

## Review

# Gaps, barriers and bottlenecks to sustainable land management (SLM) adoption in Uganda

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**Land degradation is a global problem and a great challenge to sustaining the biological, economic and social services provided by various ecosystems. This work assessed the causes of land degradation in Uganda and identified gaps, barriers and bottlenecks that hinder sustainable land management programmes adoption. The major human-induced types of land degradation in Uganda included soil erosion, soil fertility decline and habitat loss. The findings of this study also point to the fact that, the decline in soil fertility affected about 88% of the rural population that subsist on less than 2 ha per family constituting over three million small-scale holdings. In addition, this work traced the various policies, plans, programmes and strategic frameworks formulated during the period of economic growth in Uganda and assessed the main constraints therein that hinder up/out scaling best land management practices.**

**Key words:** Land use, land policy, sustainable land management, river basin, Uganda.

## INTRODUCTION

Land degradation is a global problem and a great challenge to sustaining the biological, economic and social services provided by various ecosystems. The negative impacts of land degradation undermine livelihoods and their economic well-being, the environment and the nutritional status of more than one billion people in developing countries (Smyth and Dumanski, 1993). It is estimated that 12.5 million hectare (ha), which is 62.5% of land area in Uganda, are agricultural area (IFPRI, 2001). However, IFPRI (2001) also estimated that 97% of Uganda land suffers from some form of human-induced land degradation problems indicating that, the land degradation problem extends far beyond the arable land. The major human-induced types of land degradation in Uganda in terms of priority include soil erosion, soil fertility decline and habitat loss (MWLE, 2006). The estimation of economic consequences of land degradation in Uganda is not comprehensive. However, there is qualitative evidence that land degradation is linked to stagnating and decreasing yields in food (cereals and bananas) and cash crops (Olson, 2004). In addressing land degradation, Uganda has over the years piloted best practices from research and appropriate

technology development such as, the farmer field school as strategic entry point for sustainable land management (FAO, 2002). Uganda has also benefited from the partnerships with bilateral and multilateral donors in transboundary programmes, for example, the Kagera transboundary agro-ecosystem management, the Nile Basin Initiative, to mention but a few. Although, Uganda has made some commendable progress in piloting best practices in the various agro-ecological zones, this study identified various constraints that impede wider geographic replication of these success stories. Such impediments are gaps in knowledge and technological limitations, policy/institutional related barriers, low investment for the expansion of best practices and socio-cultural constraints. Barriers, gaps and bottlenecks related to institutional and governance, economic and financial issues, technology and knowledge and social/behavioral considerations need to be addressed more comprehensively through adequate investment opportunities within national development frameworks. The objective of this work was to assess the causes of land degradation in Uganda and identify gaps, barriers and bottlenecks that hinder sustainable land management

(SLM) programmes adoption.

## LAND DEGRADATION AND BEST PRACTICES

### Land degradation in Uganda

The underlying causes of land degradation in Uganda are of socio-economic nature which are difficult to measure and include population pressure, poverty and policies (Matagi, 2002). In this section, the major human-induced types of land degradation in Uganda are discussed.

#### **Soil fertility decline**

Among other issues, this study also focused on soil fertility in Uganda. It suffices to note that, the decline in soil fertility is affecting about 88% of the rural population that subsist on less than 2 ha per family, constituting over three million small-scale holdings. Soil fertility decline is a serious problem particularly in the highlands of Uganda such as Kabale, Kisoro and the northern slopes of Muhavura mountains. A strategy to prevent, reverse or control land degradation due to soil fertility decline therefore, should prioritize the above areas for the introduction of SLM related initiatives. For the case of cereal yield trends, the yield per area had remained more or less stagnant (1.5 metric tons per ha) over the last 30 years, while area under cereal production has doubled from about 800,000 ha in 1990 to 1.6 million ha (FAOSTAT, 2005). The area under banana cultivation has increased (1975 to 2005) from 100,000 ha to 135,000, while the annual yield has increased from 3.3 to 4.5 tons/ha, indicating a more or less stagnant or small increases in yields, which is linked to area increase. The area under cassava production had more or less remained around 0.5 million metric tons between 1980 to 1999 and at around 1.5 million metric tons between 2002 and 2005. The rise in production per hectare was probably as a result of improved cultural practices, adoption of good agronomic practices and variety improvement. There are also indications that, farmers are changing crop choice from banana to root crops due to decline in soil fertility. The traditional center of banana production in Mpigi and Mukono districts in central Uganda has been experiencing declining yields and farmers are switching to cassava and sweet potatoes (Olson, 2004). Meanwhile, banana production is moving towards western Uganda. If not addressed in a sustainable manner, crop production will continue to impact negatively on soil fertility and the quality of water resources since by consequence soil erosion sets in (Tonderski, 1996).

#### **Soil erosion**

Soil erosion is the most serious and widespread form of

land degradation in Uganda with estimated average annual soil losses of more than 30 tons per ha in highlands (IFPRI, 2004). The severely affected districts included Kotido, Moroto, Northern Luwero, Mbale, Kisoro, Mbarara, Kabale, Mukono and Arua, where fragile vegetation cover had been destroyed by overstocking and overgrazing. Among other factors, the declining fish harvest from Lake Victoria is also attributed to siltation and eutrophication partly due to soil erosion (Okwerede et al., 2005). In other words, the eroded silt ends up in water bodies. An increase in turbidity, associated with the suspended soil material in the water has a potential impact on the tourism industry (Toumazis, 1995). From the foregoing, it is desirable to raise some reflections on the increasing pollution from land degradation in Uganda. Besides tourism, the socio-economic implications of land degradation in general and soil erosion in particular include increased rural poverty, increased vulnerability of communities to food insecurity, increased cost of food production, declined (foreign) revenues due to low fish harvest, rural to urban migration and encroachment into gazetted natural reserves. In fact, by the 1950s and the early 1960s popular fish species negege (*Oreochromis esculentus*), had diminished so severely that, they had become commercially extinct (Kyomuhendo, 2002).

Furthermore, between 1969 and 1977, the East Africa Water Fisheries Research Organization (EAFPRO), initially in collaboration with United Nations Development Programme/Food and Agriculture Organization, carried out a fish stock survey of Lake Victoria. A comparison of the trawl catch data made in the Nyanza Gulf in 1976 with earlier records of 1969/1970, showed a reduction in stock densities of the most important species, tilapiines as well, *L. Victorinus*, Barbus species, mormyrids and *S. mystus* were virtually absent (Ogutu, 1990). Traditional lifestyles of lake shore communities have been disrupted and are crumbling (Banadda et al., 2009). In 15 years, the population of Kampala city had risen from 775,000 in 1991 to 1.5 million in 2006 (UBOS, 2006). As the population grew and fishing methods advanced, over-fishing also became a problem and catch sizes also dropped (Chege, 1995).

#### **Habitat loss**

Another serious land degradation type is loss of habitat through deforestation and encroachment of agriculture into protected areas and rangelands. The problem is most severe in eastern Uganda and south western highlands. Establishment of commercial ranches along the north-east to south-west cattle corridor and privatization of communal land for shifting agriculture have contributed significantly to the habitat loss (MAAIF, 2004). Of importance is overgrazing and over-harvesting of vegetation in rangeland and forests for wood fuel and timber. The present forest cover in Uganda is estimated at about 3.6%, which is about 20% of its original value in

1890, as a result of deforestation (MAAIF, 2004). Furthermore, MAAIF (2004) estimated that the forest cover decline in Uganda was 1.95% per annum. Deforestation has resulted in widespread soil erosion, floods, droughts and desertification (Olson, 2003). As mentioned in the preceding section, overall soil erosion is the lead cause of human-induced land degradation in Uganda, further resulting in serious environmental implications (MWLE, 2006). This has been evident in the cattle corridor of Uganda which includes the districts of Moroto, Kotido, Mbarara and northern Luwero. Soil erosion is responsible for the loss of land productivity in eastern Uganda, siltation of Lake Albert and Lake Victoria and rivers and the associated problems of eutrophication (MWLE, 2006). This problem is severe where former wetlands adjacent to lakes and rivers have been converted to cropping and animal production. Two pollution issues related to increased animal production are occurred, that is, fecal contamination of water bodies and non-point source related pollution (Banadda et al., 2009). According to Doran and Linn (1979), surface runoff from grazed pasture may reach 5 to 10 times higher fecal coliform concentration than from ungrazed one. Severely affected areas include Manafa, Kafu, Nyamwamba and the Nile River (MWLE, 2006). Heavy sedimentation experienced along the shores of water bodies is resulting in significant loss of fish production and consequently, deterioration in water quality. The loss of biodiversity and agro-ecosystem functions was reported in the Kagera River Basin (Olson, 2004).

### **Best practices and success stories**

Several initiatives addressing land degradation and SLM in various parts of Uganda have been implemented successfully and need to be up-scaled to the national level. The success of some identified best practices has been anchored on the following facts, among others; their contribution to household incomes, stakeholder participation and partnerships, collaboration and synergies dialogue and institutionalization of key breakthroughs, availability of markets for products, cost effectiveness of operations and bottom-up participatory process (FAO, 2002). The key practices include:

#### ***The farmer field schools (FFS)***

This is a significant approach for promoting improved land management in Uganda. Such initiatives include the farmer field schools for soil productivity improvement, conservation agriculture and nutrient monitoring in eastern Uganda.

#### ***Payment for environmental services (PES)***

Good ecosystem stewardship created conditions for

higher productivity and greater direct environmental income, not only for the stewards (ideally farmers and other land resource managers), but also for the immediate surroundings. In Uganda, several ecosystem service payments, markets and mechanisms operates mainly through agreements/collaboration between government agencies, private sector/companies and non-governmental organizations. Cases in focus include, the agreement between local communities and Uganda wildlife authority for park management, payment for ecotourism services in parks and sanctuaries and planting of trees for global carbon benefits.

### ***Past and ongoing initiatives of relevance to SLM approach***

These include bee farming in Sironko district in eastern Uganda, community termite infestation control in rangelands and enhancing rapid information dissemination at community level through radio and internet in Nakasongola district (Central Uganda), community-based afforestation and integrated community agroforestry in Ntungamo district (Western Uganda), rain water harvesting for domestic use in Mbarara (Western Uganda), integrated livestock health improvement and conflict resolution in Moroto district (North-eastern Uganda) and promotion of farmer innovations approach to rural development in Katakwi district (Eastern Uganda).

### **GAPS, BARRIERS AND BOTTLENECKS TO SLM ADOPTION**

There are numerous sustainable land management (SLM) projects/programmes aimed at addressing land degradation in Uganda. These have been successfully piloted by development partners, non-governmental organizations, community-based organizations and the government of Uganda. The best practices in these initiatives are ready for institutional/policy mainstreaming as well as for up-scaling and out-scaling at all levels, that is, local, national and regional. However, progress in mainstreaming of these best practices which will promote SLM practices faces several barriers, bottlenecks and gaps which must be addressed. Thus, some of the constraints are discussed

#### **Institutional and governance constraints**

The institutional and governance issues are major barriers that hinder the adoption of good land management practices. The leading constraints in this category are weak land and land-use policies that are not area-specific and that do not effectively protect over 85% of the total land. This is also weakened by poor of the

existing laws and regulations due to lack of technical and financial resources coupled with a lack of political will for enforcement of land related laws. There is a need to raise the national priority on the effective implementation of land laws and especially to promote land tenure systems that will encourage investment in SLM related activities. This will also depend very much on the improvement of planning and implementation capacities of government institutions charged with land and land-use policy implementation. Gaps and operational weaknesses have been identified in the National Agricultural Advisory Services (NAADS) approach, which has not factored in issues of tenure, culture, capital and insecurity in its programmes.

### **Economic and financial constraints**

The adoption of good land management practices is also constrained by economic and financial factors, which largely affect the levels of investment in SLM related activities. Low public and private investment in research and technology and under-funding of extension services and public institutions dealing with environment and natural resources, present a serious constraint to SLM adoption and mainstreaming in Uganda. Low national budgets do not make land degradation and SLM priority issues. Ultimately, it is difficult to strengthen research-extension-farmer/end user linkages that are critical for sustainable adoption of good husbandry practices. Lack of economic incentives such as compensation mechanisms for environmental services is a barrier to investing in high capital and labor demanding SLM technologies, such as soil and water conservation technologies. This can be attributed to a poor payment for environmental services system and weak institutionalization of payment for environmental services; best practices in Uganda. One of the key lessons learnt in promoting preventive measures to combat land degradation is to put in place SLM packages that link economic and financial incentives for the majority of subsistence smallholders who own less than 2 ha per household.

### **Technological and knowledge constraints**

Despite the progress made in research and technology related to land management in Uganda (IFPRI, 2001, 2004; MWLE, 2006), there are clear indications of technology and knowledge gaps and barriers to adoption of SLM related practices. One of the constraints is lack of expertise/low capacity in extension services for land management even at institutional level [National Agricultural Research Organization (NARO)], which can be partly attributed to low investment in capacity building and financial facilitation from national external resources. The problem is aggravated by low levels of awareness

and understanding among land users about the environmental impacts of land degradation and its relationship to poverty and decline in household incomes. These issues need to be addressed in future SLM initiatives if long term impacts and sustainability of good land management is to be realized. The inherent vulnerability of soils to degradation under various land-use options also limits the level of application and success of good land management practices, especially because it is expensive to address them. It is therefore expedient to have area- and case-specific technological packages.

### **Social and behavioral constraints**

Unfavorable social and behavioral characteristics among various stakeholders particularly that of farmer/pastoralists are a major constraint in the efforts to promote SLM approaches. First, poverty which has already been perceived as an underlying cause of land degradation in Uganda is sustained by external and internal forces such as declining soil fertility and productivity of land, vulnerability to climate variability especially persistent droughts and other natural calamities, epidemic diseases, unskilled human capital due to low education levels and poor health due to debilitation diseases such as malaria and HIV/AIDS. Poverty in Uganda is also hinged upon inadequate possession of land resources, access to credit and financial resources and poor physical infrastructure such as markets and roads (Matagi, 2002). With limited livelihood alternatives, it is difficult for farmers/pastoralists to adopt good land management practices, some of which seem to take long before benefits can be realized.

In the rangelands, pastoralists resist livestock de-stocking recommendations due to their preoccupation with risk management during drought periods and also due to cattle rustling. Agricultural and pastoral households also maintain a large family size as insurance for constant source of human labor and security for old age. The censuses of 1980, 1991 and 2002 put the population in Uganda at 12.6 million, 16.1 million and 26 million, respectively. In barely two decades, the population in Uganda had doubled. Since 1991, the Uganda Bureau of Statistics (UBOS) estimated that, the average rate of annual increase has been around 2.5% despite the HIV/AIDS infection rates which have profoundly affected demographic patterns (UBOS, 2006). This rate of growth is expected to continue and it is predicted that it will reach 55 million by 2025. These and other social factors significantly are likely to lower the rate of adoption of SLM practices in Uganda.

## **POLICIES AND STRATEGIC FRAMEWORKS**

Uganda has a comprehensive set of policy, strategies

and action plans to address the issues of land degradation. However, these initiatives have not been very effective in reversing the land degradation trends. The country lacks the resources, both technical and financial, to tackle the issues of SLM within the environmental management and coordination act. As such, some of the national strategic frameworks formulated are discussed.

## **National strategic frameworks and SLM approach**

### ***The poverty eradication action plan (PEAP)***

Poverty incidence in Uganda is closely linked to land degradation problems (Akello, 2002; Nkonya et al., 2002; Wood, 2002) and it could be the main obstacle in addressing land degradation, since resources are required for investing in good land management practices. In 1995, Uganda started a process of developing a comprehensive and sustainable development strategy, with an overall objective of wiping out abject poverty in the country. This process culminated in the formulation in 1997 of the PEAP, which aims at reducing the population living in absolute poverty to 10% in 2017. In 2000 this was revised to incorporate information generated from the widened consultations and analysis, particularly, from the pilot participatory poverty assessments. Based on the PEAP as the guiding policy framework, Uganda has pursued the development and implementation of sector-wide policies, investment plans and programmes, with the participation of as many stakeholders as possible. As such, two strategic action plan frameworks are discussed.

### ***The NAP/United Nations convention for combating desertification framework***

The NAP is an integral part of the national economic and social development and environment protection plans. The United Nations convention for combating desertification (UNCCD) calls for the formulation and implementation of NAP as the central element in a strategy to combat desertification/land degradation and to mitigate the effects of drought. Under the national UNCCD framework, the government of Uganda had made several efforts that included entrenching NAP priorities within the main national development frameworks such as the PEAP, and efforts to mainstream NAP into the various sectoral plans and programmes. The environment and natural resources sector, which is a key to NAP implementation, has also been centrally positioned and recognized in the PEAP. The capacity of NAP to address land degradation in the country and especially in dry lands is hampered by low capacity.

### ***The plan for modernization of agriculture (PMA)***

The PMA focuses on agricultural modernization and commercialization through a multi-sectoral approach to addressing the constraints facing agricultural-based livelihoods. Interventions in the PMA included research and technology development, advisory services, rural financial services, rural infrastructure, sustainable national resource use and management. Basically, PMA seeks to promote sustainable use and management of the environment and natural resources. Since the PMA is seen as a broad strategy within the framework of PEAP, the harmonization of approaches among all the key stakeholders in the PEAP with the PMA is critical and lacking at this stage due to limitations of technical and financial resources.

## **Environment and natural resources policy frameworks and SLM approach**

### ***Land policy***

The government of Uganda has formulated a land sector strategic plan (LSSP) for the period ranging from 2001 to 2011, to be implemented in two phases. The key issues of sustainable land management addressed by LSSP are; ownership and management of reserved land (forest reserves, national parks, wildlife reserves, lakes, rivers and wetlands) under the trusteeship of government/local government, management of common property resources, individual land use and planning and development of urban areas. LSSP acknowledges that, there is a lack of a holistic, clear land use policy and national and district physical development plans.

The implementation of LSSP has been constrained by among other factors, the delay in approval of the land act amendments, funding (Timing and predictability of flow of funds) and political insecurity and instability (Akello, 2002). The smooth implementation of LSSP assumes all areas in the country are accessible. The insecurity and instability in the northern and north-eastern districts of the country has undermined the initiative. The land act also lacks a clear policy on equitable access to land among family members and hence, development of land policy, land-use policy and land sector laws are being addressed in the LSSP. The rate of implementing land reforms aimed at preventing land degradation and also creating an enabling policy environment for the adoption of sustainable land management practices is slow and not well synchronized with the expected pace of implementing national sustainable development plans. Only 15% of the national land is registered under Mailo, freehold and leasehold. Hence, the most serious challenge to introducing SLM is insecurity of land tenure. The process of land titling and certification is expensive (US \$250 at the minimum) and therefore, remains a long-

term objective. SLM should experiment with pilot areas in the various land tenure systems to see if the positive results of SLM can catalyze the process of land demarcation and definition of land ownership and land-use rights. For this challenge to be overcome there is a need to build the capacity at national, district and country levels for the establishment of land information system that will support and inform national land and land-use policies and also serve the needs of other stakeholders.

### ***Environmental policy***

The government of Uganda has developed the national environment action plan (NEAP) to provide a framework for addressing environment and natural resource management concerns. The National Environment Management Authority (NEMA) established by the National Environment Act (2000), is the leading organ of the NEAP and oversees natural resources management. The NEAP/NEMA implementation process over the past two years had emphasized capacity building for environment management at the district and lower levels. Although, the efforts by NEAP/NEMA for institutional capacity building are commendable, there is a need to formulate environmental checklists at all levels (national, district, and local/community), to monitor development activities in compliance with national sustainable development policies.

One major weakness of environmental and natural resources legal frameworks is the weak capacity for enforcement and implementation. Though several institutional reforms have been made, the review of associated laws has been too slow, making implementation of laws rather difficult especially in cases where environment enforcement officers have had to deal with high profile politicians.

### ***Forest policy***

The national forestry plan (NFP) formulated in 2003 seeks to increase incomes and quality of life of poor people, increase economic productivity, employment in forest industries and achieve sustainable resource management in the central forests. The plan recognizes the need to integrate with NAP/UNCCD framework for combating land degradation. However, NFP falls short of specifying the linkages with the NAP framework and also with PMA. The plan will draw on the private sector to promote sustainable forest management practices.

### ***Rangeland management policy***

Although, rangelands cover 43% of Uganda and support over 6 million people, there is no coherent rangeland

policy that addresses the broad range of environmental issues such as land tenure, immigration of people from densely populated areas, privatization of land along the north east - south west cattle corridor and expansion of crop cultivation into rangelands. The policy also does not clearly safeguard the land rights of pastoralists to avoid conflicts over privatization of common property rights. The current initiative to review and formulate a new rangeland management policy is an opportunity for addressing the current driving and underlying forces that are responsible for land degradation.

### ***Other land-related policies relevant to land degradation and SLM***

Although, not discussed in detail, several other sectoral policies and strategies that are likely to influence SLM implementation exists in Uganda and they include; National Food Security Strategy, National Wetlands Policy, National Water Action Plan, National Biodiversity Strategy and Action Plan.

### ***Ongoing SLM initiatives***

Some of the key ongoing SLM initiatives are described as;

#### ***Kagera transboundary agro-ecosystem management***

It is a multi-focal project addressing land degradation, biodiversity and climate change with relevance to international waters. A key aspect of the project relevant to SLM is the creation of a communication and education strategy to share and disseminate the best practices in Uganda, Burundi, Tanzania, Rwanda and Democratic Republic of Congo (D.R Congo).

#### ***Integrated nutrient management to attain sustainable productivity increases in East African farming systems***

This project addresses the serious decline in soil fertility and crop productivity in smallholder farms in Uganda through institutional strengthening for farm or catchment level technologies, strengthening the policy to address soil nutrient depletion and the generation and dissemination of appropriate soil fertility management technologies.

#### ***Lake Victoria environmental management project (LVEMP)***

This project covers Uganda, Kenya and Tanzania and it

is aimed at supporting the governments through harmonization of legislation for environment and strengthening the policy and institutional capacities for biodiversity conservation.

***Development strategy and investment plan by the Ministry of Agriculture, animal industry and fisheries (MAAIF)***

The development strategy and investment plan has identified several intervention areas relevant to SLM such as capacity building for water harvesting, soil and water conservation, agricultural research and technology, agricultural planning and policy and agricultural advisory/extension service through NAADS.

***Payment for environmental services (PES)***

This is a good practice and has proved to be a good approach in scaling up SLM. PES initiatives are common for water, biodiversity and carbon/forest projects. Cases in focus include the agreement between local communities and Uganda wildlife authority for park management, payment for ecotourism services in parks and sanctuaries and planting trees for global carbon benefits.

Uganda shares important natural resources with the neighboring countries, which calls for inter-country and trans-national cooperation and policy harmonization. An illustration of a National Park will suffice. A national park lies in the Virunga Mountains in the eastern D.R Congo and then, borders Rwanda and Rwenzori mountains in Uganda. Interestingly, in each of the three countries, the national park has a different name. In D.R Congo, it is known as Virunga National Park while in Rwanda, it is National Park and in Uganda, Rwenzori National Park. Covering 7,800 km<sup>2</sup>, it was established in 1925 as Africa's first National Park and world's second to Yellowstone (United States of America).

Intensive poaching and the civil wars in the respective three countries seriously damaged its wildlife population and the capacity to monitor and control activities therein in the recent past. Land invasions had also challenged the park authorities in the three countries. Widespread depletion of forest due to fuel-wood demand by refugees had also impacted the park negatively. In addition, cross border conflicts have had a toll on SLM initiatives. Uganda has been at the center of conflicts, both internal and external and so civil/political/ethnic tensions are common in Uganda and some neighboring countries such as Sudan, D.R. Congo, Kenya and Rwanda. Cattle rustling and fighting (Karamoja of Uganda/Pokots of Kenya) over pasture and water resources is also a pertinent issue. In this paper some transboundary and regional conventions and agreements are discussed as

follows:

**Transboundary and regional conventions and agreements**

Past and present regional activities, conventions and agreements that impacted the policy framework in place include: The Lake Victoria fisheries convention of 1994 which aims at regulating and enhancing fisheries on Lake Victoria. The Lake Victoria basin is threatened by overgrazing, poor crop cultivation, removal of vegetation cover (Matagi, 2002), water quality degradation (Cowi, 1998; Emerton et al., 1999; Okwerede et al., 2005), uncontrolled development along the Lake shore and river banks and industrial waste (Banadda et al., 2009). Currently, Lake Victoria environment management project discussed in the preceding section is being implemented by Uganda, Kenya and Tanzania to arrest land degradation and water quality deterioration; the Kagera basin agreement of 1977 whose objective is to ensure equitable entitlement of each riparian state to the use of the River Nile waters. The Kagera river basin occupies a strategic position in Africa providing up to 10% of the water of the downstream Nile basin and forms the upper part 75% of the Lake Victoria basin. The lower Kagera river basin confers a set of global biodiversity benefits which are now threatened by rapid population pressures, land-use changes and associated land degradation as a result of deforestation and encroachment of wetlands. In Uganda, of the Nakivubo wetland (the largest) original area of 5.29 km<sup>2</sup>, it was estimated that, 2.9 km<sup>2</sup> of Nakivubo remains uncovered (Cow and VKI, 1998) and thus, 2.39 km<sup>2</sup> or 45% had been modified or reclaimed. The consequences of this encroachment on the wetlands contributing negatively to water quality in the Lake Victoria and on the ecological balance is fairly well documented (Cowi and VKI, 1998; Okwerede et al., 2005; Banadda et al., 2009). Clearing forests and wetlands for agriculture is taking place in parts of Burundi, D.R. Congo, Uganda and Rwanda. The present forest cover in Uganda is estimated at about 3.6%, which is about 20% of its original value in 1890, as a result of deforestation (MAAIF, 2004). It is therefore of paramount importance that land degradation initiatives should bear transboundary characteristics for SLM.

**RESPONSE OPTIONS AND RECOMMENDATIONS FOR SLM MAINSTREAMING AT MULTIPLE LEVELS**

Although, Uganda has a comprehensive set of policy strategies and action plans to address the issues of land degradation, these initiatives have not been very effective in reversing the land degradation trends. As such, strategic choices to address identified gaps and barriers

associated with the constraints discussed earlier are described.

### **Institutional and governance strategic choices**

#### ***Strengthen national development/institutional frameworks***

There is a need to harmonize SLM initiative with the existing initiatives particularly under United Nations Convention for Combating Desertification (UNCCD)-National Action Programmes (NAP) framework. In addition, SLM approach may be introduced through the focal national institutions that are mandated with the implementation of Comprehensive Africa Agriculture Development Programme (CAADP). This should be harmonized with NAP since SLM approach is aimed at preventing land degradation and maintaining sustainable agriculture. There is need for coordination of activities within NAP framework for effective and efficient resource utilization targeting sustainable land management. The NAP structure is linked to the local and sub-regional initiatives to combat land degradation and is therefore the most ideal mechanism of linking sub-regional and international SLM initiatives.

#### ***Support land and land-use policies***

Issues of access to land and land tenure security are critical in the plan to modernize agriculture for economic growth and poverty reduction. The plan to establish a land information system is an important aspect of SLM approach particularly for the decision makers at all levels. Such a plan is to go hand in hand with the necessary political support for the enforcement of land related laws.

#### ***Mainstreaming SLM at sub-regional and regional levels***

SLM practices have been highlighted in the New Partnership for African Development (NEPAD)-CAADP country programmes, which provide a good entry point for coalition of development partners to contribute technical and financial resources at sub-regional and regional levels.

### **Economic and financial strategic choices**

#### ***Financial and technical support for the decentralization of responsibilities to district and local institutions***

Establishment and support of environmental services

need to be reflected in the budget allocation. This approach will facilitate compensation mechanisms for investment in high cost practices such as soil and water conservation measures.

#### ***Integration of poverty strategic programme with SLM approach***

This strategy addresses economic and financial incentives that will support livelihoods dependent on natural resources and agricultural/rural development. The national economic recovery strategy is largely based on the PMA policy which supports the sustainable agriculture and management of natural resources. A fair share of PMA resources are expected to support SLM practices.

#### ***Budgetary support for SLM approach***

According to the Maputo (Mozambique) declaration of 2002, the Ugandan government is expected to raise support of agriculture to 10% of the national budget. This target is yet to be achieved. Initiatives should continue catalyzing SLM mainstreaming and funding through coalition of partners since national commitment in co-financing SLM activities are likely to be constrained by other macro-economic considerations. The NAP process/mechanism should ensure Uganda's national desertification fund and community development fund to support the SLM approach.

### **Technological and knowledge choices**

The lessons from integrated area-based development activities in east Africa are relevant in the introduction of SLM approaches. At the community level, strong emphasis on facilitating farmer-to-farmer information sharing and technology transfer have been effective in farmers' field schools experiences in east Africa (FAO, 2002). Policy and institutional reforms are required for enhancing the participatory technology development and for effective dissemination mechanisms that take cognizance of decentralized governance framework. Some of the technology transfer priorities are discussed further.

#### ***Support sustainable agricultural practices that conserve natural resources***

Promotion of conservation agriculture (CA) is strongly recommended for its unique contribution to SLM. The CA approach embraces researcher-extension-farmer linkage for up-scaling SLM practices.



### ***Soil nutrient management and fertility***

Ongoing activities entail controlling soil erosion problems, use of organic/farm and green manure, use of cover crops and introduction of nitrogen fixing plants.

### ***Irrigation and water management***

Promotion of water lifting technologies, water harvesting, rehabilitation of smallholder irrigation schemes and national capacity for sustainable smallholder irrigation technologies may be a win to win situation where food security and livelihood support goes hand in hand with sustainable land management.

### ***Rangeland management and livestock management***

Given the high vulnerability of dry land ecosystems from human-induced land degradation, preventive, restoration and control measures are critical investment areas. Investment in land-use planning is an effective strategy to minimize negative environmental impacts from ad hoc settlements and encroachment of cultivations in key production areas. Other potential areas of investment in sustainable rangeland management include: policy reforms to define land tenure and community property rights; participatory community land use planning; investment in natural resources-based conflict resolution mechanisms; protection of wetlands key production areas against conversion to agriculture; livestock productivity improvement and rationalized water development activities; development of livestock marketing infrastructure to facilitate livestock off-take to control overstocking and overgrazing problems.

### ***Social and behavioral choices***

Investment in farmer education and extension service is the most effective way of dealing with social and behavioral change. The empowerment of farmer organizations, community based organizations (CBOs) and non-governmental organizations with information on SLM are one major way of changing the mindset of land users. The participation of religious institutions is critical in educating land users on good land stewardship principles in accordance with the accepted moral norms. The integration of SLM activities with PEAP and PMA will ensure that, these national development frameworks are responsive to SLM concerns. The SLM approach should be relevant and acceptable to small-scale farmers who are subsisting on 36% of Uganda land area. Investment in strengthening governance/leadership of community based organizations to deal with issues of conflict management, education and community health needs is also necessary.

## **CONCLUSION**

In this work, the major human induced types of land degradation in Uganda which include soil erosion, soil fertility decline and habitat loss were discussed. The outcomes and experiences of past sustainable land management initiatives in Uganda have brought out various lessons worth noting, which include a key lesson learnt in promoting conservation which is, unless farmers can expect an economic return equal to their level of investment, there will be little incentive for them to adopt sustainable land management practices. Another lesson learnt was that, participatory approaches to land management involving stakeholder greatly contribute to sustainable productivity and conservation of land. It is prudent to support greater involvement of farmers and other stakeholders in participatory technology development and transfer.

In conclusion the success of some identified best practices in dealing with the problem of land degradation has been anchored on these facts; their contribution to household incomes, threading partnerships, collaboration and synergies dialogue and institutionalization of key breakthroughs, availability of markets for products, cost effectiveness of operations and bottom-up participatory process.

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