Approaches For Water Management in Drylands

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The most vulnerable areas in any ecosystem are the ones at its periphery. Most of the land erosion, degradation of soil quality, loss of biodiversity, and eventual loss of productivity occurs in these marginal – but high-priority – lands. This is particularly true for drylands, which comprise arid, semi-arid and dry sub-humid regions. Strategies for sustainable water management in these dry areas are most critical for protection, conservation and reclamation or rehabilitation of these fragile systems. Such strategies are closely linked to human development and quality of life in these marginal areas.

Threats to Water Availability in Drylands
Freshwater is abundant in itself but is geographically distributed so that it’s not equally available to all. Water utilization has increased three times with a mere doubling of population in the past 50 years. For example, the water usage in some Asian and African countries far exceeds the available and renewable water resources. By 2025, most countries of the world will be facing a high water stress (UNEP, 2000). How we deal with this water scarcity will be a major issue in the coming decades.

Land Degradation in Drylands
Land degradation is defined as a process that leads to reduction of land productivity and is typically a result of soil erosion, wind erosion, water erosion, soil salinization, waterlogging, chemical deterioration, or a combination of these factors. These processes are globally manifest, causing the transformation of marginal lands into wastelands and the destruction of many natural ecosystems. The UN estimates that some 70% of the 5.2 billion hectares of drylands used for agriculture around the world are already degraded (UNEP, 2000). The immediate causes include poor management of water resources, deforestation, inappropriate land use practices, overuse of chemicals, fertilizers and pesticides, and disposal of domestic and industrial wastes. The underlying driving forces include rapidly increasing population, economic policies that over-exploit natural resources, and rapid, often poorly managed industrial and urban development.

Integrated Water and Land Management Approaches
Development of integrated approaches for water and land management in drylands is critical to minimizing adverse societal and economic impacts. This calls for actions to build and strengthen existing institutional capacities for regional, national and basin-level agencies to effectively address and integrate cross-sectoral aspects. These integrated approaches should be adopted to local and regional requirements, rather than using them as ready-made solutions. A general framework for such integrated approaches must address the following closely interlinked dimensions (based on Adeel, 2001):

A. Scientific Dimension: Innovative solutions have to be identified for managing land degradation, mainly through water use efficiency and productivity, and soil conservation. Re-use and recycling of water for agricultural and other uses is becoming increasingly attractive.
B. Human Dimension: Impacts of integrated water management on livelihood of local people need to be accounted for when designing and discussing resource management approaches. This, in turn, requires active involvement of local communities in development and implementation of such strategies. It is also important to account for the effects of indigenous practices on water resources, both positive and negative.

C. Economic Dimension: There is a need for evaluation of social, environmental and economic costs and benefits to ensure long-term viability of integrated approaches. At the same time, capital investment into developing new infrastructure as well as maintaining existing and traditional practices is essential.

D. Natural Resource Dimension: Rehabilitation of ecosystems in marginal lands should have the highest priority in integrated programmes, primarily through in situ conservation approaches. Due consideration must be given to trans-ecozone characteristics of resources – especially water. Planning and conflict resolution on a trans-ecozone level become crucial in approaches to improve the water resources distribution in drylands.

Innovative Approaches for Integrated Water Management

A series of new and innovative approaches have been developed in the recent years with particular emphasis on drylands’ conditions. These include the following (Adeel and Mainguet, 2001):

- Water productivity in drylands can be significantly improved through water harvesting, supplemental irrigation and deficit irrigation. These technologies have been quite successfully tested at pilot scale and now require a broader implementation.
- A number of approaches are available for safe and productive use of recycled water in agricultural applications. Again, these have been implemented at relatively small scales and require a more careful evaluation as broader-scale implementation schemes are developed.
- In conjunction with recycled water applications, emphasis has to be given to development of cheaper water treatment technologies that are suited to local conditions.

Scientifically-based policy guidelines should be developed for governments to facilitate the implementation of these innovative approaches. Within these policies it is important to put a strong emphasis on demand management policies, rather than focus just on water supply side.

References