

Climate change adaptation and mitigation

Context

Over the past 5,000 years, an estimated 1.8 billion hectares of forest land has been lost worldwide, with an estimated 13 million hectares of land being lost every year.¹ This decline in global forests has been linked to the rise in atmospheric carbon dioxide – one of the principle causes of climate change – owing to the important role of forests in global carbon cycling. Whilst climate change is a global phenomenon, those living in developing countries are disproportionately affected. This is due to the heightened geographic vulnerability of many developing countries, and the unique challenges faced by individuals and governments from these countries to mitigate, adapt, respond and recover from the effects of climate change. This includes rising sea levels, increased variability and intensity of precipitation (rainfall) events, and an increase in extreme weather events and natural disasters such as droughts, floods, and cyclones. As a result, climate change has a profound destructive impact on the lives, property and livelihoods of the poorest and most vulnerable, trapping them in a perpetual cycle of poverty.



Tree swallowed by sand

How Farmer Managed Natural Regeneration contributes to climate change adaptation and mitigation

The practice of FMNR yields important environmental benefits and contributes to climate change adaptation and mitigation. Along with the 2030 agenda for Sustainable Development Goals (SDGs) and the Paris Agreement on Climate Change 2015 (COP21), regeneration has gained an increased international interest for playing a key role in assisting with climate change adaptation and mitigating efforts. Goal number 15 in the SDGs highlights the importance of forests in sustainable development and aims to, "... sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss". Many key country leaders acknowledged this goal at the COP21 and identified afforestation, reforestation and preservation of existing forests as a key element in combating climate change.² In response, World Vision has been actively contributing to major international land restoration targets. This includes the Bonn Challenge target of restoring 350 million hectares of degraded land globally by 2030 and the Africa Restoration Initiative (AFRI00) target of restoring 100 million hectares of degraded land in Africa.

The net total increase of trees and shrubs through FMNR allows for more carbon to be stored and sequestered, leading to reduced air and soil temperature. Research has also shown that tree-based

FMNR's contribution to climate change adaptation and mitigation

- Increased carbon sequestration
- Localised reduction in soil and air temperature
- Reduced greenhouse gas emissions from felled woody biomass and soils
- Improved biodiversity
- Improved vegetation, land and soil quality
- Reduced land degradation and soil erosion
- Increased soil moisture and greater drought resilience
- Increased soil fertility (especially in areas where trees border fields)
- Increased woody biomass (trees and shrubs)

1. Food and Agriculture Organization of the United Nations (27 July 2017), "State of the World's Forests 2012" [online]. Available at: <<http://www.fao.org/3/ai3010e.pdf>>, p.9; United Nations Development Programme 2017 (14 August 2017) "Goal 15 Targets" [online]. Available at: <<http://www.undp.org/content/undp/en/home/sustainabledevelopment-goals/goal-15-life-on-land/targets/>>.

2. United Nations Framework Convention on Climate Change, 2015 "Forests as key climate solution 2015" [online]. Available at: <<https://unfccc.int/news/forests-as-key-climate-solution>>

farming systems store carbon in soils, trees and shrubs, contributing to reduced greenhouse gas emissions.³ Contingent upon the woody species used, and how they are managed, they may contribute to bolstering nutrient supply through nitrogen fixation and nutrition cycling

as well as generate greater quantities of organic matter in soil surface residues.⁴ Regeneration has also led to reduced land degradation, increased soil moisture and greater drought resilience by increasing vegetation and organic material.



World Vision FMNR project in Humbo, Ethiopia

Implementation of FMNR at World Vision

World Vision has demonstrated ongoing experience implementing FMNR in over 25 countries. Carbon stock monitoring data from World Vision's Humbo Community Managed Natural Regeneration Project (2005 – 2018) in Ethiopia found that FMNR activities led to the sequestration of 181,650 tonnes (net) of carbon dioxide from the atmosphere between the period of 2006 and 2018. In a household survey conducted among community members in Humbo, 82.9 percent of respondents in the project area reported decreased on-farm soil erosion over the past five years, while 74.0 percent reported increased on-farm soil fertility over the same period. In contrast, only 36.9 percent of respondents in non-project areas reported an increase in on-farm soil fertility over the past five years. Several environmental and economic benefits were also recorded in the World Vision Soddo FMNR project in Ethiopia. The project recorded a total CO₂ sequestration of 94,819 tCO₂, 188.5 tCO₂ per hectare, \$US520,000 of carbon revenue and a total increase of tree and bird species in the project area.

Community members in World Vision's Humbo and Soddo FMNR projects further identified increased rainfall, better air quality, reduced air temperature and reduced soil erosion as some of the additional benefits of FMNR.

“Before there were no trees, it was bare degraded land and temperatures were very high. After protection, the trees started growing fast, wild life started coming back, the temperature has gone down, and rainfall is getting better.” – Child Members of Environment Club, Humbo, Ethiopia

“After the project, we have got good rain, good crop production, fresher air, and water for livestock. All of the weather conditions for humans and animals have become good.” – Male Farmer, Humbo, Ethiopia

In another example, 85 percent of farmers who participated in the World Vision Australia SEFLEI project in Senegal reported an increase in soil fertility following the establishment of FMNR.

“Falling leaves contributed strongly to the organic enrichment of the soils, which contribute towards improved yields similar to when chemical fertilizer are used on a small scale.” – Focus Group Discussions member, Senegal

3. Mbow, C., Van Noordwijk, M., Luedeling, E., Neufeldt, H., Minang, P.A. and Kowero, G., 2014, “Agroforestry solutions to address food security and climate change in Africa,” *Current Opinion in Environmental Sustainability*, pp.63

4. Garrity, D.P., Akinnifesi, F.K., Ajayi, O.C., Weldesemayat, S.G., Mowo, J.G., Kalinganire, A., Larwanou, M. and Bayala, J., 2010, “Evergreen Agriculture: a robust approach to sustainable food security in Africa,” *Food Security*, pp.197-214