Building community based adaptation and resilience to climate change in Uganda

By

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Abstract

Climate change and its impacts are already being felt in Uganda in the form of erratic rains, drought, famine, floods and landslides. These hazards do not only affect the crop life cycle but also the entire value chain from pre-production to post-harvest storage, marketing and transport. This ultimately leads to serious socioeconomic consequences in food security, health, and economic development. The reality of climate change is no longer in doubt and therefore, it is important to prepare and adapt to its impacts through appropriate adaptation and resilience strategies. However, resource – poor communities, households and individuals with least resources have the least capacity to adapt to the impacts. Since the linkages between climate change and land degradation are very high, there is a real need to devise community adaptation and resilience strategies that include sustainable land management. These adaptation and resilience strategies include a range of re-greening interventions, such as farmer managed natural regeneration and its variants such as "Ngitili" and community exclosures as well as conservation agricultural practices like "bocage" and "Zai" in West Africa. This paper presents a set of adaptation and resilience interventions implemented by the National Forestry Resources Research Institute (NaFORRI) in various parts of Uganda. These range from agroforestry, avoided deforestation to alternative livelihoods. It is, however, recommended that, in designing and implementing these community adaptation and resilience interventions, great care and consideration should be taken of the gender relations, wealth, power relations, culture and traditions existing in the local communities.

Introduction

Climate change is one of the greatest challenges facing humankind today. It poses serious threats to socio-economic development, biodiversity and ecosystem services. While the impacts of climate change are already being experienced globally, the least developed countries, including those in Africa are the least prepared to deal with these impacts. Undoubtedly, Uganda is one of the countries identified to be the most vulnerable to climate change (CIGI 2007). Climate change not only affects the crop life cycle, it also directly and/or indirectly influences the entire value chain, from pre-production to post-harvest storage, marketing to transport.

Many parts of Uganda are already experiencing climate change related hazards like erratic rain, drought, famine, floods and landslides together with their associated impacts on natural resources that form the basis of people's livelihoods. With current average temperatures expected to increase by between 0.7°C and 1.5°C by 2020 (GoU, 2009; McSweeney et al., 2010), the frequency and severity of these hazards will increase, and this will inevitably have serious socio-economic consequences and/or implications with regard to food security, health, and economic development. Resource – poor communities, households and individuals with least resources have the least capacity to adapt to the impacts related to these hazards and are therefore the most vulnerable (IPCC, 2001). Climate change awareness is uneven throughout government, and different ministries and agencies usually plan, invest, and implement adaptation and resilience strategies separately (USAID, 2013).

The debate on climate change is no longer about how to mitigate its effects, but how to prepare and adapt to its impacts. Moreover, the linkages between climate change, land degradation and loss of biodiversity are highly interactive and would therefore require more holistic approaches to solve common problems (Millennium Ecosystem Assessment, 2005). There is therefore a need for sustainable land management combined with a socio-economic understanding of the asset portfolios of the land users (Bebbington, 1999). Several sustainable land management processes, including conservation agriculture, "climate-smart" agriculture and re-greening of landscapes, have been championed to combat the impacts of climate change.

Re-greening is a process in which farmers protect and manage trees that naturally regenerate on their land, rather than cut them down. The most typical examples of re-greening include farmer managed natural regeneration (FMNR) and its variants such as "Ngitili" in Tanzania and community exclosures (e.g in Tigray, Ethiopia). Other community initiatives such as bocaġe or Wegoubri (Girard, 2008) and Zai in West Africa (Kaboré and Reij, 2004; Reij et al. 2009), have been very important in promoting resilience through conservation agriculture and tree regeneration. Regenerated trees and shrubs help restore degraded lands and provide many benefits – from increased crop yields, recharging groundwater, providing fodder and firewood, and storing carbon.

Re-greening is, especially very pertinent in Uganda's drylands that cover an extensive area which occupies over 60% of Uganda's land area (Barrow et al., 2007). These dry land areas are faced with a series of challenges that hamper their resilience and ability to adapt to climate change. Their vulnerability is exacerbated by high levels of illiteracy, in addition to successive poor rains, frequent droughts, unpredictable and sometimes heavy rainfall, resulting into massive flooding and erosion as well as diseases, political and economic marginalization, inappropriate development policies which do not take into account traditional/cultural values in these areas (Banadda, 2010). These challenges have also been the cause of many conflicts for supply of different ecosystem services that are still available to the people (UNDP, 2013). Relevant interventions are therefore needed to address these challenges in order to improve agricultural productivity and achieve economic growth.

This paper presents experiences from the National Forestry Resources Research Institute (NaFORRI) on the interventions aimed at building community based adaptation and resilience to climate change. NaFORRI is one of the Public Agricultural Research Institutes of the National Agricultural Research Organization (NARO) and has been active in work with local communities, government and donor agencies in building resilience of local communities to climate change.

Elements for guiding the development of effective community adaptation and resilience strategies

In developing and implementing strategies for effective adaptation and resilience by the local communities in various parts of the country, NaFORRI has been guided by the following elements as enunciated by the International Union for the Conservation of Nature (IUCN, 2009):

(a). **Reducing non-climate stresses:** It is important that in tackling climate related problems, attention should also be made of non-climate stresses. The strategy should include anthropogenic stresses that lead to degradation of ecosystems and thereby

undermine their resilience to climate change. Such stresses include unsustainable harvests, habitat fragmentation, nonnative species, and pollution. When working with poor communities in the highland areas of Mt. Elgon, Kabale and the savanna parklands of Teso and northern Uganda, NaFORRI was cognizant of factors such as high population, poverty and political displacement of persons. These were major causes of tree cutting, land fragmentation and unsustainable farming methods.

(b). **Involving local communities:** Adaptation measures can be more successful when the local population participates in both planning and implementation. Therefore, community participation is critical for successful interventions aimed at promoting adaptation and enhancing resilience to climate change. NaFORRI has always made it a point to involve local political, community and opinion leaders in introduction of adaptation interventions. This helps to forster acceptability of the interventions.

(c). **Multi-partner strategy:** Adaptation and resilience can be effectively tackled by aligning conservation, development and poverty alleviation interests. Such synergies may result from collaboration between indigenous and local communities, conservationists, natural resource professionals, relevant private sector stakeholders, development specialists and humanitarian aid specialists. Where possible, NaFORRI has collaborated with other agencies in areas where similar adaptation and resilience work was being undertaken.

(d). **Building upon existing good practices:** The most effective adaptation strategies apply established best practices in natural resource management. Local communities have been able to innovate some of the most amazing best practices e.g. through taboos and prohibitions. These may be particularly crucial to the implementation of adaptation and resilience interventions. NaFORRI is cognizant of the fact that local communities have been able to exist for centuries because of their ability to understand nature. In the areas where we have worked, we have taken due regard of the taboos and customary practices regarding natural resources. We have had particularly useful experiences in northern Uganda and Teso sub-region (with shea butter tree regeneration).

(e). **Adopting adaptive management approaches:** Adaptation strategies should support adaptive management options that facilitate and accelerate learning about appropriate adaptation options for the future. Climate impacts should be monitored carefully so that management actions can be appropriately adjusted in response to changing conditions. This has been very apparent in the Mt. Elgon – Teso confluence, where drought tolerant crops such as sorghum and millet have expanded upwards towards Mt. Elgon, indicating and appreciated by the local communities that the climate is changing.

(f). **Integrating adaptation with wider development strategies:** Successful adaptation depends upon integrating adaptation initiatives with other risk management components, such as early warning systems and awareness-raising, and in some cases with physical infrastructural interventions. It is important to encourage and enable technology transfer and dialogue between planners and practitioners with expertise in hard engineering, and in ecosystem management. In the early 1990s, in a bid to promote tree planting in degraded highlands in Uganda, NaFORRI together with ICRAF pioneered the introduction of temperate fruits as high value crops. These were very acceptable to government and were incorporated in the National Agricultural Advisory

Services (NAADS) priority interventions for economic emancipation of poor farmers in these areas.

(g). **Communicating and educating:** Successful adaptation depends on knowledge transfer, capacity building, integrating science and local knowledge and raising awareness about climate change impacts and the benefits and potential of sound environment management. This aspect has particularly been used by NaFORRI in medicinal plants research – where we see medicinal plants as an entry point to conservation.

Community adaptation and resilience strategies – experiences by NaFORRI

In Uganda, it has been suggested by government and several climate change agencies that the design of climate adaptation strategies should be based on information about agro-ecological zones (MAAIF, 2009). These agro-ecological zones have uniform soil and climate conditions and are generally suitable entry points for the introduction of different technologies. In all agro-ecological zones, however, farmers tend to divert excess labor to off farm activities hence reducing labor available for climate adaptation strategies adoption (Ekiyar, et al. 2012). Moreover, elderly farmers have low ability to adapt and therefore tend to be more affected by climate change (Hisali, et al. 2011). NaFORRI is utilizing several strategies to reduce the rate and magnitude of climate change and enable such communities and farmers to adapt to its impacts. We usually recommend conservation agriculture or "climate-smart" agricultural interventions to enhance the adaptive capacity of the agricultural systems. These include introduction of improved crop varieties, agroforestry, farm or land use planning, mulching, crop diversification/inter-cropping (including shift to non-traditional crops), terracing and use of contour bands in hilly areas. Other alternative income generation activities, such as apiculture, fish farming, high value crops, non/off farm labor, also improve the adaptive capacity of the local communities, are also encouraged.

Agroforestry

Agroforestry is an old practice where on-farm trees are managed with crops and/or animal production systems. Several factors contribute to the increased interest in agroforestry, including high pressure on existing natural forests, diversifying farming to guard against effects of crop failure and provision of household wood requirements. As a whole, agroforestry addresses salient impacts of soil erosion (e.g. low crop yields, food and income insecurity) and extended dry seasons (e.g. water stress on croplands and fodder shortage). Agroforestry systems are more resilient in the face of climate change due to the interactive synergies enjoyed by the various components of the system. Many re-greening projects in Uganda have identified agroforestry as a major intervention area. NaFORRI has used several agroforestry practices in many areas of the country for promoting adaptation and resilience. These include taungya, home gardens, growing multipurpose trees and shrubs on farmland, boundary planting, farm woodlots, improved fruit tree gardens, windbreaks, water conservation hedges, fodder banks, live fences, trees on pasture and apiculture with trees. Spatial technologies e.g. home-gardens, hedgerows, live fencing, alley cropping provide opportunities for introducing trees on smallholder farms without significantly compromising crop and livestock enterprises. However, its impacts are not easily quantifiable despite the many projects and resources that have promoted it as a major option.

Reforestation / afforestation

Reforestation is the planting of new trees in previously forested areas while afforestation is the establishment of forests in previously un-forested areas. Although this is a major strategy

for re-greening landscapes, funding shortages present major challenges to reforestation and/or afforestation programmes. Reforestation and/or afforestation faces the problem of acceptability as it usually involves drastic change of land use, especially in areas of small landholdings. Growing of trees on such meager pieces of land inevitably requires careful assessment of various trade-offs. The cost of acquiring tree seedlings is an additional encumbrance to prospective tree growers. However, there has been an upsurge of interest in tree growing by the wealthy members of Ugandan society and every year, NaFORRI supplies over 2 million eucalyptus clones for planting in different areas of the country. The driving reason, though, is not environmental conservation but economic!

Farm and land use planning

Farm planning includes appropriate selection and use crop types/varieties, farm infrastructure and spatial arrangement to suit the farmer and landscape. Since farming is the major land use in most parts of Uganda, farm enterprise-selection should be based on farm location. For instance, minimum tillage is a prerequisite for soil conservation, while crop and animal selection should be guided by site conditions. The design of farm infrastructure like granaries and shelter should also be guided by hazard occurrence for instance in flooded locations raised buildings should be encouraged. NaFORRI has always advocated for the proper planning of farms to provide all the farmer's requirements, including soil and water conservation.

Avoided deforestation

Avoided deforestation involves any measure that prevents loss of forests. The major causes of deforestation are agricultural expansion, fuel wood and timber extraction and over exploitation of biodiversity. Avoided deforestation can therefore be promoted by curbing encroachment and reducing forest fragmentation. Formerly degraded areas may therefore be re-planted with trees and neighboring communities allowed to harvest herbal medicines, firewood and other minor forest products. In Uganda, this has been successfully done by the National Forestry Authority (NFA) through an arrangement called Collaborative Forest Management where communities that live adjacent to forest reserves sign agreements or memoranda of understanding to jointly manage an area of forest while non-destructively utilizing the forest e.g. by collecting firewood and medicinal plants. The Uganda Wildlife Authority (UWA) also has a similar arrangement with communities that live next to the national parks. However, in some instances, avoided deforestation is a costly measure to implement since it requires enforcement and maintaining natural forest cover in areas of small land holdings can be viewed as anti-people. For example, arrests of forest encroachers can be cause of apprehension in local communities. However, NaFORRI is currently working with a community in Kaliro district which is promoting medicinal plants through avoided deforestation. Natural vegetation is left to flourish on its own on the understanding that all plants were provided by nature and are useful sources of medicine.

Improved crop varieties

Most local communities recognize climate variability as a major hindrance to agricultural production. Many farmers therefore seek improved crop varieties, e.g. drought tolerant maize (Longe series that are more drought tolerant). Millet and sorghum have become major food crops across Uganda, even in areas where they were not traditionally eaten or used. The introduction of these non-traditional crops is an adaptation strategy that, no doubt, is having considerable implication to the lifestyles of the communities. Improved crop varieties have therefore been sought as a strategy for disease, pest and drought hazards. However, access to these varieties is impeded by their high cost and inefficient distribution chains.

Alternative livelihoods

Most of the people in Uganda are resource poor smallholder farmers who largely depend on agriculture and extractive forestry. There should be deliberate efforts to enhance household incomes through alternative income generating activities. Prospective income generating activities include:

(a). **Community based tourism** aimed at improving the enhancing natural resource management and livelihoods. The benefits of community based tourism can be numerous, ranging from economic, environmental and socio-cultural to the building of skills and empowerment of local people.

(b). **Small business development** where farming is no longer feasible, off-farm employment opportunities should be supported. Developing and supporting small business development would be an appropriate strategy to boost off-farm sources of income and enhancing adaptive capacity of smallholder farmers.

(c). **Bee keeping** is very amicable with environement management and can greatly enhance household income. Bee keeping interventions would be highly fitting to areas adjacent to forest reserves or those areas with woodlands. Such communities should be organized into groups and supported with equipments such as improved bee hives as well as in packaging and branding their honey so as to attract good return on the local and national market.

Conclusions

The adaptation and resilience strategies suggested in this paper can generally address a broad range of climate change impacts, including water shortage, floods, storms, soil erosion and ecosystem productivity and resilience. However, socio-economic factors such as population pressure and land tenure have not been seriously considered. It is important for the implementers or promoters of these strategies to make deliberate efforts to understand and appreciate issues such as gender relations, wealth, power relations, culture and traditions. These will not only influence the adoption of these adaptation and resilience strategies, but also the extent to which people can adapt to climate change in general.

There are diverse and scattered efforts in re-greening, adaptive and resilience efforts in Uganda, resulting in limited impact. This is due to lack of synergies among actors, leading to duplication of efforts which compromises cost effectiveness. There is need for a **multi-stakeholder platform** to review and build on past and present efforts. This will create an opportunity for tapping into individual competences of various actors, contributing to the implementation of adaptation and resilience measures.

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