

Sustainable Land Management in Kenya: practices to enhance yields



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Summary

Food production in Kenya is suffering from low yields, partly due to land and soil degradation caused by poor land management practices. Sustainable land management practices can potentially improve yields, for example, for cereal production. In this research we worked with smallholder farmers in three counties in Western Kenya (Bungoma, Kakamega and Siaya) to examine the costs and benefits of different SLM practices that were already being used. This enabled us to identify which practices give quick returns on investments,

and allowed us to develop recommendations that can be used to inform policy options in cases where SLM benefits take longer to be delivered. Manuring and intercropping deliver universal benefits quickly, and can be implemented with minimal initial outlay. Physical terraces and agroforestry take longer to provide benefits, and the yield effects are smaller. Policy recommendations are made that can help bridge the gap between initial investments and receipt of benefits.



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Figure 1: Maize yields can improve through use of SLM practices

SLM practices can improve land quality

Declines in productivity and a reduction in the quality of agricultural land worsens economic and social welfare, with significant negative impacts on people's livelihoods and Kenya's economic growth. Changing the way that soils are managed can result in higher farm productivity. A growing body of research has identified yield improvements resulting from the adoption of SLM practices.

Manuring and intercropping deliver high, quick returns

The ELD study in Western Kenya revealed that some SLM practices (e.g. manuring and intercropping) deliver universal benefits for yields and are already being used by some farmers.

The SLM practices of manuring and intercropping have low requirements for materials and low implementation costs. As such they provide a positive net present value, meaning that farmers recoup their initial outlay costs very quickly, through improved yields.



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Figure 2: Farmers are already using some SLM practices

Physical terraces and agroforestry yield smaller benefits to individual farmers more slowly, but provide other ecosystem services to wider society

Other SLM practices (e.g. physical terraces and agroforestry) demand high upfront costs and incur high maintenance costs. It takes longer for these SLM practices to deliver yield benefits. The overall benefits are also smaller over a longer time frame. It is nevertheless important to note that not all benefits are quantifiable in terms of yields.

Some farmers in our study used agroforestry because they perceived benefits for the soil and for water retention, even though they considered it made little short-term difference to crop yields. In this way, SLM practices used at the farm scale provided wider benefits for society (by e.g. reducing erosion and siltation of water bodies), but it was the farmers who had to cover the costs of these investments.

Policy options

Several policy options exist that can be applied to stimulate and increase the adoption of SLM practices by smallholders. The key options emerging from our study are:

Subsidies: The national government is implementing a nationwide fertiliser subsidy program targeting smallholders. At the same time, the County governments of Siaya, Kakamega and Bungoma are also subsidising tractors charges to lower the cost of cultivation borne by smallholder farmers. These subsidy schemes could be usefully extended to cover input costs for manuring (e.g. covering transport costs) and intercropping (reducing costs of e.g. bean seeds). Subsidies may still be a useful tool even for SLM practices such as agroforestry and terraces, where benefit to cost ratios for individual farmers were more diverse. Support for implementing and maintaining physical structures and agroforestry systems would provide wider societal gains, beyond helping the individual farmers themselves. To improve the uptake of SLM practices that deliver multiple results will require that individual farmers do not solely bear the costs. Subsidies should be appropriately targeted within agro-ecological zones or counties. Practices that offer quicker returns and higher benefits (manuring and intercropping) should be prioritised or at least promoted in tandem with those that take longer for benefits to accrue.



Figure 3: Agro-forestry makes less difference to yields but provides important benefits to wider society

Institutional measures: Providing support to Agricultural Innovation System (AIS) represents a useful way to enhance interaction and learning between farmers, through projects and in consultation with extension advisors. AIS can often be developed based on existing networks, projects and institutions. They offer a flexible approach that can embrace the complexity of the socio-economic and biophysical landscape to promote knowledge exchange and SLM uptake. AIS could also help to reduce dis-adoption rates of SLM practices.

Improved monitoring of relationships between land management practices and yields: Very few farmers keep records of their land management practices. Fewer still relate their practices to the yields they obtain. This identifies a key area in which building farmers' capacity to monitor would be useful. Improved farmer records of SLM practices, yields and weather (e.g. rainfall) would provide farmers with more accurate information as to what they did and how they benefitted. Improved records would also provide decision makers with a better overview of (both positive and negative) soil quality changes and combined with investment in climate and soil monitoring would strengthen monitoring over the longer-term.

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