehabilitating degraded drylands, scientists of the German Scientific Network to Combat Desertification (Desert*Net, \url{www.desertnet.de}), who are working in different dryland research projects, have developed innovative approaches to embed research initiatives on sustainable development in the social, cultural, economic and political structures existing in countries prone to or suffering under desertification. Whereas the development of interdisciplinary, application-oriented training programmes prepares young Uzbek academics in their role as future decision-makers, training programmes for rural dryland communities in Namibia and South Africa principally create the ground for disseminating target information for community-based environmental monitoring. Self-motivated incentives are evolving among the trained para-ecologists in the rural communities of southern Africa, which suffer from high unemployment rates, for activities for income generation in the field of environmental protection.

1 The Desertification Issue for Rural Households in Drylands

Natural resources are still the major economic backbone of most rural households in arid, semi-arid and dry sub-humid regions. Multifarious social, economic and political reasons especially during the last century have supported the policy of maximum utilisation of these resources. This has resulted in the wide spread of unsustainable farming and land use systems, which have exacerbated the desertification (degradation of the land). Field research in drylands emphasises the importance of interdisciplinary and participatory-based research approaches to combat and to prevent desertification for stabilising the rural production systems. The German Scientific Competence Network for Research to Combat Desertification (Desert*Net) was established to form a binding link between different scientific fields, as well as between scientists, policy makers, development agencies, public institutions and stakeholders in order to support applicable sustainable land use systems in degraded areas. Desert*Net recognises mono-disciplinary excellence as the pre-stage for aggregating reliable information for interdisciplinary research. Desert*Net identifies pressing desertification-related issues at the social, economic and political level. This network scientifically supports innovative research concepts that are feasible and applicable to the local realities in desertification-prone areas. For this reason, member institutes of...
Desert*Net co-operate with countries affected by desertification in the line of technical and methodological training, scientific knowledge transfer and applied field research.

2 The Training of Para-Ecologists in the Communal Lands of Southern Africa
The Desert*Net member BIOTA Southern Africa Project (www.biota-africa.org), an interdisciplinary and international biodiversity research and monitoring research initiative which is funded by the German Federal Ministry of Education and Research (BMBF) exemplifies how the development of a new strategy helps to sensitise members of local communities in southern Africa to the complex ecological and socio-economic causes and effects of desertification. New measures to combat land mismanagement require the participation of local stakeholders in research for sustainable development. Besides the capacity development of young academics, BIOTA Southern Africa therefore employs and trains members of local land-user communities as para-ecologists (i.e., ecologists that did not receive formal, academic training but are trained on the job and during training courses in the field of biodiversity research): Eight para-ecologists (3 women, 5 men) have been selected from communities in the vicinity of the research sites of BIOTA Southern Africa Project and are currently employed on a fulltime base. The capacity development comprises training workshops as well as training during the field work. Each para-ecologist is supervised and supported by a BIOTA Southern Africa researcher.

The training comprises the following aspects: a) general skills (e.g., to facilitate workshops, to conduct interviews, to share research activities and objectives with local communities, to promote environmental awareness in the community, to develop self-help), b) the use of technical equipment (e.g., GPS, maps, cameras, computers), c) collection and identification of plants and animals, d) assessment and documentation of monitoring data: flora, fauna and soils, e) assessment of socio-economical information, and f) ecology and threats of the respective ecosystems they work and live in.

After the first six months of the para-ecologist programme, the para-ecologists have become very important for the BIOTA Southern Africa Project. The para-ecologists now independently conduct monitoring (e.g., on phenology of selected plant species), interview land-users about stock numbers or local knowledge of special organisms, set up and maintain research infrastructure, function as contact persons and multipliers in the local communities. For the para-ecologists the programme provides a job and capacity development which goes beyond the mere learning and applying of methods but also helps to develop job experiences, self-confidence and self-help, an invaluable precondition to the successful application for new jobs.

With the long-term training in eight rural communities the BIOTA Southern Africa Project strives to integrate the communities into research activities in a participatory way, to empower them to take over substantial parts of the biodiversity monitoring tasks to facilitate their ownership of the research results. A major aim of the para-ecologist programme is to encourage members of local land-user communities to realise their own role in combating or preventing land degradation, as well as their expectations to other vital groups (science, political administration, development agencies). Incentives should be created for self-administration and income diversification which are in balance with local natural resources.

3 Academic Training for Sustainable Development – The Aral Sea Case
Another activity in which Desert*Net members are involved is the project Economic and Ecological Restructuring of Land and Water Use in the Region Khorezm (Uzbekistan): A Pilot Project in Development Research (http://www.uni-bonn.de/khorezm) carried out by the Centre for Development Research (ZEF) of the University of Bonn in the lower Amu Darya Basin in Central Asia.
To improve the livelihoods of the population in the region through more efficient and sustainable water and land use, an integrated approach is needed which simultaneously addresses the ecological sustainability of the agricultural production system, its economic efficiency, and the political and institutional arrangements. Furthermore, such an approach should be truly user-driven, which means that viable solutions must be developed in close cooperation with the farmers and decision makers of the region.

The Centre for Development Research (ZEF) has, in close consultation with its national and international partners, and under great support from the main partner in Uzbekistan, the State University of Urgench, designed an interdisciplinary, application oriented research programme. The aim of this programme is to provide appropriate regional development concepts for a sustainable, efficient resource use in the region. The 10-year programme started in 2001 with a philosophy of a long-term participatory commitment and a strong human capacity building component. Particularly the training of young Uzbek academics in their role of future researchers and decision-makers in the region has a high priority. The research programme is carried out in the district of Khorezm in Uzbekistan, a model region where solutions for the Aral Sea Basin are being tested.

In 2005, the first phase of the project was finished and the first “generation” of Ph.D. students is now writing up their theses and publications. Their research has been focusing on the many different aspects of science that contribute to a better understanding of the system of land and water use in this region. A new picture of the intricacies and interdependencies of the natural resource availability and quality, of the various human actors and their interests and driving forces is arising. It now allows the researchers involved, if not to “get it right”, to come closer to the right problem definition about the Aral Sea, as a first step to be able to provide the necessary innovations. A modelling approach in which decision support systems for both the farm and the district level will be developed is a very important part of the concept, because it will allow addressing the multiplicity of problems.

The project has been very successful so far in producing updated, geo-referenced information for the region that is widely used by local counterparts (e.g., Ibrakhimov 2005). Also, the human capacity formation of more than 25 Ph.D., and 36 M.Sc. students, and the training of about 40 bachelors in the context of the project are features that have been well acknowledged by the counterparts. In the upcoming Phase III, now in the planning stage, the developed solutions and innovations – such as conservation agriculture, the introduction of trees, and the optimization of fertilizer use in crop rotations - will be tested on-farm with the participation of a wide variety of farmers throughout the region.

4 Conclusions and Recommendations

Desertification is always driven by ill-conceived land tenure, access and property rights as well as weak institutional structures. Integrated science can significantly support the development and implementation of sustainable resources utilisation practices. However, desertification proves that a highly integrated scientific networking approach is necessary to pool information on training and best practice mechanisms for safeguarding the natural resources and for sustainable development. Cost-efficient and implementable strategies for preventing and combating desertification require the exchange of knowledge.

Desert*Net is such an information pooling and disseminating network that enables the sharing and transfer of knowledge gained from geographically separated projects which have different approaches to sustainable development in drylands. The comparison of the project areas in southern Africa and central Asia exemplifies that training measures for sustainable development have to be embedded in the social, cultural and political realities. Experiences show that solutions for sustainable development cannot exclusively favour bottom up or top down approaches. In fact both mechanisms have to be closely linked and finely adjusted to the respective target area of research. The communally managed communal areas of

Photo 2: Academic training in Uzbekistan, measuring soil salinity. Photo: C. Martius
southern Africa primarily support initiatives for environmental education that are accepted and firmly grounded in the local communities. For this reason right at the onset of the project a very direct cooperation was built up with the local land users. On the other hand, the hierarchically and very centralised government structures in Uzbekistan which exist since Soviet times require a more formal human capacity building approach, because any measure towards the transition to more sustainable land use must directly address the policy level.

The prime addressees of scientific research on sustainable development lie at the political level. In order to create a higher visibility of the existing scientific expertise for development planning drylands, the German Desert*Net together with Belgium and French scientific networks\(^1\) has started with the development of a European Desert*Net.

5 References


\(^1\) Belgian Expert Group on Desertification to support Ministry for Development Cooperation and Comité Scientifique Français de la Désertification (CSFD)