



Badia Benchmark

The Steppe (Badia)The badia represents the drier environments of WANA, excluding desert areas. These marginal areas are home to a substantial proportion of the region's rural and poorest populations. Water is the over-riding constraint. The low and highly variable rainfall is often inadequate for economic crop production. The distribution of precipitation in these areas is highly erratic both within and between years. Most of the limited rainfall comes in sporadic, intense, and unpredictable storms, usually on crusting soils with low infiltration rates, resulting in surface runoff and uncontrolled rill and gully water flow. Thus, much of the limited rainfall is lost either directly by evaporation from the soil surface or to run-off, which, if not intercepted, collects in wadis or pans where it eventually evaporates. The result is that the greater part of the precipitation is lost back to the atmosphere as evaporation, land is degraded by erosion, and vegetation, except in those areas where rainwater collects, is limited and subject to severe water stress. Intervention in these extensive areas is needed if land degradation is to be halted or reversed and the productivity and livelihoods of rural communities are to improve. Due to its limited resources and perceived lack of returns, investments in development in the badia have been low in relation to the number of households that depend on it. Moreover, given the vulnerability and fragility of the natural resources, and in the absence of suitable development plans, national policies have tended towards minimizing intervention and disturbance to the existing system. Consequently, productivity remains low, degradation continues and rural populations seek alternative income-earning opportunities elsewhere. Increasing migration from these areas not only creates added economic and social pressures in urban areas, but also can lead to the collapse of traditional systems of land, water, and vegetation management, leading to further degradation of the badia. The challenge here is to enhance productivity and halt land degradation in these areas through the improved management of the natural resources, particularly the most limiting resource, water. Water harvesting provides a means for making water more available to the plants in drier environments. Through controlled concentration of runoff into target areas, water harvesting increases water availability to plants, controls soil erosion, reduces the impact of drought and increases rainwater productivity. Various systems of water harvesting have been developed and used for centuries throughout the WANA region such as jessour and meskat in Tunisia, tabia in Libya, cisterns in north Egypt, hafaer in Jordan, Syria and Sudan. Unfavorable socio-economic conditions in recent decades have led to a decline in the maintenance and use of many of these systems, but as water scarcity in the dry areas increases, attention has focused on efforts to revive the use of these systems. Examples of the successful use of new water harvesting systems include small basin micro catchments that have supported almond trees for over 17 years in the Muaqqar area of Jordan where mean annual rainfall is 125 mm. The system has proved sustainable over a period of several years of drought. In the same area small and low-cost farm reservoirs, used to store and release runoff water several times over the season, provided enough water to support economic agricultural development. Livestock (sheep and goats) represent the principal economic output and contribute a large proportion of the income of households in the badia. The establishment of fodder shrubs can provide a valuable feed source for rangeland based livestock. In the Mehasseh area of the Syrian steppe, with average annual rainfall of 120mm, the survival rate of rainfed shrubs is less than 10%, while those that were grown in micro-catchments had a survival rate of over 90%. Shrub survival rate can be improved between 70 to 90% with the introduction of water harvesting interventions (semi-circular bunds). In the Mahasseh case, shrubs were planted during a normal rainfall year, followed by three consecutive drought years. In north-west Egypt, with average annual rainfall of 130mm, small water harvesting basins with 200m² catchments support olive trees and harvesting rainwater from greenhouse roofs can provide about 50% of the water required by vegetables grown inside the greenhouse. These experiences and many other examples show that the productivity of rain in the drier environments can be substantially increased when appropriate water harvesting techniques are used. At the larger scale, methodologies have been developed for using remote sensing combined with ground information in a GIS framework to identify suitable areas and appropriate methods for water harvesting. It is estimated that 30–50% of the rainfall in these environments might be captured and utilized if water

harvesting is practiced, thus improving current rainwater use efficiency several fold. The successful and sustainable integration of water-harvesting techniques within existing agricultural systems in the dry areas is not an easy task. Socioeconomic, technical and policy factors need to be considered. Among the major questions needing answers are: i. Why have farmers not adopted water-harvesting techniques on a large scale? ii. What changes are needed in existing land ownership and use rights to support improved rainwater management? iii. Which areas are appropriate for the development of water harvesting and which crops and techniques are recommended? iv. How can the capacity of the farmers to implement these techniques be improved? v. How can farmers' participation in water harvesting be increased? vi. How can the economics of water harvesting (both micro and macro catchments) be evaluated? vii. How may upstream-downstream water allocation conflicts be resolved and equitable water user rights be ensured? viii. What government policies may be needed to support the development of water harvesting? [Badia-Summary of the Workplan.pdf](#) [Badia-Workplan Benchmark.pdf](#) [Badia-List of Project Management and Technical Staff.pdf](#) [Badia-Activities Gantt Chart.pdf](#) [Badia-Workplan for the 2004-2005.pdf](#)