Farmers in Kenya willing, able to ramp up croton nut output for biofuel

December 19 2017

Croton trees are very common in Kenya. Until recently, local people valued them only for the firewood and shade they provide. The nuts they produce went to waste. Credit: Eco Fuels Kenya

Small-holder farmers in Kenya have the capacity and desire to play a major role in the scale-up of biofuel production from agroforestry, according to a Penn State forest economist, who led a study in the East

African country.

Croton trees—which seem to grow everywhere in Kenya—and the oilseeds they produce have the potential to improve rural livelihoods, said Michael Jacobson, professor of forest resources, College of Agricultural Sciences. Through the production of oil for energy and co-products, such as animal feed and organic fertilizer, croton represents an opportunity many poor farmers are eager to take.

That is the conclusion Jacobson reached after surveying hundreds of Kenyan farmers and meeting with them in villages across four counties in the central region of the country. The objective was to assess household preferences for planting and cultivating croton trees for collection and selling of nuts to a growing market. Researchers gathered and analyzed demographic data on income, household size, age, other occupations and village from farmers to determine if those factors influence their preferences.

Farmers were presented with production scenarios and asked to make choices depending on seedling cost, oilseed yield, tree-maturation period, labor needed for seed collection and seed selling price. Results show that almost all households have croton trees on their land and are willing to produce croton nuts. More importantly, Jacobson noted, most would be willing to plant more croton trees.

Penn State researcher Michael Jacobson surveyed small-holder farmers in villages across four counties in Kenya about their willingness to grow croton trees. He asked them such things as how many trees they have, whether they would be willing to plant more, and whether they would gather the nuts and provide them to a biofuel-making company at collection points and, if so, at what price. Credit: Eco Fuels Kenya

"Many small farmers, although land constrained, have access to land to plant groves of croton trees if they become sold on the idea," he said. "If they knew that there was going to be a dedicated market for croton, they would certainly add trees to their farm household lands."

Seed price is the most dominant concern cutting across all socio-demographic characteristics, Jacobson pointed out. "Time and labor constraints were significant for some households," he said. "Farmers are more averse to longer tree-maturation periods than non-farmers, while those already collecting seeds for the nascent croton industry are less concerned about the opportunity costs of time and labor than non-collectors."

The research stemmed from the World Agroforestry Centre's examination of the sustainability of the infant croton-tree value chain in Kenya with the intent to support its up-scaling. Initial studies indicated the business holds significant potential for generating additional income and improving local livelihoods, without jeopardizing the environment.

The international organization invited Jacobson to assess whether small farmers could play a significant role in the scale-up of the business.

Croton nuts are the source of an oil that can power generators, water pumps and other internal combustion engines and, with processing, can be used in place of diesel fuel in cars and trucks. Credit: Eco Fuels Kenya

"To ensure economic sustainability in the long term and scale-up the value chain, a consistent, reliable and economical supply of seeds must be secured to support large bio-refineries," Jacobson said.

"Croton offers a significant opportunity in East Africa—it can play an important role in providing income opportunities and meet the needs of poor farmers, maybe even lifting them out of poverty. I am not saying that croton production and biofuel will save Africa, but I know others have."

Findings of the research, which were published in late November in *Forest Policy and Economics*, provide guidance for the development of a croton value chain that Jacobson believes biofuels entrepreneurs will use in their business plans.

"If I were an entrepreneur in East Africa and I wanted to start a croton business, I would use this information to determine where best to locate and how to provide incentives for production," he said. "The statistical analysis we performed is likely to lead to further development of the croton biofuels industry in Kenya. It gives credence to the opportunity and provides critical information to entrepreneurs to better understand farmer characteristics."

Development of the croton biofuel industry has been hampered by falling prices of diesel fuel. One company that has been trying to develop the market and produce croton biofuel, Eco Fuels Kenya, is struggling to find support. Jacobson has worked with that company's management to help them understand ecological conditions that affect the planting of croton and the profit potential for byproducts.

Provided by Pennsylvania State University