

Modeling Soil Erosion, Fertility Mining, And Food Import Quality Enforcement: The Case Of Wheat In Northern Tanzania

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ABSTRACT. This research develops a soil conservation model for smallholder farmers who apply little or no fertilizer. Empirical results drawn from northern Tanzania imply that ignoring the fertility mining problem in model specification leads to overestimation of profits for farms that use little or no fertilizer. Wheat cultivation in the Hanang wheat complex, northern Tanzania erodes an average of 11 mm of soil each year. Soil fertility mining averaged 22.2 kg of nitrogen/ton of wheat. Consequently, wheat yields in the HWC have been decreasing annually. The effectiveness of pricing policies that may encourage farmers to adopt soil conservation methods depends on the curvature of the soil erosion function. When the erosion function is convex, increase in output price is likely to encourage farmers to adopt soil conservation technologies. However, when the soil erosion function is concave, increase in output price may lead to more soil erosion. Since fertilizer prices have been increasing, increased research funding for alternative sources of industrial fertilizer may reduce the current rate of soil degradation in northern Tanzania.

Part II of this research examined the international trade for foods with uncertain quality attributes. The relative effectiveness of the following policy instruments are discussed: enforcement of import quality, penalty to firms importing poor quality foods, and tariff on imported foods. It is shown that enforcement is the most effective instrument for reducing importation of poor quality foods. This implies, for the government of Tanzania to check the current upward trend of importation of poor quality foods, it needs to increase its current efforts of enforcing the quality of imported foods.