ecoagriculture
Policy Focus
No. 12 March 2015

Scaling up Sustainable Agriculture Land Management in Bungoma County, Kenya

Agricultural landscapes must provide food, fiber and energy to a growing population in a changing climate, while potentially serving as instruments for climate change mitigation. Agriculture is the backbone of the Kenyan economy, contributing approximately 25% of the GDP annually and employing more than 75% of the population (The Government of Kenya 2010). The development of agriculture is also important for poverty reduction since most of the vulnerable groups, like pastoralists, the landless, and subsistence farmers, depend on agriculture as their main source of livelihoods. Growth in the sector is therefore expected to have a greater impact on a larger section of the population than any other sector. This is especially true in Bungoma County in western Kenya, where the agriculture sector is projected to provide up to 70 percent of jobs between 2013 and 2017 (The County Government of Bungoma 2013).However, climate change presents many challenges, as well as new opportunities, for the development of agriculture, and Bungoma County needs to promote and support sustainable agricultural practices that will improve agricultural productivity, as well as help farmers adapt to and mitigate climate change, at both small and large scale, as outlined in the Bungoma County Integrated Development Plan (CIDP) 2013-2017. This brief provides a review of the potential benefits of Sustainable Agriculture Land Management (SALM) practices, the relevant policy context for implementing them in Bungoma County and suggests policy steps that could be taken by the County government to scale them up.

Background

Bungoma County covers an area of 3,032 Km^2 in the Lake Victoria Basin in western Kenya. In 2013 it had a population of approximately 1,553,000 people, which is projected to grow to over 1,751,000 people by 2017. The County has about 2,880 Km^2 or arable land, 70% (201,654.6 ha) of which is under food crop production and about 29.9% (86,423.4 ha) of which is under cash crop production (The County Government of Bungoma 2013). The main subsistence crops produced include: maize, beans, finger millet, sweet potatoes, bananas, Irish potatoes and assorted vegetable, while sugar cane, cotton, palm oil, coffee, sun flower and tobacco are the main cash crops. The land is very important to the lives of Bungoma County's citizens, and, if properly managed, the agriculture sector is projected to provide up to 70% of jobs in Bungoma County (The County Government of Bungoma 2013). The County's economy is predominately based on agriculture, especially centering on the sugarcane and maize industries. In addition to growing crops, farmers also raise livestock, including cattle, sheep, goats, donkeys, pigs, poultry and bees, as an integrated part of their land use, and most households meet their needs for tree products and services (i.e. firewood and charcoal) from trees in the local communities. Bungoma County also contains the Mt. Elgon forest reserve (618.2 Km^2) and part of the Mt. Elgon National Park (50.683 Km^2), which both face challenges due to encroachment, overgrazing, charcoal burning, logging and poaching (The County Government of Bungoma 2013).

However, the development of agriculture in Bungoma County faces many challenges. Increasing population and land fragmentation has resulted in a decrease in the average size of land holdings to uneconomical units; small-scale farms average only 0.4 hectares while large-scale farms average only 4 hectares (The County Government of Bungoma 2013). Additionally, unsustainable farming practices, soil erosion, pollution and climate change have resulted in land degradation, which along with the high costs of farm inputs, poor market infrastructure and storage facilities, and poorly managed cooperative societies has resulted in low agricultural productivity. Livestock production is also low due to poor breeds, the prevalence of diseases, limited extension services, and poor husbandry, among other factors. Furthermore, due to County budget shortfalls, the agriculture and forestry extension services are often not able to reach many farmers.

ecoagriculturepartners

Climate change has already begun to impact agriculture and ecosystems in the county, with erratic and unpredictable weather patterns and declines in indigenous flora and fauna already observed (The County Government of Bungoma 2013). Multiple severe impacts are also likely to result from climate change in the future, including higher temperatures, water scarcity, changes in rainfall patterns, environmental stresses like the El Nino phenomenon, and an increase in extreme weather events, like storms, droughts and floods. Agriculture is highly sensitive to climate change and variability, and rain-fed agriculture systems in particular, are especially susceptible to unpredictable weather. High rates of land degradation only increase the sensitivity of farmers to climate variability and change. Furthermore, unsustainable agriculture practices contribute significantly to climate change, through the emission of gases (carbon dioxide, methane and nitrous oxide) that contribute to global warming. The climate change-related risks affecting agriculture are likely to intensify in the future, resulting in an increase in poverty and food insecurity. As the population continues to grow, the County needs to invest more in developing resilient agricultural systems that are able to maintain, or even increase, agricultural productivity and food security in the face of the adverse effects of climate change.

Sustainable Agriculture Land Management (SALM) in Bungoma County

Sustainable Agriculture Land Management (SALM) refers to a set of land management practices implemented by both smallholder farmers and agribusinesses that can increase agricultural productivity, and therefore food security and incomes. SALM practices can also improve farmers' resilience to climate change while mitigating the release of greenhouse gases (Figure 1).

SALM practices are currently being implemented by farmers in Bungoma County with the support of Vi Agroforestry and the Kenya Agriculture Carbon Project since 2009. This project takes advantage of the climate mitigation benefits of SALM and the international

Figure 1. SALM practices seek to enhance the productivity, resilience and mitigation of climate change in agricultural systems.

A farmer learns about SALM practices on a demonstration farm in Bungoma, Kenya in 2013. Photo credit : Seth Shames, EcoAgriculture Partners.

voluntary carbon market to finance training for farmers as well as a small 'carbon bonus' to participating farmers. The project relies on an innovative farmer-to-farmer extension model, where skilled community resource people teach farmers how to implement SALM using training manuals, posters, and field-based learning sites. The practices that are being implemented within this program include: soil and water conservation measures; soil nutrient management practices; improved agronomic practices; agroforestry practices; improved livestock management practices; sustainable energy technologies; and the restoration of degraded lands (Table 1).

By building the capacities of community resource persons and embedding the training resources in the community, the project has been able to reach about 30,000 farmers who may not have had access to traditional extension services, while helping to ensure that the knowledge remains in the community even after the project leaves (Vi Agroforestry 2014). In addition to providing the aforementioned production and resilience benefits of SALMs, this model also improves livelihoods by emphasizing enterprise development and the utilization of Village Savings and Loan Associations. In Bungoma County, about 15,000 farmers are already implementing SALM practices over about 12,000 hectares across the 6 focal areas (Vi Agroforestry 2014). While there has been substantial success in this project, scaling up the number of farmers who are using SALM practices in the county will require more active engagement and commitment of the county government, as well as Water Resource Management Authority (WRMA), Kenya Forest Service (KFS) , National Environment

Table 1: SALM practices in Bungoma County	
Types of SALM Practice	Examples of SALM Practices
Soil and water conservation measures	Building terraces, road catchments, diversion ditches, infiltration ditches, planting pits, micro catchments
Soil nutrient management practices	Mulching, composting, using improved fallows, more efficient use of fertilizers
Improved agronomic practices	Contour strip cropping, use of improved germplasm, crop rotation, intercropping, relay cropping, cover crops, alley cropping, constructing woodlots, boundary planting, riparian tree planting, apiculture, constructing fodder lots, planting trees for shade, windbreaks, soil conservation, fruit orchards
Improved livestock management practices	Improved breeds, improved housing, improved feed, investing in health control programs, feed conservation
Sustainable energy technologies	Efficient cooking stoves, solar energy, biogas
Restoration of degraded lands	Riverbanks, deforested areas, gullies, unproductive areas, areas with low species diversity

Management Authority (NEMA), Consultative Research in Environment and Agriculture Development Initiatives (CREADIS), Anglican Development Services (ADS), One Acre Fund, community based organizations (CBO), and other development partners in the County.

Current Policy Situation

Bungoma County's development priorities, as outlined in its County Integrated Development Plan (CIDP) for 2013-2017, include, among other objectives, supporting investments to ensure food security, promoting local economic development and job creation, supporting environmental protection and conservation, and increasing agriculture value addition and agri-business. The CIDP also highlights the need to promote the adoption of sustainable farming practices, sustainable land use technologies, and a low carbon economic growth (The County Government of Bungoma 2013). Furthermore, these goals are aligned with many national policies and strategies, including Kenya's Vision 2030, the National Farm Forestry Program target of having 10% of each farmer's total acreage reserved for agro-forestry, and the National Climate Change Action Plan, as well as regional programs, such as the Comprehensive Africa Agriculture Development Program (CAADP) (The Republic of Kenya 2013a; The Republic of Kenya 2013b; The County Government of Bungoma 2013). However, currently there is no policy or strategy at the County level that specifically addresses the adoption of sustainable agriculture and land management practices, and such a policy or strategy is needed for the County to achieve these interlinked goals in the face of climate change.

Recommended policy priorities for the adoption of SALM in Bungoma County

In order for SALM practices to most effectively improve the livelihoods of Bungoma's people they need to be implemented throughout the County, including on farmlands, along riverbanks, in schools and on urban and peri-urban land. To support this objective, the County Government could build on the work of Vi Agroforestry and other government efforts to promote the adoption of SALM practices among small-scale farmers and on large-scale farms. This model emphasizes farmer-to-farmer extension, a strong system for monitoring the benefits of SALM, as well as an emphasis on the development of farm enterprises and Village Savings and Loan Associations (VSLA). To achieve this, we make the following recommendations:

Build the capacity of Bungoma County's technical officers to train on SALMs.

Officers from Bungoma County agencies including the Ministry of Agriculture, Livestock, and Fisheries; Ministry of Forestry and Tourism; KFS; and NEMA will need additional capacity in implementing and training on SALM practices.

Promote a farmer-to-farmer extension system as a cost-effective way to scale-up extension services for SALM.

This system relies on the training and support of community resource people who serve as community-based trainers, and requires the development of community-based learning sites. These learning sites, through regular trainings and field days, can showcase SALM practices and technologies to farmers and agribusiness in every sub-county. Tree planting campaigns can also raise awareness about SALM in each ward. Investing in community-based extension will help to ensure that a larger number of farmers receive trainings, as well as helping to target marginalized farmers, who are normally not able to access extension services. Technical officers based in Bungoma County can help to identify community resource persons in each ward and build their capacities in SALM by conducting trainings

This woodlot also provides fodder for livestock. Photo credit: John Recha, ERMCSD.

themselves, encouraging them to train other farmers in their communities and by organizing exchange visits.

Support the development of farm enterprises and Village Savings and Loan Associations (VSLA) along with SALM training.

By using SALM trainings as entry points to business and finance development programs (or vice versa) it is possible to capitalize on the livelihood benefits of adopting SALM practices and ensure their long-term sustainability. This is especially important for small scale farmers who, in addition to requiring a sustainable source of funding to implement SALM practices, will be motivated to continue practicing SALM in the long-term if they receive additional income and livelihood benefits.

Develop and implement a farmer-centered, cost-effective system of monitoring and evaluation of SALM implementation and benefits in the County.

A SALM monitoring and evaluation system that enables tracking of the adoption levels of SALM practices and their impacts on local community livelihoods, food security as well as climate adaptation and mitigation will allow SALM investors which may include government,

Table 2: Roles and Responsibilities of all partners in SALM policy implementation

Partner	Responsibility
Farmer/ farmer organizations	Implement SALM technologies, VSLA and agribusinesses
Community resource persons	Train farmers on SALM, agribusiness, contract farming, as well as VSLA
Bungoma County Ministry of Agriculture, Livestock, Fisheries and Co-operatives	Train community resource persons on SALM practices, agribusiness, farm produce marketing, and contract farming; backstop farmer trainings; establish learning sites to demonstrate SALM technologies; support the development of VSLAs; organize exchange visits and study tours; link local universities and crop insurance providers to farmers
Bungoma County Ministry of Environment, Natural resources, Water and Tourism	Support individual and group nursery establishment, agroforestry and tree planting campaigns
Vi Agroforestry	Train Ministry of Agriculture, Livestock and Fisheries, Kenya Forest Service, National Environmental Management Authority on SALM practices, agribusiness establishment, VSLA, and contract farming
Community Based Organizations and Non-Governmental organization	Support training of farmers and monitoring of SALM practices; help identify community resource persons
County Executive Committee	Coordinate partners and activities

Glossary

Adaptation: Adjustment or preparation of natural or human systems to a new or changing environment which moderates harm or exploits beneficial opportunities.

Adaptive Capacity: The ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.

Climate: Average weather described in terms of mean and variability over a period of time ranging from months to millions of years

Climate change: Any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among others, that occur over several decades or longer.

Greenhouse Gas (GHG): Any gas that absorbs infrared radiation in the atmosphere including carbon dioxide, methane, nitrous oxide, ozone, chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride.

Mitigation: A human intervention to reduce the human impact on the climate system; it includes strategies to reduce greenhouse gas sources and emissions and enhance greenhouse gas sinks.

Resilience: A capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment.

Sustainable Agriculture: In simplest terms, sustainable agriculture is the production of food, fiber, or other plant or animal products using farming techniques that protect the environment, public health, human communities, and animal welfare. This form of agriculture enables production of healthful food without compromising future generations' ability to do the same.

Sustainable Agriculture Land Management (SALM) practices: A set of land management practices implemented by both smallholder farmers and agribusinesses that can increase agricultural productivity, and therefore food security and incomes. SALM practices can also improve farmers' resilience to climate change while mitigating the release of greenhouse gases.

Weather: Atmospheric condition at any given time or place. Measured by things such as wind, temperature, humidity, atmospheric pressure, cloudiness, and precipitation.

donors or buyers of carbon credits to keep track of their return on investment. The staff at the Ministry of Agriculture, Livestock and Fisheries and the KFS will need to manage the technical components of a SALM monitoring and evaluation system which require high-levels of technical skill and knowledge. However, this should be integrated with a farmer-based monitoring system, in which farmers self-monitor and record data at the level of their individual farms. Five farmers per ward could be selected to form a permanent monitoring unit, and they could assist with the aggregation of data from individual farmers. Vi Agroforestry can support the county government in developing the SALM monitoring and evaluation framework.

Build on the implementation of SALM practices in the County to promote integrated landscape management.

For SALM to reach its maximum effectiveness, it should be implemented within a wider effort to balance agricultural, livelihood and ecosystem needs throughout a landscape. Relevant stakeholders, including the local government, research and development organizations, and farmer groups throughout the County should be involved in these landscape planning and management processes.

Stakeholder roles and partnership development for SALM

The scaling up of SALM in Bungoma County will require a wide variety of stakeholders in addition to the county government. There are already a number of organizations operating in Bungoma which can help support the county's efforts to scale up SALM. In addition to Vi Agroforestry, these include CREADIS and ADS, as well as a variety of other community-based organizations. These groups can play a strong role in supporting community-based capacity building and monitoring and evaluation systems. Additionally, the county government can play a role in linking the Department of Meteorological Services and agro-advisory agencies to farmers to provide them with relevant climate information. They can also help link crop insurance service providers to farmers.

Beekeeping is an income source from forest resources, while providing important pollination services to crops. Photo credit: John Recha, ERMCSD.

Relevant county government agencies should seek out these potential partners and consider the most effective means of working with them. The members of the County Executive Committee in charge of agriculture and the environment should be responsible for coordinating these efforts. A suggested list of the various roles and responsibilities of each of the partner organizations can be found in Table 2.

Conclusion

Scaling up SALM practices throughout Bungoma County would help to support small and large scale farmers improve their farming practices, ensure the long-term productivity of the land resource base, improve their resilience to climate change, as well as contribute to a low carbon, green economy. By utilizing a model that emphasizes farmer-to-farmer extension and monitoring of SALM practices, as well as the development of farm enterprises and VSLA, the county government would be making significant strides towards achieving several of Bungoma County's development priorities related to food security, environmental protection, and livelihoods improvement, as outlined in the CIDP 2013-2017, in a cost-effective and sustainable way.

References:

The County Government of Bungoma. 2013. Bungoma County Integrated Development Plan 2013-2017. Republic of Kenya.

The Government of Kenya. 2010. Agriculture Sector Development Strategy: 2010-2020.

The Republic of Kenya. 2013a. Kenya Vision 2030: Second Medium Term Plan, 2013-2017. Nairobi.

———. 2013b. National Climate Change Action Plan 2013 -2017.

Vi Agroforestry. 2014. Kenya Agriculture Carbon Project: Progress Report 2014.

Prepared by:

Seth Shames and Krista Heiner, EcoAgriculture Partners; Martha Kapukha and Amos Wekesa, Vi Agroforestry; and John Recha, Environmental Resources Management Center for Sustainable Development (ERMCSD).

This work was undertaken as part of the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), which is a strategic partnership of CGIAR and Future Earth. This research was carried out with funding by the European Union (EU) and with technical support from the International Fund for Agricultural Development (IFAD). The views expressed in the document cannot be taken to reflect the official opinions of CGIAR, Future Earth, or donors.

CGIAR RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security CCAFS

ERMCSD Vi AGROFORESTRY

Ecoagriculture Policy Focus Series

The Policy Focus series, produced by EcoAgriculture Partners, highlights issues relevant to policy experts and decision makers in the fields of agriculture, conservation and rural development to promote integrative solutions.