Fertilizers may not help poorest African farmers

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Recent studies looked at soil fertility data for maize plots -- some that had been cultivated for 100 years -- on 260 farms in western Kenya such as this one.

(PhysOrg.com) -- Researchers have linked poverty in sub-Saharan Africa with poor soil health, but two new Cornell studies find that the recommended practice of applying more fertilizer may not help the poorest farmers.

Two new studies by Chris Barrett, the Steven B. and Janice G. Ashley Professor of Applied Economics and Management at Cornell, and Paswel Marenya, Ph.D. '08, a lecturer at the University of Nairobi, find flaws in the fertilizer-promotion strategy used by dozens of African countries to improve soil health, crop yields and the wealth of poor farmers. Forty African heads of state had devised plans in 2006 to help

farmers in sub-Saharan Africa -- one of the poorest regions of the world where soils are often too degraded to reliably grow crops -- get better access to soil-enhancing fertilizers by improving roads, increasing access to seasonal credit and improving farmer education on fertilizer use.

"If soils are too degraded, fertilizers don't respond well," said Barrett. "These results challenge basic assumptions behind efforts to promote fertilizer use and distribution as a key element of poverty reduction strategies in rural Africa."

The first study, published online in the *American Journal of Agricultural Economics* (and in print in November), looked at soil fertility data for maize plots -- some that had been cultivated for 100 years -- on 260 farms in western Kenya. The study found that fertilizers' effects on crop yields are far greater when applied to healthy soils with higher levels of soil carbon and organic matter than when applied to degraded soils with low soil carbon. The degraded soils usually were the result of repeated plantings without breaks. The authors also reported that poorer farmers most commonly cultivate the most degraded soils, which means that fertilizer policies aimed at helping the poor may actually reinforce income inequalities.

The paper noted that without adequate soil carbon and organic matter, plants absorb fewer of the nutrients in fertilizers. The study recommends greater emphasis on integrating organic matter, such as manure from livestock or post-harvest crop waste, to raise soil carbon levels and make nutrients from fertilizers more available to plants.

The second study, published online and in the September print issue of the journal Agricultural Economics, reports that Kenyan farmers find fertilizers expensive and recognize that they do not increase yields in degraded soils. Therefore, farmers on low-carbon soils use less than half as much fertilizer as neighbors cultivating better soils. In spite of

government efforts to educate farmers and make fertilizers more available and affordable, farmers working with degraded soils have failed to respond to such programs or to increase fertilizer use, while farmers who cultivate good soils reap further benefits from cheaper fertilizers.

"Fertilizer promotion policy doesn't help the poorest farmers very much," said Barrett.

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