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INNOVATION PLATFORMS: A TOOL FOR SCALING UP SUSTAINABLE LAND MANAGEMENT INNOVATIONS IN THE HIGHLANDS OF EASTERN UGANDA

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ABSTRACT

Sustainable Land Management (SLM) technologies for preventing land degradation have been pilot tested in highlands of eastern Uganda with success and are available for uptake by farmers in the zone. Despite the available technologies and successful pilot experiments, the effect and uptake of the SLM innovations still remains insignificant. This has been attributed to lack of incentives, innovative institutional governance structures and policy processes to accelerate uptake and utilisation of SLM technologies. Innovation systems approach was experimented in scaling up SLM innovations in the highlands of Eastern Uganda. Stakeholders were organised into platforms and empowered to promote SLM practices in the landscape. Members of IPs selected the SLM innovations and implemented them with support from National Agricultural Research Organisation (NARO). More households adopted SLM practices including trenches, contour bunds and agroforestry. Twenty three tree nurseries were established and over 350,000 tree seedlings distributed for planting. The platforms facilitated collective visioning, sharing of skills and knowledge and strengthened participation of local governments in research and promotion of SLM technologies. When well initiated and operationalised, innovation platforms are effective avenues for scaling up adoption of SLM innovations to a wider landscape and communities.

Key Words: Innovation platforms, scaling up, sustainable land management

RÉSUMÉ

Les technologies de gestion durable des terres (SLM) pour prévenir la degradation des terres ont été testées avec success dans les hautes terres de l'Est de l'Uganda et sont disponibles pour utilisation par les fermiers de cette région. Malgré la disponibilité des technologies et le success des essais pilotes, l'effet et l'adoption des innovations de SLM demeurent insignifiants. Ceci a été au manque des mesures d'encouragement, des structures de gouvernance institutionnelle innovative et les processus de lois qui accélère l'adoption et l'utilisation des technologies de SLM. L'approche des systèmes d'innovation était éxpérimenté par des innovation de SLM dans les hautes terres de l'Est de l'Uganda. Les partenaires étaient organisés en plate forme et renforcés pour promouvoir les pratiques de SLM dans le paysage. Les membres des IPs ont sélectionné des innovations de SLM et les ont execute avec le soutien de National Agricultural Research Organisation (NARO). Plusieurs ménages ont adopté les pratiques de SLM entre autres les tranchées, les courbes de niveaux et agroforesterie. 13 pépinières étaient établies et plus de 350.000 plants d'arbres étaient distributes pour plantation. Les plates forms ont facilité dans la vision collective, le partage d'expériences et connaissances et renforcé la participation des gouvernements locaux dans la recherche et la promotion des technologies de SLM. Lorsque correctement initiées et opérationnalisées, les plates forms d'innovation constituent des voies efficaces pour l'adoption des innovation de SLM sur un vaste paysage et une grande communauté.

Mots Clés: Plate forme d'innovation, gestion durable des terres

INTRODUCTION

The highlands of east Africa are characterised by steep slopes that render them very vulnerable to soil erosion and run-off leading to high land degradation (Stroud and Peden 2005a; Nyssen *et al.,* 2009). In Uganda, the highlands of the eastern region have been very vulnerable to events of landslides and flooding causing untold land degradation and human suffering. This region is one of the heavily populated parts of the country (UBOS, 2002). Most of the land which was a forest reserve under the Mt. Elgon National Park managed by Uganda Wildlife Authority (UWA) has been decimated. The forest cover has diminished mainly due to agricultural encroachment (Mugaga *et al*., 2012) and indiscriminate felling of trees for construction poles, timber and fuel wood to match the increasing demand of the growing population.

Sustainable Land Management (SLM) technologies for averting land degradation that are closely associated with soil and water losses are available as evidenced by some pilot projects in Mt. Elgon area (Keely, 2001; Mekuria *et al.,* 2008). Despite the success of pilot projects on Integrated Natural Resource Management (INRM) implemented in the study area, effect and uptake of the pilot tested innovations have been insignificant (Stroud and Peden, 2005b). This has been attributed to lack of incentives, innovative institutional governance structures and policy processes that accelerate uptake and utilisation of SLM technologies (Sanginga *et al.,* 2004). Elsewhere, Nederlof *et al.* (2006) have shown that innovation platforms (IPs) have positive multiplier effects on wide scale adoption of Natural Resource Management (NRM). In this context, IPs are defined as a coalition, collaboration and partnership of actors of agricultural research and development such as farmers, researchers, extension workers, policy makers, private firms and NGOs (Fungo *et al.,* 2011). Innovative platforms like farmer participatory research groups (FPRG), facilitate social, unidirectional learning, knowledge management and sharing, collective and joint initiatives to address and solve jointly recognised problems in the community (Sanginga *et al*., 2006; Fungo *et al*., 2011; Kilelu *et al*., 2013). These attributes are essential ingredients in progressing development interventions in sectors that span across political boundaries and require coordinated approach across the landscapes.

The objective of this study was to assess implications of adopting IPs as a means of accelerating uptake and utilisation of SLM technologies in the highlands of eastern Uganda.

METHODOLOGY

Study area. The study was conducted in the highlands of eastern Uganda, in the districts of Kapchorwa, Kween and Bukwo located along the slopes of Mt. Elgon. Together, the three districts constitute the sebei region which lies within the altitudes 1.7^0N, 1.36N and longitudes 34^0 18E, 34^0 48E. The region is characterised by steep hilly terrain ranging from 1,500 - 3000 m. above mean sea level and high population of 190,391 people and population density of over 110 people km^{-2} (UBOS, 2002). The study region receives heavy rainfall with a moderate bimodal pattern ranging from 1500 – 2000 mm from April to October with peaks in May and July/August and minimum in June. The rural communities of the sebei region mainly depend on subsistence farming. The farming system comprises a range of systems from food and cash crops (annual and perennial) as well as animal rearing. The major crops grown in the area include coffee, maize, beans, wheat, cassava, potato and sweet potato. The region is blessed with fertile soils although there is high incidence of soil erosion due to the steep hilly slopes and poor farming methods. Apart from farming, people also keep livestock, cattle, goats, sheep, pigs and chicken are some of the livestock reared (MoFPED, 2000). The sebei region is one of the areas highly affected by soil erosion. The high population and small landholding combine to exacerbate the problem as people clear trees to open more farm land and fragment cultivable parcels of a land among the family members. These, together with the high amount of rainfall and steep slopes make the region more vulnerable to land degradation. To reduce soil erosion, sustainable land management innovations such as trenches, contour bunds, cover cropping and tree planting have been promoted in the region.

Data collection and analysis. Data was gathered throughout the project period and participant observations, records of implementation activities and outcomes of specific IP actions were the main means of data capture. The narrative nature of data could only entail qualitative analysis thus, a descriptive analysis was done. Major items of focus during data collection included; trends in numerical shift in numbers of households engaged in SLM before and after the project, the involvement of IP members in project activities, looking at participation from onset to the time of project close. Use of skills and information acquired through the IP platform to enhance scale-up of SLM innovations. Particularly, focus was made on the use of micro-finance institutions and investments in SLM.

RESULTS AND DISCUSSION

Relevant stakeholders identified. The stakeholders considered relevant to scaling of SLM technologies through the IP process (Table 1). These stakeholders were identified basing on their potential contribution towards developing IPs into functional units through which sustainable land management innovations would be promoted. The functioning of the IP is dependent on the commitments and will of the stakeholders to contribute their skills, knowledge and time to the activities of the IP. The roles and responsibilities of the IP stakeholders were identified as awareness creation and sensitisation, providing labour, mobilising people, mobilising money, providing tools and equipments for construction of SLM structures, providing quality planting material and accompanying knowledge packages for their establishment and management, backstopping technology transfer and adoption, participating in policy/bye-law formulation and enforcement.

Outcome of stakeholder interactions. At the initial stage of this study, key stakeholders were identified and engaged to implementing the scale up process. The stakehodelrs played different yet, synergic roles in catalysing change and adoption of SLM innovations through various ways (Table 1). Through the synergies, a community of the three landscapes were informed, empowered and facilitated to upscale selected SLM innovations in the landscape. This synergy created awareness amongst the community members and the appreciation of the need to conserve land using soil erosion control measures in the three landscapes increased (Fig. 1). Due to the different interventions by the stakeholders in the IPs, the number of households utilising the SLM innovations had increased across the three landscapes. Figure 1 shows the trend in number of households practicing SLM innovations from the time the project was initiated to the time of project phase-out in 2013. There was a marked increase in number of households utilising SLM innovations from less than 100 to over 3,000 in the three landscapes. This could be attributed to increased flow of information and appreciation of the work of SLM structures by the community members. Similar to the number of households, is the increase in number of specific SLM innovations. The number of tree nurseries in the project site has continued to increase from four tree nurseries (02 in Bukwo, 01 in Kween and 01 in Kapchorwa in 2012) to 23 nurseries in the three project sites by March 2013. Although the activities in the 23 tree nurseries were not as vibrant as they were during the active period of project implementation, they were still in existence and communities continued to use the structures to raise seedlings for planting in the de-forestated landscapes. Six of the nursery sites were being used by enthusiastic individual farmers to raise seedlings from which they were generating income for themselves.

Of great success was a farmer named Silkei, who was part of the Kwoti IP. This farmer used his knowledge from the IP to raise tree seedlings which he sold to International Union for Conservation of Nature (IUCN) and earned up to five million Ugandan shillings (2,000USD). International Union for Conservation of Nature (IUCN), which is an NGO, provided the market for the farmers for the tree seedlings where as NARO, the research arm provided the knowledge and skills in conjunction with the District Natural Resource Office in the local government. African Highlands Initiative (AHI) mobilised the community members into the IPs and empowered them with business skills including business plan

TABLE 1. Key IP stakeholders and their contributions in the IP system designed for up scaling SLM technologies in the eastern highlands of Uganda

Key stakeholder/agency	Contribution in the IP
NARO, AHI-ICRAF, PAAP-ASARECA researchers	Generate SLM technologies, provide technical backstopping to farmers, generate supporting information for proper adoption of generated SLM technologies and policy innovations
National Agricultural Advisory Services (NAADS) Sub-county Office	Provide guidance for farmers on proper adoption of SLM technologies; teach farmers on best enterprise mixes for sustained agricultural productivity. Guide farmers on enterprise selection and integration of traditional cropping system with sustainable land management practices.
District Local Government	Advocate for adoption of SLM technologies, mainstream SLM issues into district plans, provide technical and financial support to the process of promoting SLM technologies, sensitize farmers on importance of SLM technologies, formulate and implement bye-laws to facilitate adoption of technology
Sub-County Local Governments	Pass local level policies and bye-laws to protect SLM structures, be advocates for SLM innovations, provide technical guidance for adoption of SLM technologies, sensitize community members on importance of SLM technologies
Farmers and farmer organizations (including champions)	Establish SLM structures on their farms, participate in activities of IP, encourage fellow farmers and guide them in establishing SLM technologies, be advocates for SLM technologies, share knowledge and experience on SLM technologies with farmers within and beyond the IPs
Private institutions	Building synergies on SLM issues in area of adoption, input supply and market of agro products, support IPs by providing for SLM technologies.
Media community (radio, TV, news papers etc)	Create awareness on SLM innovations, publicize success stories, experiences and sharing information project impact
Micro finance institutions	Advise on investment in agricultural productivity and soil and water conservations, and agroforestry, provide credit to finance SLM investments
Local Council I	Enforce bye-laws, sensitise people on SLM, monitor activities of farmers and mobilize farmers for IP activities
Religious leaders	Provide publicity on SLM technologies, encourage follows to embrace soil and water conservation practices, be exemplary and demonstrate to followers the importance of utilising SLM technologies in their farms

development, record keeping and emphasised the need for proper planning and budgeting.

These, all played part in the success of increased number of households participating and individual farmers' success in the project area.

The use of Micro-Finance Institutions was not well developed. Apart from the commercial banks, the members of the IPs lacked access to micro-finance institutions to obtain loans. The loans which are tagged to assets are usually employed in quick ventures to avoid defaulting. This therefore, rendered the micro-finance component of the IPs retardant.

Consultations. The consultation process led to establishment of a working relationship and mutual trust amongst the stakeholders, as well

as appreciation of the prevailing conditions with respect to technology diffusion within the community . This is an important environmental setting before promotion of any innovation (Salawu, 2008). The consultation process enabled the IP members to come up with constraints and opportunities for up scaling SLM innovations (Table 2). The main constraints were related to land resource degradation, access to finance required for the significant investment associated with SLM technology implementation and unfavourable land tenure systems. The land tenure system of the sites, according to the participants, was characterised by absentee land lords, whose terms did not favour the adoption of SLM technologies most of which promised long term benefits. Research has shown strong correlation between investment in sustainable land management practices and land tenure security, access to credit and benefits accruing from investments in soil and water conservation (MLHUD, 2001; Himmelfarb, 2006; Banada, 2010). This therefore, means that even if the technology is suitable, its adoption will be more if farmers

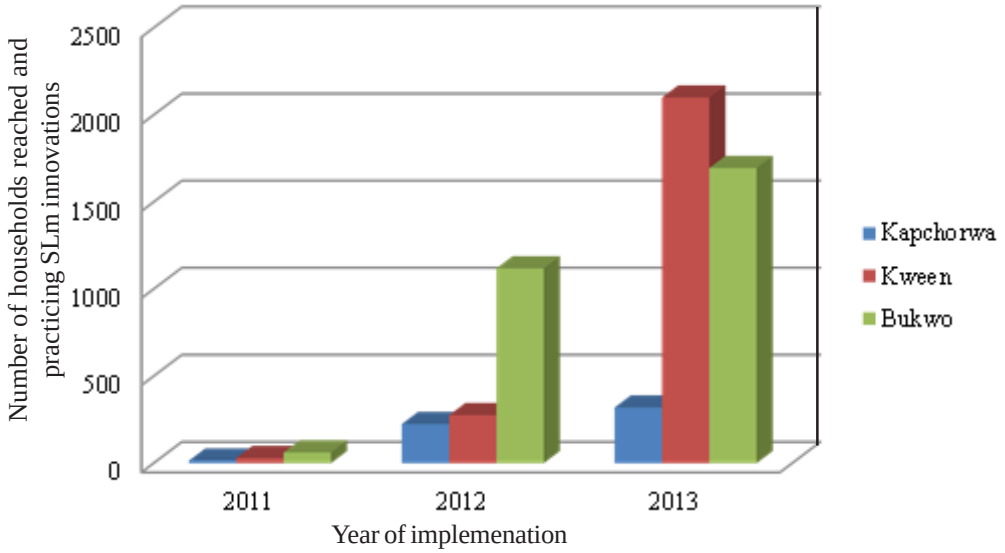

Figure 1. Showing change in number of households practicing SLM innovations in the three project sites (Kapchorwa, Kween and Bukwo) where IPs were used in implementing scale up.

TABLE 2. Constraints and opportunities for scaling up SLM innovations in the highlands of eastern Uganda

Constraints	Opportunities
Land degradation	Overall acknowledgement that land degradation exists and should be addressed
Limited resources (money) to invest in SLM technologies	Available technologies for sustainable land management
Limited knowledge on application of SLM technologies for control of soil erosion	Support from local and international agencies for SLM activities
Absentee landlords – refuse to establish SLM technologies and thus farmers down slope are over burdened with silt in the trenches	Available bye-laws for SLM
	Willingness to change attitude towards SLM
Negative mind sets	Local champions to lead the process

own land, have access to credit and believe that they can get immediate benefits from adopting the technologies. Through the Innovation Platforms, farmers were able to learn that use of SLM innovations did not necessarily require one to own land. The commitment of working together and having a landscape approach allayed the aspect of small holdings since the IP looked at landscape as a whole rather than fragments. The appreciation of the fact that one person in the landscape cannot sustain the land encouraged the farmers to adopt SLM innovations. This was further complemented by the field visits by the farmers to areas of success and through farmer to farmer leaning and information sharing. This resulted in drastic increase in the number of trenches, contours and trees in the landscapes throughout the project implementation phase.

The IP members determined priority technologies for their locality and strategies for implementation by themselves to accelerate SLM technology adoption (Table 3). Through this process, the IP members were able to generate future depictions of scenarios following successful SLM interventions (Fig. 2). This was an important process, as it set the ground for the IP members to appreciate what was needed for action. Sanginga *et al.* (2004) argues that farmers can adopt SLM options that are associated with long term benefits as long as they are encouraged and facilitated to develop visioning scenarios. This is further supported by Schwilch *et al.* (2012) who argues that SLM is a highly complex issue and decisions regarding its implementation require provision of structure and decision making processes which should be wholesome involving all the key stakeholders.

The outcome of the consultative workshop provided insight and direction for future actions and scenarios of SLM intervention as well as the critical paths towards the attainment of the future scenarios.

Conflicts and conflict management. The iterative process of planning proved to be an important aspect of IPs as specific interests of all members who were incorporated into the IP action plans and, thus implemented as desired by the IPs. This was vital to gain interest and ownership of the process, which is an important factor for successful technology adoption as Vanclay, 2004 argues that scaling up, like extension, is not just about technology transfer but a critical understanding of the needs and visions of farmers. In this study, the interests of different stakeholders were reflected both positively and negatively, which triggered some conflicts. The conflicts were associated with the inputs availed to facilitate the IP activities and the financial facilitation to enable IPs plan. There were also conflicts pertaining to collective action where some members refused to participate. These conflicts were solved by the rules set by the members. These rules involved denying the

Figure 2. Community vision/ future map for Kaseko watershed landscape.

defaulter seedlings at the time of distribution and expelling them from the IPs. Some of the afflicted members dropped out of the process thus, enabling the few interested to keep the IPs operating. There were also conflicts resulting from misleading information from the different implementation partners. Where at one point a collaborating partner promised IPs money to implement activities which were to implement by another IP with difference financial management policy and regulation. This created undue excitement amongst some of the members of IP which eventually turned into a disappointment when members realised that the IPs were to receive funds for operations. To manage the conflict related to funds, the chief accounting officers of the districts were involved in approving funds for use by the IPs. Eventually, the local governments allocated some funds, from the district resources for implementation of SLM practices.

Capacity enhancement of the IP. Provision of skills enhancement at different levels of the IP played a critical role in elevating the understanding of the members about the forms and functioning of SLM innovations. Though critical to all levels, perhaps the most important capacity strengthening sessions were those at village IP clusters. These sessions focused on the key aspects for SLM interventions prioritised by the IP farmers. A glaring example was in one site in Kapchorwa, where, before the training on soil and water conservation (SWC), farmers used to believe that trenches and contour lines could only be marked using spirit levels; the A-frame was deemed difficult. Unfortunately, acquiring spirit levels and poles for support were beyond the means of the common farmer. After the training, farmers were able to appreciate the use of A-frame and this resulted in a drastic increase in contour bunds and trenches in the landscapes. In Bukwo site, the number of tree nurseries and tree seedlings raised by IPs increased by up to 200% after the training sessions on tree nursery operations and local seed collection. This scenario depicts the importance of knowledge and skills in scaling adoption of SLM technologies. The need for knowledge in technology transfer was emphasised by Anandajayasekeram *et al.* (2008).

TABLE 3. Priority SLM interventions selected by IP stakeholders in the highlands of eastern Uganda

Technology	Purpose	Strategies for upscale
Trenches	Reduce soil erosionWater harvesting and conservation	Collective actionUse of bye-laws to enforce compliance
Contour buds	Control of oil soil erosion and conservation of soil water	Collective actionUse of by-laws to enforce compliance
Tree planting (woodlots and agroforestry)	Stabilize contour bunds and trenchesProvide forest products; fruits, poles, and fodder for animals	Collective action in tree nursery establishment and timber, firewood managementProvision of nursery inputs (equipment and seed) by NARO) Training on nursery operations and agroforestry practices

Both authors fronted a similar position concerning training in extension systems and argued that though mostly top-down approach, trainings are necessary to ensure proper technology adoption by farmers. In the IP system, the difference is that training is not only by the extension agents or research scientists, but farmers train and learn amongst themselves as they work together and share experience between themselves.

Field visits. Through the field and exposure visits, IP farmers were challenged and returned with a promise of becoming practical with SLM innovations, in addition to encouraging their neighbours to emulate the same. The level of influence of this process may not be easily measureable independently but its contribution towards facilitating adoption of SLM innovations and, thus scaling up cannot be overemphasised. In extension, it is argued that when more than one senses of a person are involved, the impact on the person is enhanced. Building on this philosophy loosely lends into the importance of demonstration. By taking farmers to areas with success stories the farmers were exposed to the practical realities of the SLM innovations and how effective they can be in ensuring sustainable land management. As argued by Anandajayasekeram *et al*. (2008), by seeing the chance of uptake the SLM innovations was enhanced in the IPs.

Knowledge management and information sharing. Crucial to the process of IP is information exchange and knowledge management. Information on SLM technologies, success stories, advocacy and awareness creation were channeled to farmers in different forms. This was achieved through local channels in local language. Important information was packaged in flyers, posters and photos and made accessible to farmers through the focal point persons and pinning in strategic locations were farmers were able to see. Farmers were encouraged to discuss the knowledge packages and provide feedback to the implementation team. Radio talk shows about IP activities and outputs supplemented the awareness creation process. About 80% of the households in the IP landscapes in Kaseko, Tuikat landscapes and the surrounding areas became aware about the threats of land degradation, knowledgeable on establishment of soil and water conservation structures and agroforestry practice. Over 2700 households in each site have adopted SLM technologies through engagements of the IPs which reflected over 80% increase in number of households adopting the technologies since operatilisation of the IPs. The adoption percentage is an evidence of the power of information sharing and collective appreciation of common needs; aspect which is well enshrined in the innovation systems approach (Fungo *et al*., 2011).

CONCLUSION

From the findings of this study, innovation platforms form a good basis for attracting stakeholder interest and invoking their participation in a bottom-up approach. The processes of consultations, exchange visits and trainings helped to strengthen the IP structures thereby reinforcing the skills and knowledge within the IP for effective implementation of the scale up process. Although an effective approach, Innovation Platforms need to be well planned for from the onset and members should be empowered through the right systems to facilitate the scale up process.

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REFERENCES

Anandajayasekeram, P., Puskur, R., Sindu, W. and Hoekstra, D. 2008. Concepts and practices in agricultural extension in developing countries: A source book. IFPRI (International Food Policy Research Institute), Washington, DC, USA, and ILRI

(International Livestock Research Institute), Nairobi, Kenya. 275 pp.

Banada, N. 2010. Gaps, barriers and bottlenecks to Sustainable Land Management (SLM) Adoption in Uganda. *African Journal of Agricultural Research* 5(25):3571-3580.

Fungo, B., Clark, L., Tenywa, M. M., Tukahirwa, J., Kamugisha, R., Birachi, E.,Wanjiku. C., Bizoza, A. R., Wimba, B., Pali, P., Adewale, A. and Olowole, F. 2011. Networks among agricultural stakeholders in the Southwestern Highlands of Uganda. *Journal of Agricultural Extension and Rural Development* 3(7) 118 - 129.

Himmelfarb, D. 2006. Moving people, moving boundaries: The socio-economic effects of protectionist conservation, involuntary resettlement and tenure insecurity on the edge of Mt. Elgon Park, Uganda. Department of Anthropology, University of Georgiahis, USA.

Kapchorwa District State of Environment Report (DSOER). 2004.

Keely, J. E. 2001. Influencing policy processes for sustainable livelihoods: strategies for change. Lessons for change in policy and organizations, No. 2. Brighton: Institute of Development Studies.

Kilelu, C.W., Klerkx, L. and Leeuwis, C. 2013. Unravelling the role of innovation platforms in supporting co-evolution of innovation: Contributions and tensions in a smallholder dairy development programme. *Agricultural Systems* 118: 65-77.

Lubell, M., Schneider, M., Scholz, J. T.and Mete, M. 2002. Watershed partnerships and the emergence of collective action institutions. *American Journal of Political Science* 46 (1):148-163.

Mekuria, M., La Rovere, and Szony, J. 2008. External review and impact assessment of African Highland Initiative (AHI). Program Evaluation report. February 2008.

Menter, H., Kaaria, S., Johnson, N. and Ashby, J. 2004. Scaling up. pp. 9-23. In: Pachico, D. and Fujisaka, S. (Eds.). Scaling up and out: Achieving wide spread impact through agricultural research. Centro Internacionale de Agricultura Tropica (CIAT). *Economic and Impact Series* 3, Volume 340.

Ministry of Finance Planning and Economic Development (MoFPED). 2000. Uganda Particpatory Poverty Assessment Process - Kapchorwa District Report.

Ministry of Lands, Housing and Urban Development (MLHUD). 2001. Land Sector Strategic Plan 2001-2011: Utilising Uganda's Land Resources for Sustainable Development.

Mugaga, F., Kakembo, V. and Buyinza, M. 2012. Land use changes on the slopes of Mount Elgon and implications for the occurrence of landslides. *Catena* 90: 39-46.

Nederlof, E.S. and Dangbegnon, C. 2006. Lessons for farmer-oriented research: Experiences from a West African soil fertility management project. Royal Tropical Institute (KIT) Amsterdam. The Netherlands, International Center for Soil fertility and Agricultural Development-Africa (IFDC-A), Lome, Togo.

Nyssen, J., Poison, J. and Dockers, J. 2009. Land degradation and soil and water conservation in tropical highlands. *Soil and Tillage Research* 103:197-202.

Salawu, J.A. 2008. Introduction to agricultural extension and rural sociology. National Open University of Nigeria.

Sanginga, P.C., Kamugisha, R., Martin, A. Kakuru and Stroud, A. 2004. Facilitating participatory processes for policy change in Natural Resource Management: Lessons from the Highlands of South western Uganda. *Uganda Journal of Agricultural Sciences* 9:958-970.

Sanginga, P., Tumwine, J. and Lilja, N. 2006. Patterns of participation in farmers research groups. *Agricultural and Human Values* 23(4): 501-51.

Schwilch, G., Bachmann, F. and de Graaff, J. 2012. Decision support for selecting SLM technologies with stakeholders. *Applied Geography* 34:86-98.

Steins, N.A. and Edwards, V.M. 1998. Platforms for collective actions in multiple-use CPR. Paper presented at Crossing Boundaries. *The 7th Annual Conference of International Association of the Study of Common Property*. Vancouver, British Columbia, Canada, June 10-14, 1998

Stroud, A. and Peden, D. 2005a. African Highland Initiative Report for the 2005 AHI priority

setting exercise. AHI Strategy for ASARECA 2005-2010. 11pp.

Stroud, A and Peden, D. 2005b. Situation analysis for the intensively cultivated highlands of Eastern and Central Africa. An input into the AHI strategy for ASARECA 2005-2010. pp. 16-20.

Swallow, B.M., Garrity, D.P. and van Noordwijk, M. 2001. The effects of scales, flows and filters on property rights and collective action in watershed management. *CAPRi Working Paper* No. 16. International Food Policy Research Institute. Washington DC, USA.

Tanner, C.L. 1995. Class, caste and gender in collective action: Agricultural labour unions in two Indian villages. *The Journal of Peasant Studies* 22(4): 672-698

UBOS, 2002. Uganda Population and Housing Census Report. Annex 3. Ministry of Finance Planning and Economic Development (MoFPED), Government of Uganda.