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Regreening the Sahel

The Sahel is a narrow strip of dry land in Africa about 5,500 kilometres long and 450 wide. It lies at the southern edge of the Sahara Desert, between dry desert land to the north and forest area to the south. The Sahel has a tropical semi-arid climate, with high temperatures throughout the year, and little and unreliable rainfall.

In the 1970s and 1980s, the region suffered severe drought, coupled with an explosion in population and destructive farming and livestock practices. The desert was progressing, denuding vast tracts of land in the process. In response, farmers in the most densely populated areas of the Sahel started spontaneously to protect their fields and naturally regenerate trees. They did this using simple water-harvesting techniques. In Niger alone, researchers estimate, more than 200 million new trees have grown, regreening about five million hectares of semi-desert.

This practice, begun in the mid-1980s, has been more effective in regreening the region and rehabilitating degraded land than any large-scale tree planting project in Africa.

It has contributed to establishing more-productive, drought-resilient farming systems that integrate agriculture, livestock and forestry.

Recent studies of vegetation patterns, based on detailed satellite images and on-the-ground inventories of trees, have found that Niger is now far greener than it was 30 years ago. Moreover, regreening has been achieved at a time when the population has exploded, and it has been concentrated in the most densely populated regions of the country.

Researchers point out many reasons to explain this reversal of trends. They believe that the regreening, although unmistakably stimulated by several years of good rainfall, is mainly the result of a change in human management or, in other words, of farmers adapting their practices to the changing environment.

Another factor is a change in the perception of what ownership means. From colonial times, all trees in the Niger had been regarded as the property of the state, which gave farmers little incentive to protect them. However, over time, farmers began to regard the trees in their fields as their own property and started to protect

“The changes that have been observed suggest that farmers are not the helpless victims of environmental change, but rather agents who try to make the best use of productive and investment opportunities,” said Chris Reij, researcher at the Centre for International Cooperation, VU University Amsterdam.



In Zabon Mousso village, Aguié Department, Niger, gardener Ibrahim Mohamedou, says “I am encouraged to continue this work when I see my trees growing big.”



Crescent-shaped excavations catch surface water after the rains, and provide shelter from the wind for seedlings in Illela Region, Niger.

and carefully manage them. In recent years the Government has allowed individuals to own trees, giving farmers an added incentive to protect them.

In the face of climate change, declining crop yields and degrading land, farmers have introduced innovative practices and new technologies to protect and improve management of natural resources. In addition, they need to continually find sustainable solutions to intensify production systems in reaction to strong demographic growth.

The increase in remittances as a result of migration is also cited as a factor in the change. For many rural households, money sent home by migrant workers is a main source of income. Thus there are fewer people but more money in rural areas, resulting in a labour shortage combined with an increase in inputs such as seed, machinery and fertilizer. In this case, increasing inputs on a reduced area under cultivation may lead to widespread vegetation increase.

IFAD's role in the greening

Combating desertification is central to IFAD's work. The Fund has played a precursor role in promoting local technologies and approaches to achieve greening, including various water

and soil conservation technologies and tree regeneration techniques. It has been a major contributor to a programme promoting farmer-managed natural regeneration implemented on more than 100,000 hectares of land in the Niger's Aguié Department. The programme was based on techniques developed by farmers themselves. As a result, about 50 new trees per hectare have grown in the area, which is now better protected from sandstorm damage. The multiple benefits of tree regeneration have been so dramatic that farmers not directly involved in the programme are spontaneously adopting the practice.

Soil and water conservation

Under the Special Country Programme in the Niger, IFAD funded a ten-year programme of soil and water conservation in the country's Tahoua region. In the Tahoua drylands, regular floods once brought fertile sediment to the valley floor, but a succession of droughts led to a loss of vegetation on the valley slopes. As a result, water ran off rapidly, causing gully erosion on the slopes and damage to fields downstream. Through a simple land rehabilitation technique, small farmers have been able to maintain or increase harvests during drought years.

When the programme began in 1988, 13 local farmers made a study visit to Yatenga, in Burkina Faso, where they discovered that a land rehabilitation technique similar to their own traditional *tassa* planting technique was very successful. In Burkina Faso the technique is known as *zai*. The improvements consist of increasing the dimensions of planting pits from a diameter of 10 cm to 20-30, and from a depth of 5 cm to 10-25, to collect and store more rainfall and runoff. The technique includes putting organic matter in the pits to improve soil fertility. The organic matter attracts termites, which digest it and make the nutrients more easily available to the plant roots. They also dig channels and by doing so increase the water-holding capacity of the soil.

Economic benefits to farmers: the example of the Niger

The economic benefits to farmers of investing in the protection and management of on-farm natural regeneration are high. In the Niger, for example, five million hectares at an average of 40 trees per hectare implies 200 million new trees. If each tree produces an average annual value of one euro (firewood, fodder, fruit, medicinal products, improved soil fertility, increased crop yields, and so on), this means an annual production value of 200 million euros – without counting the value of the timber and of the carbon captured by the standing tree stock. If four million individuals are involved in greening, this means an average annual benefit of 50 euro per capita.

When farmers dig the pits, they remove the soil and bank it on the downstream side. This forms a small ridge that helps retain water. When it rains, the holes fill with water and millet or sorghum can be planted.

When the farmers returned home after their visit to Burkina Faso, some decided to revive the *tassa* technique. They started with four hectares of land, including one field next to a main road so people travelling by could see the impact. The results were so impressive that the following year *tassa* use increased to 70 hectares. This was a drought year, and only those farmers using the technique had a reasonable harvest. Over the next few years, it was instrumental in bringing 4,000 hectares back into production.

Tassa is now an integral part of the local farming scene. It continues spreading in the post-programme phase, and is being introduced in Cape Verde.

Other IFAD projects have worked on reversing land degradation and soil erosion trends. The Agroforestry Project to Combat Desertification in Senegal and the Sustainable Rural Development Programme in Burkina Faso have both supported land rehabilitation measures in the Sahel.

In many cases, the capacity of African farmers to innovate on their own initiative and adapt their production systems to changing environmental, market and demographic conditions has been underestimated. When

such innovations are integrated into projects, they contribute significantly to their success.

Economic benefits of greening

As a result of the increased integration of trees, crops and livestock, farming systems have become more sustainable and more productive, which has led to improved household food security and rural poverty reduction. For instance, trees produce fodder, which allows farmers to keep more livestock. More livestock means more manure, which is no longer used as a source of household energy, but only to fertilize fields.

Twenty years ago, farmers had to plant two to four times before crops could establish themselves, as strong winds early in the rainy season destroyed the plants or covered them with sand. Now, on-farm trees have reduced wind speed, and farmers often plant only once, which increases the length of the growing season.

Regreening has also reduced vulnerability to drought. Indeed, during the 2005 food shortage in the Niger, infant mortality in villages that had protected natural regeneration was much lower than in villages without it. Villagers could cut and prune trees and sell the cuttings as firewood.

In addition, the time women spend on collection of firewood has declined from two and a half hours to half an hour daily. This has allowed women more time for other tasks.

“There is an urgent need to look at long-term trends in Africa’s dry lands and to draw lessons from success stories for policy and practice as well as for up-scaling of successes. Some of the doom and gloom stories about Africa’s dry lands are not based on facts, but on fiction.”
Chris Reij (Reij and Smaling 2008)

Sahel Re-Greening Initiative

The Sahel Re-Greening Initiative (SRI) is currently being developed by national and international NGOs and research institutions. They will cooperate closely with relevant ministries such as those for agriculture and the environment in various Sahelian countries (at present Burkina Faso, Mali, the Niger and Senegal).

In each participating country, a national alliance of NGOs and other partners has been created. All partners in the national alliance will jointly promote the protection and management of on-farm natural regeneration by farmers. An international alliance of NGOs and research institutions has been created to support the national alliances.

SRI will carry out the following activities:

- advocate for policy change: it is essential that national policies and legislation support farmer investment in trees, and farmers must be granted exclusive rights to the trees in their fields;
- identify and analyse success stories in farmer-managed greening and use these stories as a starting point for scaling up. Farmer study visits are a proven tool for spreading good practices;
- include farmer-managed natural regeneration in existing and new agricultural development projects;
- use mass media to inform farmers and the widest possible audience of success stories, the impacts of farmer study visits and forestry legislation.



IFAD/D. Rose

IFAD provides tools and seeds for the nursery and will buy back the saplings for anti-desertification and reforestation programmes in Aguié Department, Niger.

Lessons learned

Policy changes are essential for the success of on-farm greening in the Sahel, and the process should continue. National policies and legislation must support farmer investment in trees, and farmers should be granted exclusive rights to the trees in their fields.

A wide range of other factors can contribute to this process:

- substantial public support for private investment in soil and water conservation;
- improvement of trunk roads, which reduces transport costs and allows traders to send their trucks to remote areas to buy new products;
- generally sound macroeconomic management, without discrimination against agriculture and natural resources;
- substantial local capacity-building by NGOs and other stakeholders (technical, organizational and management skills);
- government action to increase awareness of environmental problems and their solutions.

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Reij, C. 2008. *Building on a current green revolution in the Sahel. Some lessons from farmer-managed re-greening in Niger*. Amsterdam: Centre for International Cooperation, VU University Amsterdam, <http://desertification.wordpress.com/2009/06/19/building-on-a-current-green-revolution-in-the-sahel-drynet-bothends/>.

Reij, C.P., and E.M.A. Smaling. 2008. Analysing successes in agriculture and land management in Sub-Saharan Africa: Is macro-level gloom obscuring positive micro-level change?. *Land Use Policy* 25 (3): 410–420.