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SUCCESS STORY

Fuel Efficient Woodstoves Help Conserve Woodlands and Biodiversity in Malawi

Photo: ECODIT/Bruce Byers

Fuel-efficient brick and clay stove, Nkhamayamaji Village, in the border zone of Nyika National Park

Photo: ECODIT/Bruce Byers

Natural regeneration of woodland in the Mphalamando Village Forest Area, border zone of the Nkhotakota Wildlife Reserve

Firewood is the main cooking fuel in Malawi, used by an estimated 97% of rural households. The traditional way to cook meals is to place a pot on three rocks or bricks, and feed sticks of wood in from three sides to the fire under the pot. Measurements show that only about 10% of the energy in the wood gets transferred to the cooking pot using this method.

Women are responsible for cooking, and usually for collecting firewood. It's not uncommon to see women and girls walking along the roads with loads of bundled firewood on their heads that weigh nearly as much as they do. The time and labor required for fuelwood collection can be a substantial fraction of a woman's work.

Demand for firewood puts pressure on natural woodlands, causing a loss of biomass and biodiversity, and a loss of trees on farms as well. USAID's two biodiversity projects, Kulera and MOBILISE, have been introducing new, more fuel-efficient cookstove designs in villages bordering a number of Malawi's protected areas. Both stove designs contain the fire, channel the heat more efficiently to the cooking pot, and hold and maintain the flame and heat better. Both are made from local materials.

The efficiency of the Kulera Project's brick and clay stoves has been measured at 17%, almost twice as efficient at converting wood energy to cooking heat as the three-stone fire. The clay pot stove design being promoted by MOBILISE can save up to 60% of the firewood that would be used in a traditional three-stone fire under ideal conditions (e.g., using split, dried wood, and a lid on the pot). Under average conditions these stoves thus use only about half the wood – and require half the wood-collecting time and labor – as cooking on a three-stone fire. Although women in rural villages can be fairly conservative, and it can take some time before they adopt the new stoves, eventually it seems that the advantages are so obvious that most women switch and use them. In Nkhamayamaji Village on the southeastern edge of Nyika National Park, for example, more than nine in ten women are now using the new stoves.

Fuel-efficient stoves work in synergy with the "conservation agriculture" being promoted by the Kulera Project to reduce pressure on biodiverse natural woodlands. Through improved agricultural practices like minimum tillage to prevent soil erosion, crop rotation with legumes to improve soil fertility, and mulching to retain soil moisture, some farmers improve their yields enough to make it possible for them to stop farming on marginal land with poor soil. When they do, thanks to the amazing resilience of miombo woodland trees, a native woodland often regenerates rapidly from roots and stumps on the fallowed land. Within a period of only a few years some farmers can have a small on-farm woodlot of native trees.

On a farm near the Vwaza Marsh Wildlife Reserve, Steven Kumwenda decided to allow an area one-third of a hectare in size to regenerate naturally. This land had been cultivated by his father, he said, but when he began to protect the resprouting trees, he soon had a dense young woodland. He is now cutting and pruning some of the trees, and using the wood for fuel and poles for construction. The firewood he can now harvest from his own woodland patch is enough for his family's needs, mainly because of the fuel-efficient stove that the Kulera Project taught his wife to build. A pot of beans now takes "only three sticks" to cook, he said.

In the Mulanje Mountain area of southern Malawi, where the MOBILISE Project is working, population density is much higher, farms are generally much smaller, and woodland scarcer. MOBILISE has promoted another type of energy-efficient cookstove, a pot-like stove made of fired local clay by village women who have been trained in its production. One advantage of the clay-pot stoves is that they are portable, and can be moved around within the kitchen, or to an outdoor kitchen, or between kitchens, retaining one of the benefits of the old three stones.

Besides reducing the pressure on natural woodlands and on-farm trees, both of these stoves have another advantage: because they contain the fire and burn more efficiently, they produce less smoke than three-stone fires. Smoke is a health hazard, increasing respiratory problems especially for women and children. The shielded fire also reduces the risk of burns and house fires.

And still another benefit: fuelwood, if produced sustainably, is a local, renewable energy source, so efficient stoves and locally-grown firewood each contribute to reducing greenhouse gas emissions and to climate change mitigation.

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Photo: ECODIT/Bruce Byers

Steven Kumwenda with his on-farm, natural-regeneration woodlot, in the border zone of Vwaza Marsh Wildlife Reserve

Photo: ECODIT/Bruce Byers

Firewood from thinning of Steven Kumwenda's woodlot

Photo: ECODIT/Bruce Byers

Cooking with maize cobs in a clay-pot stove design promoted by MOBILISE, Nantali Village, Phalombe District