

**TREE REGENERATION IN THE DISTURBED
REAFFORESTED PARTS OF MOUNT ELGON
NATIONAL PARK FOREST, UGANDA.**

BY

MUHEREZE RONALD

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UNIVERSITY.**

JUNE 2015

DECLARATION

I Muhereze Ronald declare that this research work has been through my own efforts and has never been submitted to Busitema University or any other Institution of higher learning for the award of a degree or any other qualification.

Signature

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Date: 24/08/2015

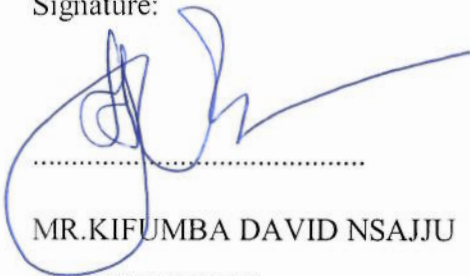
MUHEREZE RONALD

(Student)

APPROVAL

This is to confirm this research report is original and has only been through the efforts of Muhereze Ronald after pursuing a three year Bachelor of Science degree in natural resource Economics of Busitema University. He has therefore fulfilled part of his requirements for the award of the degree in Natural Resource Economics of Busitema University.

Signature:



.....

MR.KIFUMBA DAVID NSAJJU
(SUPERVISOR)

Date:

24/6/2015



DEDICATION

I dedicate this work to my mother Tumusiime Albina, my father Tindamanyire Erineo, my brothers, sisters, and the Family of Dr. Placid Mihayo for have been there me through hardships.

May the good Lord reward them a abundantly.

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Also in special way, I thank my classmates for the moral support and a shoulder to learn on.

LIST OF ACRONYMS

DBH	Diameter at Breast Height (1.3M)
FACE	Forests Absorbing Carbon Emissions
FAO	Food and Agricultural Organization
GIS	Geographical Information System
GPS	Global Positioning System
H	Height
Ha	Hectare (10000m ²)
IFER	Institute of Forest Ecosystem Research
IPCC	International Panel for Climate Change
M	Metre
MENP	Mountain Elgon National Park
NFA	National Forestry Authority
NTFP	Non Timber Forest Products
UNFCCC	United Nations Framework Convention on Climate Change
UWA	Uganda Wildlife Authority

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CONCEPTS AND TERMS

Variance - This is the sample variance of all the values in each row of the data matrix.

Dispersion (I)-the dispersion statistic that is the variance over the mean.

Chi of I - Is the value of the dispersion statistic.

Dispersion Model - Whether the dispersion is random, aggregated or uniform.

Natural disturbance: Disruption to forest stands, vegetation and wildlife by a natural event such as strong wind, fire or grazing.

Natural regeneration: Trees or shrubs which become established through the natural processes of seeding and germination.

Natural Reserve: Unmanaged stands set aside to allow natural processes a freer reign and to encourage the development of structural diversity and deadwood habitats.

Old growth: A forest stand which has developed free from large-scale disturbance over a long period of time (80-500+ years) and contains large old trees, large fallen and standing deadwood in various states of decay, and a wide variation in tree size and spacing.

Alpha diversity – is species richness within a particular area, community or ecosystem, measured by counting the number of taxa within the ecosystem (typically species).

Biological Diversity, or biodiversity, is the variety of living plants, animals and microorganisms on earth.

Ecosystem or environmental services are the “benefits that people obtain from ecosystems.”

Reforestation is the process by which trees are returned to areas from which they have been previously cleared.

Secondary forests are defined as forests regenerating largely through natural processes after significant human disturbance of the original forest vegetation at a single point in time or over an extended period, and displaying a major difference in forest structure and/or canopy species composition with respect to nearby primary forests on similar sites.

ABSTRACT

Around the world today, deforestation has become one of the most serious threats to biodiversity conservation, livelihood systems and regeneration rates of forest ecosystems. Study was carried out in the formerly disturbed reforested areas within Mt Elgon National Park, Uganda. The aim was to generate information on the overall tree regeneration patterns in the formerly disturbed and reforested MENP forest sites. This would highlight the current forest status and also guides management of the park in designing tree protection strategies in the community that will result in successful tree recovery in Mt Elgon forest.

Comparisons done were abundance of different tree size classes for existing tree species, abundance of tree damage for different tree life categories and different sources of current tree regeneration for the existing tree species in formerly enriched UWA-FACE project sites under years of enriching planting. Field Measurements were carried out according to the IFER (2002) methodology designed for the FACE-UWA inventory of 2002. Species diversity comparisons for the study sites were done using Shannon and Simpson diversity indices. Tree diversity was higher in earlier enriched planted sites and tree size distribution for all species combined across all sites followed the reverse J-curve, a sign of healthy forest recovery. Very low densities for shade tolerant specie seedlings in forest with the longest history of enrichment planting were a surprise. Communities still harvest hard wood species as source of fire wood and poles. The continued forest disturbance and lowered levels of enrichment planting decreased natural regeneration of species in forest. This suggests that anthropogenic activities still exist and continues to influence the regeneration of trees in all sites where enrichment planting took place.

Keywords: Enrichment planting; Diameter size distributions; reforestation, forest disturbance, tropical rain forest, Regeneration.

CHAPTER ONE

1.0. INTRODUCTION

1.1 Background.

1.1.1 Tropical forests on Global perspective.

Around the world today, especially in the tropics, deforestation has become one of the most serious threats to biodiversity conservation, livelihood systems, ecosystem functions, peoples' welfare and sustainable development (FAO, 2001). On average, the global figure of deforestation has been 14.6 million hectares per year between 1990 and 2000. The increasing exploitation of these forest resources is due to the conversion of forests to agriculture, fuel wood, timber and other non-timber forest products (FAO, 2001).

The diversity of tree species is a fundamental component of total biodiversity in many ecosystems because trees are ecosystem engineers that provide resources for growing industries and habitats for almost all other forest organisms (M. A. Huston, 1994). According to Bell et al. (1997); Huxel and Hastings (1999), forest biodiversity helps in the restoration of sinks, flows of matter, energy and information to the surrounding landscape. Lugo and Helmer (2004), notes that, species composition of plant and animal communities often differs between secondary and old-growth forests and provides a variety of ecosystem services and contributes to ecosystem maintenances. Whisenant (1999); Tongway, (2004), reported that forests helps in control of hydrology and nutrient cycling and its key fauna to the ecosystem (Reive et al., 1992; Block et al., 2001). According to Achard et al. (2002), Secondary forests are important for global carbon cycles, forests form a major component of the Carbon reserves (Houghton, 2007), influences both activity of living organisms and human societies (Whittaker and Likens, 1975). The main ecosystem functions of forests include protection of soil from erosion, carbon sequestration, nutrient cycling and water conservation (Herrick, 2000; Herrick et al., 2006). IPCC (2007), Canadell and Raupach (2008) notes that managing forests through agroforestry, forestry and plantation systems is seen as an important opportunity for climate change mitigation and adaptation. Ketterings *et. al.* (2001) asserts that

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