DRYLAND ZONE CASE STUDY 6

Land Rehabilitation through Participatory Soil and Water Conservation in the Yatenga Region, Burkina Faso[1]

BACKGROUND

The Yatenga region of Burkina Faso is located at latitude 13°-14° 15′ N and longitude 1°45′–3° W in the Sudano–Sahelian area that borders the southern edge of the Sahara desert. Rainfall is low and highly variable: long term average for the regional capital Ouahigouya from 1950 to 1987 was 560 mm, but less than 400 mm of rain fell in both 1982 and 1983.

Population density is as high as 75 – 100 per km^2, the highest in the country. Rural communities composed mostly of Mossi farmers and Fulani herdsmen, practise subsistence crops and livestock farming. Because of high population pressure, farmers have had to shorten and eventually to eliminate the fallow system, which used to be the main strategy for restoring land productivity. Continuous cultivation without proper replenishment of soil fertility has exhausted the land and led to dramatic soil erosion. As early as 1973, it was estimated that 11% of the land in central Yatenga had been degraded beyond use and that degradation was growing at a rate of 0.35% per year. The process has led to the formation of large patches of sterile unproductive zones devoid of any vegetation. To survive, many farm families have had to migrate or to rely on remittances from relatives.

Earlier efforts by the Government and international organizations to improve the situation largely met with failure. In the early 1960s, a multimillion dollar project carried out by the *Groupement Européen de Restauration des Sols* (GERES) constructed soil and water conservation structures over 120,000 ha using bulldozers and other heavy machinery. Completed between 1962 and 1965, the project did not involve local populations, nor take their knowledge or needs into account. Thus, the population did not maintain the treated plots properly. Local communities made foot paths through the project area and by the end of the project in 1965 it was described as a failure.

In an effort to arrest land degradation, local farmers attempted to remedy the situation using traditional techniques of soil and water conservation. This consisted of line barriers and *zai,* which consists of digging small holes and putting manure in them for sowing cereal crops such as sorghum. In 1979, the international NGO OXFAM launched an innovative land rehabilitation project with the goal of decreasing environmental degradation while improving production, building on the efforts started by the local farmers.

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[1] This case study has been compiled by Edouard G. Bonkoungou, based on the following sources:

Sawadogo,H.; Hien F.; Sohoro A. and F. Kambou. 2001. Pits for Trees: How Farmers in Semi-arid Burkina Faso Increase and Diversify Plant Biomass: 35 – 46 in: Chris Reij, Ch. and Waters, A. – Bayers (Ed): Farmer Innovation in Africa. A Source of Inspiration for Agricultural Development. Earthscan Publications Ltd, London.

Wright, P. and Bonkoungou, E.G. 1986. Soil and Water Conservation as a Starting Point for Rural Forestry: the OXFAM Project in Ouahigouya, Burkina Faso. Rural Africana 23-44: 79-85.

Younger, S.D. and Bonkoungou, E. G. 1989. The *Projet agro-forestier*. A Case Study of Agricultural Research and Extension: 11-26 in: Successful Development in Africa : Case studies of Projects, Programs, and Policies. The World Bank, Washington, DC.

OBJECTIVES

The project pursued the following objectives:

- Development of low cost water-harvesting technologies;
- Improvement of the tree cover using water harvesting techniques;
- Training farmers in soil and water conservation techniques;
- Fostering effective farmers participation.

APPROACH

The project used a microcatchment soil and water conservation technique, which consists of constructing low earth walls to enclose a one square metre run-off surface. At the lowest end of the microcatchment a single basin was dug to collect run-off water, with the objective of providing a planting site for trees and of reducing erosion. To try out the idea, the project first organized meetings between project personnel and eight village pre-cooperative groups chosen for their interest in the previous tree planting programme.

At first the farmers were sceptical, so they volunteered their worst pieces of land for the trials. They became more interested when they observed that large amounts of water collected in the microcatchments. During discussion between project staff and participating farmers at the end of the first season, it became apparent that the farmers were more interested in planting cereal crops in the microcatchments rather than trees. Accordingly, the project agreed to shift its focus according to the farmers' wishes.

In the subsequent development of the project farmers made additional requests for changes which, again, were agreed to by the project. As farmers began to appreciate the potential benefit of water harvesting, they shifted their attention from group plots to their own private fields and then began to introduce various modifications to the initial design of the microcatchment by using line-barriers of rocks or branches placed perpendicular to the water flow. The modified design known as bunds or diguettes was basically a reintroduction of traditional techniques that farmers had abandoned. To improve on these, the project technicians found that it was necessary to lengthen the line barriers for maximum efficiency, which required following the contour lines of the terrain. The project therefore introduced a simple and inexpensive surveying device known as a *water-tube level* which is quite accurate even for slopes as low as 0.5%

By the early 1980s various successive refinements over the course of two seasons resulted in the technique as it is still used today. This involves determining the contour line with the water-tube level, digging a small trench on the contour to anchor the rocks and building a barrier, which was 10 to 50 cm high and 10 to 100m long depending on the size of the field.

The use of the water-tube level technique was easy to learn and the project quickly realised they could train an entire village in the use of the technique in two or three days.

RESULTS

Success

- The project was very popular among farmers: By the end of the first year about 500 farmers from more than 100 villages volunteered to be trained in the use of the water-tube level technique; and many of them tried the technique on their private fields.

- Crop yield was found to be on average 67% higher on the treated plots compared to that on non-treated fields.

- 90% of the farmers in the test reported substantial accumulation of soil and organic matter behind the bunds with soil depth increasing in some instances more than 20 mm in the first year.

- Cost benefit analysis studies found that the internal rate of return to the project ranged as high as 37 % to 42 % depending on assumptions.

Shortcomings

- The technique works well only in areas where stones are available.

- The project did not keep adequate records for proper monitoring of the full range of its activities.

REASONS FOR SUCCESS AND LESSONS LEARNT

The project has been very communicative with farmers. Not only has the project encouraged feedback from farmers; it has also taken their concerns seriously and has made major shifts in the project's initial objectives to respond to farmers' demands i.e.,

- growing cereal crops instead of planting trees;

- building line barriers instead of microcatchments to harvest run-off water and

- emphasis on private fields instead of group work on community land.

The technological package (water-tube level and line-barriers) was simple and inexpensive, resulting in wide adoption.

RECOMMENATIONS

Policy

Local knowledge, perceptions and needs should be recognized and integrated in project planning and management.

Management

- Technology transfer should focus on technologies that are simple, inexpensive and relevant to the farmers.

- Effective participation of partners is key to successful land rehabilitation and management.

Research

- Conduct more cost-benefit analyses on a wider range of site conditions and farmer socio-economic circumstances.

- Assess the feasibility and potential benefits of incorporating multi-purpose trees into the farming system to improve soil quality, crop productivity and rural livelihoods.

- On sites devoid of stones, assess the potential of using planted vegetation as an alternative to other contour barriers