



Ministry of Environment, Climate Change and Forestry

Kenya Forest and Landscape Restoration Monitoring Framework

A framework for monitoring, reporting and learning on forest and landscape restoration

2023



Acknowledgements

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Cover photo: Kelvin Trautman



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Foreword



Land degradation is a major challenge in Kenya with around a third of our land mass classified as severely degraded and costing the nation billions of shillings each year. The Kenyan government has therefore committed to restore degraded landscapes with various global, regional, and national commitments to alleviate the adverse effects of land degradation in the country. These include the African Forest Landscape Restoration Initiative (AFR 100), linked to the Bonn Challenge, where Kenya has committed to restore 5.1 million hectares of degraded landscapes by 2030 and a national commitment to restore 10.6 million hectares of degraded forests and rangelands by 2032. 15 billion seedlings will be grown on the degraded land and will increase the national tree cover to 30 percent. In addition to Land Degradation Neutrality (LDN) commitments, Kenya has National Determined Contributions (NDCs) for climate change, which depend in part to restoring landscape both for mitigation and adaptation. The Kenya National Biodiversity Strategy and Action Plan, also depends on the restoration of critical ecosystems. In short, landscape restoration is critical to achieving many of Kenya's commitments and to delivering on environmental and livelihood outcomes.

The Forest and Landscape Restoration Implementation Plan 2023-2027 (FOLAREP) has been developed to guide landscape restoration in Kenya and provides a framework to operationalize restoration interventions including the national programme for accelerated forestry and rangelands restoration. FOLAREP calls for long-term monitoring, reporting and verification of restoration initiatives at national, county, and local levels. In this regard, FOLAREP proposes the creation of an integrated monitoring and reporting framework to report on all the restoration efforts occurring in Kenya, the roadmap for which is outlined in this document.

The development of both FOLAREP and this monitoring framework are great steps forward in the country's commitment to landscape restoration and achievement of the outcomes for our people and the environment on which we depend.

Hon. Soipan Tuya, CBS

Cabinet Secretary,

Ministry of Environment, Climate Change and Forestry

Preface



The Kenya Forest and Landscape Restoration Monitoring Framework has been developed to support coordinated tracking, assessment, and reflective learning to both report on restoration of landscapes in the country and direct future investments. This is important because without a consistent and coherent monitoring framework and related institutional arrangements it is challenging to report on the progress and learning towards the achievement of restoration related commitments and expected impacts of these investments.

The framework outlines a set of 30 indicators and 45 sub-indicators for restoration monitoring considering both the process of restoration and the expected outcomes or impacts. Also included in this report is the process taken to develop the framework, tools and organisational structure to support its operationalisation and a road map outlining the next steps. The Ministry of Environment, Climate Change and Forestry is committed to support the operationalization of the framework in the coming years.

The monitoring framework was developed through a multi stakeholder consultative process led by the members of the Restoration Monitoring Technical Working Group with feedback drawn through a series of meetings, workshops, county engagement forums and a national validation event. The process has been consultative and engaging and we are pleased to now have both FOLAREP and a monitoring and reporting framework to deliver on our ambitious restoration commitments.

Ephantus Kimotho

Principal Secretary, State Department for Forestry
Ministry of Environment, Climate Change and Forestry



The development of the monitoring framework through a multi-stakeholder consultative process. (Photos: Ann Wavinya, Caroline Njoki/ICRAF)

Acronyms

AFR100	The African Forest and Landscape Restoration Initiative
ARLI	African Resilient Landscapes Initiative
CBD	Convention on Biodiversity
CDCs	Counties Determined Contributions
CECs	County Environment Committees
CIDPs	County Integrated Development Plans
COG	Council of Governors
FAO	Food and Agricultural Organisation of the United Nations
FLR	forest and landscape restoration
FOLAREP	Forest and Landscape Restoration Implementation Plan
KFS	Kenya Forest Service
LDN	land degradation neutrality
LSDF	Land Degradation Surveillance Framework
MEAs	multilateral agreements
MoEF	Ministry of Environment and Forestry
MTWG	Restoration Monitoring Technical Working Group
NCCAP	National Climate Change Action Plan
NDCs	nationally determined contributions
SEPAL	System for earth observation, data access, processing, analysis for land monitoring
SDGs	Sustainable Development Goals (SDGs)
ToTs	training of trainers
UNCCD	The United Nations Convention to Combat Desertification
UNFCCC	The United Nations Framework Convention on Climate Change

Key definitions

Afforestation	Establishment of forest through planting and/or deliberate seeding on land that, until then, was under a different land use; implies a transformation of land use from non-forest to forest. ¹
Agroforestry	A dynamic, ecologically based, natural resource management system that, through the integration of trees in farms and rangeland, diversifies and sustains smallholder production for increased social, economic, and environmental benefits. ²
Deforestation	The conversion of forest to other land use, whether human-induced or not. ³
Ecosystem restoration	Conservation of intact ecosystems and assistance in the recovery of degraded or destroyed ecosystems. Healthier ecosystems with richer biodiversity yield greater benefits such as more fertile soils, bigger yields of timber and fish, and larger stores of greenhouse gases. Restoration can happen in many ways – for example, through active planting or by enabling natural recovery by removing ecosystem pressures. It is not always possible – or desirable – to return an ecosystem to its original state. ³
Forest	Refers to a land area of more than 0.5 hectares, with canopy cover of at least 15 percent and trees with a minimum 2 meter height, that is not primarily under agricultural or other specific non-forest land use. ⁴
Forest and landscape restoration	An active, long-term process that aims to regain ecological functionality and enhance human well-being in deforested or degraded landscapes. ⁵
Land degradation	The multiple human-caused processes that drive the decline or loss in biodiversity, ecosystem functions or ecosystem services in any terrestrial and associated aquatic ecosystem. ⁶
Land use	Social and economic purposes for which land, including water, is managed. ⁷ Alternatively, the total of arrangements comprising human actions, activities and inputs undertaken in a certain land- cover type. ⁵
Tree	A woody perennial plant of at least 2 meters in height with one or several stems having a definite crown. This grouping includes bamboos, palms, fruit trees and excludes non-perennial, non-woody species such as bananas, tall shrubs or climbers. ⁴
Tree canopy cover	Area covered by tree patches of less than 0.5 hectares, outside recorded forest areas. ⁸

1 FAO (2020) Global Forest Resources Assessment 2020: Terms and Definitions. Rome

2 Draft Kenya Agroforestry Strategy

3 <https://www.decadeonrestoration.org/what-ecosystem-restoration>

4 KFS (2013) National Forest Resource Mapping and Capacity Development for the Republic of Kenya. Forest Preservation Programme, Report No. KEF09/11494/01. Nairobi: Kenya Forest Service

5 <https://www.forestlandscaperestoration.org/>

6 IPBES (2018): The IPBES assessment report on land degradation and restoration. Montanarella, L., Scholes, R., and Brainich, A. (eds.). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany. 744 pages. <https://doi.org/10.5281/zenodo.3237392>

7 NEMA (2011) Integrated National Landuse Guidelines. <https://www.nema.go.ke/images/Docs/Guidelines/national%20landuse%20guidelines-nema.pdf>

8 Kenya Forest Service (2021) National Forest Resources Assessment Report.



1 Background

Land degradation is a global issue that disproportionately affects the poor and marginalized communities in least developed countries, with serious implications such as widespread poverty and food insecurity.^{9,10} Between 1 to 6 billion hectares of landscapes globally are degraded,⁸ significantly affecting the livelihoods and health of millions of people.

In Kenya, more than 30 percent of the country's land mass is estimated to be severely degraded, costing the Kenyan economy at least 3 percent of GDP annually (estimated around USD 390 million¹¹) and an estimated USD 1.3 billion per year between 2001-2009.⁸

As a result of the major challenges of land degradation, countries around the world have made commitments to landscape restoration under various global and regional initiatives. The UN Decade on Ecosystem Restoration was launched in 2021 with the aim to prevent, halt and reverse the degradation of ecosystems worldwide. Under the Bonn Challenge and its regional initiative for Africa, the African Forest Landscapes Restoration Initiative (AFR100), Kenya has pledged to restore 5.1 million hectares of degraded land by 2030 and an ambitious national target to restore 10.6 million hectares of degraded forests and rangelands by 2032. At a national level, the government has set a target of increasing tree cover to 30 percent through growing 15 billion trees by 2032, and reducing 32 percent of greenhouse gas emissions by 2030, as part of the updated Nationally Determined Contribution (NDC).

Kenya has made other relevant restoration commitments to various multilateral environmental agreements (MEAs), such as the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD) linked to land degradation neutrality (LDN) goals, amongst others.

⁹ Besseau P, Graham S, and Christophersen T. eds. 2018. Restoring forests and landscapes: the key to a sustainable future. Vienna, Austria: Global Partnership on Forest and Landscape Restoration. https://www.forestlandscaperestoration.org/images/gpflr_final%2027aug.pdf

¹⁰ Mulinge W. et al. (2016) Economics of Land Degradation and Improvement in Kenya. In: Nkonya E., Mirzabaev A., von Braun J. (eds) Economics of Land Degradation and Improvement – A Global Assessment for Sustainable Development. Springer, Cham.

¹¹ International Monetary Fund (IMF). (2010). Kenya: Poverty Reduction Strategy Paper MF Country Report No. 10/224 July 2010. Washington, D.C.

Improving ecological functionality with FLR

Forest and landscape restoration (FLR) is a process of regaining ecological functionality and enhancing human well-being in landscapes, leading to:

- improved livelihoods
- poverty reduction
- improved food security from enhanced land productivity
- energy and water security
- enhanced climate resilience, and
- job creation in the green economy sector, among

other benefits.⁹

Within Kenya, the goal of FLR is to improve ecological functionality and socio-economic benefits.

The **Forest and Landscape Restoration Implementation Plan 2023-2027 (FOLAREP)** is a five-year cross-sectoral and multi-stakeholder coordination framework, which aims to accelerate the restoration of deforested and degraded landscapes in Kenya for resilient socio-economic development and improved ecological functioning. The implementation of FOLAREP will further contribute to the achievement of 30% tree cover from the current 12.4% cover, and will

A national restoration monitoring framework

help to fulfil Kenya's international obligations.⁸

One of the challenges in reporting on NDCs, biodiversity action plans, LDN, AFR100/Bonn Challenge and other applicable restoration commitments, has been the lack of a consistent and coherent landscape restoration monitoring framework in Kenya. Without agreement on common indicators, measurement tools and methods, reporting processes, and institutional arrangements, it remains challenging to reliably track progress, assess outcomes, and learn and adapt restoration interventions.

To address this, FOLAREP proposes the creation of an integrated monitoring and reporting framework to report on all the restoration efforts occurring in Kenya: the Kenya Forest and Landscape Restoration Monitoring Framework.

A webinar on forest and landscape restoration monitoring, held in 2021 as part of the Kenya National Landscape Restoration Scaling conference, stressed the need to develop such a framework citing the following reasons:

- **It will coordinate restoration monitoring and track progress** made in the achievement of target and goals by all involved actors across sub-national, national, regional, and international

levels. This will enable all actors, including government, to assess the success or failure of restoration initiatives and to identify barriers that require further support to accelerate action.

- At the national level, the restoration monitoring framework will **enable the government to report on national, international, and regional commitments** in a coordinated manner.
- Development partners will also be able to **quantify their investments in the sector and to track the impact of their investments** in restoration.

This document is intended for all stakeholders working in forest and landscape restoration in Kenya. Stakeholders include government at multiple levels, civil society, including non-governmental organisations, research and academia, intergovernmental organisations, private sector, and the community.

This document explains how the Kenya Forest and Landscape Restoration Monitoring Framework was developed, provides potential monitoring tools to guide monitoring, reporting and learning on forest and landscape restoration, and outlines next steps to operationalise monitoring, reporting and learning in Kenya.

2 Framework development

The Kenya Forest and Landscape Restoration Monitoring Framework was developed through a consultative process led by the members of the Kenya Landscape Restoration Monitoring Technical Working Group (TWG).

The key steps involved in its development are highlighted in Figure 1. These steps outline both the process and the information sources that contributed to the framework.

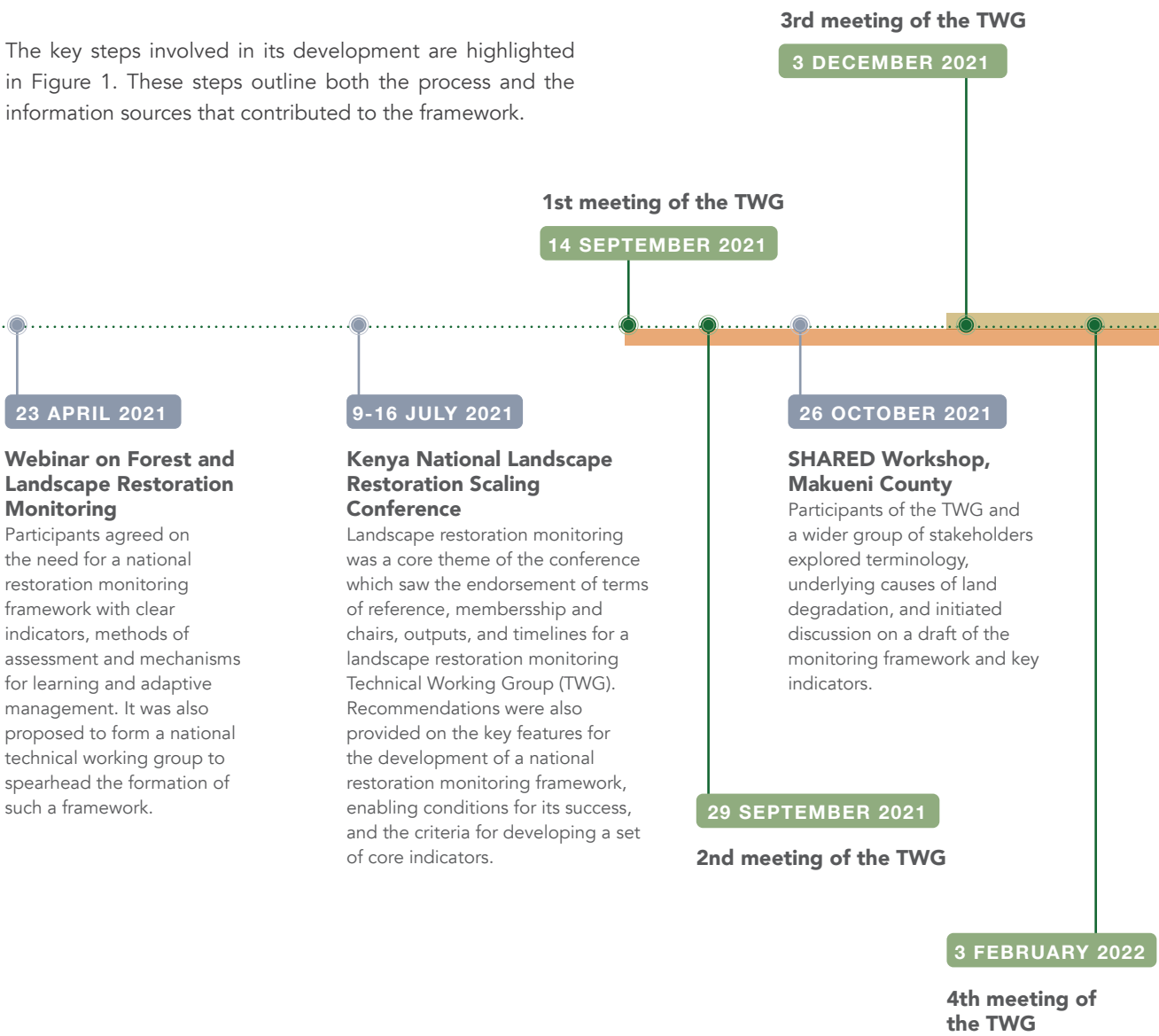


FIGURE 1: Timeline of the major steps in the process of developing of the Kenya Landscape Restoration Monitoring Framework

DECEMBER 2021–MARCH 2022

County consultations

Seven engagement forums brought together national government, all 47 counties, the Council of Governors, and development partners to **review drivers of degradation and barriers to restoration, top indicators for restoration monitoring, and County Environment Committees (CECs)**, which are the proposed structures for mainstreaming forest and landscape restoration at the county level. A synthesis report of the engagements was produced.¹²

The **top five indicators crucial for a national restoration monitoring system in Kenya** as noted by counties were:

- Area of forest and forest land restored.
- Number of existing plans, policies, strategies, regulations reviewed and developed.
- Area of degraded agricultural lands restored.

- Area of landscapes under improved management to benefit biodiversity.
- Trends in population accessing adequate quantities of safe water in urban/peri-urban areas.

It was noted during the consultations that CECs are active in only 18 of the 47 counties. Further, 25 of 47 counties mentioned that county climate change entities are critical to enhancing the CECs’ FLR functions. This indicates that all counties have distinct FLR monitoring structures, including CECs, monitoring and evaluation committees, and units. This distinction arises from a unique clustering and nomenclature of county departments, which highlights the importance of harmonized departments to allow for easier implementation and monitoring of FLR.

National Validation Workshop

To validate the monitoring framework, the validation workshop gathered relevant stakeholder to provide final feedback was on the county engagement synthesis report, FOLAREP and the national restoration monitoring framework. Additional sub-indicators and refinement of the monitoring framework took place. The next steps and way forward for landscape restoration monitoring were also agreed upon during the workshop.

5th meeting of the TWG

15 MARCH 2022

7-8 JULY 2022

24-25 MARCH 2022

17-18 MAY 2022

29 JULY 2022

Restoration Barometer Meeting

A rapid stocktake of Kenya’s restoration progress under the Restoration barometer tool, used to assess Bonn Challenge pledges, was assessed by many members of the TWG and other relevant stakeholders.

Capacity Building Workshop on Restoration Monitoring Tools

The meeting selected restoration monitoring tools and assessed their availability, ease of use, training and capacity needs and accuracy. The draft monitoring framework was reviewed and updated during this event.

6th meeting of the TWG

14 SEPTEMBER 2021-29 JULY 2022

Six meetings of the TWG

The TWG was officially formed by the Principal Secretary of the Ministry of Environment and Forestry to **develop a monitoring framework in support of restoration tracking, assessment, and reflective learning**. The TWG held a total of 6 meetings from September 2021 to July 2022, through which the monitoring framework was developed.

The key considerations of the TWG when developing the indicator framework can be summarised as follows:

- Considered drivers of degradation, inputs in terms of activities, outcomes, and national and international commitments.
- Based on a specific set of criteria i.e., indicators must be relevant, accurate, and cost-effective/ measurable.
- Grouped indicators under relevant categories.
- Separated indicators into those that could be measured now and later, given the capacity and the spatial and temporal scales of the indicator.

12 Muthuri C, Odhiambo E, Akombo R, Kamau PM, Wanyora V, Mugi P, Wanjira EO, Muga M, Njoki C, Bourne M. 2022. A trends analysis on forest and landscape restoration in Kenya. Nairobi, Kenya: World Agroforestry

3 Framework structure

Creating an adaptable framework

The restoration monitoring framework was developed as a **flexible and adaptable** framework, which acknowledges and accounts for differences in capacity to monitor restoration changes over time and space. Given the temporal lag in achieving some restoration impacts, the framework aims to capture both effort (process) and impacts (outcome) indicators, to understand changes in restoration investment and implementation and to track the overall impacts on ecological function.

The framework outlines key restoration information to be collected by all projects and initiatives. Under each category, a list of proposed indicators and sub-indicators has been identified; these will be further delineated to identify a set of **'core' indicators**

collected by all, supported by **additional indicators** illuminating additional complexity and outcomes that may not be practical for all restoration actors to report against.

Thus the framework is adaptable as it collects a core set of indicators that can be aggregated to the national level, while also collecting additional variables that elucidate critical outcomes of restoration activity and push for further information to be collected and realised as capacity grows.

It is expected that the framework will be fluid, and will be updated and evolve over time. Currently, the framework includes 30 indicators and 45 sub-indicators, as expanded on in Tables 1 and 2.

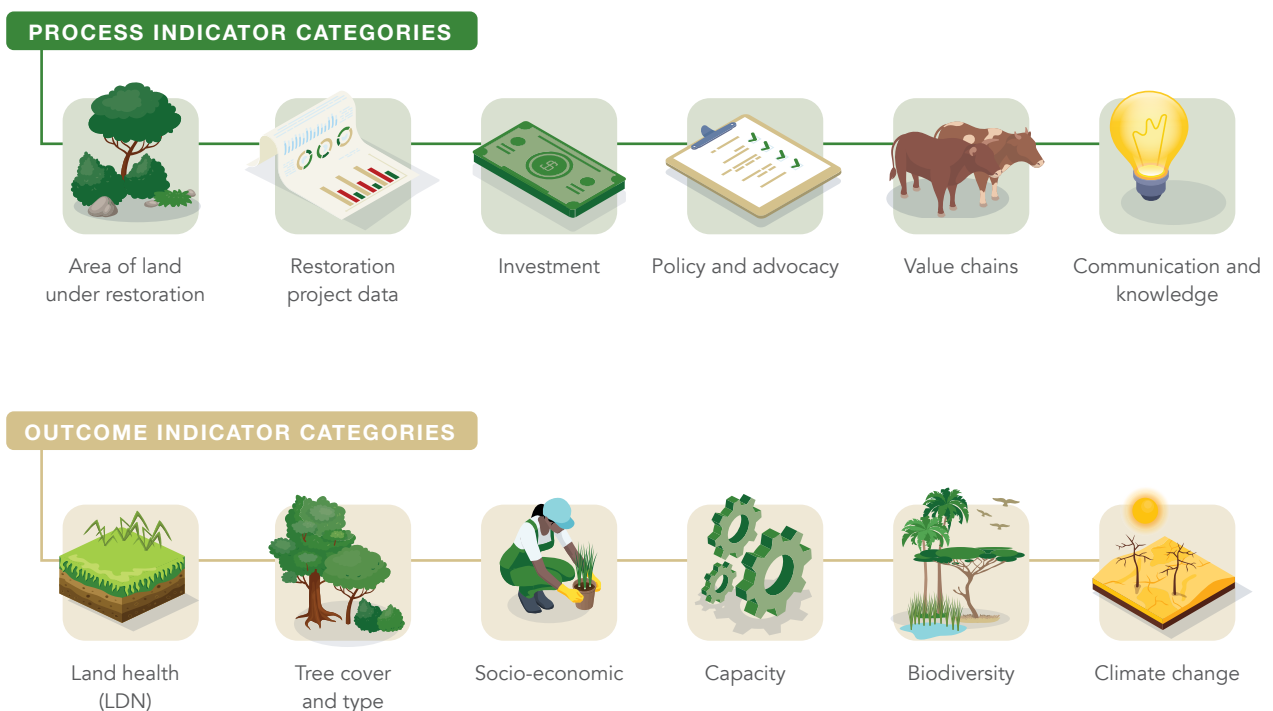


TABLE 1: Process indicators

Category	Indicator	Sub-indicators	Metrics	Frequency
 Area of land under restoration	1 Area of landscape under improved practices and/or undergoing restoration	A. Land use type: forest, grassland, crop land, rangeland etc. from national typology B. Restoration type from national typology	A. Hectares B. Hectares	Annually
 Restoration project data	2 Project name	A. Number of community members engaged and disaggregated by gender, age and other groups	A. Open B. Geospatial polygon, GPS coordinates C. List/Typology D. List/Typology E. List F. Start /end date G. List	Annually
	3 Project location (geospatially explicit)			
	4 Restoration actions			
	5 Beneficiaries of restoration initiatives (disaggregated)			
	6 Project partners (names of institutions)			
	7 Duration of the project			
	8 Challenges and mitigation in the project			
 Investment	9 Amount invested in landscape restoration (KSH/USD)	A. Source of funding/investment (private, donor, national government) B. Types of funding (loans, grant, equity, in kind) C. Where it was invested (county, sub-county, ward) D. How it was invested (project, finance access, policy)	A. List and KES / USD B. List C. Location (county, sub county, ward) D. List (project, finance access, policy)	Annually
 Policy and advocacy	10 Number of new or revised policies, legislations/ regulatory frameworks, strategies, and plans that positively impact landscape restoration	A. Number of policies that mainstream restoration targets B. Number of concluded, endorsed and operationalised policies C. Number of policies that have been collaboratively/ intersectorally designed D. Number of engagement forums (to capture how consultative forums held to develop the policies)	A. Count and description B. Count and description A. Number and description B. Number and description	Annually
	11 Number and existing enforcement and compliance mechanisms (at national and county levels)	A. Number of policy enforcement and compliance mechanisms B. Number of functional cross sectoral coordinating mechanisms (e.g. TWGs, CECs, etc.)	A. Number and description B. Number and description	
	12 Number of sensitization and advocacy forums organised/ facilitated on landscape restoration at national and county levels			









 Value chains	13	Nature-based and green value chains initiated and commercialised	A. Number of nature-based or green value chains initiated ie the number of products developed	A. Number and description	Annually
	14	Cooperatives/associations created to promote nature-based value chains	B. Number of nature-based or green value chains (i.e. products) commercialized	B. Number and description	
	15	Bankable projects on green value chains promoted	C. Type of value chains promoted and commercialised D. New markets accessed or linked E. Number of products certified F. Number of value addition infrastructure created G. Number and type of value chain players/actors engaged H. Number of cooperatives/associations created to promote nature-based value chains I. Percentage of income ploughed back into restoration J. Number of financial schemes accessed to promote nature-based value chains K. Number of bankable projects categorised as promoted and commercialised	C. List D. List E. Number and description F. Number and description G. Number and description H. Number and description I. Percentage J. Number and description K. Number and description	
 Communication and knowledge	16	Knowledge products produced and shared	A. Number of knowledge products produced and shared	A. Number	Annually
	17	TIMPS (Technologies, Innovations and Management Practices) developed and promoted	B. Number of functional knowledge management infrastructure developed for disseminating knowledge C. Number of TIMPS (technologies, innovations and management practices) developed and promoted D. Number of forest and landscape restoration tools developed and used	B. Number C. Number and description D. Number and description	

TABLE 2: Outcome indicators

Category	Indicator	Sub-indicators	Metrics	Frequency
 Land health (LDN)	18	Soil organic carbon	g/cm ² kg/ha or %	2-5 years +
	19	Soil erosion prevalence	% (prevalence over the total area) or by land use land cover change	
	20	Proportion of land that is degraded over the total area	% degraded land	
	21	Vegetation cover	% cover	
 Tree cover and type	22	Percentage forest cover (target to reach over 10% as currently at 8.8%)	A. % Forest cover B. Forest type (KFS classification)	5 years
	23	Percentage tree cover (target of 30% by 2050)	A. % Tree cover B. Type: natural, planted, invasive C. Tree spp. (for benefits of medicinal, nutrition, carbon, income)	

 <p>Socio-economic</p>	<p>24 Number of green jobs created</p>	<p>A. Types of green jobs B. Income provided by the green jobs (disaggregated by gender, age, socio-economic) C. Duration of the green jobs D. Inclusivity in participation; subdivided into three: i) gender; ii) age (18-35 and other); iii) persons with special needs E. Diversity of jobs provided</p>	<p>A. List/Typology B. KES or USD C. Days D. % of total or # E. % based on A</p>	<p>Annual</p>
 <p>Capacity</p>	<p>25 Change in level of capacity, skills, and knowledge</p>	<p>A. Change in skills of men, women, youth B. Change in knowledge of men, women, youth C. Change in capacity of men, women, youth D. Change in attitudes of men, women, youth</p>	<p>A. Change in capacity from baseline B. Number of people that have been trained C. Number of people trained who have adopted technologies D. Number of people who have a changed belief or feeling towards restoration</p>	<p>Annual</p>
 <p>Biodiversity</p>	<p>26 Changes in biodiversity status (using taxa/framework for ecosystem status)</p>	<p>A. Ecosystem connectivity B. Flora/Fauna (i.e. wildlife abundance) C. Flora/Fauna (i.e. tree abundance, species richness)</p>	<p>A. Rating/score and Connectivity % B. Number</p>	<p>5 years</p>
	<p>27 Species abundance</p>			
	<p>28 Species richness</p>			
 <p>Climate change</p>	<p>29 Tonnes of CO₂ sequestered (including above and below ground, SOC)</p>	<p>A. Activity data B. Removal factors (default or country specific) C. Climate type D. Land use type E. Vegetation type</p>	<p>Calculated from tree cover increase/decrease and using species specific allometry + SOC subindicator. (Barometer uses area restored + removal factor)</p>	<p>5 years</p>
	<p>30 Number of projects working on adaptation and mitigation</p>		<p>Based on action plans</p>	

Indicator considerations

It is recognised that drivers of landscape degradation include poverty, poor livestock management practices (such as overstocking and overgrazing), poor land management practices (such as forest clearing/deforestation), charcoal production and inappropriate land use change. Some of these drivers will be captured by the indicators in the framework, while some are broader and may not be captured but should be considered at a later stage.

In addition to identifying the core set of indicators and sub-indicators, the TWG will need to consider the following in updating and reviewing the framework:

- **Ensure the framework sufficiently captures elements of gender and social inclusion (GESI)** as well as important aspects that are not currently explicit, like nutrition.
- **Develop a typology of restoration** that may include practices and approaches and consider reporting “area under direct restoration” and “area under indirect restoration”.
- **Develop a typology of beneficiaries** and type of support provided.
- **Evaluate/unpack the meaning of bankable projects and green value chains**, also considering non-commercialised incentives that create livelihoods.
- Recognise that the framework has a strong emphasis on tree-based restoration, and include rangelands, grasslands and other ecosystems.

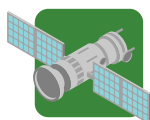


4 Tools to measure the indicators

A range of tools exist that can be used to measure several of the indicators outlined in the monitoring framework. During the capacity building workshop on restoration monitoring tools held in May 2022 in Makueni County, an assessment of existing restoration monitoring tools used in Kenya was conducted. Assessment outcomes are detailed below.



(Photo: Caroline Njoki/ICRAF)



Earth observation tools

KEY:

Ease of use without training:

- 👍👍👍👍 Easy
- 👍👍👍 Moderate to easy
- 👍👍 Moderate
- 👍 Moderate to difficult

Training:

- 📦 Minimal training required
- 📦📦 Some training required
- 📦📦📦 Significant training required

COLLECT EARTH (MOBILE)

Indicators it can measure: Socio economic data, Project investment, Knowledge, Tree cover, Land cover, Forest cover, Area of land under restoration, Biodiversity. (Earth observation tools are unable to differentiate invasive species in tree/vegetation cover)

Accuracy: Very accurate

Current availability: Free and open source; available on Google Play Store

Ease of use without training: 👍👍👍👍

Training required: 📦

COLLECT EARTH (ONLINE)

Indicators it can measure: Land use change, Seasonality of vegetation, Area of land degraded, Land health, Area of forest /tree cover, Management practices, Area with agricultural practices, Type of agricultural systems, Area under restoration over a period of time, Degraded land area

Accuracy: Accuracy challenges unless ground-truthed

Current availability: Free and open source; available on Google Play Store

Ease of use without training: 👍👍👍👍

Training required: 📦📦

SEPAL (System for earth observation, data access, processing, analysis for land monitoring)

Indicators it can measure:

Tree cover, Tree cover changes, Land cover types and coverage (e.g Area under tree/forest cover, Area under agricultural land, etc), Land cover change, Land use, Area under restoration, Area of degraded land

Accuracy:

Accurate depending on the source of data; requires ground-truthing

Current availability:

Free, open-source and public; has a data production platform that allows users to query and process satellite data and tailor products towards local needs

Ease of use without training: 👍

Training required: 📊📊📊



Field-based tools

KEFRI APP

Indicators it can measure:

Area of land under restoration, Number and type of trees planted (species composition), Location of tree planting, Tree species site matching, Tree cover

Accuracy:

Accurate but there is a risk of double counting

Current availability:

Can be downloaded from the Google Playstore (for Android)

Ease of use without training: 👍👍👍👍

Weaknesses: only focuses on tree planting with monitoring after planting, doesn't list suitable species in descending order

Training required: 📊📊

KEY:

Ease of use without training:

- 👍👍👍👍 Easy
- 👍👍👍 Moderate to easy
- 👍👍 Moderate
- 👍 Moderate to difficult

Training:

- 📊 Minimal training required
- 📊📊 Some training required
- 📊📊📊 Significant training required

KFS ARCGIS SURVEY 123

Indicators it can measure:

Forest disturbance e.g illegal logging, forest fires, forest encroachment, quarrying in a forest, kindling in a forest, waste dumping on forest land, hunting in the forest, injury to trees, trespassing, stealing of tree seedlings, illegal grazing, illegal clearing of forestland) and details of the incidents (reporting officer, source of report (e.g., whether community, etc.) forest types in which the incidents reported occurred, the type of incident, and the total number of incidents reported), forest regeneration, forest cover, area under restoration.

Accuracy:

Accurate but requires expertise in GIS, particularly ArcGIS

Current availability:

Partly (requires permission from KFS)

Ease of use without training: 👍👍👍

Training required: 📊📊📊

LDSF (Land Degradation Surveillance Framework)

Indicators it can measure:

Land management: agricultural and rangeland management strategies, land cover classification, land use, landform designation, impact on habitat and soil and water conservation

Soil health variables: organic carbon (concentration and stocks), acidity (pH), total nitrogen, base cations, soil texture, and soil biology module (mycorrhizal spores, macroinvertebrates, earthworms)

Soil hydrology: infiltration capacity

Vegetation cover: tree density, shrub density, vegetation structure and distribution, tree biodiversity, shrub biodiversity, herbaceous cover type and density, rangeland module (grass species richness and abundance; grass perennial to annual ratio & distance measurement for perennial grasses)

Land degradation: soil erosion prevalence & root depth restrictions

Accuracy:

Very accurate

Current availability:

<http://landscapeportal.org/blog/2015/03/25/the-land-degradation-surveillance-framework-ldsf/>

Allows for systematic and science-based landscape-level assessment and monitoring of soil and ecosystem health across diverse landscapes across scales

Ease of use without training: 👍

Training required: 📖 📖 📖

REGREENING AFRICA APP

Indicators it can measure:

Area of land under restoration, Tree cover, Number of trees planted, Number of tree nurseries, Farmer managed natural regeneration (number of trees, species composition & plot size), Land size, Management practices, Training, Types of interventions, Species composition

Accuracy:

Accurate

Current availability:

Can be downloaded from the Google Playstore (for Android)

Ease of use without training: 👍 👍 👍 👍

Training required: 📖

Tool considerations

No single tool can be used for data collection as none covers all the indicators. Additional tools may exist that were not assessed, and additional, new tools will be needed to capture some of the indicators. There are currently more tools that capture biophysical indicators with the socio-economic indicators neglected. Some tools may need to be tailored for use.

Some further considerations on tools and their use include:



Double counting will need to be considered, as it can occur when field level tools monitor restoration in areas with several actors.



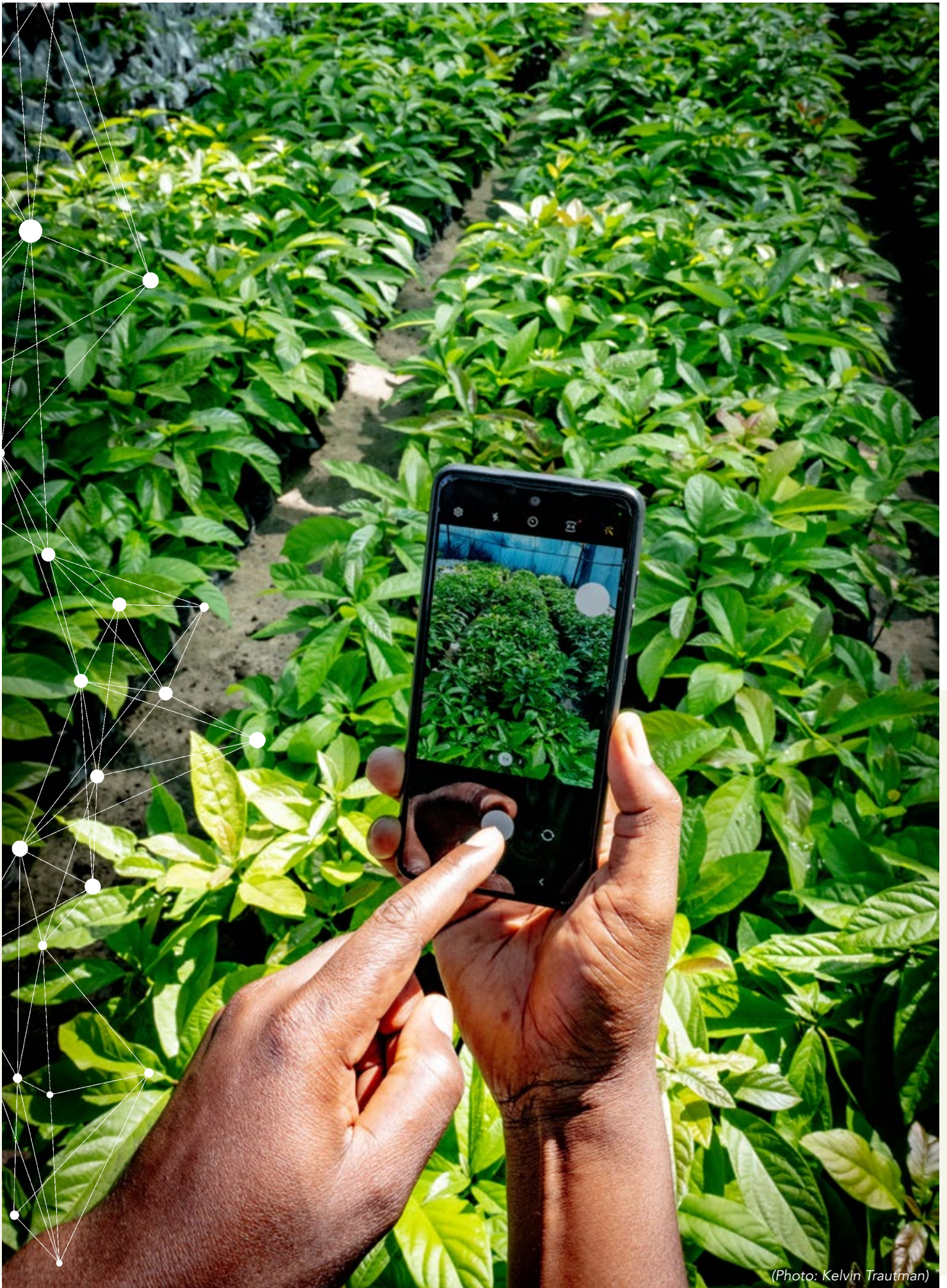
A standardised online survey/checklist/form could be useful in collecting data on restoration monitoring from the county to the national level, similar to what was used for reporting on the National Climate Change Action Plan (NCCAP) 2018-2022.



Further **audience-specific capacity strengthening**, including Training of Trainers (TOTs), will be needed—particularly for some of the more complex tools.



To promote county-level restoration monitoring, **legal and institutional frameworks** are required, with provisions for a designated officer at the county level in charge of reporting on restoration progress, along with guidelines for implementing and monitoring forest and landscape restoration (definition of terms and guidelines for indicators).



(Photo: Kelvin Trautman)

5 Data sharing, management, and reflective learning

Reporting under the forest and landscape restoration initiatives in Kenya will follow the structures outlined in FOLAREP:

- The **Monitoring Technical Working Group (TWG)** will continue to guide the process, under the guidance of the **National FLR Technical Committee**.
- **Kenya Forest Service (KFS)** will provide the institutional base for this work and continue as the secretariat for the TWG as well as the FLR Technical Committee.
- **KFS** will lead in data aggregation and reporting to national, regional, and international commitments related to FLR.

- Data sharing protocols, arrangements for reporting, aggregation and analysis will need to be outlined by **KFS** and the **TWG**.

In addition to a process for sharing, aggregating, analysis and reporting on data under the indicators in the framework, the TWG will lead a process of reflection and learning with stakeholders. This process will include annual reviews of progress and available data and should guide future priorities, investments and areas for further research to support forest and landscape restoration and the desired ecosystem and socio-economic outcomes.

Identified features

The TWG has identified several important features of an online data management and reporting framework:



Allows for **continuous monitoring** (i.e., real-time monitoring)



A **private database** and also a **public platform** for information dissemination.



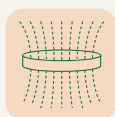
Contains data /information **sensitivity classification**.



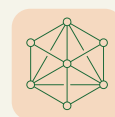
Guided by data sharing protocols to avoid duplication of data collection efforts where necessary and ensure data contribution to the system.



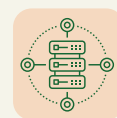
Accessible and user-friendly.



Captures/aggregate all indicators in the framework.



Builds on existing institutional structures.



Promotes data sharing by creating incentives such as competitive reward systems.



A **gateway to other systems** (especially if the information is not available).



Contains only **verified data and information**.



Designed in consultation with the stakeholders.

6 Roadmap to operationalising the framework

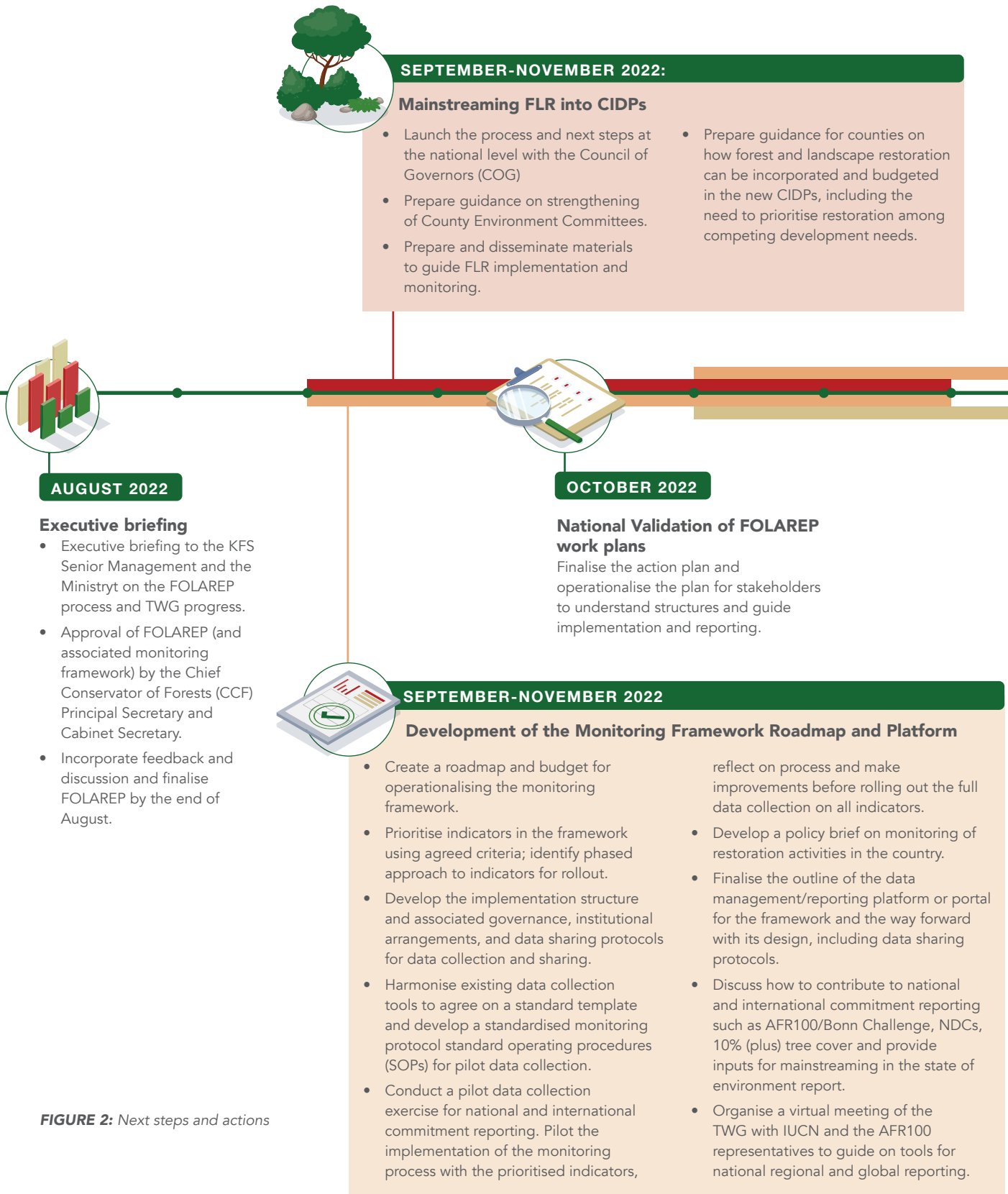


FIGURE 2: Next steps and actions



2023

Building capacity of county governments

- TWG to develop concept notes to mobilise funding for forest and landscape restoration monitoring at county level, led by KFS.
- Implement county engagements on the FLR agenda, to sensitise and domesticate the FOLAREP work plan with counties and to ensure engagement of stakeholders for data capture, including the private sector and citizen science.
- Strengthen CECs and Council of Governors to ensure implementation of FOLAREP.
- Consider formation of restoration technical committees under the CECs to support monitoring and reporting.
- Fundraise and mobilise resources for the implementation of the ROAM process at the county level.
- Cascade the restoration targets down to the county levels.
- Increase capacity building efforts, especially of county governments, on the NDC process, the monitoring framework, and the (eventual) data portal.



2023-2024

Developing the monitoring platform

Develop the monitoring system/platform software and hardware including the establishment of a centralised data portal and management system for aggregating cleaning verification and sharing at multiple levels.

2023

Launching FOLAREP

- Final comments on FOLAREP plan incorporated and launched.
- Launch the outline of the monitoring platform/portal on FLR with data/information sharing protocols.



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