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APPROACHES AND PRACTICES OF RESTORATION











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ZOOM ETIQUETTE

Always join the meeting using your full name. For security purposes, unknown participants or those who join using numbers, initials or nicknames will henceforward be removed. Mute your microphone every time you are not contributing. For better bandwidth utilization, you may put off your video when not contributing.

Raise your hand when you want to speak



Ask questions or comment in the chatbox

Theme: Forest Landscape Restoration





KENYA FORESTRY RESEARCH INSTITUTE

KEFRIApp

The Tree Species to Site Matching Tool for Ten Percent Tree Cover in Kenya

Jane Njuguna (PhD) and; The KEFRI Innovation Team

Introduction to KEFRI



Kenya Forestry Research Institute (KEFRI) is a state corporation established in 1986 under the Science and Technology ACT, Chapter 250 of the Law of Kenya, which has since been repealed to Science, Technology and Innovation Act 28 of 2013

Vision, Mission and Mandate and Strategic Objectives

> www.kefri.org

Role of Applications in Forest Management

Key Strategic Objectives in the 6th KEFRI Strategic Plan



To generate and transfer forestry technologies for:

- 1. Production of **superior germplasm for priority tree species** for different agroecological zones through intensive breeding and management of pests and diseases to increase productivity.
- 2. Establishment and management of forest plantations, trees on-farms and general landscapes
- **3.** Rehabilitation and restoration of degraded forest landscapes, woodlands, wetlands and riparian eco-systems for adaptation to climate change and sustainable livelihoods
- **4. Efficient processing and utilization** of wood and non-wood forest products to promote **circular economy**
- 5. Enhance corporate communication, technology transfer and partnerships

KEFRI Innovations



Over 500 research products technologies and innovations instrumental to assisting the country achieve its national and global development agenda. These include;

- High quality germplasm to increase on-farm productivity and expansion of forestry programmes
- Integration and diversification of trees, bamboo, grasses, shrubs for soil erosion control and increased crop production
- Bioprospecting for biochemicals, medicinal and herbal products for improved citizen health and dyes for the textile industry, food flavors, food, fruits and fiber and biomass energy,
- Right species mix for optimum Carbon sequestration for mitigation of climate change.
- Innovative digital products such as KEFRIApp to track progress of ten percent (10%) tree cover by 2022 and;
- Piloting aerial seeding assisting the country meet its international commitments of restoring 5.1 million hectares of degraded lands by 2030.





Professional Guide to Tree Growing in Your Hand

Why Develop the App?



Projects come and go: Many tree planting activities have been undertaken in the country costing billions of shillings with <u>no data of their achievements</u> on trees planted on public and private land and also data on survival is lacking; >Publications??

Investors (processors) are therefore not sure of where to establish investments especially near farmlands; (high transport costs leads to low cost for forest produce)

➢No data on how many trees are felled every year and for what purposes to update contribution to GDP

➢Many complaints of poor survival and mortality of trees due to wrong choices of tree species in various sites

➢To achieve the National Strategy for achieving and maintaining 10% tree cover by 2022 identified the need for innovative products to track progress of the same





- KEFRIApp is a mobile platform that seeks to guide tree growing using species site matching to enhance establishment and survival potential.
- Takes in to account the conditions optimal growth or conversely optimal conditions for disease /mortality to occur as explained in the "The Disease Triangle"

The Disease Triangle (Trapezium)



3. Environment: Temperature, Rain, Site, Wind, Soil factors

KEFRI APP- Objectives

•To provide science based information to enhance success of the many greening activities by stakeholders in forest based enterprises and initiatives in forest management and landscape restoration to promote resilient tree growing across the country.

>Enable Government Institutions, private companies and individuals to **document tree planting** activities over time,

>Monitor survival of planted trees to inform investors and;

➢ Provide professional guide on tree planting/management for various purposes by linking with:

> *m-Forester* and

>IPM modules

>Commercial tree species selection for different areas

KEFRI APP- Other Objectives



>Initially to track the progress towards the achievement of the 10% tree cover by 2022,

➤When fully implemented it will provide big data on total number of trees in planted in the country, disaggregated by species, age, County /region etc

>User friendly application for use by tree growers just like the MPESA

Together with the use of drone technology in forest monitoring, KEFRI envisions that it is possible to calculate the number of trees growing in Kenya at any given moment

And redefine "Tree Cover and Forest Cover"

Current Features of the KEFRIAPP



- 1. Phone module and Web-based module
- 2. A dashboard with menu of functions/tools:
- 3. Species to site matching (up-to sub-location level)
- 4. Documenting new planting activities and national tally of planted trees in <u>real time</u> and also cut trees
- 5. Documenting a previous planting activity and also cut trees over time
- 6. Map view of all documented tree planting activities (*Photos not downloadable, must be a real activity*!)
- 7. Web-based version with capability for detailed analytics
- 8. To include registered and certified tree nurseries in various locations and tree species available
 - a. Connecting tree growers with local tree nurseries (e-commerce for forestry)

Who Can Use – The App



Public institutions (Ministries, State Agencies in both levels of Government);

•NGOs (Local and International)

- Development partners
- Private companies
- Community groups
- Tree nursery owners
- Individuals (hopes to capture this main group of tree growers who are not usually captured)

How to get Access to KEFRIApp

4	KEFRIApp KEFRI, Kenya	
	Uninstall	Open
Wh Last	at's new • updated 12 May 2021	\rightarrow
Opti	mization and bug fixes	
You	ır review	
	Gilbert Busolo	
Won	derful Forestry app	
Edit	your review	
Dev	veloper contact	^
0	Website	
	Email	
	kenya.forestry@gmail.com	
0	Address	
	Kenya Forestry Research Institute Kenya. Telephone: +254 722 157 Muguga, Kenya	r, P. O Box 20412-00200 Nairobi, 414, +254 (0) 724 259781/2

Steps:

- Using Android Phone-Go to Google play store. Apple version on the way
- Download the KEFRI App
- Register
- Login
- Bravo!! Use the App
- Note. Ensure that your phone's location service is enabled for best results





KEFRIApp







KEFRIApp





Malindi

0



Role of Applications in Forest Management



KEFRIApp Sponsor a Tree





New feature that onboards you as our partner towards 10% tree cover

ENTER DETAILS TO PROCEED

○ Organization ○ Individual

Organization name

E2000 Coodlings plants

Your organization phone number

How many trees would you like to

Your organization email

REQUEST



➤Create awareness and train tree growers on how to use the KEFRIApp

Provide periodic data updates towards attainment of 10% tree cover

 Partner with County Governments and other Institutions for enhanced KEFRIApp awareness, uptake and utilization
 Strengthen Monitoring and Evaluation Component –

Survival rate

>Will be reviewed from time to time

➤Open to integrating with other Apps for wholistic data capture in the country

Acknowledgement

Cabinet Secretary Hon. Keriako Tobiko and Principal Secretary, Dr. Chris Kiptoo, Ministry of Forestry and Forestry for

>Spearheading the development and implementation of the National Strategy for Achieving and Maintaining 10% Forest Cover by 2022

Continuously supporting the development of innovations in forestry and environment for socio-economic development

State Agencies in the Ministry, KFS, KWTA, NEMA, NECC, Environment Tribunal and NETFUND, KMD and the Ministry Departments for supporting and adopting technologies

>Kenya Government through The National Treasury for funding 10% Tree Cover activities

>You for installing KEFRIApp and helping to track tree growing and restoration activities in the country

Conference organizers for accepting this presentation

Case study of the restoration of the Tana Delta

Presenter: Rudolf Makhanu, Nature Kenya



Catalyzing Landscape Restoration at County Level-Case of Tana River and Lamu County

- 1. Tana River Delta Strategic Environmental Assessment
- 2. Tana River Delta Land Use Plan
- 3. Ecosystem Services Assessment
- Restoration Opportunity Assessment and Mapping
- Mainstreaming landscape restoration into county policy frameworks-Providing practical actions and county targets by integration of restoration into county planning processes



Building Capacity of Institutions

- 1. Setting up and building capacity of WRUAs and CFAs who would set up tree nurseries,
- Village Natural Resource Committees carrying out village level restoration action plan-

Sustainability of Forest and Landscape Restoration

- Green Industrial Park concept-aimed at achieving and delivering green value chains while
- Mainstreaming Restoration into Other Sectors of the Economy-Climate Smart Agriculture; Indigenous Community Conservation Area
- Innovative Financing- Green Climate Fund, Carbon Financing



Work Supported By









Forest Landscape Restoration (FLR) in East Africa – political framework and pilot measures for the successful implementation of FLR strategies project

Presenter: Kiunga Kareko, WWF-Kenya Forest Programme Manager





Duration: Five years (2021-2024)

Budget: KSh 131M

Donor: German Federal Ministry of Economic Cooperation and Development (BMZ) through its BENGO-Climate funding facility

Implementers: WWF Kenya & the National Alliance of Community Forest Associations (NACOFA)



- Responding to <u>negative ecological and economic implications</u> faced by large areas of East and Southeast Africa due to extensive deforestation.
- The key shared objective: To prevent further deforestation and restore the functionality and connectivity of degraded forest landscapes (Forest Landscape Restauration, FLR)
- The 3 countries (Kenya, Tanzania & Zambia) are now committed to the objectives of the Bonn Challenge (<u>https://www.bonnchallenge.org/about</u>; 2011, 350M ha by 2030, total pledge 74 countries, 31 in Africa), AFR100 Initiative (<u>https://afr100.org/</u>; 2015, 100M ha by 2030; total pledge 31 countries, 126M ha (December 2020); "New York Declaration on Forests" (2014; 200 endorsers; end natural forest loss by 2030, and Sustainable Development Goal 15 (Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss).
- The key objective of these international initiatives is to globally restore 350 million hectares of forest landscapes including at least 100 million hectares in Africa.
- To be achieved through creating powerful national strategies with both legal and political planning frameworks within the region.



General overview



Outcome

Livelihoods of 4 communities in Kenya are improved through model FLR activities, leading to an increase of income from sustainable agriculture and forest production of at least 20%. National forest landscape restoration policy frameworks securing ecosystem services, resource availability and benefit sharing mechanisms are strengthened by an active political participation of civil society actors

1. The development of **national policies for FLR** in Kenya is supported, thus securing the base for a successful implementation of the pledged AFR100 contributions. The participative policy improvement secures future benefits and sustainable resource management for communities and small holders.

2. FLR business model on sustainable production of products from forest landscapes is implemented and leads to increased income for min. 400 beneficiaries in 4 communities in the selected landscape. **3.** In the Kenyan forest model landscapes, **key areas are restored** and sustainably contributing to an increased harvest/yield of timber, NTFPs and conservation agriculture products (quality/quantity).

4. By 2024, **improved exchange** between partners enables scaling of project's good practices – including incorporation of social safeguards – on national and international level.





FLR in Naivasha: Specific Objective

To improve agriculture and forest production systems of forest communities in Nyandarua County through enhanced political framework and successful implementation of FLR strategies.



FLR in Naivasha: Scope & Targets

Joint Efforts & Scope

- Three (3) Community Forest Associations (CFAs): Geta, North Kanangop & Aberdare Kiburu
- Three Water Resource Users Associations (WRUAs): Mkungi Kitiri, Upper Turasha Kinja and Wanjohi
- Kenya Forest Service
- Nyandarua County Government

Restore

500 ha of Bamboo and mixed forest in the gazetted forest

40 km of riparian land mostly on farmlands

100 ha of deforested or degraded farmlands.

"Sustainably managed by the communities through an effective business model for bamboo and agroforestry benefiting communities"



OUTPUTS

1.1: FLR implementation in Kenya is supported by effective policies, strategies, legislations and guidelines and enhancing the development and implication of the target groups

1.2: A national civil society FLR Alliance is strengthened and informing policy making processes

1.3: A FLR strategy for Nyandarua county is in place

2.1: Income from forestry and agriculture value chains is increased by
20% for at least 400 community members in Nyandarua
2.2: Target communities have reliable acces to markets and valueaddition facilities for forestry and agricultural products
3.1: 500 ha Bamboo and mixed forest and 100 ha of degraded farmland are restored and sustainably managed by the communities through i.e. an effective business model benefiting communities

OUTPUTS Cont.

3.2: 40km stretches of riparian area are restored

4.1: Successful FLR initiatives are documented, published and presented for upscaling and replication outside the project area on national/regional and international level

4.2: Environmental and social safeguards and standards for Particpative Forest Management (PFM) are incorporated in WWF-supported programmes and adapted to local conditions




together possible ...

Mangrove Ecosystems Restoration.

Community Based Initiatives.





Derrick Muyodi. CEO, Ceriops Environmental Research Organization. www.ceriops.org 12, July 2021.



Content

- 1 Introduction: Who we are.
- 2 Mangroves Ecosystems: Importance & Threats
- 3 Mangroves Restoration: Project Adopt A Site.
- 4 Program Impacts Assessment
- 5 Monitoring Technology: Project Treestand.

Ceriops Pillars



Vision Statement

To promote integrated coastal zone management while conserving natural ecosystems in the East African Coastal Region.

Mission

To restore degraded coastal ecosystems with **local communities** while exploring additional **livelihoods** from **coastal & marine resources**.

Core Values Quality Delivery | Teamwork | Respect | Integrity.

About Us



What we do.

A canopy non profit network of environmental management experts with focus on integrated natural ecosystems research & development programs with direct impact to local communities.

Our expertise include;

- Mangrove Ecosystems Restoration & Livelihoods.
- Forestry Research & Technology Innovations.
- Community Seaweed Farming
- Marine Litter Research
- Experimental models for sustainable Agriculture.

We also develop data systems for commercial environmental programs; Forestry, Agriculture, Spatial planning, Urban planning & Waste Management.

Website: <u>www.ceriops.org</u> Mail: <u>info@ceriops.org</u>. Contact: (+254)718171308



Tropical Mangroves Ecosystems





ECOSYSTEM SERVICES

The benefits people derive from mangroves

Wood

Its density makes mangrove wood a valued source of timber and fuel

Federal Ministry Ior Economic Cooperation

and Development

Coastal protection Restoring mangroves for coastal defence up to 5 times more costeffective than "grey infrastructure" such as breakwaters⁸

Livelihoods 120 million people living near mangroves

Water filtration 2–5 hectares of mangroves may treat the effluents of 1 hectare of aquaculture⁸

Mangrove ecosystem services Worth US\$ 33,000–57,000

per hectare per year¹ x 14 million hectares² = up to US\$ 800 billion per year

Tourism

There are over 2,000 mangroverelated attractions globally, such as boat tours, boardwalks, kayaking and fishing⁷





Climate regulation

Carbon storage potential of mangroves is 3–5x higher than that of tropical upland forest due to strong carbon storage in the soil³; CO₂ released by global mangrove loss annually could be as high as the annual emissions

of Australia4-5



Fisheries More than 3000 fish species

are found in mangrove ecosystems⁶



Sources: O UNEP, 2014 • O Giri et al., 2011 • O In the Indo-Pacific region: Donato et al., 2011 • O Up to 450 million t CO Pendleton et al., 2012 • O In 2015; EDGARv4.3.2., 2018 • O Sheaves, 2017 • O Spalding et al., 2016 O Primavera et al., 2007 • O In Vietnam: Narayan et al., 2016

Mangroves Threats & Need for Urgent Action.



Drivers

Rapid Urban Development

Demand for wood & poles

Mining for minerals

Illegal logging

Conflicts with Conservators

Massive urban pollution

Rapid industrialization

Growing residential estates



Degraded areas (Google Earth View.)



Satellite Earth observation of the Mangroves Ecosystem

- Sections of the project area.

 Mapped polygons.





Snapshot: Ground Imaging.

Mombasa

Mombasa

















Suitability Classification.

CLASS 1: Regenerating





CLASS 2: Sedimented





CLASS 3: Degraded





Tudor Creek CBOs: Project Adopt A Site





2. Bidii Creek

3. Amani Jipange







Project Location.





Mombasa: 1000 Ha



Kwale: 1500 Ha



Snapshot: Map Imaging.





CEROPS Environmental ACOPS

Adopt A Site: Project Model



OBJECTIVES

Mangrove Planting (500 +seedlings).

Entails buying of seedlings and participating in the planting exercise (planting with the community).

> 1st 6 Months

Provide Nature Based Community Livelihood Project Entails supporting crab farming, ecotourism and bee keeping (mangrove honey production)

V

Next 6 Months Participate in Monitoring of the outlaid activities

 Support the community groups (beneficiaries) in sustainability of the livelihood projects through capacity building.

Subsequent Years

Corporate Social Obligations Will be met. Concrete technical report of the Adopt-A-Site to the Stakeholder. Increased Forest Cover of Mangroves in the selected area. Empowered Mangrove community hence Poverty Alleviation.

Tudor Creek Mangrove area: Mombasa, Kenya. ceriops

Case Study: Tudor Creek Mombasa

Concept Test: Mombasa

- Project: Adopt A site.
- Start Year: 2018.
- Community: Ganahola.
- CBO: Big Ship CBO.
- CFA: MOKICFA



Communities Based Restoration (CBR)



Community & stakeholders participation



- Women groups
 - Intercommunity groups
- Learning Institutions
- Social groups























PROGRAM IMPACTS



2018

Planted <u>200+ HA</u>



<u>CSR:</u>

50+ org.

Community

7 groups

















PROPOSED OBJECTIVES



Community Based Initiatives

- Scale up Mangrove tree nursery production to 1.5M seedlings/Year
- Scale up sustainable mangrove honey production to 300 kg/farmer groups.

Restoration:

- Map 2000 Ha for restoration of Degraded & Suitable for forest establishment
- Map 2500 ha for Conservation of existing second generation forest

Carbon Investment:

- Create 2000 ha of mangrove forest stand equating to 2.8MtC.

Community:

- Improve livelihood of 1000+ families through carbon finance benefit

Proposed Project Area.



- Baseline Survey and Remote mapping data for July 2020.
- Areas determined by physical characteristics and canopy density of less than 30% distribution cover per ha.

Location	Available Area (Ha)	Yr 1	Yr 2	Yr 3	Yr 4
Majoreni - Kibuyuni	1016.885	337Ha	236Ha	237Ha	206Ha
Mwazaro-Bodo-Funzi	416.324	115Ha	104Ha	99Ha	99Ha
Rabai-Mwakirunge	1016.578	252Ha	365Ha	355Ha	345Ha
Total Coverage	2750	704Ha	705Ha	691Ha	650Ha

Monitoring Program.









Tree Tracking: Restoration Monitoring

Android Application



Web based Tree Map





Tree Tracking: Restoration Monitoring





Remote sensing: Patches & Filling.



CERIOPS Environmental

NDVI Change detection (2016-2020)

Analysis Area:

- Loss: 11% 30ha² / 0.3 km²
- Growth: 5% 15ha² / 0.15km²



Ceriops Sites: Concentrated growth

- Loss: 1% 0.19 ha^{2/} 0.0019km²
- Growth: $10\% 1.68 ha^2 / 0.0168 km^2$





PROGRAM CHALLENGE (2016-2020)





"It's the little things citizens do. That's what will make the difference. My little thing is planting trees." - Wangari Maathai, Kenyan environmentalist & 2004 Nobel Peace Prize Winner



Asante!



Partner with us to make this possible!

Contact us: info@ceriops.org Visit our website: www.ceriops.org

2013 Earth Week Heroes from Renewable Choice

Initiative for Sustainable Landscapes: ISLA

Presenter: Beatah Nzove, Senior Program Manager, ISLA Program Kenya, IDH, The Sustainable Trade Initiative





Location



























Other Partners: Ministry of the Foreign Affairs of the Kingdom of Netherlands, CIFOR, IDH, P4F (DfID)



Goverr ance




Thematic areas;

1. FOREST CONSERVATION

Done through:

NACOF

- Adopt a forest
- Capacity building of CFAs

CERIOPS

META

- Dairy Value Chain Development
- Addressing illegal forest activities; Surveillance flights, Bongo surveillance projects and enhanced law enforcement

WOCAT Ith the suitability



KENYA

Thematic areas;

2. WATER FLOW AND ACCESS

Done through:

EvenGreening

Kataro Porest

NRT

- Strengthening WRUAs •
- Springs rehabilitation and protection •

CERTOPS META CISLA & World Vision WOCAT It have be autobalded



Thematic areas;

3. SUSTAINABLE ENERGY

Done through:

Community access to sustainable energy

CERIOPS META World Vision WOCAT It the substation



Thematic areas;

4. IMPROVED LIVELIHOODS

The theme on improved livelihoods cuts across all the three themes

CERTOPS META CISLA & World Vision WOCAT It have be autobalded

Key Achievements



Plans for Phase II 2021-2025

\$\$ **Convene the** public and private sector funding to expand interventions initiated in the 1st phase of the program

KENYA

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Upscale Interventions in the 1st phase; -Forest conservation -Dairy VC Development -Water Rehabilitation -Ecotourism

WWF

Increase collaboration to lower number of cattle in the forest in order to speed up forest regeneration

NACOFA

EvenGreening

Operationalize the ISLA Sustainability vehicle; Stawisha Mau Charitable Trust

World Vision

WOCAT In the successful







Community Forest Land Restoration Efforts and Programs

Gerald Ngatia, NACOFA Secretary







Community involvement in forest land restoration

- Communities' world over not just in Kenya play a vital role in protection and sustainable management of forests.
- Protection and sustainable management of forests was a cultural practice that has been practiced over the years by many ethnic groups in this country.
- However, this tradition has been eroded through the years by economic pressures exerted on our forests through the years







Community Forest Associations (CFAS) Involvement In Forest Land Restoration

- Forest laws in Kenya have recognized communities as important stakeholder in protection and sustainable management of forests.
- There are over three hundred registered CFAs in Kenya today many operating in gazette forest blocks and others in community and county forests.
- The CFAs bring together communities living adjacent to forests in implementation legal and well coordinated forest utilization, protection and rehabilitation programs.
- Kenya Forest Service Officers (KFS) on the ground provide guidance and technical support to the CFA members
- National Alliance of Community Forest Associations (NACOFA) is the network that brings together all CFAs in the country and is the nation voice and linkage both to the government and various partners between on matters of policy and community issues.







Community and KFS collaboration and other partners

NACOFA

EverGreening

- CFA members loading indigenous tree seedlings on a Kenya Forest Service vehicle in South Kinangop (Aberdares) for planting on a degraded forest site in May 2021
- Over 40,000 mixed indigenous tree seedlings planted by that CFA this year in that forest station with facilitation by WWF-Kenya and NACOFA



CISLA 🛚 World Vision WOCAT Ith the automation





Community collaboration with private sector and other government agencies

 Community members Of Mombasa Kilindini CFA rehabilitating a Mangrove Forest

with support from Kenya national

Highways Authority (KENHA)

Some other Communities in the coast region are earning Carbon credits from their Efforts in restoration of Mangrove forests. (Mikoko pamoja project in Kwale)









Community efforts in tree seedling production

- Nearly all CFAs in the country have tree nurseries that produce wide range of mixed indigenous tree seedlings for forest land rehabilitation programs, Exotic tree seedlings for plantation development, Fruit tree and Bamboo seedlings for on farm and riparian areas planting.
- Tree seedling production capacity ranging from 20,000 to over 500,000) annually per CFA depending on capacity to fund raise or attract partnership of each particular CFA
- All these efforts have assisted in increasing tree cover in the country.
- Kabaru CFA in collaboration with KFS presently (as at July 2021) has a stock of Six Hundred and Thirty Two tree seedlings in their tree nursery ready for planting this year.
- The only major challenge being limited market for seedlings which at times over grow in tree nurseries and go to waste. Thus demotivating the communities.







Successes in legal frameworks



- Having in place good legal frame works that recognize environment is an assent for the wellbeing of citizens and also big opportunity in this country (The Constitution, Forest Act, EMCA, Water Act, Wildlife Act etc)
- Community recognition in various laws in the environment sector is also a big opportunity and success in this sector.
- Forest Sector; Community Forest Associations(CFAs)
- Water Sector; Water Resource Users Associations (WRUAs)
- EMCA; County Environmental Committees
- Wildlife Act; County Wildlife Compensation Committees

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LEARN MORE:

www.regreeningafrica.org Email: regreeningafrica@cgiar.org f RegreeningAfrica 🖸 @RegreeningAfrica



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WWF KENYA TOGETHER FOR NATURE