Restoration Monitoring Readiness in Kenya:
A Rapid Assessment

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1. Highlights

- Land use and land cover change is the second largest contributor (38%) to Kenya's greenhouse gas emissions following agriculture.[1]

- Restoration is prioritized by the Kenyan government as demonstrated by various policies and the commitment to restoring 5.1 million hectares of land by 2030 under the African Forest Landscape Restoration Initiative and Bonn Challenge, as well as a national target of attaining 10% tree cover. Restoration is also critical for the country to meet its economic development and environmental goals.

- Most restoration projects or initiatives have focused on the arid and semi-arid areas where land degradation is rampant due to soil erosion and excessive runoff.[2]

- The highest number of implementing partners from the survey were from the private sector, especially the energy sector.

- The reported restoration activities and practices focused on reforestation, agroforestry, capacity building for conservation, policies, and institutions.

- Restoration indicators monitored by the projects were in the areas of tree growth and diversity, benefits, alternative energy/carbon, policy and enabling environment and institutions, investment, and yield. Most of the indicators were for activities and outcomes with a few considering the impacts of restoration.

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[1] MEMR, 2016
[2] Gachenje et al 2019

2. List of Acronyms and Abbreviations

AFR100	African Forest Landscape Restoration Initiative
ASALs	Arid and Semi-Arid Lands
BURs	Biennial Update Reports
CBOs	Community-Based Organizations
CEC	County Executive Committee
CIDP	County Integrated Developmental Plan
CIFOR	Center for International Forestry Research
CIMES	County Integrated Monitoring and Evaluation System
CO_2	Carbon dioxide
CSAS	Climate Smart Agriculture Strategy
CSOs	Civil Society Organizations
EMCA	Environment Management and Coordination Act
FAO	Food and Agriculture Organization of the United Nations
FLR	Forest and Landscape Restoration
FMNR	Farmer Managed Natural Regeneration
FOLAREP	Forest and Landscape Restoration Action Plan
GEA	Global Evergreening Alliance
GHG	Greenhouse gas
GOK	Government of Kenya
Ha	Hectare
ICRAF	World Agroforestry Centre
KEFRI	Kenya Forestry Research Institute
KM	Knowledge Management
MEF	Ministry of Environment and Forestry
MEMR	Ministry of Environment and Mineral Resources
MoALF	Ministry of Agriculture, Livestock and Fisheries
MOPND	Ministry of Planning and National Development
MRV	Measuring, Reporting and Verification
MTP	Medium Term Plan
NCCAP	National Climate Change Action Plan
NCs	National Communications
NDC	Nationally Determined Contribution
NEMA	National Environment Management Authority
NFMS	National Forestry Monitoring System
NGO	Non-governmental Organization
RAE	Rehabilitating Arid Environments
REDD+	Reduction of Emissions through Deforestation and Degradation
SFM	Sustainable Forest Management
UN	United Nations
UNFCC	United Nations Framework Convention on Climate Change
WRI	World Resource Institute

2. Introduction

Land degradation caused by deforestation and loss of vegetation cover is one of the most serious impediments to Kenya achieving its development goals under Vision 2030 (MEMR, 2016). Furthermore, land is a pillar for the country's development blueprint which is structured around the Big 4 Agenda that prioritizes: (i) Food and nutrition security (ii) Affordable housing, (iii) Increased manufacturing and (iv) Affordable healthcare. Furthermore, the state of the environment and food security are interlinked in tropical landscapes with the ever-increasing demand for productive land, land for settlement and for development, among other uses, posing a threat to long-term sustainability (Vågen et al 2018).

Human activities that pose the greatest threat include unsustainable land management practices such as the destruction of natural vegetation, over-cultivation, overgrazing, poor land husbandry and excessive forest conversion (Gachenje et al 2019). This puts Kenya at a high risk of the negative effects of climate change as it is already susceptible to climate related events; especially if nothing is done to reverse the degradation trends. Land in Kenya is continuously degraded, threatening the livelihoods of most of the population who rely on agricultural activities for food and income.

Land degradation is a huge global environmental and developmental challenge (Gachenje et al 2019). Spatial analysis of the land use cover changes in 2015 showed an overall deterioration of vegetation cover. According to the Land Degradation Assessment in Kenya Report of 2016, high levels of land degradation are likely to occur on about 61.4% of the total area of Kenya, while very high degradation affects 27.2% of the land (MEMR, 2016). Furthermore, according to the same report, national land use challenges include deforestation, habitat degradation, fragmentation and loss of biodiversity, soil infertility, overstocking and overgrazing, soil erosion and/or siltation of water bodies, flooding, landslides, water scarcity, and climate change.

Kenya's greenhouse gas (GHG) emissions keep increasing, although the 2015 emissions contributed to less than 0.1% of global emissions, Kenya's increasing emissions cannot be ignored (MEF, 2020). Land use and land cover change is the second largest contributor (38%) to Kenya's emissions, this is largely due to deforestation and energy needs. This closely follows agriculture, which is the largest contributor to the country's emissions (40%) (MEF, 2020).

Landscape restoration is a vital process for reversing degradation by increasing soil fertility and productivity, reversing biodiversity loss, and contributing to climate change mitigation and adaptation. Furthermore, according to the Food and Agriculture Organization of the United Nations (FAO) and World Resources Institute (WRI), restoration activities improve social, ecological, and economic benefits as forests and vegetation cover are continuously

increased (Buckingham et al 2019). Restoration is prioritized by the Kenyan government and is denoted by the various policies and legislations. For example, the Kenya Vision 2030 states the need for sustainable land use as part of the proposed land reforms where the Government of Kenya is committed to restoring 5.1 million hectares of land by 2030 under the African Forest Landscape Restoration Initiative (AFR100) and Bonn Challenge, as well as a national target of attaining 10% tree cover (MOPND, 2011). Additionally, the potential of landscape restoration can be unlocked to achieve environmentally and socially sound outcomes if support, cooperation, and contribution is from different stakeholders at all levels.

Counties most affected by degradation include Samburu, Kitui, Garissa, Tana River, Mandera, Turkana, Marsabit, Baringo, West Pokot, Kajiado, Kilifi, Wajir and Makueni. Relatively wet zones also have a high propensity for soil erosion, especially on the steep slopes of Mt. Kenya and the Aberdares, these include parts of Muranga, Nyeri, Meru and Tharaka-Nithi (MEMR, 2016). The 2016 national assessment of the potential restoration opportunities identified seven priority restoration options: afforestation activities, reforestation efforts, agroforestry practices, commercial tree and bamboo plantations, tree-based buffer zones along water bodies and wetlands, tree-based buffer zones along roads and rangeland restoration (MEMR, 2017).

For several decades now, restoration initiatives have been driven by the government, non-governmental organizations (NGOs), community-based organizations (CBOs), the private sector among other key players. However, the extent and effectiveness of these initiatives need to be monitored accurately, especially to report on international commitments and local restoration ambitions. Importantly, the United Nations Decade for Ecosystem Restoration, launched in June 2021, is likely to catalyze further restoration projects in the country.

The need to monitor and learn from landscape restoration initiatives prompted this rapid assessment of Restoration Monitoring Readiness in Kenya, the aim of which is to take stock of the extent of landscape restoration practices and monitoring in Kenya and to share the key lessons. This rapid assessment will contribute to the establishment of an aligned and coordinated monitoring, reporting, and learning framework for landscape restoration in Kenya. This report was prepared as part of the Regreening Africa Program support to restoration in Kenya.

3. Methods
The results in this report come from three main data collection processes:
  (i)   Online survey targeting a wide range of restoration stakeholders and actors in Kenya including government agencies, NGOs, CBOs, and youth groups. The online survey was launched in mid-April 2021 and kept open for six weeks.
  (ii)   Qualitative data from a webinar on Forest and Landscape Restoration Monitoring with stakeholders in 2021.

(iii)   Desktop review of restoration work in Kenya.

The initial results were presented during the Forest Landscape Restoration Monitoring Webinar held on the 23rd of April 2021. The survey was officially closed on 2nd June 2021 for the development of the final report.

4. Restoration projects/initiatives

 (i)   Counties and number of projects

Thirty-two projects/initiatives were reported in the survey. The projects/initiatives were distributed throughout the country, Turkana had the highest number of projects (10), followed by Laikipia (8) and Isiolo (7) (Figure 1). Most of the restoration projects were in the Arid and Semi-Arid Lands (ASALs), where land degradation is most prevalent (MEMR, 2016 and MEMR, 2017).

There was no feedback from initiatives in 15 counties (Bungoma, Kakamega, Kilifi, Kirinyaga, Kisii, Kisumu, Mombasa, Murang'a, Nyamira, Nyandarua, Nyeri, Samburu, Vihiga, Wajir and West Pokot). However, this does not mean that there are no land restoration projects/activities in these counties.
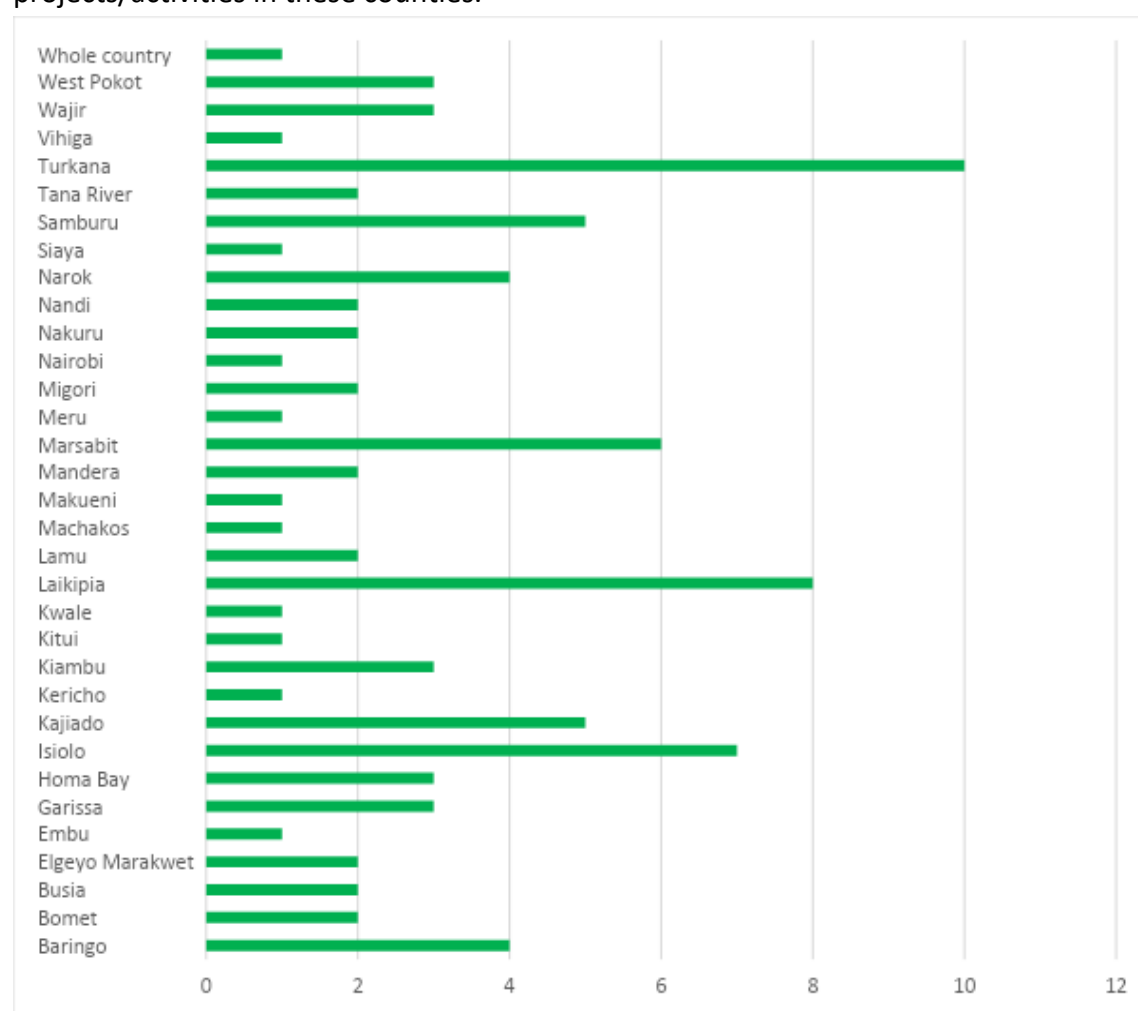

Figure 1: Number of reported projects/initiatives per county

(ii)   Project timelines

Most timelines given by the projects extended from 2019 to 2021, thereby leading to the UN Decade on Ecosystem Restoration which runs from 2021 through to 2030. The year 2021 has the highest number (25) of active restoration projects. Of the 32 restoration projects/initiatives, 27 indicated their period of operation[3], which averaged at 6.7 years. These included projects with short timelines of less than a year, long-term timelines of between 5 and 15 years, and two with infinite timelines.
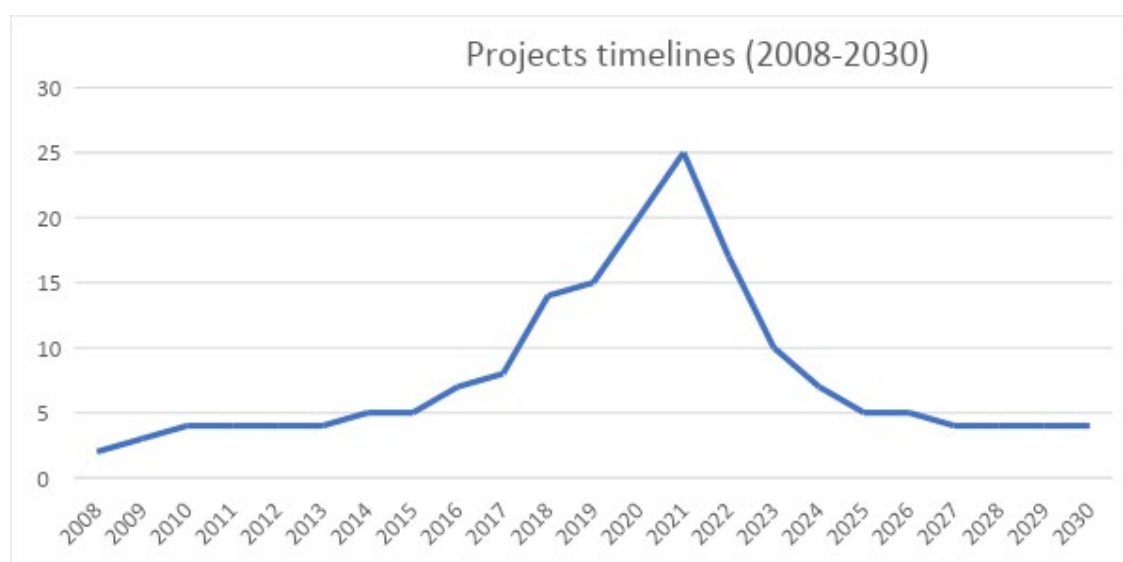

Figure 2: Project dates of operation

(iii)   Targeted versus covered hectares

Fourteen[4] of the 32 surveyed projects declared a total of 1,859,343 ha as targeted for restoration. Of the total target area, 839,057 ha were reported to have been successfully under restoration activities (Figure 3). To determine whether the reported areas are fully restored, an assessment of restoration dimensions such as soil and vegetation health and livelihood dynamics is required.

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[3]For the purposes of this report, we have reported dates of operation up to 2030 as there are two** projects with infinite timelines.
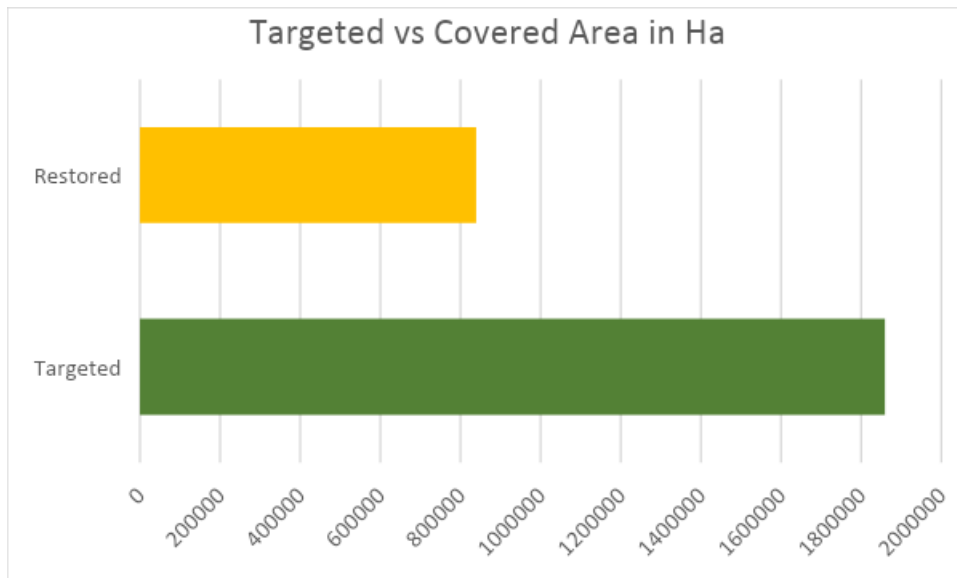[4] Eighteen projects did not differentiate between targeted area versus successfully covered area.

Figure 3: Total targeted versus restored (covered) hectares for 14 projects

4.2. Landscape restoration activities/ practices

The ongoing land restoration activities/practices that were reported include:

i. Reforestation practices: such as tree planting, the use of bamboo, greenbelt establishment, reseeding, and catchment restoration.

ii. Agroforestry practices (where trees are planted together with crops): involving seedlings establishment, planting of fruit trees and indigenous trees, improved land management, and Farmer Managed Natural Regeneration (FMNR).

iii. Conservation practices: including soil and water conservation, pasture development, alternative energy approaches, invasive species management, organic farming, and patrolling.

iv. Other practices (that support implementation): including capacity building, policy and regulatory support, climate proofing, intervention bylaws and conservation agreements, institutional support, and advocacy.

Figure 4 presents a word cloud of the restoration indicators being monitored by the projects/initiatives. The size of each word indicates the frequency with which it was reported. Reforestation, seedlings establishment, and soil and water conservation were the most frequently reported.
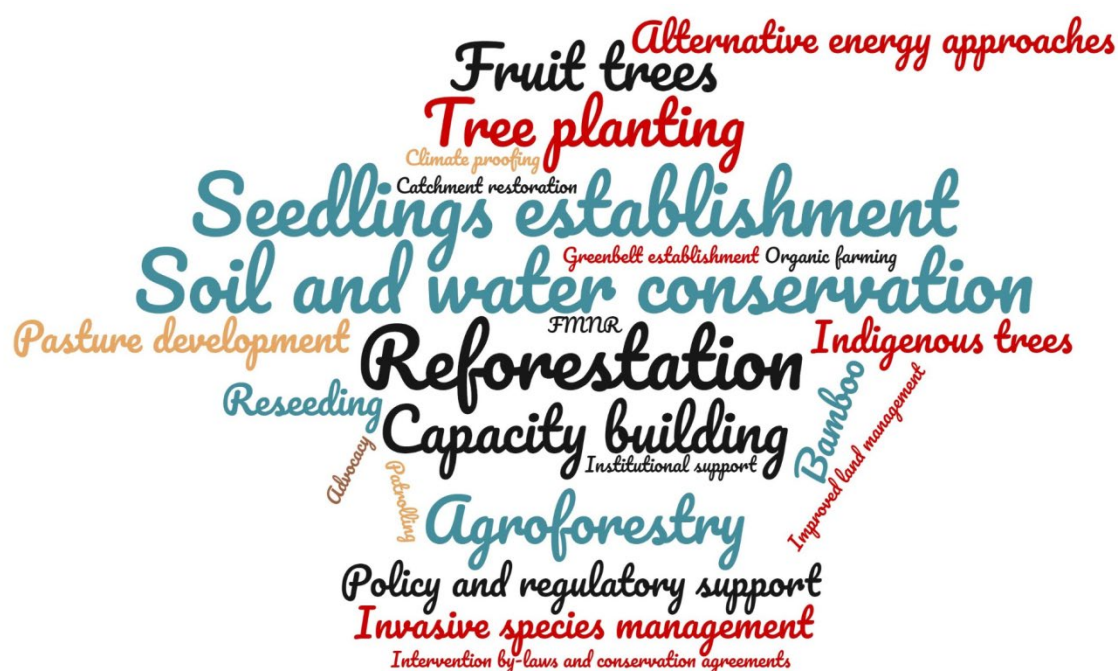
Figure 4: Restoration indicators being monitored by projects (size of text indicates frequency of mention)

The analysis of Kenya's policies and plans by Gachenje et al (2019) summarizes specific measures to reduce/reverse degradation that are closely aligned with the findings of this monitoring survey. Although the survey results only captured projects/initiatives that responded to the online survey, literature shows that there are other notable forest landscape restoration efforts whose impacts need to be captured. For example, the Mau Forest Complex faced extensive illegal settlement and deforestation. This was addressed by the Kenya Forest Service (KFS) who rehabilitated more than 4,000 ha of the Likia and Sururu blocks through bare soil-mixed species planting, natural regeneration, and enrichment planting (Munyasya 2018).

Another good example is Rehabilitating Arid Environments (RAE) Ltd that has directly rehabilitated more than 2,400 ha in the Rift Valley, specifically in Baringo County. The rehabilitated areas comprise 75 community fields (0.5–200 ha) that are managed by communities or groups, including shareholders' and women's groups, and 924 private fields (each 0.5–16 ha) that are managed by individual families (Meyerhoff, 2020).

All county governments support landscape restoration projects and activities, this is evident in their County Integrated Developmental Plans (CIDPs). The counties are required by the national government to have mechanisms in place for reversing land degradation and reducing the negative effects of climate change.

5. Restoration indicators being monitored

The restoration indicators being monitored by the projects that completed the survey are as follows:

1. **Area of restoration**: Hectares of land reclaimed/Hectares under improved land management/ Hectares under direct restoration/Hectares reseeded with pasture/hay produced/ Number and area of orchard established/ Naturally regenerating pastures propelled by effective enclosure of grasslands/ Number of hectares directly contributing to biodiversity conservation and sustainable use/ Increased household farms on bamboo/ stabilized riverbanks and dykes/ soil health.

2. **Tree growth/diversity**: Number of trees managed/ Germination, growth, and maturity to reseeding of selection sites/ Regreening action index (extent of restoration practices, intensity of restoration practices, diversity of restoration practices, intra-household equity/ Effective substitution of monoculture tree plantations with polyculture tree species/ Number of seed banks established or supported/ tree nursery establishment.

3. **Population benefitting**: Number of people trained/ benefiting from forest landscape restoration (FLR) interventions/ farmers integrating FMNR/ Increased individual farmers/ number of community ranch members trained and skilled on group ranch organization organizational capacity and natural resource management/ Number of people directly benefiting from project activities (including capacity building events and trainings)/ number of capacity building events and numbers of farmers attending/ number of grazing scouts trained and enforcing grazing agreements/ Bamboo farmers' cooperative formed/ Number of local community restoration crews employed and trained for restoration/ number of herders recruited trained and applying alternative sustainable grazing plans/ participation in training/extension on restoration approaches.

4. **Alternative energy/carbon:** Number of households adopting alternative and clean efficient technologies/ Number of tons of CO_2 directly mitigated through project activities/ recovering, reusing, recycling, and reducing ecosystem by-products/ reduction in cutting of trees for charcoal production.

5. **Policy and enabling environment/institutions**: Number and type of relevant FLR -related action plans and policies developed and adopted/ cross-sectoral coordination mechanisms in place at the national level/ Implementation of enforcement of developed bylaws/agreements and restoration plans/ progressive alignment of the needs of dryland communities into the action plan vis-à -vis the nature of dryland ecosystems/ policy influencing/ Seamless integration of indigenous and scientific knowledge.

6. **Investment:** Number of investment tools developed/improved to support FLR initiatives/ systems, values, and practices/ Impactful gender-responsive climate finance and decision-making strategy/ increased gum Arabic production.

7. **Yield**: Volume of yield increase, capacity, and volume of water harvested/ end-point water use optimization for humans, animals, plants, and soils/ frequent stable rains.

Most of the reported indicators were for activities and outcomes with a few that consider the impact of the restoration projects/initiatives.

6. Tools and methods that are used to monitor the indicators

The key tools and methods used to monitor the indicators of landscape restoration activities in Kenya, as reported by the surveyed projects/initiatives, include surveys, observation and field visits, community feedback, photography, smart gadget (phones and tablets) applications, reports, monitoring and evaluation, satellite images, assessments, measurements, production, surveillance, Collect Earth; Open Foris, Inbar bamboo mapping tool, vegetation monitoring, policy, and legal tools. The word cloud below (Figure 5) shows that surveys and observation/site visits were the most mentioned methods used for monitoring indicators.

Figure 5: Monitoring methods and tools reported to be used by the projects (size of text indicates frequency of mention)

7. Challenges in developing indicators and deploying monitoring tools

Financial, human capacity, technological and data challenges were identified in the survey as negatively affecting the development of indicators and the deploying of monitoring tools.

Table 1: Challenges in developing indicators and deploying monitoring tools

Challenge	Responses from the survey
Technological	- weak technological base - not comprehensive; does not capture feedback
Financial	- inadequate financial resources for projects - sometimes leads to abandonment of projects
Human capacity	inadequate human capacity
Data challenges	- knowledge gaps - no previous programs and/or images for comparison - data available is unreliable
Engagement	- low reporting - insincerity from beneficiaries - lack of good will and poor coordination between stakeholders - change in gender norms - encroachment
Bio-physical	- poor terrain making project sites inaccessible - drought hinders establishment of vegetation - measures the status (current) of activities but not progressively
Policy and legal framework challenges	- weak policy and legal support of restoration activities - unfavorable land tenure system

8. Implementing partners

The largest number of implementing partners reported in Kenya are interestingly from the private sector (15) and mostly from the energy sector like Cookswell Jikos Ltd and Chardust Ltd, among others. The second largest category of implementing partners is the national government (13). Other implementing partners include CBOs (9), NGOs (8), United Nations and intergovernmental organizations (5), county governments (4) and research institutions (2), see Figure 7 below.
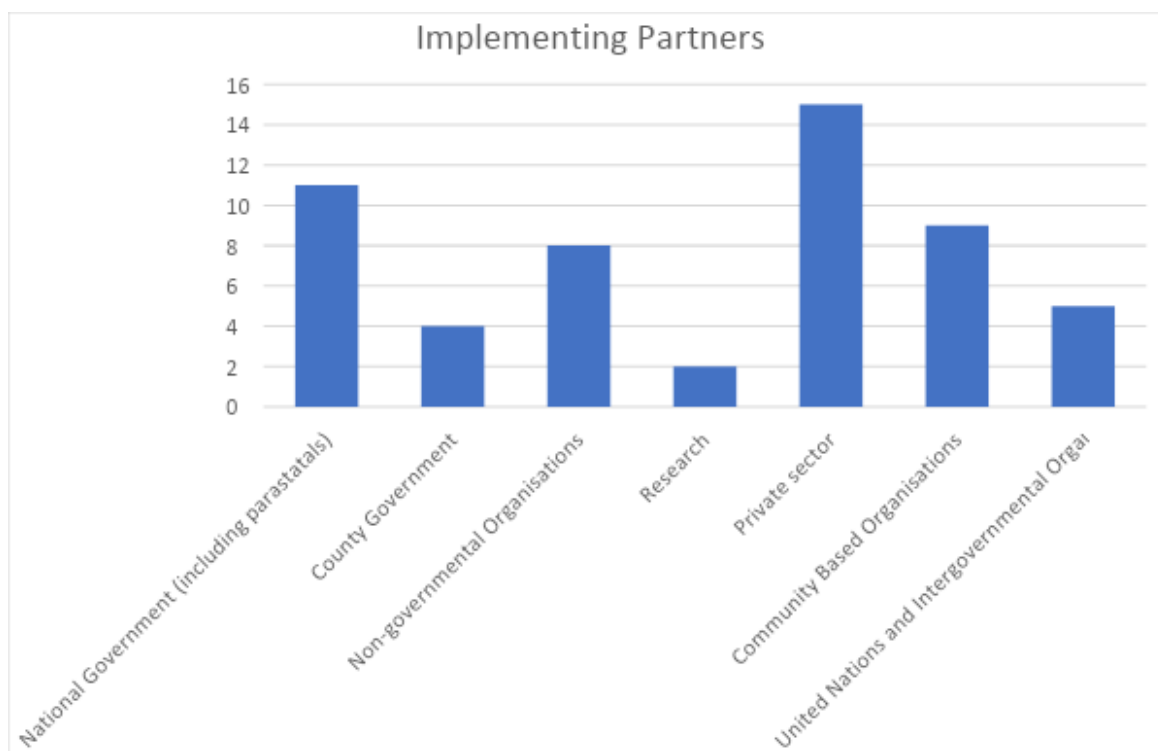

Figure 7: Numbers of implementing partners per category

During the webinar on the 23rd of April 2021, it was evident that projects are actively engaged in monitoring landscape restoration activities. For example, Kenya is implementing an Integrated MRV System that will help in tracking mitigation and adaptation actions ready to report to the United Nations Framework Convention on Climate Change (UNFCCC), National Communications (NCs) and Biennial Update Reports (BURs). It will also track progress on implementation of the Nationally Determined Contribution (NDC). Additionally, the Integrated MRV System will demonstrate the country's climate finance readiness and provide a strong platform for attracting international climate finance flows from multilateral and bilateral development partners.

The KFS implements the National Forestry Monitoring System (NFMS) which comprises the Forest Information Platform, Reduction of Emissions through Deforestation and Degradation

(REDD+) and Sustainable Forest Management (SFM) [5]. Specifically, the NFMS monitors forest degradation and deforestation and will also be used as one of the systems to monitor forest and landscape restoration initiatives.

The National Forest Landscape Restoration (FLR) Knowledge Management (KM) System is a portal under development by the Kenya Forestry Research Institute (KEFRI) the aim of which is to centralize management of FLR knowledge in Kenya. The portal will be a one-stop shop online platform for FLR resources for restoration initiatives in Kenya.

The County Integrated Monitoring and Evaluation System (CIMES) was presented by the Council of Governors. CIMES is used to track the implementation progress of projects and programs outlined in the Medium-Term Plan (MTP) which is to implement the Kenya Vision 2030, the CIDPs and other projects and programs financed by devolved funds, development partners and Civil Society Organizations (CSOs).

The Open Foris Collect Earth, an FAO restoration tool, enables data collection through Google Earth in conjunction with Bing Maps and Google Earth Engine, to analyze high and very high-resolution satellite imagery. The objective of the tool is to assist governments, communities, and others to make well informed decisions on sustainable forestry and land management.

There is also the Regreening Africa Kenya Dashboard and Regreening Africa App by World Agroforestry (CIFOR-ICRAF) through the Regreening Africa Program, for robust monitoring of interventions and impacts of land restoration. Regreening Africa App captures information on tree planting, FMNR, trainings and tree nurseries and the results can be combined with satellite imagery and the Land Degradation Surveillance Framework database to determine vegetation cover and land health indicators such as erosion and soil organic carbon.

The main objective of the Global Restoration Monitor by the Global Evergreening Alliance (GEA) is to track global land restoration projects, spanning from large multi-country programs to local grassroots initiatives. It utilizes ground level data with a significant focus on smallholder farmers across 18 countries including Kenya. It monitors indicators like total land under restoration, number of women and men trained in restorative methods, number of households practicing restorative methods, number of trees under management and tons of carbon sequestered.

Many other tools and approaches to monitoring landscape restoration exist in Kenya that were not captured by the survey or the webinar.

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[5] Sustainable Forest Management (SFM) - a relational Database Management System for sharing information and data on forestry and related issues and for the development of sustainable forest management plans.

9. Policy and enabling environment

Land restoration is an intensive process that involves a variety of intertwined economic, environmental, and social issues, which cut across the mandates of various government and non-governmental agencies. Thus, to achieve landscape restoration, there must be coordination, collaboration and cooperation across institutions, sectors, actors, and policy domains.

There are several laws that prescribe measures to reduce degradation and/or restore degraded land: The Constitution of Kenya, National Strategy for Achieving and Maintaining over 10% Tree Cover by 2022, draft Agroforestry Strategy and the Environment Management and Coordination Act (EMCA) of 1999, which promotes afforestation and reforestation activities in eroded areas and areas prone to erosion.

There are various policies and plans that prescribe specific measures to reduce and reverse land degradation. For example, the National Climate Change Action Plan (NCCAP) 2018-2022 and Climate Change Act not only mainstream climate change mitigation and adaptation into sector functions but also identify and support implementation of targeted land restoration activities. Obligations across legal and policy documents are well-aligned with land restoration efforts across different areas. For example, the Community Land Act, Land Act and the National Policy for the Sustainable Development of Northern Kenya and other Arid Lands caters for the ASALs, the Forest Conservation and Management Act and the Forest Policy targets forested land, while the Climate Smart Agriculture Strategy (CSAS) and other documents cover agricultural areas.

Additionally, Kenya is preparing the Forest and Landscape Restoration Action Plan (FOLAREP) 2021-2025, which is in the final stages of development. The plan is meant to address challenges like inadequate implementation of legal and policy frameworks, low application of modern technology, poor coordination among stakeholders, inadequate investments in FLR value chains, inadequate market infrastructure, research, and knowledge gaps among other challenges.

Counties have a task to adopt national laws and policies at the county level to a point where they have specific policies and/or action plans that address their county level issues. For example, in Turkana, the County Government through the Climate-Change Steering Committee chaired by the County Executive Committee (CEC) Water, Environment and Mineral Resources came up with the Turkana County Climate-Change Policy 2020. This further enabled the development of the Turkana County Climate-Change Bill 2020 which is in the final stages of becoming an Act. There is also a Turkana County Action Plan in place. This legislation has been established to address the poor coordination and conflicting/duplicating roles within the climate-change sector. It is through this legislation that it has been proposed that

after the bill is passed, 2% of the county budget will be allocated to climate-change mitigation and adaptation efforts. Such milestones are promising to landscape restoration efforts. Other counties that are domesticating national policies and/ or action plans include Nandi, Embu, Marsabit, Vihiga and Kilifi, among others.

To inform policy implementation and review, a robust monitoring framework at local, sub-national and national levels is needed to report on the restoration progress, understand the impacts of restoration initiatives on the environment and people's livelihoods and to create space for reflection and improvements moving forward.

10. Concluding remarks and way forward

Landscape restoration has been identified as a critical area in Kenya and many projects and initiatives are underway across the country, particularly in the ASALs. A range of monitoring tools and approaches are being deployed but a coordinated and integrated framework for monitoring, reporting and reflection has not yet been established. A technical working group for monitoring landscape restoration has been called for in several strategies and action plans to allow for reliable reporting of restoration at the sub-national and national levels. This rapid assessment has highlighted the range of tools and approaches that are being used and some of the challenges in their deployment. It is also evident that different organizations have their own monitoring tools; thus, there is need for a streamlined tool. Results from this report can be used by the working group, once established, to support the monitoring framework establishment and operationalization.

Furthermore, there is need for streamlining of institutional mandates for proper coordination and clear data flow systems. There must be clear definition of indicators for appropriate monitoring and reporting. There is also need for concise data quality control and assurance protocols. It is also evident that there is need for easy-to-use data collection systems as several surveyed projects indicated that there were technological hiccups in the use of monitoring tools. There is also a dire need for building capacity in terms of skills in restoration monitoring related technologies. The restoration indicators being monitored are mostly activity and outcome based, therefore there is need for impact-based restoration indicators. Therefore, FOLAREP is timely, it will streamline and address the various issues and challenges in the monitoring of restoration efforts and will create a roadmap for a monitoring framework.

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