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# PROFILES OF FARMING PRACTICES IN THE SAHEL

## AN ANALYSIS OF LOCAL FARM-LEVEL PRACTICES, TECHNOLOGIES, AND METHODS

### CONTEXT

Farmers in the Sahel use a variety of crop management practices to adapt to seasonal variations in temperature and rainfall. To help farmers adapt to the changing climate, a document titled *An Approach to Evaluating the Performance of Agricultural Practices under Climate Change in the Sahel* was developed. It describes considerations for selecting among the various approaches available, and proposes three basic components to any such evaluation: defining expected changes in climate; defining adaptation objectives and the practices to be assessed; and conducting the evaluation of the defined practices. This brief summarizes aspects of the second component by presenting an overview of the practices to be evaluated.

The strategies catalogued here address four common farming challenges: moisture retention, supplemental water supply, soil fertility enhancement, and temperature and wind abatement. The information used, drawn exclusively from available research and technical literature, addresses the current state of the practices. Understanding the effectiveness of these practices under a changing climate within a specific geographic range requires the use of these profiles in conjunction with the approach developed in the document mentioned above.

Effective methods to manage climate are important in all farming contexts, and the practices described here have been developed to address several of the major constraints (e.g., significant rainfall variability, low soil productivity, high temperatures, extreme events) to productivity in the Sahel. Thus, these management objectives, and the limitations these practices address, can be expected to gain heightened importance as the Sahel experiences higher temperatures, greater rainfall variability, and a higher frequency of extreme climate related events.

### PRACTICES

**Moisture retention:** Practices to retain moisture include various types of bunds, earthen dams, and

#### PERMEABLE ROCK DAM, BURKINA



Photo: S.M. Simpson

weirs suitable for a range of topographies and rainfall. Some bund types require less maintenance and are suitable for mixed cropland and grazing situations. Weirs and permeable rock dams are particularly useful where high rainfall and flooding are common, and the dams can also help prevent erosion. Where rainfall is low, microcatchments are useful; and contour ridges can be used in many situations to help retain water. For large-scale water harvesting, necessary for planting trees and shrubs, a technique that uses a specialized plow to create a water-retaining furrow can be used. Land rehabilitation can be accomplished using planting pits, or *zai*.

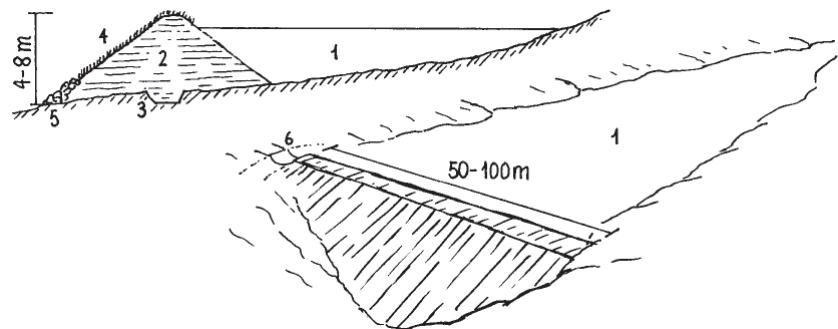
**Supplemental water supply:** The main ways to provide supplemental water for agriculture are irrigation and dams. Drip irrigation and pump irrigation are both commonly used in West Africa. Where runoff water is available from upstream catchments, small earthen dams and check dams can be used to trap water for agricultural use. Lowlands (*bas fond*) and river floodplains can be developed to take advantage of seasonal water availability.

**Soil fertility enhancement:**

Where rice cultivation already occurs, fertility of the soil can be improved through intensification, which is labor-intensive but conserves water. Agroforestry, the practice of mixing cropland with trees, improves fertility in a wide range of situations. The integrated management of soil, water, and biological material, known as conservation agriculture, is also suited to many agricultural situations in West Africa. Traditional organic fertilizer sources, such as manure, compost, and mulch, also can be used to add nutrients to many types of soils. Where chemical fertilizers are desirable but the cost is high, micro-dosing has proven effective and economical. Integrated soil fertility management combines both organic and chemical fertilizers to maximize the benefit to soils.

**Temperature and wind abatement:** Stabilization of sand dunes, a major strategy for preventing encroachment on farmlands, is typically done either by erecting physical barriers, such as fences, or planted barriers. Firebreaks are commonly used to protect farmlands and structures from bushfires during the dry season.

**A SMALL EARTH DAM**



*Dimensions and main components of a small dam: (1) water body; (2) dam wall (with layers of compacted soil; side slopes, 3:1); (3) central core ('key'); (4) grass cover; (5) stone apron; (6) spillway. Source: Liniger, H.P., et al. (2011).*

**ADDITIONAL INFORMATION**

This brief highlights key conclusions from Ray, M., and Simpson, B. (2014). *Agricultural Adaptation to Climate Change in the Sahel: Profiles of Agricultural Management Practices*. USAID. Interested readers are invited to review the full paper at <http://community.eldis.org/ARCC/>.