The Role of Forests in Climate Change Mitigation in Uganda

Balitta P., Turinayo Y. K., Esegu J.F.O., Kissa D. O., Kiwuso P., Kalanzi F.

National Forestry Resources Research Institute (NaFORRI), P. O. Box, 1752, Kampala - Uganda

Introduction

Globally, there is scientific evidence that greenhouse gas emissions i.e. carbon dioxide, methane, Chlorofluorocarbons (CFCs), nitrogen oxide (NOx) gases etc have resulted into climate change as a result of atmospheric temperature rise (IPCC, 2006). According to NASA (2014), carbon dioxide accumulation in the atmosphere has been varying over the years with a sharp rise in 2014 (Fig. 1). In Uganda, climate change impacts have been significant on forests, aquatic, grassland and mountainous ecosystems. This has led to changes in people's livelihoods thus affecting forests resilience due to deforestation and land use changes. Therefore, there is need for coherent adaptation and mitigation strategies to combat climate change.

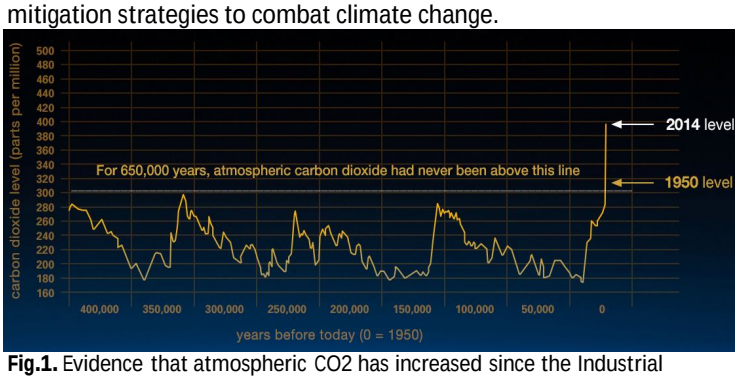

Fig.1. Evidence that atmospheric CO2 has increased since the Industrial Revolution. Source: NASA, 2014

Evidence of climate change in Uganda

Evidence shows that, there has been variation in temperature, precipitation and rainfall patterns in Uganda due to climate change. Looking at the 1991–2000 drought episodes in Uganda (Fig. 2), Kaggwa et al. (2009) analysed the data per region and found that, South – Western Uganda had experienced a temperature rise of 0.3 ^{0}C. Generally, climate change has led to devastating effects leading to floods and landslides in Bududa district that affected over 300,000 people in 2010. There has also been experiences of water shortages in Karamoja and Teso regions, as well as reduced water level in lake Victoria in 2006. Pest and disease outbreaks affecting both agriculture and human health has been rampant as a result of climate change.

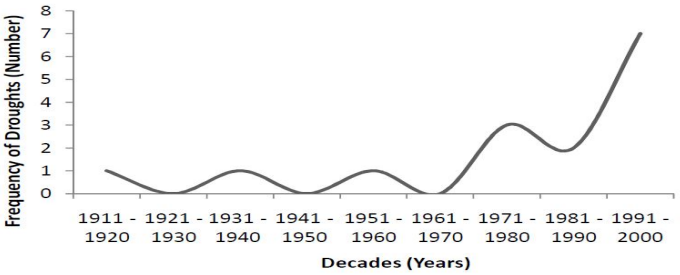

Fig. 2: Frequencies of Droughts in Uganda, 1911–2000, Source: Uganda NAPA report 2007

Role of Forests in Mitigating Climate Change

Much as Uganda's forest cover has reduced from approximately 3.6 to 2.9 million hectares between 2005 and 2010 (FAO, 2010), the estimated 47.5 million metric tonnes of carbon stored (FAO, 2010) is equivalent to 871,625 tonnes of CO_2 sequestered from the atmosphere. Hence, with the increasing reforestation and afforestation activities in Uganda, there is high potential for future carbon sequestration and livelihood enhancement. Therefore, in a bid to achieve the aforementioned role of forests in mitigating climate change, National Forestry Resources Research Institute (NaFORRI) is undertaking research on active forest management covering species selection, management options, pests and diseases management, energy conservation and tree improvement to enhance forest development in Uganda. Among NaFORRI's research activities, above ground biomass carbon sequestration potential of 7, 9, 11 year old *Pinus caribaea* has been estimated at 61.4 t of C ha^{-1}, 107.9 t of C ha^{-1} and 138.4 t of C ha^{-1} – equivalent to 225.4 t of CO_2, 395.9 t of CO_2 and 507.8 t of CO_2 sequestered per hectare, respectively in Lake Victoria agro-ecological region.

Forest Resource Regeneration and Monitoring

Knowledge on forest resource base and monitoring approaches are key aspects in ensuring resource sustainability. In Uganda, over 30 % of the natural forests are degraded due to conversion of forest land to agricultural land, over utilisation of forest products for energy and other usage and expanding human settlement. Therefore, there is need to employ adaptive forest management techniques to promote resource regeneration and monitoring (Fig. 3).

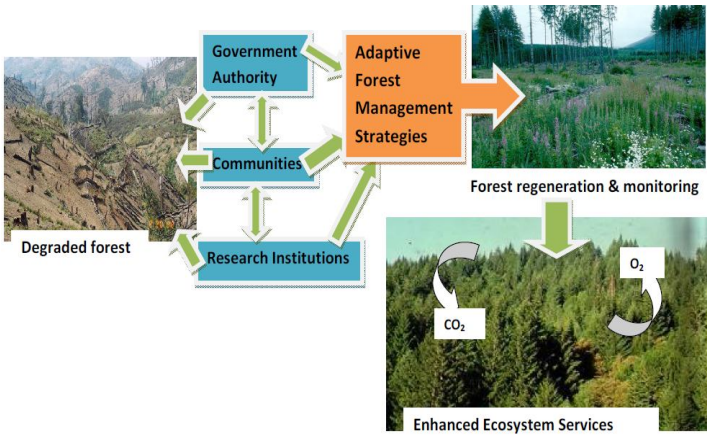

Fig. 3: Adaptive Forest Management Practices to enhance Ecosystem Services

Conclusion

There is evidence that forests mitigate climate change. However, over exploitation of forest resources has affected their resilience. There is need for collective effort in tree planting to restore degraded forest areas in Uganda as a way of mitigating climate. Hence improving on ecosystem service delivery.

References

FAO. (2010). Forests Resource Status of Uganda. Food and Agricultural Organisation, Rome 2010

Kaggwa, R., Hogan, R., and Hall, B. (2009). Enhancing the Contribution of Weather, Climate and Climate Change to Growth, Employment and Prosperity. Kampala.

NASA (2014). Climate change: How do we know? Retrieved 16th March 2015, from http://climate.nasa.gov/evidence .