



ECOLOGICALLY-BASED RURAL DEVELOPMENT IN MALI



Location: Douentza Region, Mali

A Unitarian Service Committee of Canada (USC-Canada) project in eastern Mali combined educational programs, soil conservation techniques, agro-forestry practices, seed conservation, market gardening, and fruit tree planting as key innovations to fight hunger and poverty. From 1995 to 1998, over 5,000 farmers received training on ecological agriculture techniques; learned how to select and preserve high yielding, locally adapted staple grains that produce much higher cereal yields; and were introduced to new income generating activities based on market gardening and fruit tree production.¹

CHALLENGE

Eastern Mali's Douentza region has a short rainy season—June to September—and a long dry season—October to May. Average yearly rainfall is approximately 400 mm. The region's economy is largely based on animal husbandry—cows, sheep and goats—and agriculture, specifically dryland food crops such as millet, sorghum, rice, cowpeas, and peanut. Millet is the most important dry-land staple food of the region, representing 85 percent of the area sown to crops.

The Douentza District has experienced chronic and serious food shortages. In 1993, less than 3 percent of the district land (46,000 hectares of land out of 1.9 million hectares) were cultivable. Combined with the persistent cereal deficits, lack of income opportunities forced nearly 40 percent of the region's male workforce to migrate seasonally or permanently in search of employment. Ongoing drought and increased natural resource exploitation from agriculture and animal husbandry created topsoil depletion, spurring ethnic conflicts between pastoralists and agricultural groups over the little remaining productive land.²

RESPONSE

In 1995, the USC-Canada, in collaboration with local and international NGOs, initiated a comprehensive agro-ecological rural development program in eighteen Douentza communities to improve soil quality, enhance and stabilize crop and livestock productivity, increase incomes, and assure food access for the entire district's population.

Villagers were trained to use a suite of low-tech, ecologically based agriculture and soil improvement practices, including organic soil amendments—composts and animal manures—either alone or with nitrogen fixing legumes. Other techniques to enhance and conserve soil productivity included intercropping cowpeas with millet, applying naturally occurring rock phosphate, constructing rock walls to prevent soil erosion and strategically integrating livestock into the cropping systems. The project also stressed selective breeding, conservation and extension of high yielding agricultural crops—millet, sorghum, rice, cowpeas, peanuts—as well as fodder plants—*Acacia albida*, *Acacia nilotica*, *Tamarindus indica* and *Andansonia digitata* (the Boabab tree). Participants received technical support to enhance and store the high yielding traditional crop cultivars derived from the selection process. A local seed repository was established to facilitate the preservation, propagation, and distribution of the selected high-yielding local crop varieties, as well as 56 important local tree species useful for soil conservation, habitat restoration, shade, and agro-forestry projects.

Four village nurseries were established, and 20 local agents were trained to propagate the selected fodder and agro-forestry species for ongoing planting. Additional project components included credit for farming equipment, market gardening and fruit tree planting. In each participating village, a committee was established to manage and steward the conservation initiatives.

RESULTS³

- Approximately 2,000 adults from 12 separate villages were trained and subsequently adopted one or more of the improved techniques for water and soil conservation.
- Using the soil improvement practices outlined above, staple crop yields increased from 300 kg/hectare (ha) to as much as 1700 kg/ha. This is about twice the average yield level needed to meet basic food needs of 225 kg/ha per capita.
- Comparative yield studies of 11 known high yielding millet landraces and 41 sorghum landraces showed that many landraces were better adapted, outperformed, or performed equally well when compared to an introduced modern hybrid variety. For example, the average yield of 41 traditional sorghum varieties was 830 kg/ha, compared to 480 kg/ha for the introduced modern hybrid variety, “CSM 63-E.”
- Top performing varieties identified in the above trials were selected for local propagation and extension education.
- Five villages with a total combined population of 3,000 individuals were trained in diverse market gardening and fruit tree production. In 1999, a total of 498 farmers—including 190 women—actively participated in the program.
- In the village of Ibissa, participating market gardeners have diversified their farms to include cash crops such as shallots, onions, garlic, cabbage, lettuce, potato, and cassava. By 1999, 260 tons of vegetables were produced from 15.5 hectares of cultivated land giving an average of 16.7 t/ha.
- In 1999, 3 hectares of land were planted with fruit trees—banana, mango, and papaya—yielding 89 tons of fruit (29.6 t/ha).
- Since 1993, USC-Canada has continued working with farmers and helped the creation of community seed banks. From 2000 to 2005, the network of seven banks was increased to nine community seed banks.⁴ In years of bad harvests, farmers have sometimes no other choice than eating the grains preserved in their houses for seeding. When this happens, the community seed bank still provides a reserve that gives communities access to seeds that are adapted to local conditions.
- In 2011, the organization reported that in addition to seed banks it also continued to support the work of local individual innovators and producers of resilient varieties (grain, vegetables and nuts), whose seeds are much better adapted to local contexts than imported varieties.⁵

Plant species used for fodder and soil conservation include the nitrogen fixing trees (Fabaceae), *Acacia albida*, *Acacia nilotica*, *Tamarindus indica*, and the Baobab, *Andansonia digitata*. Nitrogen fixing trees and shrubs, like *Tamarindus indica*, produce significant amounts of protein-rich biomass for animals (improving animal nutrition, weight gain, and manure quality) and people. Agroforestry also provides significant amounts of nitrogen-rich organic matter for compost or direct incorporation into the soil, and for weed suppression, phosphorus cycling, building materials, and fuel.

Using the soil improvement practices, staple crop yields increased from 300 kg/ha to as much as 1700 kg/ha. This is about twice the average yield level needed to meet basic food needs of 225 kg/ha per capita.



Woman farmer taking a break among the seedlings.
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Farmers are consulting together to select and save a diverse variety of seeds in the banks. © USC Canada - Mali

This case study was produced by the Oakland Institute. It is copublished by the Oakland Institute and the Alliance for Food Sovereignty in Africa (AFSA). A full set of case studies can be found at www.oaklandinstitute.org and www.afsafrica.org.

ENDNOTES

- ¹ Uphoff, Norman (ed). *Agroecological Innovations: Increasing Food Production with Participatory Development*. London: Earthscan, 2002.
- ² *Ibid.*
- ³ *Ibid.*
- ⁴ *Rapport annuel d'USC-Canada 2005*. Annual report, USC-Canada, 2005. http://usc-canada.org/UserFiles/File/USC_AR_2005_FR.pdf (accessed October 31, 2014).
- ⁵ *S'inspirer de la base, Rapport Annuel 2011*. Annual report, USC-Canada, 2011. [http://www.usc-canada.org/UserFiles/File/Annual-Report-2011\(French\)-LO-REZ-Final.pdf](http://www.usc-canada.org/UserFiles/File/Annual-Report-2011(French)-LO-REZ-Final.pdf) (accessed October 31, 2014).

FRONT PAGE PHOTO:

Mrs. Kotiné Traoré, a seed innovator who produces a diversity of vegetable seeds, including okra, tomato, ground nut, cowpeas, onions, and African eggplant. © USC Canada - Mali

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