



# Re-greening Niger by combining trees & crops



*Niger became green again, after farmers found out that it paid to let the native trees grow up, and produce their crops under these trees.*

### How long before the natural systems break down?

The world that we inhabit has been shaped by natural forces for billions of years, but during the last millennia also, to an increasing degree, by the acts of human beings. The introduction of the use of fire started the transformation of landscapes. Greater changes came when man started agriculture, but the changes were still on a local scale. One example of this is the transformation of much of the Mediterranean region into eroded land due to overgrazing and excessive cutting of trees for timber and charcoal.

But it is only during recent decades that humans have been able to change nature on a global scale.

Modern technologies have allowed humans to exploit the full range of natural resources that exist on earth, and oil and gas are extracted from deep down under the sea.



*Humans are using or destroying a quarter of our planet's biological production - harvested, destroyed in fires or as pictured here prevented production through overgrazing.*

Humans make up only a part of one percent of all living mass on our planet - about 100 million tons. (With five times as much biomass, a small kind of shrimp, the Antarctic krill, is considered the most successful animal species). The domesticated animals have a biomass about seven times larger than humans.

Plants, fungi and bacteria by far make up the largest amount of biomass on Earth. In spite of our fairly small biomass, humans use or destroy just under one quarter of all biological production on land. Half of this is directly harvested and used for food, feed, fibres or timber. A small part is destroyed in fires caused by humans.

The rest is reduced biological productivity because of human influence such as deforestation, erosion and land degradation.

2.6 billion people, over one third of the human population, are today affected by significant levels of land degradation.

This one quarter is the global average. In large parts of the world, especially in Asia and Europe, humans are already appropriating between 60 and 100 % of the natural production.

The obvious question is how large a percentage of the biological production humans can take, before the natural systems break down.

The percentage humans use will certainly increase as the human population grows and the use of biomass for energy is developed. Global cereal demand is



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projected to increase by 75% between 2000 and 2050, and global meat demand is expected to double. More than three-fourths of growth in demand in both cereals and meat is projected to be in developing countries.

One of the crucial issues humans on Earth is facing is therefore how to combine a healthy production of biomass to sustain all the other living organisms with ensuring that people on Earth have decent living conditions.

The re-greening of Niger is an example of how this is possible to establish such sustainable farming practices, when the farmers are actively involved.

### Niger re-greening

Niger is an extremely poor country in Western Africa, which is mainly heard of in situations of drought, hunger and desertification.

As so many other examples from Africa, the problems have their roots in colonialism.

Land clearing and tree-felling became common in the 1930s, as the French colonial government pushed Nigerien farmers to grow export crops and in general to use the Northern systems of clearing the land, ploughing and cleaning the land completely and discouraging trees in the fields - practices which are totally unsuited for most tropical environments.

The French also implemented policies that removed any incentives for the farmers to care for their land. One of these disincentives was a law that established the government as the owner of all trees and required Nigeriens to purchase permits to use them. These policies led to extensive deforestation, which was further worsened by the extensive drought in the Sahel region in the start of the 70s. The loss of tree cover led to a rural fuelwood crisis. Poor households were forced to burn animal dung or crop residues instead of using them for compost. This again led to worse soil quality and crop yields - a downward spiral.

The government and international organizations then focused on establishing plantations of exotic trees. This was expensive - typically about US\$ 1,000 per ha to plant and maintain. Local people were not involved, but their land was in many cases taken, and its existing vegeta-



*The Sahel region south of the Sahara desert was hit by severe droughts in the 70s. Many people and animals died of hunger and the environment was further degraded.*



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*Over 250,000 ha of land, previously thought unusable, now provide crops such as this millet, due to farmers now using soil and water conservation practices.*

tion destroyed. Over 12 years, 60 million trees were planted in Niger, but less than half of them survived.

Because of the many problems, the farmers experienced low yields in the barren fields, some farmers, aided by some non-governmental organizations, started to experiment with other methods.

The farmers realized that their fields were actually not barren, but contained roots of native trees and shrubs that could grow into healthy plants if given the chance. These are trees that can provide wood, nutritious fruits, edible leaves, and livestock fodder, while at the same time allowing the farmers to grow their crops under them.

Over the years, and especially after farmers saw that fields with trees were less affected in drought years, more and more abandoned the practice of clearing fields and started protecting and actively managing the native vegetation.

These trees improve soil fertility, because they reduce wind erosion, provide enriching mulch, and fix nitrogen in their root systems. More beneficial insect and bird species also reduce crop pests. The areas with trees are less affected during locust attacks.

It also helped that the government finally, in 2004, gave the ownership of trees back to the rural population. By 2007, about 5 million ha of land - about half of the cultivated land in Niger - was densely covered with trees, shrubs, and crops.

The sustainable practices, together with soil and water conservation programs, have resulted in water tables rising again, after falling for decades.

More than 250,000 ha of land, that was once considered unusable, is now producing crops.

This has reversed desertification and brought increased crop production, income and food security to poor rural farmers. At least 4.5 million people benefit from this, and between a quarter and half of all the country's farmers are involved.



*After decades of falling, Niger's water tables are now rising due to improved treecover and more sustainable farming, thus providing water for irrigation.*



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There are also many side benefits, such as reducing the average time spent by women to collect firewood from 2.5 hours to half an hour, or reducing the number of young people moving to the urban centres.

This approach of promoting the management of natural vegetation has been very different from the centralized one of the government (and colonial administration), with its emphasis on large plantations and mechanized farming.

200 million trees are now protected and managed, at a fraction of the cost of planting the 30 million trees that survived in the plantations. But the huge difference is that the poor farmers now benefit from their trees and better crops, while the plantations largely benefit the private owners and corrupt politicians.

The struggle between man and nature is a continuous one - also in Niger. Tem-

porarily, both sides have achieved better conditions, and there is less struggle between the two than twenty years ago. But there are numerous challenges ahead. Niger's population has doubled to 14 million people in just 20 years, and the country still has one of the highest birth-rates in the world of over seven children per woman!

By 2015, the area of cultivable land in Niger will fall to just over 1 ha per person. Global warming will over the next decade make conditions much more difficult.

### Using the lessons from Niger

The systems used in Niger can be used in many other parts of Africa. Both western and Southern Africa have large areas where beneficial trees will grow up or can be planted - such as msangus (*Faidherbia albida*), which fertilize the ground with its leaves and allow farmers to grow crops under them because they drop their leaves at the start of the rainy season.

The two billion people that live in the world's dry areas, will need solutions such as the one found to re-green Niger - and many others to succeed in the struggle between man and nature.

**Read in the next GAIA Info Series how water tables have been restored in India.**