

KENYA: BUNGOMA COUNTY POLICY BRIEF ON LAND DEGRADATION

Fred Kizito, Lulseged Tamene, Nicholas Koech, Brian Pondi and Kennedy Nganga (2018) in collaboration with TMG Think Tank for Sustainability: Land Degradation Assessments Using Multiscale Hierarchical Approaches for Agroecosystem Restoration and Improved Food Security: The Case for Kenya and Burkina Faso. *CIAT publication, pp56*

This policy brief aims to give an overview of land degradation hotspots in Bungoma County and the policy options for land restoration. In this assessment, land degradation is referred to as the persistent loss of ecosystem function and productivity caused by disturbances from which the land cannot recover without human intervention (unaided). Hotspots are defined as places that experience high land degradation and if left unattended, will negatively affect both human wellbeing and the environment. The spatial location of hotspots was identified through a methodology combining modeling, participatory stakeholder consultations and field validation. Understanding the spatial locations helps identify hotspot areas and target them as priority intervention sites with relevant management options. This county policy brief is complemented by detailed National comprehensive assessment report which can be accessed at this link: <https://cgspace.cgiar.org/handle/10568/97165>

The methods conducted in this land degradation assessment were hierarchical (covering three different scales: national, province and watershed) and involved stakeholder consultations for field validation evidences (See Figure 1).

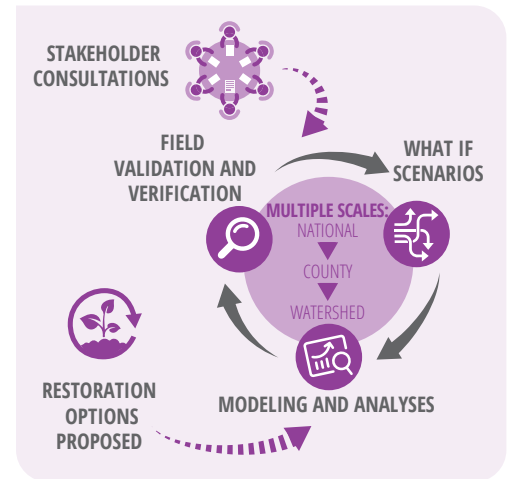
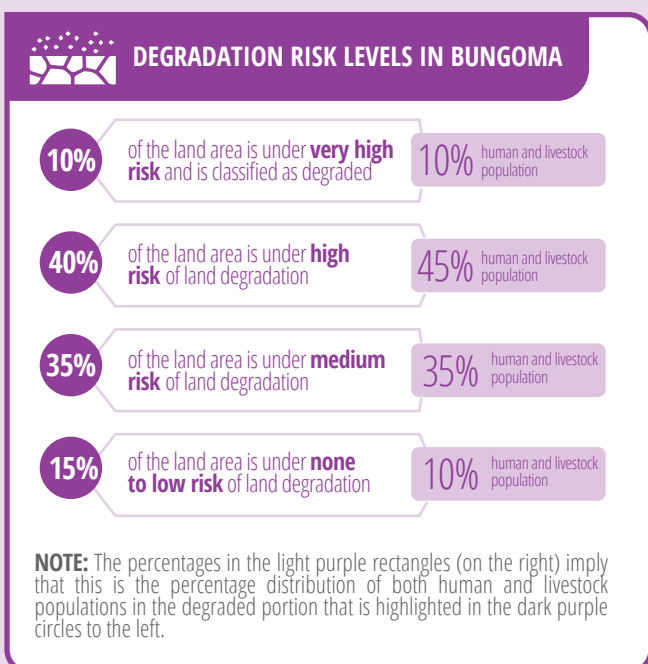


Figure 1: Land degradation assessment approaches

KEY MESSAGE 1: Soil erosion and land degradation risks are eminent in the Southern parts of Bungoma County specifically around Nzoia, Chwele, South of Bungoma, Mayanja and South of Webuye and deserve tailored management interventions to prevent a downward spiral

Bungoma presents a unique case where most of the county has a medium to high degradation risk with demography playing a key role; there are specific pockets of areas that require tailored interventions.



DEGRADATION LEVELS FOR BUNGOMA

The figure depicts an overall degradation risk map. The areas most affected by degradation (brown patches) are in the Southern parts of Bungoma specifically around Nzoia, Chwele, South of Bungoma, Mayanja and South of Webuye as well as Sirisia. The land degradation map highlights areas with high risk. This is more pertinent in the southern parts of Bungoma specifically around Nzoia, Chwele, South of Bungoma, Mayanja and South of Webuye. There are areas with the light green to brown patches. The green areas are areas with moderate to no degradation risk.

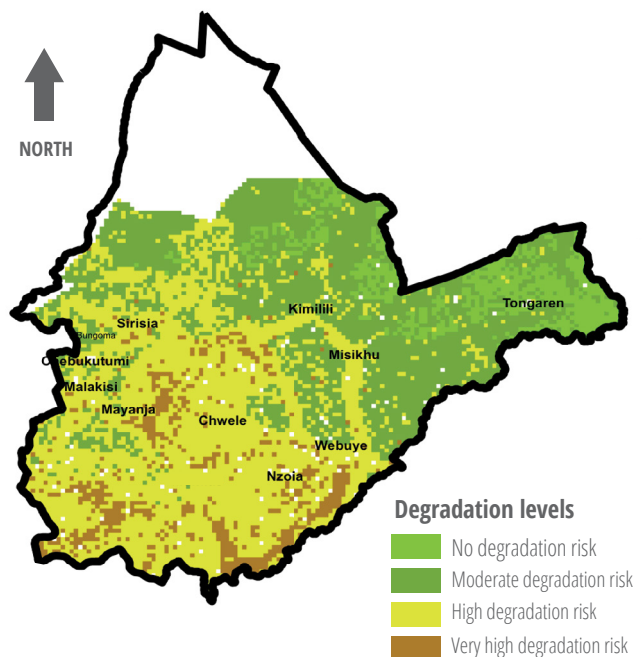


Figure 2: Degradation levels for Bungoma

KEY MESSAGE 2: Food insecurity within Bungoma county is specific to the Southern parts of Bungoma specifically around Nzoia, Chwele, South of Bungoma, Mayanja and South of Webuye and to the North East of Webuye areas and deserves tailored management interventions

Local knowledge (experts from Bungoma County and at national level) contributed in a participatory manner to identify hotspot areas of food insecurity and vulnerability. To accomplish the task, consensus was reached with the stakeholders during the workshop on indicators of food security and vulnerability so that evaluation by each county team would be consistent across the board where the stakeholders discussed and mapped their ideas. To facilitate this exercise, Google earth images complemented formation of detailed maps for each county by the stakeholders. Complementary land degradation risk maps based on modeling approaches were also provided to each team.

INSIGHTS



The preference dynamics in relation to the crop of choice being grown affects food insecurity, even if there is low degradation risk. North of Kimilili, Misikhu and Tongaren areas which focus on a single cash crop need concerted efforts towards enterprise diversification. This may come in the form of subsidies towards improved crop varieties, enabling friendly land tenure policies in the areas as well as training towards multiple enterprise management to realize optimal outcomes.

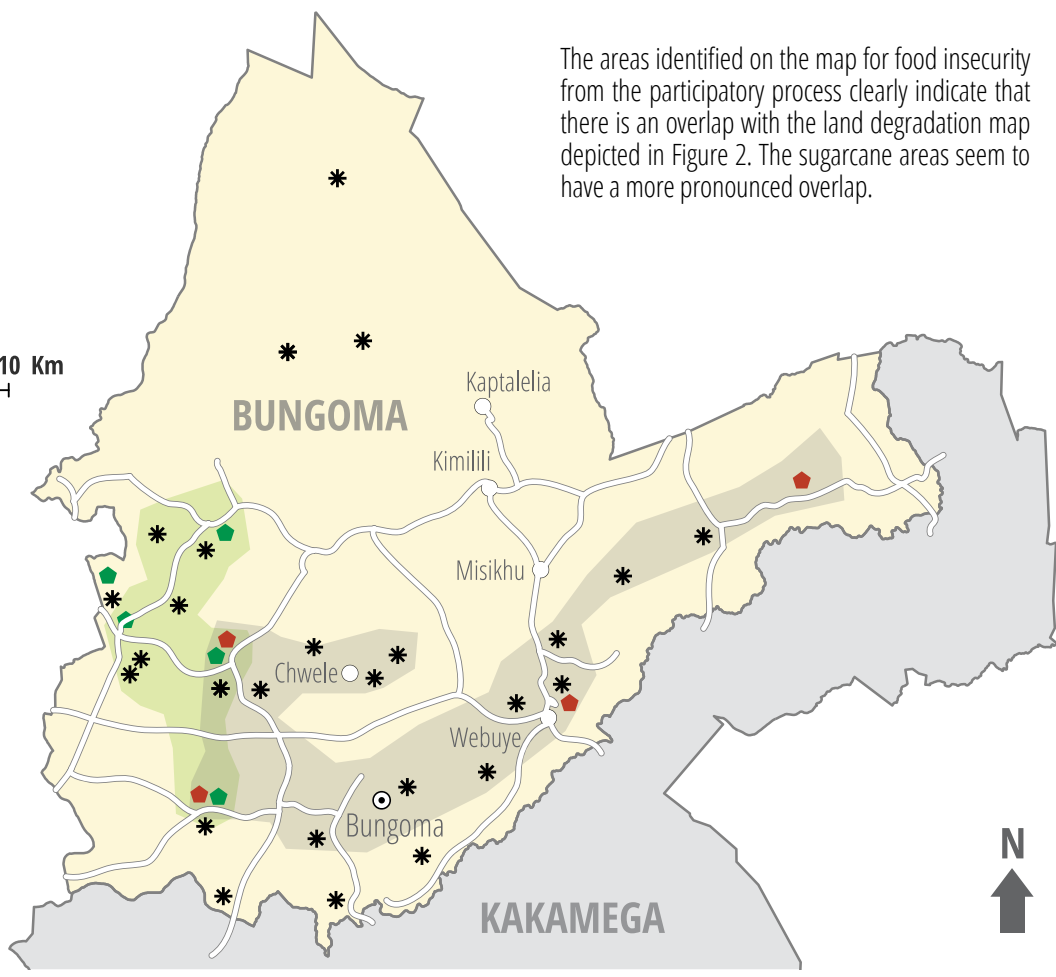
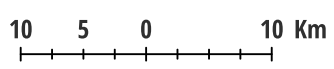


High levels of degradation risk can cause food insecurity especially due to soil degradation in the sugarcane areas, specifically around Malakisi, Mayanja, Bungoma and Sirisia. Interventions may include promoting soil health for improved productivity; sensitization of communities about the importance of conducting soil tests to ensure that specific problems are correctly identified in order to tailor relevant interventions for the area.

THE FOOD INSECURITY ZONES IN BUNGOMA

ZONE	FOOD INSECURITY REASONS
Sugarcane belt	Striga weed infestation; low soil fertility; mono-cropping of sugarcane all year.
Tobacco zone	Low soil pH; encroachment on community agricultural lands by tobacco & paper companies; population pressure
Extended tobacco zone	Intense deforestation; encroachment on catchments between hills and Saboti Land Defense Forces (SLDF) ; squatter displacement

- Towns
- ⦿ Admin Town
- * Participatory Hotspot
- ▣ Tobacco Area
- ▣ Sugarcane Area
- County Roads
- County Boundary
- ▣ Other Counties



The areas identified on the map for food insecurity from the participatory process clearly indicate that there is an overlap with the land degradation map depicted in Figure 2. The sugarcane areas seem to have a more pronounced overlap.

Figure 3: Food insecurity zones in Bungoma

KEY MESSAGE 3: Land use changes in Bungoma County have greatly contributed to land degradation highlighting the need for policy reforms in land use decisions

To account for the role of differences in land use/cover on land degradation, we used land use/cover data generated from Landsat satellite image analysis. This figure exemplifies the land use and land cover changes in Bungoma County. Since agriculture is most predominant, the figure portrays values above zero which are areas in square kilometers converting into agriculture in relation to other classes. Values below zero are areas in square kilometers for agriculture converting into another land use class. Land use conversions and transitions for Bungoma County show that the most pronounced changes were in the agriculture land use category.

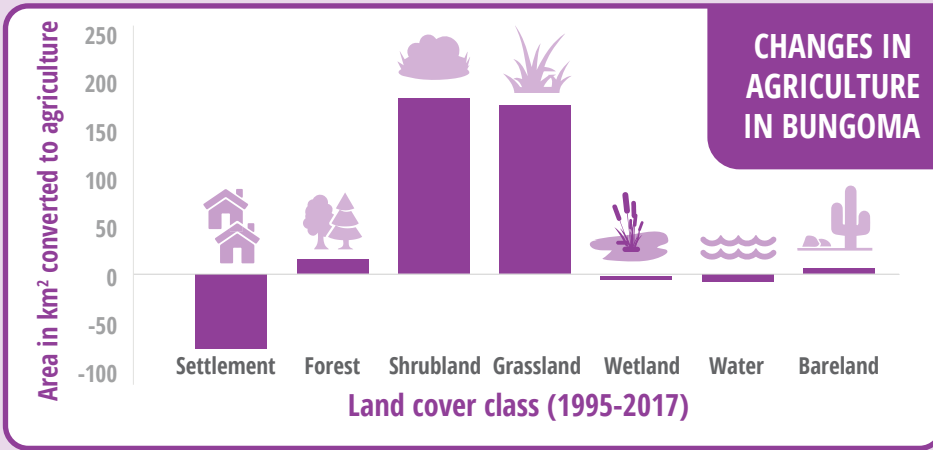
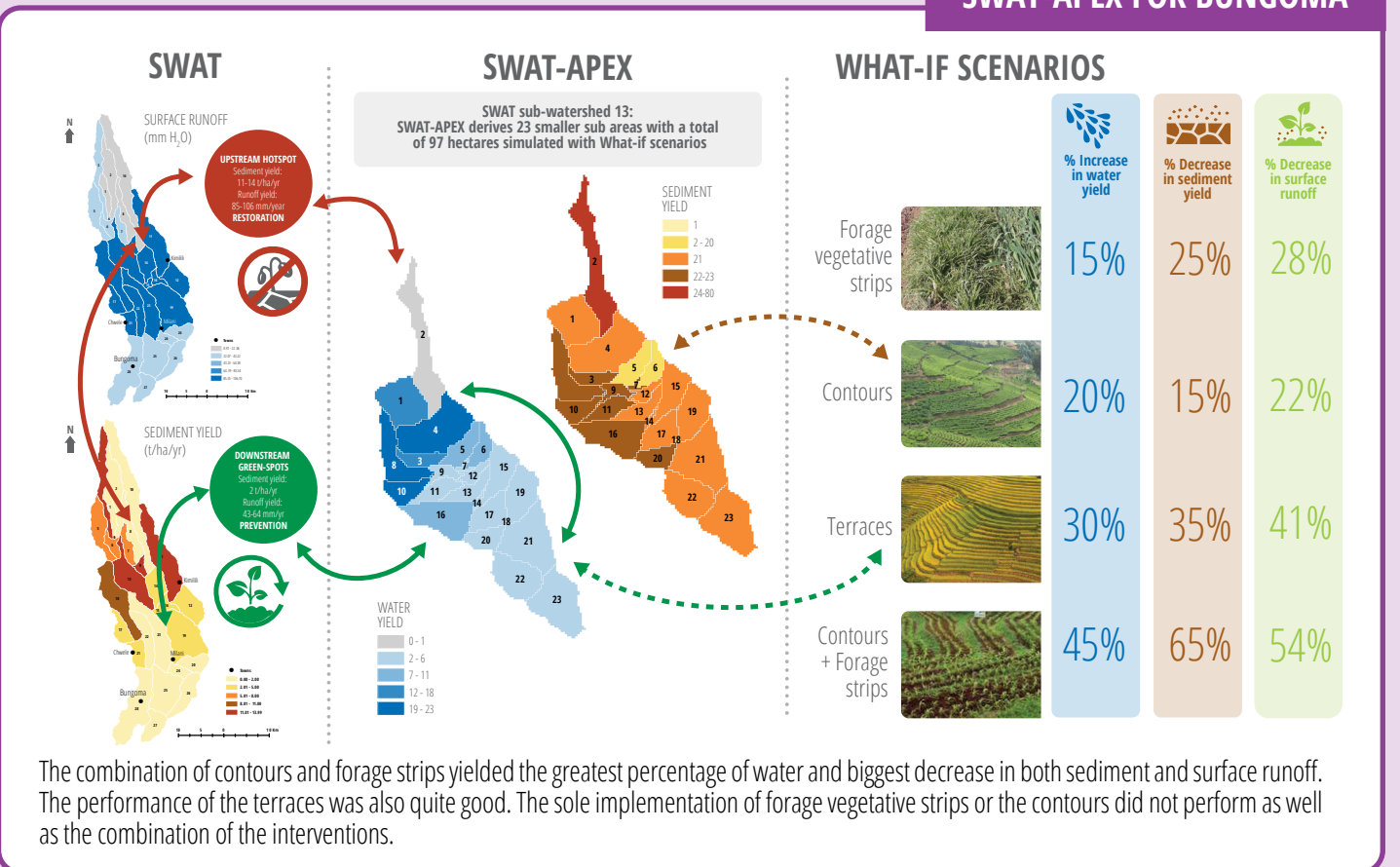


Figure 4: Changes in agriculture in Bungoma

This study further analyzed both sediment and runoff load reductions obtained from simulated scenarios for current (business as usual) and proposed best management practices within a selected watershed of Bungoma. This served as a means to explore possible intervention options that can be promoted by decision makers for implementation by local communities. We describe the identification of dominant sediment and runoff delivery mechanisms in the watershed with readily available tools consisting of SWAT and Agricultural Policy and Environmental Extender (SWAT-APEX) models for conducting the "What-if" scenarios. These tools also developed multiple regression equations to estimate the sediment and runoff ratios for the subwatershed areas of interest. The models used 35 years of weather data from 1981 to 2016. The "What if" scenarios that were conducted in the SWAT-APEX interface were selected based on Kisumu workshop participants inputs and from quantitative data on the current status quo or business as usual in case no interventions were done. The applicable interventions are presented in the "What if scenarios" section.

SWAT-APEX FOR BUNGOMA



The combination of contours and forage strips yielded the greatest percentage of water and biggest decrease in both sediment and surface runoff. The performance of the terraces was also quite good. The sole implementation of forage vegetative strips or the contours did not perform as well as the combination of the interventions.

Figure 5: SWAT-APEX for Bungoma



Concerted efforts are needed to build the capacity of County officials towards both technical and policy oriented interventions such as zonal ordinances and land use policy regulations. This permits policy-makers to understand the value of investing in Sustainable Land Management (SLM) options around Webuye and Chwele.



Sustainable land management techniques for interventions should focus on creating a permanent cover and target the most vulnerable zones. The proposed interventions will require context specific or tailored approaches in the areas with high food insecurity around Malakisi, Mayanja, Bungoma and Sirisia as well as for the areas with high degradation risk around Webuye and Chwele.