Increasing Agricultural Production, Conserving Natural Capital, and Strengthening Farmer Livelihoods: A Discussion of Landscape Management Options for Sub-Saharan Africa[1]

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Executive Summary

The Challenge: Unprecedented demands are being placed on rural landscapes of Sub-Saharan Africa - for the livelihood security of smallholder farmers, for commercial agricultural enterprises to improve food security and generate national revenue, for diverse products to satisfy food, fibre and fuel demands of expanding urban populations, and for biodiversity conservation to ensure the provision of ecosystem services. Furthermore, agriculture is at a crossroads as governments and private sector actors increase direct investment as a means to increase productivity and ensure the long-term viability of food supplies. Expanded efforts to combat hunger and nutrition will fail however, if they do not produce higher incomes and improved livelihoods for small-scale farmers. And short-term gains will be offset by long term losses if ecosystems are further degraded, threatening future ability to maintain current levels of production.

The Need: We must explore alternative models of delivering diverse products and services required from rural landscapes if we are to satisfy the multiple demands for people, food, and nature. These models and approaches must be able to satisfy growing demand despite increasing scarcity and competition for resources and increasing climate variability. The sector-based, business-as-usual approach to investing in rural economies and managing rural lands needs to be re-examined in favour of multi-sectoral, spatially explicit approaches that reduce tradeoffs among competing land uses and resources, and build synergies among them, and between urban and rural landscapes. In landscapes dominated by agriculture, as is prevalent in many parts of Sub-Saharan Africa, approaches and practices must be pursued that integrate biological and ecological processes into food production, and that benefit the poorest farmers.

The Strategy: Integrated landscape management approaches offer a strategy for conserving natural capital and generating ecosystem services while also sustaining diverse agricultural production systems and livelihood strategies. These approaches nest improved agricultural practices within a larger spatial context to create a mosaic of sustainable land-uses. Through the deliberate management of different biological and social components of the landscape, positive interactions (synergies) can be realized and trade-offs among competing uses and outcomes can be minimized.

This discussion paper is intended to contribute to the Summit for Sustainability in Africa by providing an overview of integrated landscape management approaches that can offer a pathway towards achieving sustainability in agricultural landscapes. It begins with a definition of integrated landscape management approaches and sustainable land management, followed by brief descriptions of specific farming systems that have demonstrated potential to improve yields, reduce environmental impacts, and strengthen farmer livelihoods. The paper concludes with profiles of several initiatives that have included these approaches within the broader context of sustainable landscapes, and which demonstrate the importance of aligning market incentives and policy frameworks to achieve sustainability.

[1] Prepared by EcoAgriculture Partners and Conservation International

Integrated landscape management – what does it mean?

Integrated landscape management is closely related to sustainable land management (SLM), defined as knowledge-intensive integration of land, water, biodiversity and environmental management to support agricultural production, conservation and livelihoods goals (World Bank 2008). SLM approaches restore and rehabilitate degraded lands to ensure adequate quantity and quality of food, fibre, fodder, and fuel while at the same time conserving the ecosystem and its resources (Liniger et al 2011). A landscape perspective on SLM provides a spatial context for pursuing relationships between agricultural production practices, rural development activities, and ecosystem management strategies that are mutually supportive. The landscape perspective is useful also in scaling up successful site level practices to realize landscape level impacts.

Box 1: Useful terms

Natural capital is the extension of the economic notion of capital (manufactured means of production) to goods and services relating to the natural environment. It is the stock of natural resources that yields a flow of valuable ecosystem goods or services. Natural capital depends on the health of the whole ecosystem in which it flows.

An **ecosystem** is a biological environment consisting of all the living and non-living organisms in a particular area, and their interactions. Landscapes are made up clusters of local ecosystems repeated in similar form.

Ecosystem management is a holistic approach that aims to conserve and restore natural resources and ecosystem services while meeting the socioeconomic, political and cultural needs of current and future generations. It aims to explicitly address the interrelatedness between all components of the ecosystem.

Agroecology, defined broadly, is the study of the relationships and interactions between plants, animals, humans and the environment within agricultural system. It may also be understood as the application of ecological principles to the agricultural production.

Climate-smart agriculture is a triple-win approach to increase productivity (addressing food security), improve resilience (adaptation) and sequester green-house gasses (making agriculture part of the solution through mitigation).

Ecosystem services are the beneficial resources and processes supplied by natural ecosystems. Ecosystem services may come in the form of provisioning (e.g. water, wild foods), regulating (e.g. carbon sequestration, crop pollination), supporting (e.g. seed dispersal, nutrient cycling), and cultural (e.g. spiritual inspiration, ecotourism). (Source: Millennium Ecosystem Assessment 2005).

Ecoagriculture is a landscape management approach that rests on three pillars: enhanced rural livelihoods, conservation of biodiversity and ecosystem services, and sustainable and productive agricultural systems, buttressed by multistakeholder dialogue and supportive institutions. (Source: McNeely and Scherr 2003).

A **landscape approach** is an evidence-based management approach that addresses the spatial, thematic, and human needs of rural landscapes, as defined by: 1) a landscape-scale focus; 2) treatment of landscapes as complex systems; 3) management for multiple objectives; 4) adaptive management; and, 5) management through participatory processes of social learning and multi-stakeholder negotiation. (Source: Milder et al 2012).

Sustainable intensification of agriculture refers to increased production from the same area of land while reducing negative environmental impacts and increasing contributions to natural capital and the flow of environmental services (Source: FAO 2011)

The Landscapes for People, Food and Nature (LPFN) Initiative adopted the term integrated landscape management (ILM) at its international Forum 2012 in Nairobi (EcoAgriculture Partners, 2012)[2] to capture diverse landscape approaches. Participants at the Forum agreed that the following ingredients characterize an ILM approach to addressing conservation, production and livelihood needs as proposed by Milder et al (2012): 1) Landscape-scale focus on complex management problems, 2) management of landscapes as complex socio-ecological systems, 3) management for multiple objectives, 4) adaptive collaborative management, and 5) management through participatory processes of social learning and multi-stakeholder negotiation.

For ILM approaches to be effective requires ecologically suitable production practices on farms, ranches and pastoral areas. It also requires a multi-stakeholder approach to managing agriculture and natural resources in the landscape as a whole. To illustrate, the section below highlights a selection of site level SLM practices that can have positive impacts at multiple scales. It is followed by examples of multi-stakeholder landscape management initiatives that exhibit multifunctional outcomes. Finally, actions are suggested that can help to "mainstream' ILM in areas of Africa where multi-sector, spatially explicit approaches to managing agriculture, rural development and ecosystem conservation are needed.

Site level sustainable land management

Effective outcomes from ILM rest on production practices by farmers, ranchers and pastoralists that regenerate soils, restore grasses and woodlands, conserve water, and provide habitat for pollinators and other beneficial insects while also producing food, fibre and fuel products for consumption and sale. Such practices include applying crop residues as surface mulch, using compost and green manures, intercropping, cycling animal manures, rotating animal grazing, and biocontrol of insect pests and diseases to enhance yields and sustain soil fertility with minimal dependence on outside chemicals and energy. This agroecological approach to the sustainable intensification of agriculture aims to increase economic returns not only to land, labour and capital, but also to other factors of production like water and energy. Furthermore, the productivity, economic and environmental benefits of agroecological approaches have been demonstrated in a variety of production contexts: a review of agricultural projects in 57 developing countries found that these approaches led to average yield increases of nearly 80% (Pretty 2008).

Choosing the most appropriate SLM practices depends on site level soil and water conditions as well as the culture, knowledge and priorities of the producers and communities concerned. Conservation agriculture, agroforestry, integrated crop-livestock systems and improved grazing land management are among site level SLM production systems practiced in Sub-Saharan Africa that demonstrate increases in yields and land productivity as well as potential for widespread adoption.

Conservation agriculture: Conservation agriculture (CA) is a set of agricultural practices that minimize soil disturbance and maximizing soil cover. Such practices nourish and enhance natural ecological processes, which, in turn, generate a host of agricultural benefits. CA is a production strategy that can address the challenges of severe land degradation, rapid population growth, and climate change hampering development in Sub-Saharan Africa. CA practices can be applied to manage food production and conservation of ecosystem services in an integrated way, on farm-, village-, and landscape-scale (Milder et al 2011). Three principles guide the practice of CA: **minimizing soil disturbance** through direct seeding, minimal or no tillage, and avoidance of excessive compaction by machinery, draft animals, or humans; **maintaining permanent soil cover** through the use of cover crops, intercrops, and/or mulching provided by crop residues or other organic matter sources; and, **diversifying crop rotations** to plant context-appropriate sequences of crops—often including nitrogen-fixing species—that help maintain soil health while reducing pest and disease problems.

Compared to conventional farming systems, studies have found that CA practices can increase yields by 20-120%, and in a range of geographies and crops (Kassam et al 2009; Derpsch et al 2010; Milder et al 2011). From a resilience

[2] The Landscapes for People, Food and Nature Initiative held its first International Forum in Nairobi, March 2012, convening 140 experts from 40] countries to discuss, build consensus and develop a plan of action and advocacy for integrated landscape management. For more information, visit: http://www. landscapes.ecoagriculture.org.

standpoint, CA systems can help ensure adequate harvest in difficult years. For example, during a drought year in Tanzania, farmers using CA technologies reaped 2-3 times as much as conventional farmers (Liniger et al 2011). Country level support for CA is increasing. FAO (2010) listed twelve countries that have established CA Focal Points to promote and coordinate CA activities: Angola, Botswana, Lesotho, Madagascar, Malawi, Mozambique, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe.

Agroforestry: Agroforestry land use systems deliberately integrate trees with agricultural crops and/or livestock to generate multiple products and services (Liniger et al 2011). By combining agricultural and forestry technologies, landscapes become more productive, profitable and sustainable. Agroforestry systems in Sub-Saharan Africa yield a host of useful and economically important products, such as food, fodder, timber, wild fruit, and medicinal plants, as well as ecosystem services such as wind buffering, nutrient cycling, and soil and water conservation (Boffa 1999). Agroforestry systems diversify food and income sources, helping to reduce poverty and promote food security (Liniger et al 2011). Carbon sequestration in trees and the soil help mitigate climate change. The broad range of agroforestry practices makes the approach applicable in diverse socio-ecological settings. While all Sub-Saharan African countries practice agroforestry, it is most widely applied in Burkina Faso, Ethiopia, Guinea, Kenya, Lesotho, Malawi, Mozambique, Nigeria, Niger, South Africa, Tanzania, Togo, Uganda, Zambia and Zimbabwe.

Evergreen agriculture is an approach to agroforestry that incorporates principles and practices of conservation agriculture to minimize soil disturbance, maintain permanent soil cover, and diversify crop rotations. A range of such 'evergreen' management practices have been reviewed and found to raise yields more than 50%, and often much more (Pretty 2008, Table 1; Pender 2009; Uphoff et al 2006). In Malawi, the Agroforestry Food Security Programme had, by mid-2009, benefited over 120,000 farmers, in the form of seeds, nursery materials, and training (ICRAF 2009). The approach has yielded remarkable increases in maize yields (up to 280% in Malawi) and, to a lesser degree, sorghum, millet, groundnuts, and cotton.

Integrated crop-livestock systems: Integrated crop-livestock systems integrate crop and livestock production in ways that harness mutually beneficial synergies in a closed, cyclical system. Rooted in traditional crop-livestock systems and guided by principles that enhance natural biological processes above and below ground, integrated crop-livestock systems intensify agricultural production while reducing erosion, increasing crop yields, improving soil health, and increasing nutrient recycling (Liniger et al 2011; Rota and Sperandini 2010). The waste products of livestock function as rich crop fertilizer. In turn, crop residues and by-products function as low-cost and nutritive livestock feed. Livestock products diversify food and income sources—serving as a "savings account"—and provide animal power for tilling and ploughing (FAO 2001). Livestock waste can also be used to produce dung cakes and biogas energy for household or industrial use, reducing pressure on trees for fuelwood or charcoal production (Rota and Sperandini 2010). The proximity of grassland to cropland provides mixed foraging and nesting habitats for certain birds (Nantaba et al 2008).

Successful adoption and upscaling of integrated crop-livestock systems often requires intensive and informed management of land and animals, and coordination among all stakeholders. Recent studies have found that these systems result in significant improvements to overall farm productivity and income: 50% in the Ethiopian highlands, 100% in Zimbabwe, and up to 195% increase in millet and groundnut yields in Senegal (Liniger et al 2011). Integrated crop-livestock management led to a reduction of water losses by runoff from 80% to zero in the semi-arid highlands of Kenya (Liniger and Thomas 1998).

Improved grazing land management: Improved grazing land management is the adaption of pastoralism or rangeland management to changing environmental conditions through management strategies such as feed banks, improvement of herd health, well systems, water storage, increased market access, and capacity building (Liniger et al 2011). Pastoralism, in general, refers to the use of common property resources while ranching is associated with individual land ownership. The idea that pastoralism is environmentally unfriendly and/or economically inefficient is being replaced with a new attitude that pastoralism can be compatible with sustainable rural development; important especially because pastoralists are usually highly marginalised (Liniger et al 2011). Recent studies have shown the potential for pastoralist areas to be competitive with ranches. Compared to ranches in Australia and North America, communal area production (in terms of cash, energy and protein) per hectare in Botswana is two to three-folds higher

(Hatfield and Davies 2006 in Liniger et al 2011). Thus, despite its continued underinvestment, pastoralism contributes to the economies of many developed countries.

Key components of improved grazing land management include closing areas for rehabilitation, planned rotational grazing, the establishment of agreed-upon passageways to prevent conflict between agriculturalists and pastoralists, and improved well distribution and establishment of water harvesting structures. Learning activities support these practices, such as awareness-building and community empowerment. Legal support, for strengthening land and water use rights, improving regional planning, and access to natural resources, is important for scaling up adoption of improved grazing management. Rural communities in northern Ethiopia and Tanzania have had success with restricted use of grazing lands, which are regulated and maintained by village organizations with technical assistance from the government. The establishments of passageways in Niger has helped increase farm incomes, reduce damage on neighbouring lands, and strengthen community institutions (Liniger et al 2011).

For an illustrative listing of other SLM strategies, please see appendix A.

Box 2: Key SLM resources

The following resources are helpful for understanding and implementing SLM in Sub-Saharan Africa.

Liniger, HP, S Mekdaaschi, C Hauert and M Gutner. 2011. Sustainable Land Management in Practice—Guidelines and Best Practices for Sub-Saharan Africa. TerrAfrica, WOCAT and FAO.
This report is a main source on principles and best practices for SLM in SSA, with examples of SLM technologies and case studies.
http://knowledgebase.terrafrica.org/fileadmin/user_upload/terrafrica/docs/topic_page/SLM_in_Practice_english.pdf

World Bank. 2008. Sustainable Land Management Sourcebook.
The publications describe SLM and major farming systems and resources with an eye to pro-poor agricultural development.
http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTARD/0,,contentMDK:21689718~pagePK:148956~piPK:216618~theSitePK:336682,00.html

Woodfine, Anne. 2009. Using Sustainable Land Management Practices to Adapt to and Mitigate Climate Change in Sub-Saharan Africa. TerrAfrica.
This guide reviews the evidence for SLM in SSA, to achieve triple win outcomes. As part of the TerrAfrica Country Support Tool, it aims to assist government, civil society, land managers, extension workers, local communities and other stakeholders in implementing SLM.
http://www.caadp.net/pdf/Using%20SLM%20Practices%20to%20Adapt%20and%20Mitigate%20Climate%20Change.pdf

World Overview of Conservation Approaches and Technologies (WOCAT).
This resource is global network of soil and water conservation specialists, providing tools for the implementation of SLM technologies and approaching and support decision-making and scaling up. http://www.wocat.net

United Nations Environment Programme. 2011. Why a Green Economy Matters for Least Developed Countries.
This report focuses on Green Economy in a development paradigm, addressing structural constraints, community management of natural resources, and discusses policy shifts to encourage sustainable agriculture and private investment.
http://www.unep.org/greeneconomy/Portals/88/documents/research_products/Why%20a%20GE%20Matters%20for%20LDCs-final.pdf

Integrated landscape management initiatives

When site level SLM practices are adopted by numerous households and communities in a landscape, the potential for restoring and conserving biodiversity and ecosystem services multiplies. Realizing this potential requires coordination among producers and other land users in the management of off-farm resources. By agreeing how to protect and use steep hillsides, waterways, and woodlands, for example, through mutual understanding and agreement, formerly dry streams can flow, degraded pastures and forests become more productive, and habitats are restored while production benefits are realized. Such collaboration is likely to lead also to better market opportunities for products from the landscape, further helping to improve the farmers' livelihoods.

The cases below highlight examples of integrated landscape management initiatives that have linked sustainable production systems with other landscape components, including protected areas of natural habitat or sensitive riparian areas, to enhance ecosystem services and livelihood security in the landscape as a whole. By no means reflective of the full scope of landscape initiatives in Africa, the selection of cases are intended to illustrate the diversity of ecosystems, production systems, primary concerns, land uses, stakeholder relationships, and other landscape-level issues that may characterize landscape initiatives.

Forest landscape restoration in Mt. Elgon, Uganda: The complex Mt. Elgon landscape illustrates how multistakeholder dialogue and sound agroecological management of productive areas, with coordinated institutional support, can generate multiple positive outcomes where protection of biodiversity and natural areas is paramount. The slopes of Mt. Elgon—a 4-km high extinct volcano that straddles the Kenya-Uganda border—are home to a growing human population, a rich variety of altitudinal vegetation zones and wild fauna, and a 1,145 km^2 national park with rich tourism value. And they are important for watershed protection, as a major source for the Kenya, Uganda and wider Nile Basin ecosystems and at least 12 rivers and streams. To counter the effects of rapid population growth and growing tensions over scare resources, the local district in partnership with the African Highlands Initiative and the IUCN initiated negotiation and planning amongst the diverse stakeholders, to restore the landscape in ways that would benefit all parties. Goals were to reduce pressure on protected areas, conserve soil and water resources, improve livestock, and diversify local livelihoods. Multistakeholder collaboration has led to the adoption of locally-appropriate and naturally-expanding restoration activities, the establishment of effective by-laws, and the improvement of local livelihoods.

Today, the Mt. Elgon landscape is a mosaic of productive smallholdings, managed grazing areas, clear waters, regulated-use buffer zones, and biodiversity-rich protected areas. Over 6,000 ha of natural forest has been restored—leading to Mt. Elgon's selection as a pilot Reducing Emissions from Deforestation and forest Degradation (REDD) project (IUCN et al nd). Additionally, the planning and learning model used in Mt. Elgon has been replicated elsewhere by the Ugandan government (IUCN et al nd).

Eco-labelled tea in Western Kenya: Eco-labelling is an approach to incentivizing more ecologically sound practices among tea producers, to capture market rewards for implementing sound practices. A multisectoral approach to eco-labelling in Kericho, Western Kenya illustrates how this supply chain mechanism can motivate landscape-level restoration. Africa is increasingly one of the world's major tea producers, with 2001 global export values for the continent nearly doubling by 2008 to USD $5.6 billion (Dewees et al 2011). Conventional tea production, however, is caustic, causing soil erosion, forest expansion, pollution run-off, depletion of fuelwood supplies, and loss of biodiversity and ecosystem services. Unilever is the largest private buyer of tea grown by Kenyan smallholders. In 1997, Unilever partnered with the non-profit Rainforest Alliance (RA), who is working with tea producers and processors to fulfil RA's criteria for certification. Products that adhere to RA's eco-standards throughout the supply chain—and in particular on ecological and social benefits at the farm-level—are rewarded with a label that leads to an increase in profitability of tea felt by farmers and processors.

By 2011, 25% of Unilever's tea purchases were sourced sustainably, and the organization is committed to becoming 100% sustainable by 2020 (Dewees et al 2011; Unilever a). Thus, only able to do so much on its own, Unilever looked to the government to create a mechanism to achieve scale. In 2006, it set up a public-private partnership with the Kenya Tea Development Agency (KTDA) to train smallholder farmers in sustainable production. The initial target of

120 farmers trained through farmer field schools ballooned to 720 with the success of the program. At the end of the project in 2008, farmer profitability increased along with an average of 5-15% increase in tea yields (Unilever b). By 2009, 38,000 smallholder tea farmers were Rainforest Alliance Certified™; KTDA is striving for 500,000 by 2013 (Unilever b).

Spontaneous regeneration in the Sahel: Farmer-managed natural regeneration (FMNR) in the Sahel illustrates the ability of farmers to generate positive landscape-scale effects, starting from the grassroots. Consistent support from diverse external actors at several levels institutionalized the FMNR approach and its knowledge management; this "fluid coalition of actors" also helped keep the movement alive through regulatory and political difficulties (Reij et al 2009; CDKN 2011). This case drives home that successful development at-scale can happen without costly investments in infrastructure with applicable local wisdom and rich information and support networks. The regeneration of woodlands and productive drylands in the West African Sahel began three decades ago, with improved soil and water conservation practices in Burkina Faso and tree planting in Niger; this development has parallels in Burkina Faso, Chad Ethiopia and Mali. Tales of the early agricultural and economic success of a few pioneers spread throughout Niger, leading to the "spontaneous" expansion of tree planting and other relatively easy-to-implement practices. Today over 4.5 million people on five million hectares of land reap the benefits of clean water, productive soil, and increased availability of food, fodder, fibre and fuel.

FMNR can reverse the historic trend of widespread land degradation, even in a region with severe climatic conditions and population pressures. FMNR hinges on taking advantage of local wisdom and traditional methods. For example, in a centuries-old practice, FMNR manages native tree species that re-sprout extensively after being cut, resulting in continuous harvests of timber, food and fodder without requiring replanting (CDKN 2011). FMNR thus does not require tree nurseries or high-level training, improved seeds or transportation of seedlings; a farmer simply selects sprouts from tree stumps and decides how many will be allowed to grow on each stump. Notably, FMNR has a 100% survival rate (CDKN 2011).

Integrated watershed management in Lake Naivasha: Multi-stakeholder planning and management of Kenya's Lake Naivasha Basin is crucial to restoring this unique watershed; this case illustrates collaboration between high level government actors from many ministries, led by the Prime Minister, with private industry and other local stakeholders. Throughout Sub-Saharan Africa, widespread land degradation and devegetation has had major deleterious effects on watershed functions, including the provision of reliable water from surface sources and groundwater, water quality, flood control, sediment and salinity control. Watershed deterioration, in turn, has depreciated agriculture through increasing topsoil erosion and the vulnerability of crop and livestock production to floods and droughts, ultimately leading to lower yields. Integrated watershed management must be a coordinated effort among agricultural, domestic, industrial and urban water users, to avoid fighting over water "at the end of the pipe".

In the Lake Naivasha region, mismanagement of resources and lack of urban planning ultimately led to the major river in the basin, the Malewa, running dry. This event was a wake-up call, but there were clear management challenges. The Lake Naivasha Basin is a closed system requiring engagement and coordination of all stakeholders in its boundaries, including local governments, NGOs, commercial flower growers, community groups, and resource users. Thus, the Imarisha Naivasha Board was created by national level leadership of Kenya to lead and coordinate restoration and the promotion of sustainable development in the basin.

The Board is tasked with bringing stakeholders together to develop an integrated basin management plan, and creating an enabling environment. The Board promotes open sharing of information, ensures transparency and accountability of stakeholders, monitors compliance with laws and regulations, reviews and adopts projects and programs, and reports quarterly to the Inter-Ministerial Technical Committee (Koyo nd). The Board instituted an effective 'stop-light system' which links water abstraction rights for different groups of users to the water level of the lake. For their part, commercial flower growers actually advocate strongly for better and more systematic and stringent management of water quantity and quality. While they feel the economic impact, growers prefer a more restrictive plan that phases in compliance requirements over five years rather than a less restrictive plan that enables an unpredictable and more arbitrary appearing set of regulations and behaviours.

Imarisha Naviasha is a promising new model of integrated watershed management that aims to restore this unique watershed to its full health and capacity, in ways that improve the standard of living of local residents, enhance the long-term viability of commercial enterprises, protect the rich local biodiversity, and develop mechanisms for effective mitigation and adaptation of the impacts of climate change

For an illustrative listing of other organizations and initiatives working on ILM in Africa, please see Appendix B.

Mainstreaming integrated landscape management

Integrated landscape management, or landscape-level sustainable land management, requires stakeholders with diverse goals to develop a shared vision for managing a large area of land to meet multiple demands over the long term. While the challenges of such a task are many, growing concern about ecosystem degradation and climate change, combined with the imperative of food and livelihood security, are focusing increased attention on integrative approaches to managing rural lands for multiple outcomes. Farmers, governments, NGOs and others are creating widespread innovations consistent with this vision, in Africa and worldwide (Buck and Scherr 2011). In practice, SLM and ILM principles are being applied successfully in many African countries (German et al 2012). Experience from diverse socio-ecological setting offers evidence that sustainable land management can be mainstreamed at site and landscape scales, and that the following actions will help to accelerate the process:

- Break down sectoral silos through multisectoral discussion, visioning, debate and collaborative problem-solving. Use and adapt the many planning and management tools that are being developed to support cross-sectoral dialogue and understanding.
- Clearly delineate and manage conservation, production, livelihood and ecosystem goals within projects and programs. Monitor relationships between different sectors and activities within the landscape, and links between different land uses.
- Explore new partnership models. New partnerships present new opportunities. Diverse partners bring diverse tools, technologies and ways of working to ILM, fostering innovative solutions to complex issues.
- Exploit market opportunities for new models such as eco-labelling. Consumers at the end of the value chain can be a powerful force for incentivizing sustainability at the origin.
- Be creative in financial resource mobilization. The inclusive nature of ILM opens up diverse funding opportunities. Seek incentives that attract private investors and non-traditional donors. Highlight the climate co-benefits of ILM to access streams of climate finance. Capitalize on the multisectoral benefits of ILM to attract funding from conservation, agriculture, livelihoods, health, cultural and other sources.
- Invest in leadership. Leaders of farmer and community organizations, NGOs, government agencies and policy forums need to hone their capacities for working together to foster the joint learning and planning needed to stimulate innovation and bring about integrated solutions to land and resource management issues.
- Finally, do not wait for consensus on goals, strategies, or a resolution to the debate over whether agroecological production practices can meet global food demand; evidence indicates it can, while achieving environmental and livelihood goals. Future trends are limited in predictability.

The objectives of rural economic development and conservation of natural resources are sometimes portrayed as competing with one another. In reality, they are mutually dependent. This is especially true in Africa where agriculture represents the dominant source of rural livelihoods and where improving rural agriculture is essential to reducing poverty and driving economic growth. The examples captured in this paper demonstrate that there is tremendous potential to achieve both objectives through integrated approaches to agricultural landscape management. These approaches offer a specific pathway by which farmers, governments, private sector and civil society can advance towards sustainability, and we hope this paper can serve to inform and inspire the dialogue at the Summit for Sustainability in Africa.

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APPENDIX A – OTHER SLM ACTIVITIES

The following technologies and activities are also promising for SLM at the site-scale:

Integrated soil fertility management strategically combines different methods of soil fertility improvement with soil and water conservation, guided by 3 principles: maximize use of organic fertilizer; minimise nutrient losses; and, use inorganic fertilizers where it makes the most sense.

Integrated pest management (IPM) is a biological approach to pest and disease control that uses biological and natural mechanisms (e.g. managing pest populations at an acceptable level) as much as possible, avoiding or eliminating the use of pesticides.

Smallholder irrigation management employs methods of efficient water collection, storage, distribution and application to achieve higher water use efficiency.

Cross-slope barriers are earth bunds, store lines and/or vegetative strip built to reduce runoff and minimize soil losses on hillsides.

Pastoralism and rangeland management involves adapting traditional grazing patters to changing environmental conditions through management strategies such as feed banks, improvement of herd health, well systems, water storage, increased market access, and capacity building.

Sustainable planted forest management involves establishing and managing tree plantations for commercial, conservation and/or rehabilitation of a degraded area.

Sustainable forest management of rainforests or in drylands aims to ensure adequate provisions of forest goods and services for short-term use and long-term availability.

Source: Liniger et al 2011

APPENDIX B – OTHER INITIATIVES AND ORGANIZATIONS WORKING ON INTEGRATED LANDSCAPE MANAGEMENT IN AFRICA

The following initiatives and organizations provide an illustration of the diversity of expert organizations working on ILM in Africa.

- TerrAfrica, Strategic Investment Program (SIP) www.terrafrica.org
- TerrAfrica multilateral partners: NEPAD, UNCCD, The World Bank, UNCCD GM, FAO, UNDP, UNEP, IFAD, AfDB, The European Commission http://www.terrafrica.org/partners/
- TerrAfrica country partners: Norway, France, Ghana, Ethiopia, Niger, Uganda, Burkina Faso (SPONG), Kenya (Suswatch)
- World Overview of Conservation Approaches and Technologies (WOCAT) www.wocat.net
- Food and Agriculture Organization of the United Nations Land Resources Program (partners with TerrAfrica) http://www.fao.org/nr/land/sustainable-land-management/en/
- International Partnership for the Satoyama Initiative (IPSI) www.satoyama-initiative.org
- Global Environment Facility (GEF) www.thegef.org (funds SIPs; funds IPSI through Small Grants Programme; funds FAO; others)
- World Bank Rural Land Resources (RLR) Program http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTARD/0,,contentMDK:20452620~isCURL:Y~menuPK:1308455~pagePK:148956~piPK:216618~theSitePK:336682,00.html
- Rainforest Alliance (eco-certification) www.rainforest-alliance.org/
- World Agroforestry Centre www.worldagroforestrycentre.org/
- COMACO – food security and wildlife conservation in Zambia www.itswild.org
- HASHI Project - Ngitili woodlands regeneration in agro-pastoral systems in Shinyanga Tanzania www.worldagroforestry.org/downloads/publications/PDFs/B16751.PDF
- Biodiversity and Wine Initiative – a partnership between the South African wine industry and the conservation sector www.wosa.us/sustainability/sustain/biodiversity-wine-initiative-bwi