

Farmer Managed Natural Regeneration

[The following is excerpted from a talk given by Tony Rinaudo at ECHO's 4th Annual Agricultural Missions Conference. Tony is a missionary with SIM to Niger, where he has served for 16 years. Interestingly, that is the same year ECHO began its work and Tony was one of the original 37 people to get the first issue of EDN. You may remember reading about his work with zai holes, which ended up in the title of ECHO's book, *From Amaranth to Zai Holes: Ideas for Growing Food Under Difficult Conditions*.]

One of the immediate problems directly affecting agricultural output and quality of life in Niger is the severe deforestation which has occurred, particularly since the 1960's. Simply planting more trees does not solve the problems.

Many millions of dollars have been spent unnecessarily in Niger because of incorrect assumptions. Organizations doing projects tend to assume that massive loss of vegetation is due to goats, droughts, the Sahara desert moving south and overpopulation leading to heavier cutting of trees. While these things have an effect, inappropriate farming practices and unsuitable tree ownership laws are, in my opinion, largely responsible for the disappearance of Niger's tree cover.

Farmers also had misconceptions. They considered trees on farmland to be weeds competing with their precious food crops. They believed that only their children or grandchildren would ever benefit from planted trees. (They also thought that people would steal their trees, and this, unfortunately, turned out to be true.)

In the last 12 years it is estimated that over 60 million trees were planted in Niger but only 50% survived. Millions of dollars were spent but few, if any, projects continued once the funding ended. Reforestation in Niger was based on an expensive western model needing a fenced-in nursery, irrigation, vehicles, and guards or wire to protect the trees. This model was impossible to copy on a village level and farmers felt that they were being forced to plant trees which would not benefit them. Despite the large amounts of



Farmland cleared in the traditional manner.

money spent, vast areas have not benefited from tree planting schemes. Only a minuscule percentage of the trees planted were planted by individuals through their own initiative.

In the initial stages of our reforestation work I was frustrated and ready to give up. No matter which direction we drove, for hundreds of miles the land was stripped of vegetation. The people did not value the tree work we were doing. Results were poor and it soon seemed obvious that even if we worked for a decade with an unlimited budget, we could not reforest the Maradi district, let alone Niger.

One day in the dry season, I was sitting in the car, looking over the barren farmland, wondering if I had made a mistake in coming to Niger. The Lord opened my eyes to what had been there all along. Covering the farmland were thousands of what I had thought of as insignificant desert shrubs. Each one in fact was regrowth from a stump of a tree. The trees were already alive and growing. There was no need to run an expensive nursery. All we had to do was convince the farmers to leave a sprout or two growing from the stumps when they cleared their land. If they protected a certain percentage of the stumps, the stumps would become trees, and they would have firewood, a source of diverse products and greater protection of their crops at no extra cost.

Acceptance of this idea was slow at first. A few individuals tried it but at high personal cost in terms of ridicule. Theft of the trees was a problem because the wood was a scarce, valuable commodity and the farmers growing them were such a tiny minority. A break came in 1984. Radio coverage of an international conference on deforestation had increased peoples' awareness of the link between deforestation and the climate. This was followed by a severe nationwide drought. Through a food-for-work program we encouraged people in 100 villages to at least give farmer-managed natural regeneration (FMNR) a try.

For the first time, farmers in an entire district began to allow trees to regrow from the sprouting. Many were surprised that their crops did well amongst the trees. All benefited from having extra wood for home use and for sale.



Woman carrying firewood out of stand of 8-month regrowth.

Unfortunately, once the food-for-work program ceased, over two thirds of the 500,000 trees protected were chopped out. But immediately farmers experienced the very problems that had plagued them previously: strong winds, high temperatures and infertile soils, plus

they again had no wood. Over the years, more and more farmers started leaving trees on their land. Today there are over two million trees being left at any one time.

There are several benefits. While trees have been cut down, in many cases they have not died. A program of protecting what is already there, rather than one of replanting seedlings can bring about rapid, cheap reforestation to vast areas.

As it turns out the “useless scrub” provides many products including: timber, firewood, fiber, medicines, foods, fodder and dyes. We have found that regrowth can be very rapid.

- Species not seen in years are reappearing (see below)
- Whereas ten years ago one was hard pressed to find a properly fenced compound or a new grain silo, people now have ample wood with which they can construct a fence or silo.
- Livestock have fodder during the long (8 month) dry season. In the past animals were at near starvation levels by the end of the dry season.
- Crops are better protected from the 70 kilometer per hour winds and the 60C soil temperatures.
- Crops grown amongst the protected trees consistently give higher yields than those in the open. Where trees are you get more lizards and predatory birds. Away from them there is much insect damage. Also, there is quite a visual difference. Millet plants growing among the trees have a much greater protection from the wind. If fully exposed to the wind, young plants are sand blasted or burried. Protected crops reach a critical survival height sooner, so the plants grow faster and taller. Sometimes farmers must replant 5 or 6 times because of wind/sand damage.
- Farmers have a new source of income because production has gone beyond just meeting domestic needs. “Bush markets,” where wood is sold, have opened up and farmers incomes have increased. Formerly village people would need to go to a distant village, Maradi, to buy firewood. Today several trucks travel from Maradi to markets in these rural villages to purchase wood to sell in the city.

The forest regrowth has even had an effect on rural exodus, as people do not need to leave home in search of work or food as often. A small cottage industry is growing as farmers fashion harvested wood into tool handles and hut roofs, etc.

Best of all, this idea is spreading unaided from farmer to farmer even into areas where no agency is working.

My advice to others is this: if you run a tree-planting project, do not abandon what you are doing. For fruit trees and valuable rare or exotic species, a nursery may be the only way of propagation. However, do not overlook the incredible potential of regenerating the natural vegetation that is already there. You will be surprised at how quickly they grow, (after all, they have a mature root system), at how adapted to the climate and how resistant to native pests they are, and at how many uses the people put them to. I call it the “underground forest.” It also comes at minor cost!

We asked Tony to add to a few points:

Q. You had such success because there were so many re-sprouting stumps. But over how much of West Africa would such a situation exist?

A. I have traveled in Benin, Nigeria and Niger and most farms that I have seen have large numbers of living tree stumps in them which are slashed each year. My guess is that this is the norm and FMNR could revolutionize agroforestry practice in the

whole region where traditional crops are still planted. Districts where tree stumps have been uprooted and regions where trees have died would require replanting or direct sowing of trees.

Q. You mentioned that species not seen in years are reappearing. What are some of those species?

A. Most of them are fast growing, hardy "survivors," used mostly for wood, e.g. *Bauhinia reticulata* and *Guiera senegalensis*. Species not seen for some time in the district but making a comeback through FMNR, include: Monkey Orange (*Strychnos spinosa*), a much sought-after orange-like fruit; Custard Apple, (*Annona senegalensis*), which produces an edible fruit, wood used for tool handles, and seeds used as an insecticide in grain storage; Zoure, (*Boscia salicifolia*) is today very rare and produces a quite tasty leaf; and Ciciwa, literally "eat, eatable" (*Maerua angolensis*), which produces a highly sought after edible leaf.



Farmer selecting and trimming sprouts from tree stumps.

Species which are not rare, but are making a come back due to FMNR, include jujube species *Ziziphus mauritiana*, and *Ziziphus spina christi*.

Other species originally in the area apparently do not regenerate so well and so are only found occasionally. These include edible plum (*Ximenia americana tswada*); Mother of medicine (*Securidaca longipedunculata*), used in medicine (& sorcery); Hanno (*Boswellia dalziell*), bark used for dysentery; Yadiya (*Leptadenia lancifolia*), a highly sought after perennial vine with an edible pod similar to okra and edible leaves that stay green well into the dry season.