Economics of Land Degradation and Forest and Landscape Restoration in Kenya

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Introduction

- Forest and land degradation is a serious global problem, particularly in developing countries where most of the poor reside

- It is estimated between 1billion and 6 billion ha of global landscapes are degraded thus millions of people are affected significantly

- About 30% of Kenya's land mass is facing severe land degradation and this anticipated to become more acute with rising population

Costs of land degradation

- LULC estimated degradation costed the Kenya economy approximately $1.3 Billion per annum between (2001 to 2009) (Mulinge *et al.*, 2016)

- At the national scale, it is that forest landscape restorations will cost the country KES 1.8 trillion for the most conservative scenario of restoring 5.1 million ha to KES 3.7 trillion for the ambitious target of 10.2 million ha.
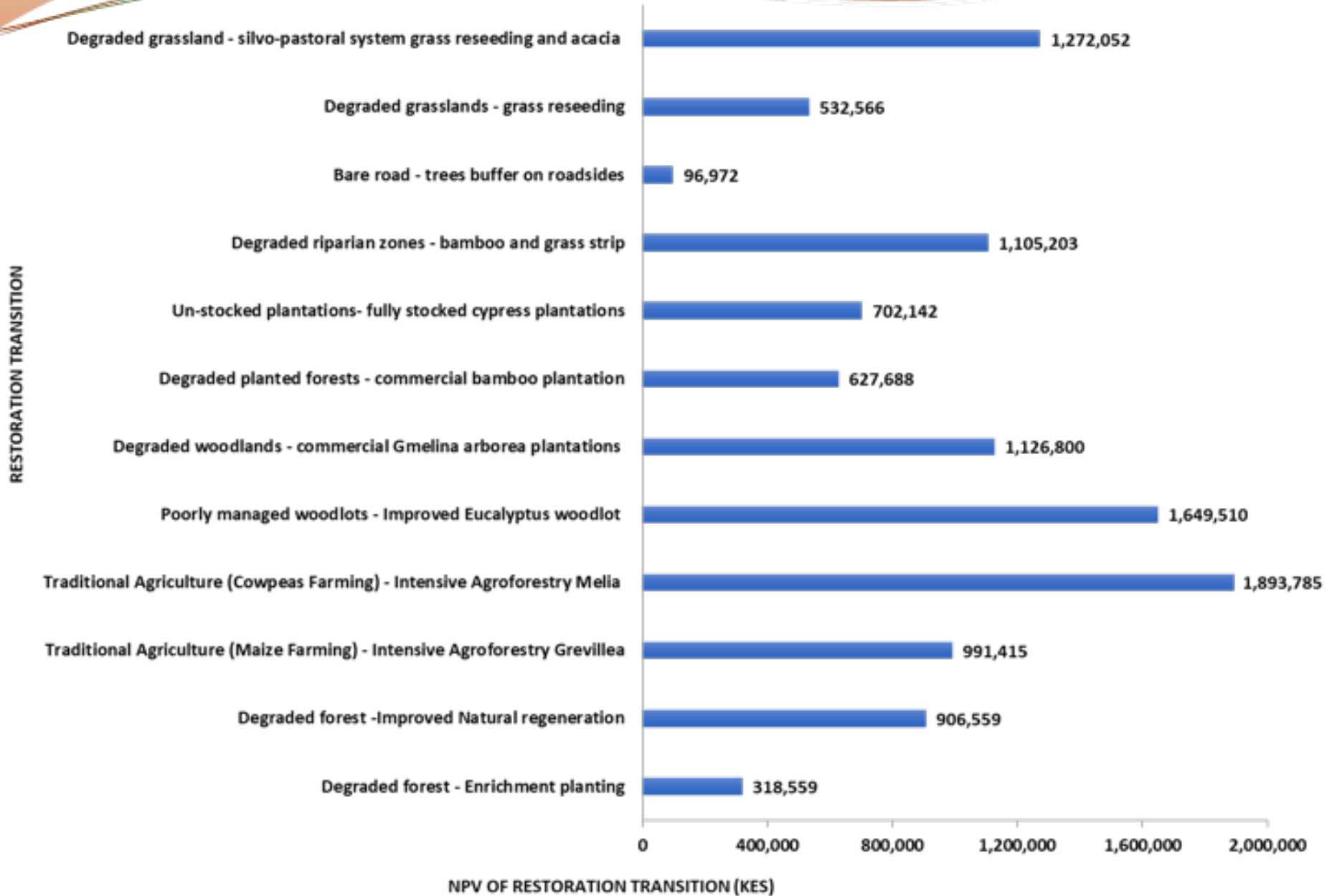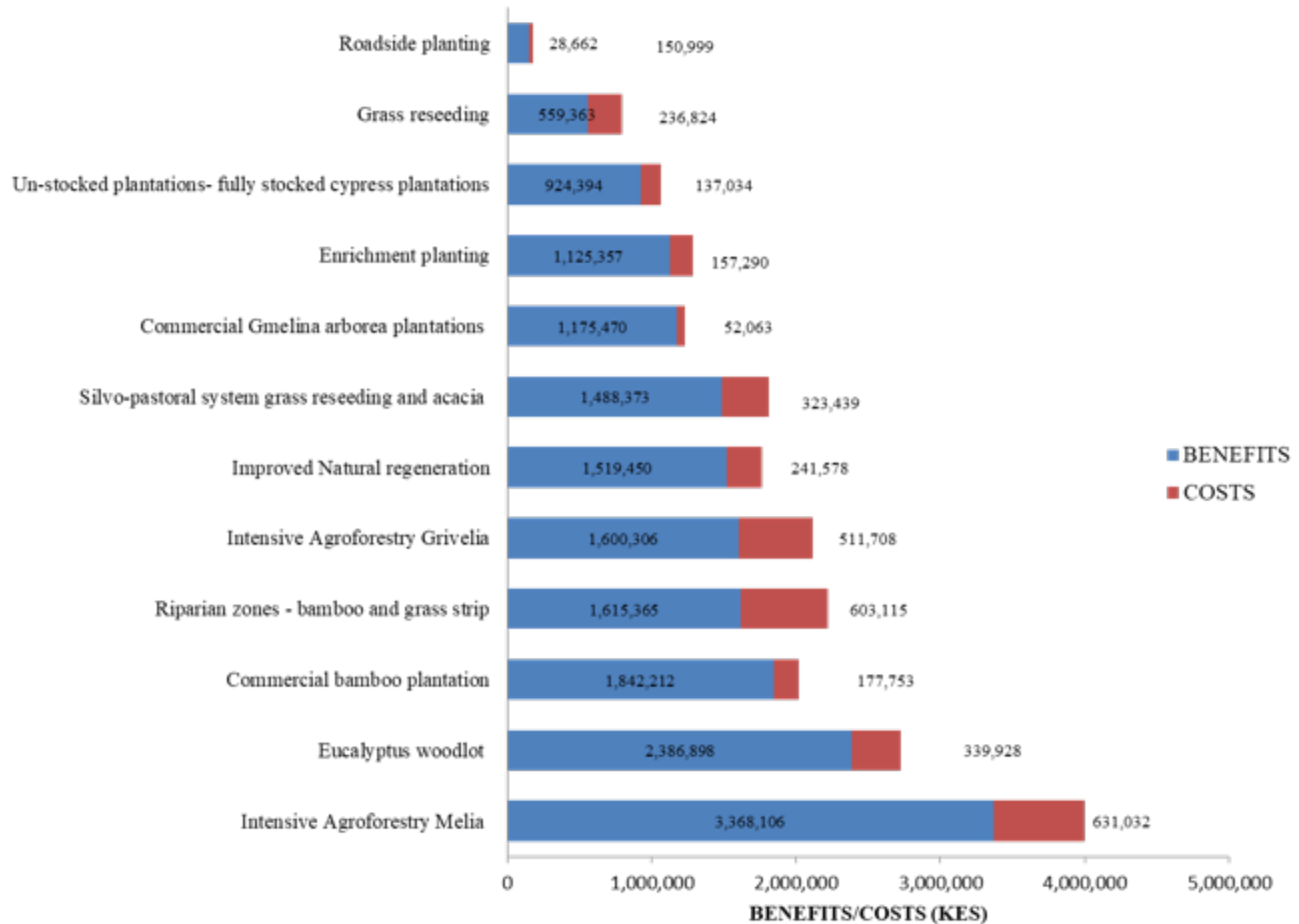

Degraded agricultural landscape

Degraded range lands

Net Present Value of Various Restoration Technologies

Discounted Costs and Benefits of Restoration Technologies

Estimated Costs of Restoration Targets at National Scale

Restoration Transition	Conservative	Intermediate	Ambitious
Degraded forest - Enrichment planting	15,229	30,458	45,687
Degraded forest -Improved Natural regeneration	169,104.6	265,735.8	338,209.2
Traditional Agriculture (Maize Farming) - Intensive Agroforestry *Grevillea robusta*	153,512.4	268,646.7	396,573.7
Traditional Agriculture (Cowpeas Farming) - Intensive Agroforestry *Melia volkensii*	883,444.8	1,262,064	1,640,683.2
Poorly managed woodlots - Improved Eucalyptus woodlot	33,992.8	59,487.4	42,491
Degraded woodlands - commercial *Gmelina arborea* plantations	10,412.6	15,618.9	20,825.2
Degraded planted forests - commercial bamboo plantation	53,325.9	53,325.9	88,876.5
Un-stocked plantations - fully stocked Cypress plantations	13,703.4	13,703.4	27,406.8
Degraded riparian zones - bamboo and grass strip	60,311.5	60,311.5	60,311.5
Bare road - trees buffer on roadsides	5,732.4	5,732.4	8,598.6
Degraded grasslands - grass reseeding	153,935.6	236,824	307,871.2
Degraded grassland - silvo-pastoral system grass reseeding and *Acacia Senegal*	307,267.05	517,502.4	711,565.8
Total	1,859,972.05	2,789,410.4	3,689,099.7

Table 1:Costs of Restoration Targets at National Scale

Benefits from Restoration Targets

Table 2: Economic Benefits from Restoration Targets

Restoration Transition	Conservative	Intermediate	Ambitious
Degraded forest - Enrichment planting	96,806.8	193,613.6	290,420.4
Degraded forest -Improved Natural regeneration	894,510.4	1,405,659.2	1,789,020.8
Traditional Agriculture (Maize Farming) - Intensive Agroforestry Grevillea	326,579.4	571,513.950	843,663.45
Traditional Agriculture (Cowpeas Farming)-- Intensive Agroforestry Melia	3,831,903.6	5,474,148	7,116,392.4
Poorly managed woodlots - Improved Eucalyptus woodlot	204,697	358,219.75	255,871.25
Degraded woodlands - commercial gmelina arborea plantations	224,681.4	337,022.1	449,362.8
Degraded planted forests - commercial bamboo plantation	499,337.7	499,337.7	832,229.5
Un-stocked plantations- fully stocked Cypress plantations	78,736	78,736	157,472
Degraded riparian zones - bamboo and grass strip	101,225	101,225	101,225
Bare road - trees buffer on roadsides	24,467.4	24,467.4	36,701.1
Degraded grasslands - grass reseeding	211,600.35	325,539	423,200.7
Degraded grassland - Silvo-pastoral system grass reseeding and acacia Senegal	1,106,687.3	1,863,894.4	2,562,854.8
Total	7,601,232.350	11,233,376.1	14,858,414.2

Conclusions and Recommendations

- All the restoration transitions analyzed are economically feasible

- Restoration requires massive financial resources e.g. for the most conservative restoration scenario, it requires about KES 1.8 Trillion for the 5.1 million Hectares

- There is need to design innovative financing mechanisms to support restoration efforts e.g. PES schemes, conservation easements, carbon credit schemes (REDD+)

Some Successful Restoration Solutions

Bamboo planting along degraded riparian areas

Tree buffer zones

Well managed wood lot

THANK YOU

THE END