

Creating an EverGreen Agriculture in Africa

For food security and environmental resilience



Mature *Faidherbia albida* parkland, Peanut Basin, Senegal.

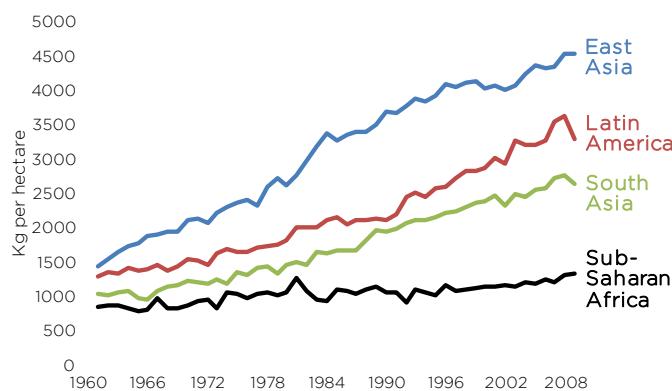
Credit: Gray Tappan

“EverGreen Agriculture allows us to glimpse a future of more environmentally sound farming where much of our annual food crop production occurs under a full canopy of trees.”

- Dr. Dennis Garrity

UNCCD Drylands Ambassador

Figure 1: Cereal yields since 1960



A perfect storm of challenges

African agriculture must be transformed in the coming decades.

With population in Africa burgeoning to 1.8 billion people, at least twice as much food must be produced per year by 2050 to avoid widespread starvation. But food production per capita has been declining since the 1960s, and cereal crop yields have remained stagnant (see Figure 1). In the face of this dire situation, observers are pointing to a perfect storm of further challenges.

Fallowing exhausted cropland for several years has always been the basic means by which African farmers could restore the fertility of their soils. But as rural populations grow, the land frontier has closed in most countries. Farm sizes are now rapidly declining. Fallowing can no longer be practiced, and the vast majority of farmers are found to crop continuously. Farm yard manure supplies are declining in many areas because livestock numbers cannot be sustained as the area of community grazing land declines. Chemical fertilizers are an important means of restoring soil fertility, but fertilizer prices are escalating, putting them further out of reach for most farmers. The risks of devastating droughts are also increasing because of climate change. These conditions prevent fewer than 1 in 4 farmers from using chemical fertilizers to increase their crop yields. Surveys are finding that farmers are becoming overwhelmingly concerned about how to reverse their declining soil fertility.

How can productivity be doubled in the presence of such constraints? It is time for fresh, out-of-the-box approaches to be given serious consideration as a basis for advancing African agriculture.

EverGreen Agriculture - a solution

EverGreen Agriculture is now emerging as an affordable and accessible science-based solution to regenerate the land on small-scale farms, and to increase family food production and cash income. EverGreen Agriculture is a form of more intensive farming that integrates trees with annual crops. The vision of EverGreen Agriculture is to sustain a green cover on the land throughout the year, increasing food and fodder production sustainably.

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EverGreen farming systems feature both perennial and annual species (trees and food crops). The overall indicator of their effectiveness is building a healthy soil and environment, while increasing the resilience of the farm enterprise to a variety of risks. They deliver extended growing seasons, increased crop yields, better water utilization efficiency, and drought resilience.

Millions of women and men farmers in Zambia, Malawi, Niger, Burkina Faso, and other countries are already practicing EverGreen Agriculture. They are successfully restoring their exhausted soils with richer sources of organic nutrients, and dramatically increasing both their crop yields and incomes.

The integration of appropriate fertilizer trees into agriculture is a promising, but underappreciated, approach. EverGreen Agriculture contributes to integrated soil fertility management (ISFM). It emphasizes the application of sound, tree-based management practices, and the knowledge to adapt these to local conditions, in order to optimize fertilizer and organic resource-use efficiency for greater crop productivity. It is also compatible with reduced tillage, increased residue retention on the soil surface, and other principles of conservation agriculture, in situations where these practices are feasible and appropriate.

EverGreen Agriculture broadens the principle of crop rotations to encompass the role of fertilizer trees and/or other cash crop trees to provide needed biological and income diversity in the farm system. In this respect, the types of intercropped trees may include species whose primary purpose is to provide products or benefits other than soil fertility replenishment alone, such as fodder, fruits, timber, and fuel wood. In such cases, the trees provide an overall value greater than that of the annual crop, within the area that the trees occupy in the field.

The Evidence

The principles of EverGreen Agriculture have already been widely applied in Africa, where complexity is a common feature of the agricultural

Forms of EverGreen Agriculture Practices



Farmer-Managed Natural Regeneration (FMNR): Systematic regeneration of trees from living stumps, roots and seeds. Over 5.5 million hectares in Niger, Senegal, and Mali have been regenerated this way (photo).



Conservation agriculture with trees: Tree-crop intercropping along with minimum or zero tillage, keeping soil covered with organic material, and rotating and diversifying crops. National programs are underway in Zambia and Malawi (photo).



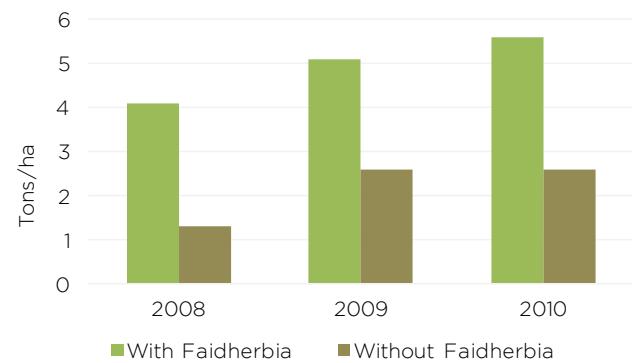
Trees planted in conventionally tilled cropland: These may be exotic or indigenous fruit, fodder, timber, fuel wood, or fertilizer trees, as in Kenya or Rwanda (photo).

system. Each of the countries where they have been adapted feature a diversity of situations managed by farmers, to build successfully on proven indigenous farming technologies.

Some of the most promising results are coming from the integration of fertilizer trees into cropping systems. These trees improve soil fertility by drawing nitrogen from the air and transferring it to the soil through their roots and leaf litter. Scientists have been evaluating various species of fertilizer trees for many years, including *Caliandra*, *Sesbania*, *Gliricidia* and *Tephrosia*. Currently, *Faidherbia albida* is showing particular promise as a cornerstone of Evergreen Agriculture. This indigenous African acacia is already a natural component of farming on millions of farms across the continent. Unlike most other trees, *Faidherbia* sheds its nitrogen-rich leaves during the early rainy season, making it highly compatible with food crops, because it does not compete with the crops for light, nutrients, or moisture.

In Zambia, more than 160,000 farmers have extended their conservation farming practices to increase the yield of their maize crops by intercropping with *Faidherbia* trees (see Figure 2). Similar results have emerged from Malawi, where maize yields on farms with fertilizer trees are

Figure 2: *Faidherbia* trial results in Zambia showing Maize yields with zero fertilizers.



typically 2.5 times higher than without them. The Malawi Agroforestry Food Security Programme is integrating fertilizer, fodder, fruit, fuel wood and timber tree production with food crops on small farms at a national scale. It has reached 200,000 farm families during its first 5 years. In Niger, there are now more than 4.8 million hectares of *Faidherbia*-dominated agroforests that are increasing food security by enhancing millet, sorghum, and livestock fodder production, with up to 160 trees per hectare. In Mali, 450,000 hectares of such parklands have recently been mapped.

In each of these cases, there is evidence that the EverGreen practices have increased household and national food security. National governments across Africa are deepening their support for the expansion of these EverGreen Agriculture systems.

Countries implementing or developing National EverGreen Agriculture scaling-up initiatives



Community of EverGreen Nations

The experiences of Zambia, Malawi, Niger, and Burkina Faso indicate that the principles of EverGreen Agriculture are applicable to a broad range of food crop systems in Africa, if accompanied by adequate testing and farmer engagement. The farming practices embodying the principles of EverGreen Agriculture are unique to each country, but they exhibit important similarities.



Young, regenerating agroforestry parkland on millet farms, Niger.
Credit: Gray Tappan

Tanzania and Kenya have recently developed national strategies and work plans to support the expansion of EverGreen Agriculture. National scaling-up programs are being launched in Ethiopia, Rwanda, Senegal, and a number of other countries, building on the successful experiences of Malawi, Zambia, Niger, and Burkina Faso (see map).

Sixteen African countries are now either implementing or developing national EverGreen Agriculture scaling-up initiatives, along with India and Sri Lanka in South Asia. The African Union, the World Bank, IFAD, GEF, FAO, UNEP, UNCCD and other international and regional organizations have endorsed these efforts and are supporting them. Many NGOs are now engaged in implementing this work on the ground.

An EverGreen Agriculture Network

An EverGreen Agriculture Network is evolving to support the information needs, capacity building, and knowledge generation required to assist the community of EverGreen Nations in scaling-up. A broad alliance is emerging of governments, international donors, research institutions, and

international and local development partners to expand EverGreen Agriculture throughout Africa and Asia. The momentum that has been generated is encouraging, but an accelerated effort is needed to expand the reach of EverGreen systems to tens of millions of the poorest small-scale farmers.

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Today, Africa is critically threatened by food insecurity, land degradation, and climate change. Smallholder farmers need science-based solutions to increase the efficiency of their crop production systems – solutions that build upon the best of local knowledge and practice, and that are truly accessible and affordable. EverGreen Agriculture provides new options to better care for the land and to increase smallholder food production and cash income. It is, in short, a concept whose time has come.

For more information, please visit

EverGreen Agriculture web site:
<http://evergreenagriculture.net>

World Agroforestry Centre:
www.worldagroforestry.org

“Successful examples of EverGreen Agriculture from Africa urgently need further research and scaling-up to create a real evergreen revolution”

- Prof MS Swaminathan
Founder, MS Swaminathan Research Foundation



Maize farming in a Faidherbia agroforest in Mbarali District, Southern Highlands, Tanzania, 2008. Credit: Saidi Mkomwa