

# Tavy boka: a Malagasy alternative to slash and burn agriculture

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## Conversion of biodiversity-rich forests

Madagascar is one of the top 3 biodiversity hotspots worldwide. Upwards of 80% of its fauna and flora is endemic to the island. Yet traditional, shifting agricultural systems employing fire continue to ravage landscapes throughout Madagascar. This practice is the main pressure on remaining, biodiversity-rich, natural forests, essentially converting forests to agricultural land. Currently, Madagascar is losing approximately 5% of its natural forests per year.

USAID has funded conservation and development activities in biodiversity-rich landscapes in Madagascar for over 15 years. One of the key components of these initiatives has been agricultural intensification and diversification in order to promote alternatives to slash and burn agriculture. A promising technique for stabilizing and intensifying land use and providing biodiversity conservation benefits in these areas builds upon a largely forgotten traditional practice known as *tavy boka* or humid or wet, slash agriculture. Combining this technique with woody, contour hedgerows – most available land in landscapes around Madagascar's remaining natural forests is hilly – can lead to an increasingly sedentary agricultural system. The USAID-funded Ecoregional Initiatives (ERI) project has been promoting this technique during the past two agricultural seasons (2007-08 and 2008-09) in one landscape in eastern Madagascar.

## Overview of approach

The ERI project facilitated the emergence of farmer producer groups – associations committed to environmentally-friendly agriculture. These associations were grouped into cooperatives to market their produce so that members' livelihoods could be improved; the farmer's movement was known in Malagasy as *Koloharena* which translates, roughly, to "guarding the wealth." Farmer extension agents worked with ERI project staff to promote a wide range of agricultural intensification and diversification techniques, including *tavy boka*; this constituted farmer-to-farmer extension. Extension practices included hands-on training, demonstrations, Farmer Field Schools and the establishment of cooperative training and demonstration centers.

The *tavy boka* technique was introduced via hands-on training and demonstrations, usually adjacent to traditionally farmed (slashed and burned) fields, allowing farmers to compare results. A summary of the technique follows:

The first season consists of creating a thick mulch out of cleared vegetation and installing contour hedgerows with *Gliricidia sepium*, *Flemingia congesta*, or *Tephrosia vogelii*. Contours are located using simple, A-frame tools and woody components are often combined with vetiver grass (highly recommended due to its deep and spreading root system). Treatment of the mulch layer is important: chopping vegetation into small pieces to accelerate decomposition is highly recommended as well as spreading the mulch evenly across the field to suppress weeds and sprouts. Crops such as rainfed rice, cassava and maize are directly seeded or planted in the mulch. Leguminous cover crops such as *Mucuna pruriens*, cowpea (*Vigna unguiculata*), and *Vigna umbellata*, are introduced between the hedgerows during the second season; in cases where the soil fertility is poor, cowpeas are planted in the first season. Crops are rotated (cereals and tubers with legumes) and again directly seeded or planted into the vegetative cover. Farmers are also advised to establish live fences around *tavy boka* plots using the multi-purpose *Jatropha curcas* shrub. Depending on growth, shrub hedgerows can be pruned and their biomass used to create mulch in some areas of the parcels. In areas closer to the natural forest, ERI staff encouraged farmers to experiment with planting fruit trees, cloves and black pepper on *Gliricidia* stakes in the bands between the hedgerows. This land use can then create a permaculture or perennial tree crop



## Results

The ERI Toamasina program (Ankeniheny-Zahamena landscape) was able to establish over 100 *tavy boka* demonstration and test plots – scattered throughout the ecoregion or landscape – in collaboration with participating farmers. These plots totaled approximately 30 ha and over 350 farmers received hands-on training in the technique during demonstration establishment. Some of the plots were established via individual farmer initiative after the initial training, representing spontaneous adoption of the technique.

Overall, farmers who participated in demonstrations and tests reported higher yields (especially for cassava and maize) but also increased labor. We expect that yields will continue to increase for several seasons before attaining optimal, steady-state levels. Labor should decrease over time as hedgerows establish themselves and cover crops become easier to maintain and re-establish.

## Scaling up environmentally-friendly practices

The Ankeniheny-Zahamena landscape where ERI promoted *tavy boka* has a population of about 431,000 people living in 1,500 villages. In order to reach the majority of these farmers and scale up (and further develop) the technique, we recommend the following:

- A large number of farmer extension agents (paid small stipends via cooperative proceeds) – ideally 1 extension agent per village; these agents should play a facilitator role and encourage experimentation as opposed to insisting on a ready-made package;
- Large numbers of project-funded or government field agents – approximately 1 for each cluster of 5 villages;
- Regular exchanges or study visits (focused on the *tavy boka* technique) between Farmer Field School groups as well as farmer associations and cooperatives;
- A widespread communication campaign on *tavy boka* that would advance local participation and ownership of the technique;
- Production of cover crop seeds as well as plots for vegetative material (cuttings) and seed production for hedgerow species; ideally, these would be located at farmer cooperative training centers;
- Promoting evolution of the technique so that the best practice after several seasons consists of direct seeding or planting into green manure cover crops; and
- Rehabilitation of secondary roads in difficult areas of the landscape so that farmers can transport produce to markets.

It should be noted that scaling up involves many challenges. Chief among these are leveraging partnerships and attracting private investment as working at a landscape scale requires significant resources.



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L. Séguy, S. Bouzinac, and O. Husson. 2006. Direct-seeded tropical soil systems with permanent soil cover: Learning from Brazilian experience. Pages 323-342 in *Biological Approaches to Sustainable Soil Systems* (N. Uphoff et al., eds.). CRC Press, Boca Raton, FL.

Anon. 2006. Les Systèmes de semis direct sur couverture végétale.

T.K. Erdmann. 2009. Ecoregional conservation and development in Madagascar. Provisionally accepted for publication in *Development in Practice*.

E. Razafiarison, A. Ranaivoarison, and J.S. Ratsisompatrivo. 2008. Tavy ala et techniques agricoles. Available at: [http://www.usaid.gov/mg/program/so6\\_articles.html](http://www.usaid.gov/mg/program/so6_articles.html)

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