

## **RESTORATION OF COMMUNITY DEFORESTED FOREST TO MITIGATE THE NEGATIVE EFFECTS OF CLIMATE CHANGE**

Uganda's forests contain 109 million metric tons of carbon in living forest biomass. Biodiversity and Protected Areas: Uganda has some 1592 known species of amphibians, birds, mammals and reptiles according to figures from the World Conservation Monitoring Centre. Of these, 1.1% is endemic, meaning they exist in no other country, and 3.1% are threatened. Uganda is home to at least 4900 species of vascular plants. 7.3% of Uganda's social ecological species are protected under IUCN categories I-V. A major factor that causes deforestation in Uganda is the need of fuel and timber. 80% of Ugandans are living in rural areas and 60% of the total population is living below the poverty line. The lack of modern and affordable fuels for domestic use has forced both urban and rural populations to depend on wood charcoal and firewood as a source of heat energy. This has resulted into exerting pressure on natural forests hence massive deforestation. As time goes on, the increased demand for these traditional fuels has resulted in several critical environmental challenges as a result of climate change with its negative effects.

**KEYWORD:** Restoration of Deforested Forests, Uganda

**PRESENTER :** Galiwango Gideon Bukko –CISONET President.

The rate of environmental degradation in Mpigi district has been gradually increasing over time and some areas, which were originally forested, have been made bare by the inhabitants of the areas as a result of cutting down trees for timber and fuel for cooking. Most of the population in the area depends on subsistence agriculture which has also contributed to continuous deforestation for cultivation, thus calls for immediate intervention of re-forestation and afforestation through sustainable agroforestry program for mitigation of the negative effects of climate change.

Cutting down forests faster than they are replaced (deforestation) is a major contributor to climate change. It accounts for about 20 per cent of human carbon emissions – more than the entire global transport sector produces. Deforestation makes such a huge contribution to carbon emissions because trees absorb CO<sub>2</sub> as they grow. The more trees that are cut down, the fewer there will be left to absorb CO<sub>2</sub>, leading to carbon buildup in the atmosphere.

Climate change is currently not only occurring, it is accelerating all over. Deforestation accounts for almost 20 % of greenhouse gas emissions according to the Intergovernmental Panel on Climate Change (IPCC). Climate change is largely driven by human activities where deforestation is a key factor. The effects of climate change on biodiversity are far-reaching and operate at many different levels i.e. from individuals, species to ecosystems. Climate change affects particular species in different ways. It may alter species distribution, abundance, and behaviour, the timing of events such as migration in birds or breeding, morphology (size and shape) and genetic composition. Many such effects have already been documented in a wide range of species. Climate change also affects species directly through changes in temperature and rainfall which lead to increased pressure from competitors, predators, parasites, diseases and disturbances (such as fires or storms). These result in catastrophic extinction rates and a bleak future for both biodiversity and people.

Climate change is real and happening now. The average global surface temperature has warmed 0.8°C in the past century and 0.6°C in the past three decades (Hansen et al., 2006), in large part because of human activities (IPCC, 2001). A recent report produced by the U.S. National Academy of Sciences confirms that the last few decades of the 20th century were in fact the warmest in the past 400 years (National Research Council, 2006). The Intergovernmental Panel on Climate Change (IPCC) has projected that if greenhouse gas emissions, the leading cause of climate change, continue to rise, the mean global temperatures will increase 1.4 – 5.8°C by the end of the 21st century (IPCC, 2001).

The effects of climate change such as rising temperature and changes in precipitation are undeniably clear with impacts already affecting ecosystems, biodiversity and people. In both developed and developing countries, climate impacts are reverberating through the economy, from threatening water availability to sea-level rise and extreme weather impacts to coastal regions and tourism. In some countries, climate impacts affect the ecosystem services that communities are largely dependent upon, threatening development and economic stability. Future impacts are projected to worsen as the temperature continues to rise and as precipitation becomes more unpredictable.

Climate change is also affecting the surface water established by rainfall and glacial melting, the most prominent impact of this being the reduction in the ice caps on Rwenzori Mountains by almost 40% and increasing the erosive power of the nearby River Semliki. Flooding and droughts have been experienced in many parts of Uganda. The temperature change and rainfall which are decisive for crop and livestock production are determinant factors of production in agriculture. This scenario means falling crop yields threatening food security for people

Although government and scientists recognize the magnitude of the negative effects of climate change, there is inadequate research on participatory approaches for adaptation to negative effects of climate change by farmers in the country. Furthermore, integrated adaptive research to combine increased agricultural productivity and environmental conservation demands is needed to minimize trade-offs and escape the trap of combined poverty and famine in these areas due to environmental degradation. Indeed strengthening the livelihood resilience of these communities in the face of increasing population and decreasing land for agricultural productivity coupled with the need for environmental conservation is a very challenging task. Therefore there is need to develop strategies to strengthen the livelihood resilience of farming communities to negative effects of climate change.

In my research, I have found that the environmental problems in Uganda are tougher than I would have ever imagined. The problems are extending from so many diverse reasons and origins that include deforestation, degradation, fragmentation, the loss of soil fertility, a dramatic decline and loss of biodiversity, and water pollution. These problems hinder Uganda from making progress as regards to sustainable environment and economic development.

Furthermore, in Uganda over 10 million farmers and their families are on the front line of climate change therefore CISONET believes that:

It is through agriculture that the negative effects of climate change can be mitigated.

Improved farming methods in a sustainable way and decreasing waste and losses can significantly mitigate the effects of climate change, prevent deforestation, and protect biodiversity.

Adopting proven sustainable agricultural practices reduces greenhouse gas (GHG) emissions and enhances the effect of natural carbon sinks.

Further research and innovation are essential to invent the necessary adaptation and mitigation solutions.

Therefore, farmers must be involved in implementing climate change mitigation and adaptation strategies. To support them, we must create sound and reliable incentives; we must share knowledge; and we must make adequate tools and technologies accessible to deliver both food and energy security.

Our intervention as CISONET in the Katabalalu deforested community forest is as below;

- We have put in place community owned and community managed tree nurseries at group levels. These are production of tree seedlings mainly the native tree species for the community to plant.
- Farmer groups have been given portions of land in the deforested area of the forest to plant and manage trees as a group with the supervision of the community elected environment committees, project staff and the National Forestry Authority area staff. There are signed agreements between the groups and the intervening Civil Society Organizations that spells out management and ownership issues of the trees planted.
- Continuous trainings and meetings on co - management of natural resources are on- going.
- We give trainings to the same communities Agroforestry trainings with emphasis on every home planting and managing on farm trees.
- We are also seriously engaging local authorities at different levels in area around Katabalalu for formation and passing by-laws at village, sub county levels and audinancy at Mpigi district level on having a re- afforestation plan approved by the local authorities before issuance of a permit to cut trees.

As key stakeholders in agriculture, the world's farmers, agronomists, scientists, engineers and industries are working together through an open coalition, to provide innovative solutions which reduce emissions from agriculture and adapt to climate change while increasing agricultural productivity to meet growing food needs. Given growing food demands, we believe that rather than pursuing blanket reduction targets for GHG emissions in agriculture, governments should commit to climate change mitigation through improved and sustainable agricultural productivity across multiple factors including water use, carbon efficiency, improved nutrient use efficiency, and land-use intensity. In response, the Farming First coalition would like to bring forward a series of climate change adaptation and mitigation strategies in accordance with its six-point action plan for enhancing sustainable development through agriculture. In line with these six principles, we encourage stakeholders to pursue policies which can achieve long-term global sustainability goals through proven techniques:

## Safeguard Natural Resources

Protect natural habitats by avoiding deforestation and land clearing by sustainably improving yields on existing arable land.

Protect the integrity of watersheds, wetlands and pasturelands to preserve ecosystem services and biodiversity.

Invest in technologies and techniques to promote water-use efficiency, such as improved irrigation systems, conservation agriculture and better water allocation systems.

Build up soil organic matter and prevent erosion by applying techniques such as conservation tillage, nutrient management and the use of reclamation varieties

Facilitate drought-preparedness and mitigation through appropriate technologies, including use of remote sensing, local weather forecasting, drought-tolerant crops, early warning information systems, irrigation technology and the building of resilience in rural communities.

## Share knowledge

Encourage education in locally-relevant agricultural practices and technologies which significantly increase carbon sequestration, reduce GHG emissions and improve agricultural productivity, particularly in developing countries.

Create international Programmes which share best practice and build capacity for the efficient application of existing climate-friendly technologies by making them more affordable and efficient in use as well as more accessible to farmers.

Foster energy-efficiency improvements and emissions reductions in nitrogen fertilizer production by helping producers of all sizes to adopt best practice techniques.

Reduce livestock-related emissions through rapid education and dissemination of improved efficiency of grazing systems, manure management, methane capture for biogas production and enhanced feeds and feed additives.

Use Integrated Crop Management (ICM) best practices (notably by deploying the right nutrient source, at the right rate, right time and in the right place to improve nutrient use efficiencies) and apply Integrated Pest Management (IPM) to optimize pesticide effectiveness.

Recognize and support the development of synergies between resilience and mitigation through the inclusion of improved farm management practices in research programmes.

Build local access and capacity

Mainstream and co-ordinate funding for climate change and agricultural Programmes, in ways which address grassroots needs and reach all levels of farming.

Encourage improved cropping systems (e.g. the use of cover crops and appropriate crop rotation methods, such as nitrogen-fixing legumes), cultivation practices (e.g. by limiting fallow periods and reducing cultivation) and soil-quality practices to increase overall resource productivity.

Invest in infrastructure-building and related training Programmes.

Provide training to existing extension networks to increase the efficiency and effectiveness of farm inputs (e.g. fuel, mineral and organic nutrient sources, seeds and crop protection).

Invest in bioenergy to achieve energy security and rural development through sustainable local production.

Secure access to land and water resources, especially for women farmers.

Provide risk management tools to support farmers in managing weather and market variations.

Localize the application of agronomic knowledge, pest identification and meteorological information.

Facilitate the use of modern varieties which are resistant to pests and diseases and decreasing the need for tilling.

Protect harvests

Reduce emissions by minimizing pre- and post-harvest losses.

Support efforts to enhance food quality and safety and to reduce waste along the food chain through to end-consumers.

Improve safety testing for food-handling and processing equipment, as well as storage techniques, cold-chain systems and transportation infrastructure.

Enable access to markets

Channel new and additional funding for climate change mitigation, adaptation and technology transfer directly to the agricultural sector.

Reward all responsive farmers using sustainable agricultural practices through positive incentives which acknowledge their vital role in providing ecosystem services.

Develop innovative financial mechanisms for the transfer of technologies in order to support farmers in developing countries.

Support farmers' Organizations, enabling them to operate as aggregating agencies bringing together individual farmers to improve access to financial mechanisms, funding and carbon markets.

Mainstream climate change related efforts into market development.

Prioritize research imperatives

Invest in R&D aimed at scaling up a broad range of new mitigation and adaptation technologies and practices addressing diverse climate needs.

Develop climate information services and early warning systems, as well as best possible estimates of weather and climate impacts on crop or forage production, at a temporal and spatial scale useful for vulnerable rural communities.

Promote partnerships between farmers and scientists to develop adequate and fit-for-use technologies as well as land and water management tools where they are most needed.

Improve scientific insight into the role of (Green House Gas) GHG emissions from methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). Increase research on areas of potential savings in order to include them in any future monitoring and accounting rules determined through the Copenhagen process.

Improve the capacity of a broad range of crops to grow in harsher climates, developing locally-adapted drought-tolerant, salinity-tolerant and heat-tolerant varieties. Instigate a system for monitoring GHG emissions from agriculture, including developing performance indicators for agricultural practices that reduce emissions.

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