12-3-2004

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Reclaiming the Sertao in Brazil

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Category/Department: Brazil
Published: 2004-12-03

Perhaps best known for the lush tropics of Amazonia and an enormous capacity for agricultural export, Brazil also encompasses a vast arid region, the Sertao, in the northeast, most of it in the state of Bahia, one of the poorest in the country. There the people of this 900,000 sq km region scratch out a subsistence living growing castor for the international market and corn and beans for their own consumption.

Ten million people live in the Sertao on lands severely degraded by decades of deforestation, plowing, and goat herding. Rain, when it comes between long periods of drought, comes in torrents, often providing as much devastation as sustenance. Up to 80% of it is lost to evaporation and nonabsorption. The reintroduction of polyculture now promises to reverse these trends.

From rural to urban badlands

As the practice of agriculture collapses because of these conditions, the people of the Sertao migrate south to live in slum conditions and seek work at the very bottom of the work force and add to the teeming millions already foundering in the precarious favelas of Sao Paulo. On the possibility of reversing these migrations and restoring the dryland ecology, a different way of managing water resources and growing cycles has begun to show some promise. The method is called polyculture and is said to have begun in 1999, when an agricultural consultant with experience in drylands management went to Bahia at the request of castor processors to solve the problem of huge production fluctuations caused by the erratic rainfall patterns.

The consultant, Marsha Hanzi, saw that the castor plants were spaced at intervals of three to four meters, with nothing in between, allowing dry winds to carry away what water there was. Hanzi also noticed that, in other fields, peas, cassava, elephant-grass fodder, and fruit trees survived under the same extreme conditions.

Her idea was to put all these crops together in a single field, filling in the spaces that encouraged evaporation and runoff, improving the humidity, and improving the soil with organic matter and nitrogen-fixing legumes. By covering all the space with growing plants, mixing tall and short species, trees, long and short growing crops, and cactus in rows to draw water she thought the ground would be protected and nourished, the quality of the castor would improve, and the yields of food crops would increase. With seed money from the castor industry, 15 experimental fields were planted on these subsistence farmer's lands.

The fields were planted by Henrique Souza, an agronomist schooled in the agroforest system of Ernst Gotsch, who adapted his system for dryland conditions. Gotsch is a Swiss farmer and researcher who has been developing these models for many years. Spectacular results In the first
year of Souza's project, the results went beyond expectations. Castor production doubled compared to adjacent, traditionally planted fields, and production of food crops was equally impressive.

By 2001, more than 1,000 farmers had observed the technique on 47 new plots of about a half to a full hectare. They were schooled in the method and taught to work cooperatively in groups to mulch and budget. They also were trained in nutrition and food preservation. The project became a professional school for farmers, who even got a certificate at the end of training.

Polyculture is said to imitate a natural ecosystem, able to stand up to climatic variation and to replenish itself in the process. The fields produce year round in order never to expose the soil to the sun. The fields are not plowed, conserving the farmers' energies and resources. In addition to the castor, a bushy plant that lives from two to four years, sisal has been introduced as another cash crop. Although it is no big money maker, this plant, which produces fiber for rope and cattle fodder, is a permanent plant, resistant to drought, and therefore a useful addition to the mix.

The method has the advantage of being adaptable to the circumstances of individual farmers. Different plants are added over a period of three years, more or less, planted for their specific contributions to the whole, and placed according to how well they get along with their nearest neighbors. Tomatoes, radishes, and parsley have a place, as do fruit and lumber trees.

After three years, a grower may decide to continue with the fruit trees as an agroforest system, or cut everything down, in which case it will all resprout, and start a cycle of short-season crops. That way, someone with more land will gradually reforest, while one with less might turn to other alternatives. As long as the right combinations are maintained, the system will produce. Hanzi has written that 40% of the region is degraded, and 25% of it is on the brink of desertification, caused almost entirely by unsustainable agricultural and livestock traditions that eliminated the covering vegetation, called caatinga.

Perhaps her most important observation, leading to the polyculture experiments, was that the climate was not the problem. The problem was the agricultural model, based on slash-and-burn, and European practices of clean-cropping and tilling. Prior to that, she wrote, "the small fields were never left bare, being a rich and dense mish-mash of short-, middle-, and long-term crops of varying heights (corn, beans, tree cotton, castor beans, pumpkins, native cucumbers, cowpeas, sesame, sunflowers, peanuts, cassava some of these crops reached tree height). Thus the overall destructive effects of the slash-and-burn were limited to small areas, and compensated for by this mixture of crops."

Therefore, she saw the polyculture model as an adaptation of the model that predated the modern method. The older method was itself an imitation of the surrounding ecology.

**An idea worth spreading**

By 2004, the spectacular success of polyculture had attracted the attention of the Brazilian government, lending institutions, and nongovernmental organizations (NGOs). The Adventist
Development and Relief Agency, for instance, began funding a project for the community of Uaua, in the center of Bahia and the heart of the Sertão, with Souza as the agronomist.

By now, Souza says with confidence based on his work that polyculture's benefits also extend to pest and epidemic resistance, weed control, lack of dependency on chemicals, and guaranteed production even during drought. Even better, the cattle fodder produced "prevents people from harvesting other cattle-food plants that are combating desertification."

The Adventist project is for a two-year period and will include the training program for farming families, provide seeds and plants, and technical assistance. The plan is to offer the program to ten villages, impacting 1,000 people, during the life of the project. This initiative follows another just-completed program funded by the government of Finland through ADRA Finland, which brought the technique to 200 families in Uaua.