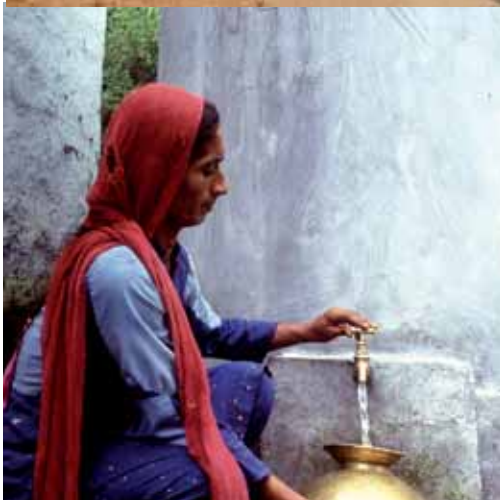
CHAPTER 5

Wider issues of water in Drylands



Water harvesting (WH) and soil water conservation (SWC) in croplands and on pasture hold the potential to contribute to the vital wider development of drylands pasture by increasing the yields and their reliability. If well planned, successful WH and SWC initatives can create the conditions required to enable local land users (smallholders, agropastoralists and pastoralists) to escape from the vicious cycles that lead to land degradation and rural poverty, by contributing to poverty reduction and economic growth. However, there are potential negative trade-offs associated with increased agricultural water use, which should be anticipated and plans made to limit potentially deleterious impacts.

Watersheds (river basins) have long been acknowledged as the appropriate and logical unit of analysis and planning for improving water resources. Through watershed management, it has been proven that soils and water (surface and ground) resources can be better managed and sustained using SWC (Kerr, 2002; WRI, 2005; Brooks and Tayaa, 2002; WOCAT, 2007). The watershed approach encourages the promotion of co-operation between upstream and downstream stakeholders – in an effort to minimize conflicts over land and water. Plans must make sense both economically and environmentally – to contribute to poverty reduction and improve the functioning of the

watersheds – particularly to restore the recent widespread reduction in groundwater levels in semi-arid areas (Seckler, 1998). The watershed approach also provides clarity in determining the economic importance of water-related ecosystem service (e.g. increasing water yield, improving water quality, reducing sediment delivery to a reservoir). The approach can be used at a range of spatial scales, from micro-catchments upwards.

Kerr (2002) reviewed the outcomes of a large number of watershed development projects in India, all designed to realize hopes for agricultural development in rainfed, semi-arid areas. These areas were bypassed by the Green Revolution and had experienced little or no growth in agricultural production for several decades. The case studies in Andhra Pradesh and Maharashtra, India offer important insights for other parts of the world. By systematically evaluating the opportunities and challenges of watershed development, Kerr concluded that while most of the projects they surveyed have had relatively little impact, those that take a more participatory approach and are managed by NGOs have performed better in conserving natural resources and raising agricultural productivity. The author cautioned that success often comes at the expense of the poorest people in watershed areas; improving the management of a watershed usually requires restricting access to the natural resource base on which they depend. Many watershed development projects do not work because those whose interests are harmed refuse to go along with the effort. The author argued that for watershed development to succeed on a large scale, projects must find a way for all affected parties to share in the net gains generated.

A detailed analysis of the benefits of one of the projects (part on an Indo-German Watershed Development Program) in drought-plagued Maharashtra, India around Darewadi Village (WRI, 2005) demonstrates the dramatic success possible with careful planning. In 1996, the main village and its twelve hamlets were on the verge of desertification. Before the watershed was regenerated Darewadi's 921 residents depended on water deliveries from a tanker truck for four months per year. In 2004 the village was tanker free, despite receiving only 350mm of rain in 2003 – 100mm less than its annual average. The program at Darewadi involved five years of regeneration activities, including tree and grass planting, a grazing ban, sustainable crop cultivation (decreasing the need to purchase inorganic fertilizers – which are energy expensive to produce), soil and water conservation measures, construction of simple water harvesting and irrigation systems (hillside contour trenches and rainwater harvesting dams). The grazing restrictions were lifted after five years, livestock number rebounded depending on more plentiful fodder and yields (milk and crop) increased. Signs of increased household wealth and well-being appeared.

In reviewing the high level of attention being given to water harvesting and groundwater recharge in Rajasthan between 1974 and 2002, when the state government alone invested 8 534 930 000 rupees (approximately US$190 million) in watershed treatment, Rathore (2005) was unable to locate any systematic scientific evaluation regarding the effectiveness of recharge techniques. This should not be interpreted as indicating that water-harvesting efforts themselves have had little impact. Rather, it simply indicates that available technical evaluations are inadequate to reach any conclusion, meaning that potentially valuable lessons could not be learned.

In a wider review of watershed rehabilitation across India, Saxena (2001) noted evaluation reports showed that watershed rehabilitation will fail to meet productivity, equity and sustainability objectives unless project beneficiaries are fully engaged and careful attention is paid to issues of social organisation. Success depends on consensus among a large number of users and collective capability is required for management of the commons, also of new water harvesting structures created during the project. He concluded that the costs and benefits of watershed interventions will be location-specific and, concurring with Kerr (2002), unevenly distributed among the people affected especially where poorer groups are unable to have their requirements met.

The record of government agencies in stimulating people's participation has been poor and their

overall success rate low (Kerr *et al*., 2000). Field staff were found to have no incentive to make the effort to pursue participatory approaches. Saxena (2001) concluded that lands in the upper catchment should be rehabilitated first for at least three reasons. First, so that the landless and the poor who depend on the upper slopes can benefit; second, so that groundwater recharges as early as possible; and third, by the time the lower catchment is treated any debris and erosion running down from the upper catchment has been minimised. High priority should also be given to rejuvenation of village ponds and tanks, and recharge of groundwater. Despite problems there are many success stories, especially in States such as Madhya Pradesh and Andhra Pradesh. Successful and sustainable projects such as Ralegaon Siddhi, the revival of johad in Alwar, Sadguru's activities in Gujarat, and watershed development in Jhabua and Sagar districts of Madhya Pradesh have characteristics which include: the emphasis on social issues, people's mobilisation, clear direction to Government machinery to accept principles of participatory management, explicit project monitoring and a strong sense of ownership by the local community.

The insights from these analyses of watershed management projects (Kerr 2000 & 2002; Saxena, 2001; WRI, 2005; Rathore, 2005) should be used as lessons to guide developments to improve water use and governance in other drylands. These models can be locally adapted to help restore groundwater, increasing crop and pasture yields, also reducing the energy required to pump water for household crop-use- contributing to poverty reduction and economic growth, particularly vital in Africa.

The two major environmental implications of the tremendous increase in the use of inorganic fertilizers are the energy costs of production and distribution, also the impact of the fertilizers on groundwater (Oberthür and Ott, 1999). SWC projects restore the organic matter content of dryland soils and raise fertility levels, reducing the need to use inorganic fertilizers – and consequently reducing energy use.

Success in water harvesting and soil water conservation, diverting a greater proportion of the precipitation for crop and pasture growth (green water) can risk directly reducing the availability of water downstream (blue water) – for urban areas, irrigation and reservoirs. One of the most conspicuous results of overuse of water harvesting and irrigation is that some large rivers now dry up before reaching the sea. Increased water use in one area may entail reduced availability in another downstream It is vital to get people involved in water management for agriculture at local level by real participation and transparent decision making. What is proposed is a new water contract. The Green Revolution was staged by scientists, the Blue Revolution should be staged by making water use and management everyone's business: its goal would be to maximize the production of food and the creation of jobs per water unit consumed. Enabling individuals and communities to understand their options for change, to choose from these options, to assume the responsibilities that these choices imply, and then to realize their choices could radically alter the way the world uses its limited water resources. The ultimate aim of water management is to optimize water use throughout a river basin in such a way that all users have access to the water they need (FAO, 2002).