# Scientists announce unique acacia tree's promise to revive African soils

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Scientists said today at the 2nd World Congress of Agroforestry that a type of acacia tree with an unusual growth habit—unlike virtually all other trees—holds particular promise for farmers in Africa as a free source of nitrogen for their soils that could last generations.

With its nitrogen-fixing qualities, the tall, long-lived acacia tree, *Faidherbia albida* (Mgunga in Swahili) could limit the use of fertilizers; provide fodder for livestock, wood for construction and fuel wood, and medicine through its bark, as well as windbreaks and erosion control to farmers across sub-Saharan Africa. The tree illustrates the benefits of growing trees on farms, said the scientists at today's meeting, and is adapted to an incredibly wide array of climates and soils from the deserts to the humid tropics.

"The future of trees is on farms," said Dennis Garrity, Director General of the World Agroforestry Centre, or ICRAF, one of 15 centers supported by the Consultative Group on International Agricultural Research (CGIAR). The Center is hosting the Congress, which has convened about 800 global experts to discuss the importance of growing trees on farms for humanity's survival. "Growing the right tree in the right place on farms in sub-Saharan Africa—and worldwide— has the potential to slow climate change, feed more people, and protect the environment. This tree, as a source of free, organic nitrogen, is an example of that. There are many other examples of solutions to African farming that exist here already."

African farmland is severely degraded and African farmers, on average, apply only 10 percent of soil nutrients used in the rest of the world. Low-cost options are critical to reversing the continent's declining farm productivity, the scientists said, as sharply increasing fertilizer prices further limit the choices African farmers have to improve farm yields while protecting forests from further clearing.

The Faidherbia acacia tree has the quality of "reverse leaf phenology," which drives the tree to go dormant and shed its nitrogen-rich leaves during the early rainy season—when seeds are being planted and need the nitrogen—and then to re-grow its leaves when the dry season begins and crops are dormant. This makes it highly compatible with food crops because it does not compete with them for light—only the bare branches of the tree's canopy spread overhead while crops grow to maturity. Their leaves and pods provide a crucial source of fodder in the dry season for livestock when other plants have dried up.

Research on the tree began over 60 years ago when scientists observed that farmers throughout the Sahelian region of Africa were retaining the trees in their sorghum and millet fields. It is a frequent component of farming systems of Senegal, Mali, Burkina Faso, Niger, Chad, Sudan, and Ethiopia, and in parts of northern Ghana, northern Nigeria, and northern Cameroon. The tree is growing on over 4.8 million hectares of land in Niger. Half a million farmers in Malawi and in the southern highlands of Tanzania grow the tree on their maize fields.

In Malawi, maize yields were increased up to 280 percent in the zone under the tree canopy compared with the zone outside the tree canopy. In Zambia, recent unpublished observations showed that unfertilized maize yields in the vicinity of the Faidherbia trees averaged 4.1 tonnes per hectare, compared to 1.3 tonnes nearby but beyond the tree canopy. Yield increases have also been documented in unfertilized millets grown under the tree in West Africa, for sorghum in Ethiopia, other parts of

Africa, and in India, in addition to groundnuts and cotton. Often, millet and sorghum exhibit no further response to artificial fertilizers beyond that provided by the tree's leaf fall.

Currently, the Departments of Agriculture in both Malawi and Zambia are seeking to double maize production with the use of the tree. They recommend that farmers establish 100 Faidherbia trees on each hectare of maize that is planted.

Scientists at today's conference noted some 700 published references to the tree's history, ecology, and growing habits. "Knowledge of this tree is farmer-driven," said Garrity. "We are now combining the scientific knowledge base with the farmer knowledge base. There is sufficient research on both sides to warrant dramatically scaling-up the planting of this tree on farms across Africa through extension programs. The risks to farmers are low; it requires very little labor, and delivers many benefits."

"Thus far we have failed to do enough to refine, adapt and extend the unique properties of these trees to the more than 50 million food crop farmers who desperately need home-grown solutions to their food production problems," he continued.

Source: World Agroforestry Centre (ICRAF)