



REGREENING AFRICA

Inclusive and Evidence-Based Approaches
to Accelerating Land Restoration in Rwanda
STAKEHOLDER WORKSHOP JULY 12-13, 2022 KIGALI





Contents

| | |
|--|----------|
| Workshop Overview | 1 |
| Workshop Objectives | 1 |
| Participants | 2 |
| Key Takeaways | 2 |
| Key Action Plan | 3 |
| Key Workshop Highlights | 5 |
| Overview Presentations of Regreening Africa Programme | 6 |
| <i>Achievements against country targets</i> | 8 |
| <i>Prominent Regreening practices with their niches and purposes</i> | 9 |
| <i>Summary of the key activities implemented by the project in Rwanda</i> | 10 |
| <i>Alex Mugayi presented on the program successes in Rwanda</i> | 16 |
| <i>Youth and women participation</i> | 17 |
| <i>Athanase Mukuralinda on challenges</i> | 18 |
| Evidence and Experience Wall Session | 19 |
| <i>Community voices</i> | 19 |
| <i>FMNR- monitoring learning and evaluation</i> | 21 |
| <i>Monitoring, evaluation, and learning component summary</i> | 27 |
| <i>Pests and diseases</i> | 47 |
| <i>Tracking land health changes in Rwanda</i> | 52 |
| <i>Regreening Africa app</i> | 53 |
| <i>Regreening Africa dashboard</i> | 63 |
| <i>Policy and planning environment</i> | 65 |
| Incentives and Disincentives | 69 |
| <i>Working groups to address incentives and disincentives for land restoration</i> | 69 |
| Opportunities for Scaling through Sustainability, Leveraging and the Agroforestry Task Force | 72 |
| <i>Establishment of Rwanda agroforestry taskforce</i> | 76 |
| Community-Practice-Science-Policy-Investment Dialogue | 78 |

Acronyms

| | |
|-------|---|
| RFA | Rwanda Forestry Authority |
| EU | European Union |
| UN | United Nations |
| UNCCD | UN Convention to Combat Desertification |
| COP | Conference of the Parties |

Workshop Overview

World Vision Rwanda and the World Agroforestry Center, in collaboration with the Rwanda Forestry Authority (RFA) held a 1.5-day workshop - **Regreening Africa: Inclusive and Evidence-Based Approaches to Accelerating Land Restoration in Rwanda from July 12-13, 2022.**

This event brought together a wide range of stakeholders and partners across local, national and regional scales to:

- A** Showcase the evidence and achievements of the European Union (EU) funded Regreening Africa Project in Rwanda over the last four years;
- B** Consider the current state of science, practice and policy for promoting agroforestry and land restoration in Rwanda that can be coalesced to accelerate positive change for landscapes and livelihoods;
- C** Discuss incentives for increasing the uptake for land restoration practices; and
- D** Identify existing and future programmes, strategies, policies and resources that can be taken forward to sustain and expand restoration efforts to contribute to and meet local, national and international commitments to sustainable livelihoods and ecosystem restoration.

At the nexus of the UN Decade on Restoration, the ongoing deliberations of the UNCCD COP, and the preparations for the Africa COP of the UNFCCC, this is an excellent moment to bring together committed partners and actors from science, community, practice, policy, development, and investment to jointly elaborate future endeavors to accelerate land restoration and resilience in Rwanda.

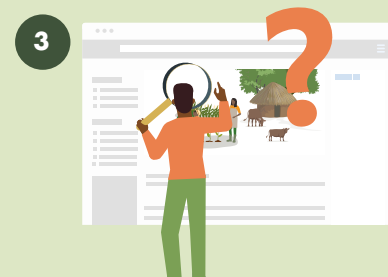
Workshop Objectives



1
Showcase the Regreening Africa Programme successes and learning



2
Review and discuss the implications of the evidence and experience from 4+ years of implementation



3
Take stock of the **current science, practice, policy, and institutional actions** in Rwanda that contribute to land restoration and multiscale commitments



4
Strategize how **ongoing efforts in Rwanda can be linked** to further support large scale restoration efforts



5
Action plan **future programmes, strategies, policy entry points, and resources** that need to be taken forward to expand land restoration on **local and national scale**

Participants




54 Attendees

 **12 Women**
42 Men

 **8 farmers**

 **1 EU**
7 government

 **38 partners and NGOs**

Key Takeaways

Areas of major concern to the stakeholders present were the growing phenomenon of pests and diseases, especially in fruit trees, as well as barriers to access quality planting materials and competing policy goals that deter farmers from adopting agroforestry.

A more concerted effort towards decentralizing policy and creating a specific agroforestry policy body, along with incentivizing adoption of agroforestry (especially of indigenous trees), were suggested for key policy action.

The major successes of Regreening Africa programme have been in the farmer lead model and in the building of training networks through Rural Resource Centers (RRCs). The engagement and network of farmers was commended highly and is a model the government want to scale up in other projects and districts.

Co-ordination and leadership on the policy and enabling environment for agroforestry will be spearheaded through the Rwanda Agroforestry Taskforce, which seeks to bring synergy across sectors to move land restoration forward.

A lot of interest in the capabilities of the Regreening app and dashboard was expressed by farmers and Rwandan government officials, who see in it a greater ability to track progress and develop more reliable monitoring systems for land restoration interventions.

A key outcome of the workshop was the creation of an action plan for scaling land restoration in Rwanda. In the workshop, three working groups collaboratively built the action plan.

- 1** Farmers and Value Chain Actors
- 2** Policy and Co-Ordination – The Agroforestry Task Force
- 3** Researchers

The following figure showcases the key action plan for near term (2022 – 2025) and longer term (LT) (2025 – 2030) key actions to address and scale land restoration in Rwanda

Key Action Plan



Research & Evidence Priorities



Inclusion and empowerment of women and youth

Longer Term (2030)

- Focus on gender aspects in agroforestry, youth inclusion and engagement.



Quality tree seed and seedling access

Longer Term (2030)

- Tree propagation studies for indigenous species.



Enhance capacity, awareness and action

Short Term (2022-2025)

- More research on appropriate scaling out practice strategies and most effective extension approaches.
- Collective action or forum for discussing pest and disease management; research on pest and disease management strategies.
- Priority setting with community, researchers, etc. to identify the tree species, perceptions, uses, and services.
- **Research in the short term on:**
 - Species suitability to different agro-ecological zones (right trees in right place for right purpose)
 - Management practices of different tree species.
 - Linking trees on farm and crop productivity (considering tree species).
 - Economic studies linked to agroforestry.

Longer Term (2030)

- **Research in the long term on:**
 - Phenology and growth of different species.
 - Agroforestry technologies and species for climate change mitigation.
 - Biophysical indicators and link to trees, e.g. soil erosion, soil moisture.
 - Nutrition research for agroforestry.



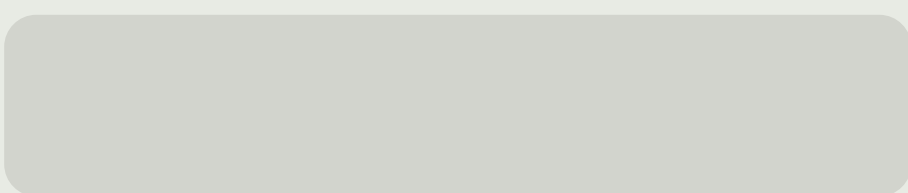
Increase market and finance access and incentives

Short Term (2022-2025)

- Broader market studies e.g. buyer preferences, quantities, quality.
- Research on alternative fruits to be exploited for enterprise development.



Greater coordination and enabling policy



Taskforce: Policy/Platform, Coordination of Implementation, Fundraising



Practices at farm level

Short Term (2022-2025)

- Actively involve youth in restoration activities.
- Gender mainstreaming in restoration activities (e.g. couple-based trainings).

Short Term (2022-2025)

- Scale community tree seedling production approach by establishing one nursery to cell level.
- Decentralize tree seed trade to increase access.

Longer Term (2030)

- Scale community tree seedling production approach by establishing one nursery to cell level and then village.
- Certification for seedlings, seed quality standards of tree products.

Short Term (2022-2025)

- Support capacity building and awareness raising.

Longer Term (2030)

- Mapping and compiling of traditional knowledge and agroforestry practices.

Short Term (2022-2025)

- Scale the community lead farmers approach across the country.
- Capacity building through exchange visits.
- Regular radio talks.
- Train farmers in practical ways (e.g. increase the number of farmers able to do grafting, disease and pest management, seed sourcing and handling).
- Create awareness on existing policies impacting restoration.
- Tree ambassador per village.
- Rewards to the best practitioners through competition.

Longer Term (2030)

- Strengthening agroforestry value chains linked to indigenous species.

Short Term (2022-2025)

- Identify and support incentives supporting agroforestry from production to consumption. For example, expanding on carbon market.

Short Term (2022-2025)

- Engaging commercial banks and MFIs in agroforestry including fruits.
- Community fruit collection centers and market linkages.

Longer Term (2030)

- Subsidies for tree seeds, seedlings, pesticides, fertilizer.

Short Term (2022-2025)

- Create a specific division for agroforestry under RFA which manages the technical teams.
- Enforce laws that support land restoration.

Short Term (2022-2025)

- Jointly plan tree planting season activities in communities as early as possible.
- Advocacy on policies and regulations on harvesting trees.
- Include tree planting in household performance agreement.

Key Workshop Highlights



Mr Nshimiyimana Spridio, Acting Director General of Rwanda Forestry Authority (RFA) formally opens the workshop



Dr Athanase Mukuralinda gave a formal opening, in which he praised the EU for supporting this land restoration project for the previous 5 years.



I don't think we'd be here celebrating without your work. We appreciate your commitment to supporting various initiatives we want you to keep momentum, and look forward to continuing working with you. There's many initiatives coming in from the government. Especially cooperatives will have the opportunity to benefit from these."

Sean Kerrigan, Country Director, World Vision Rwanda

- Tree planting events are organized each year to raise awareness on climate challenges and tree services. \$260 million pledged for environmental, political, and economic projects for the first four years, next cycle until 2027.
- Regreening Africa is contributing to the success of Rwanda's goals and national commitments in the Bonn Challenge.
- Thus far, Regreening Africa has reached **25,000 HHs in 4 districts**, planted over 6 million tree seedlings, **3 million fruit trees**. RRCs have promoted active participation of communities and promoted sustainability. - Spridio Nshiyimana, Director General of Rwanda Forest Authority (RFA) and Chairperson of the Regreening Africa National Oversight and Coordination Committee.



Overview Presentations of Regreening Africa Programme

Rwanda – a densely populated country – is currently placing extremely high pressure on its limited natural resources. The population is particularly dependent on forestry products for biomass and fuelwood. The unsustainable demand on natural resources, coupled with the prolonged droughts in Eastern Province, has contributed to the drastic change in vegetation witnessed over the years since 1990, and heightened the vulnerability of farmers and rural communities. The overall degradation of Rwanda's landscapes and ecosystems is resulting in exacerbated biodiversity loss, a decline in crop and livestock productivity as well as food insecurity and malnutrition.

The Regreening Africa Programme is a five-year project (2017-2022) funded by the European Union that seeks to improve livelihoods, food and nutritional security, resilience to climate change and to restore ecosystem services through evergreen agriculture. The unique programme structure is illustrated on page 7.

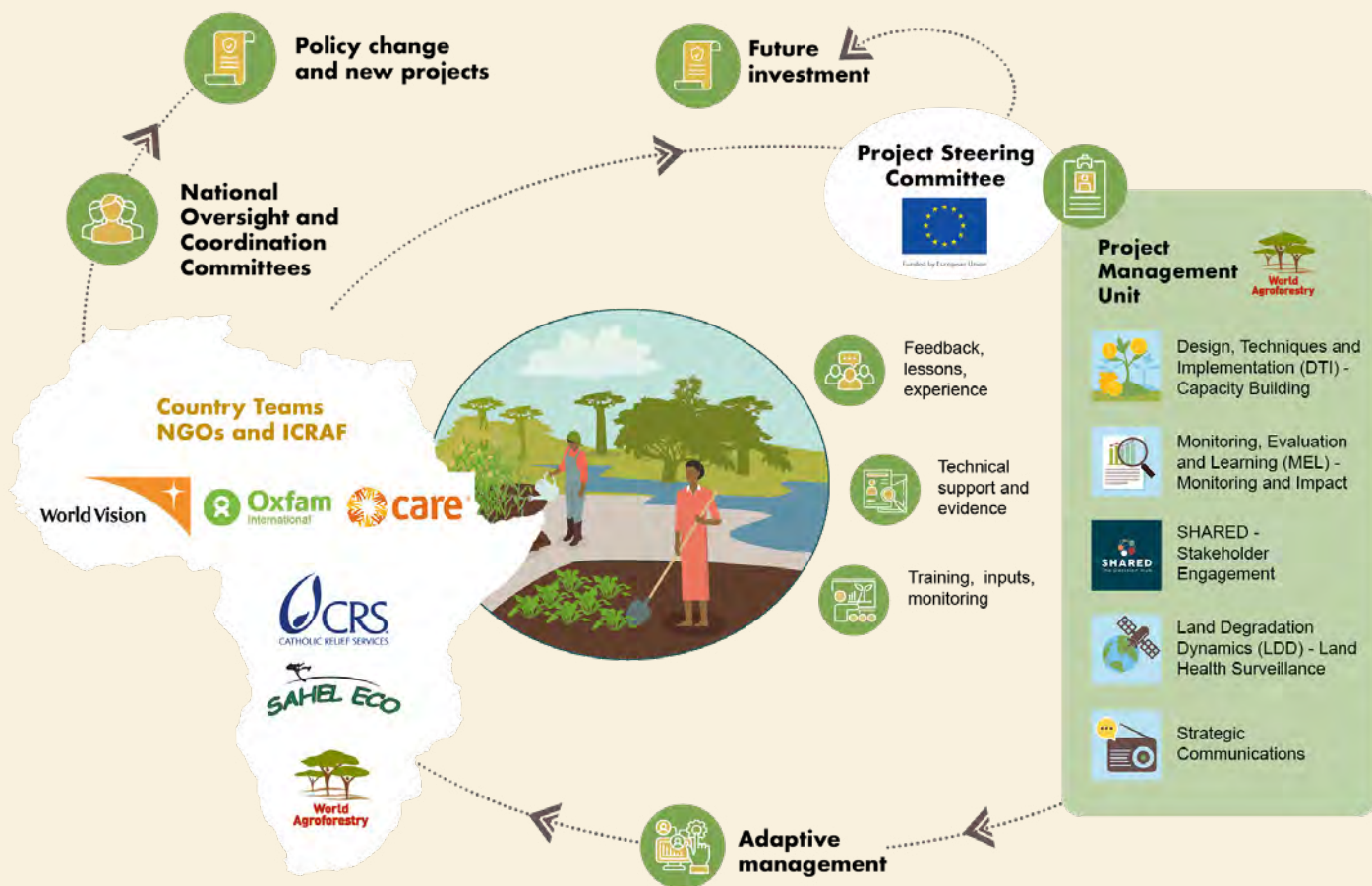
To date, the programme has reached



401,297 households and covered



665,924Ha of land across the 8 programme countries.







In Rwanda, the programme seeks to reach 70,000 households and restore 100,000 hectares. The expected results include:

- Increased tree density and diversity
- More fruit trees
- Increased awareness of land degradation and restoration measures.

In Rwanda, the project implementation partners include the MoE, MINAGRI, MINALOC, the National Oversight and coordination committee (NOCC), which is made up of RFA, EUD, MINAGRI, World Vision Rwanda (WVR), GIZ/Economics of Land Degradation (ELD), ICRAF, Bugesera, Kayanza, Gatsibo & Nyagatare districts. The direct implementing partners are the local government districts, farmer cooperatives, churches and schools.

The achievements to date and the prominent Regreening practices and niches are outlined on page 8 and 9.

ACHIEVEMENTS AGAINST COUNTRY TARGETS

| Target Type | Country Target | Actual targets reached | Verification approach used |
|---|----------------|------------------------|---------------------------------|
|  Directly facilitated Households | 30,800HH | 26,378HH | Regreening app Uptake survey |
|  Directly facilitated Hectares | 52,000Ha | 75,627Ha | Regreening app records |
|  Leverage Households | 49,000HH | 36,540HH | Project monitoring data |
|  Leverage Hectares | 79,000 Ha | TBD | - |

PROMINENT REGREENING PRACTICES WITH THEIR NICHES AND PURPOSES

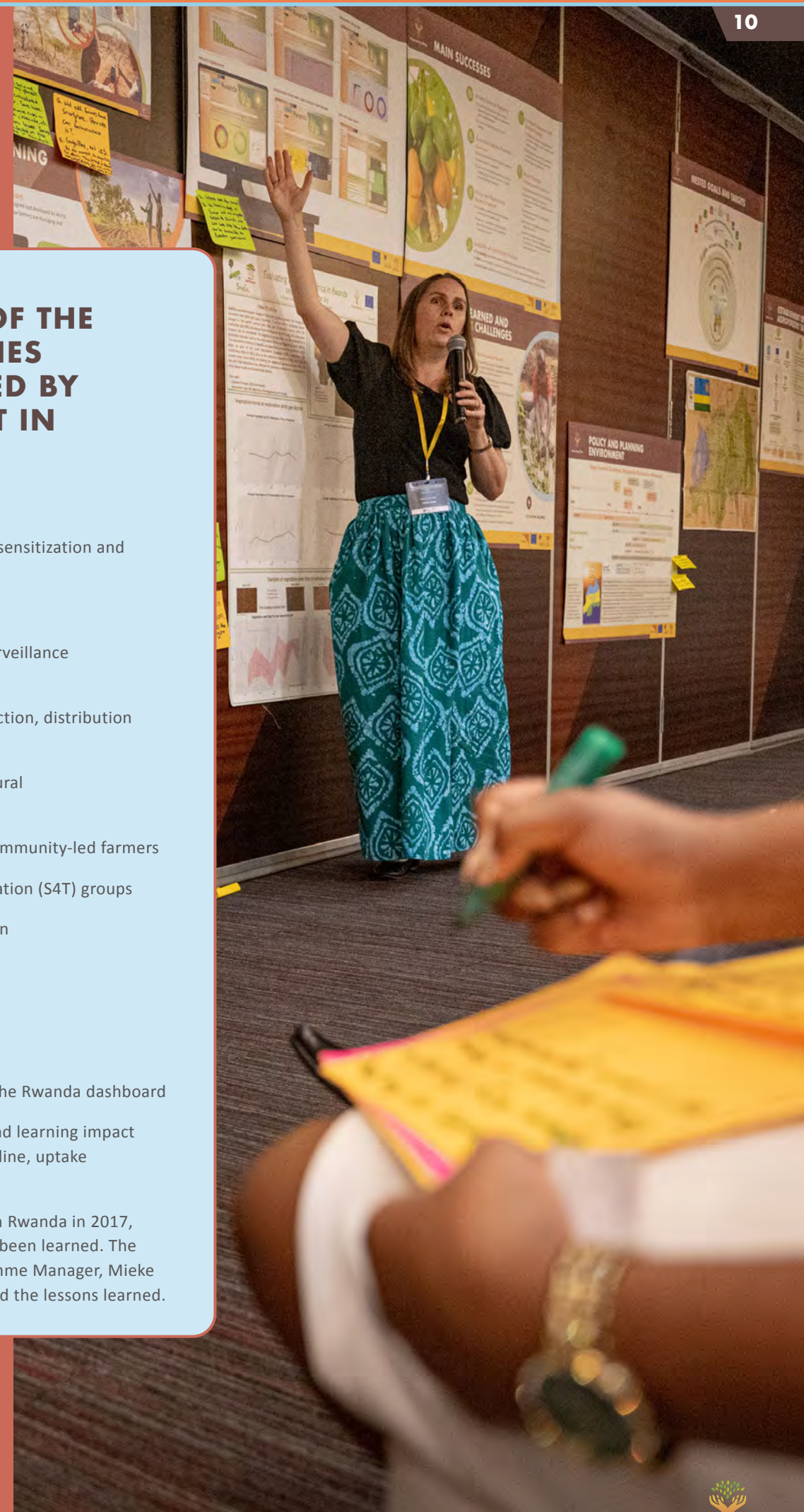
| Practices | Niches | Purpose |
|---|---|--|
|  Fertilizer trees | Boundary planting, contour hedges | Improving soil fertility, erosion control, improving crop yields |
|  Fodder trees/shrubs | Boundary planting, contour hedges | Increase milk production and income generation |
|  Woodlots | Individual plots | Fuel wood, restoration of degraded soils, economic benefits |
|  Timber | Boundary planting | Income generation |
|  Silvopastoralism | Boundary and scattered planting | Livestock shade, fodder, timber, fire wood |
|  Farmer-managed natural regeneration | Scattered trees | Promoting indigenous species and management Livestock shade, fodder, timber, fire wood, landscape restoration |
|  Fruit tree growing | Home gardens, orchards, scattered in fields | Improving nutrition, income generation, motivation |



SUMMARY OF THE KEY ACTIVITIES IMPLEMENTED BY THE PROJECT IN RWANDA

- Building partnerships
- Awareness creation, sensitization and policy engagement
- Capacity building
- Land Degradation Surveillance Framework (LDSF)
- Tree seedlings production, distribution and planting
- Establishment of 3 Rural Resource Centers
- Extension through community-led farmers
- Saving for Transformation (S4T) groups
- Biomass incorporation
- Value chains
- Progress monitoring
 - ◆ Regreening app
 - ◆ Development of the Rwanda dashboard
 - ◆ Joint reflection and learning impact assessment (baseline, uptake surveys, endline)

Since the project launch in Rwanda in 2017, a number of lessons have been learned. The Regreening Africa Programme Manager, Mieke Bourne Ochieng, presented the lessons learned.





LESSON 1

Practices are varied and must match local context – if it doesn't work for the local community, we won't have adoption. Nurseries, tree growing and grafting and direct seeding. It's not so much how many we plant, but how many are still there and how diverse they are.



Regreening Africa Programme Manager Mieke Bourne presents a summary of the key lessons



Nurseries
(Including indigenous trees)



Tree growing
Grafting
Direct seeding



Farmer managed natural regeneration, assisted natural regeneration
(Big return on investment)



Niger
soil & water conservation



Ethiopia
exclosures



LESSON 2

Address drivers of degradation and create incentives for restoration – particularly given the key role farmers play in making restoration work.

Land degradation in Rwanda is characterized by soil erosion and declining soil fertility and is driven by unsustainable land use practices, namely deforestation, overcultivation including on steep slopes without appropriate soil conservation measures, and overgrazing. Incentives can include the incredible work around cooperatives, establishing sustainable value chains (such as honey and fruit tree species) and RRCs. At least one value chain per country has been supported. Activities varied from raw materials and product development, through to processing, access to finance and marketing. Caution was raised around the issue of pests and diseases, as factors that will undermine efforts made to incentivize farmers, as well as the general enthusiasm of the community.



Key questions that were raised include:

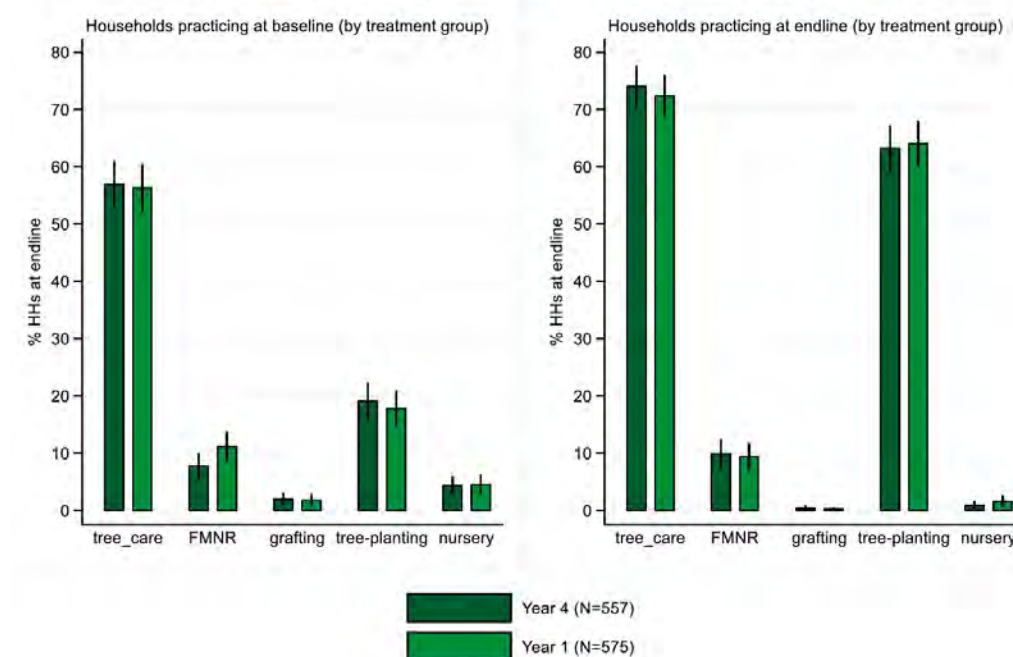
How can seedlings be sold if they're given for free by projects?
Will there be some varieties that will not be given for free?



LESSON 3

Measurement is critical. LDSF, MEL, app – start to get polygons, know where work is taking place, cheaply and see change that takes place over longer time.

Households practicing different regreening activities at baseline



Tree planting increased significantly between baseline and endline.

Slightly higher among households in treatment sites.

FMNR practice barely changes.

Less tree grafting and involvement in nursery at endline.

Figure 1: Practice of Regreening initiatives at baseline by treatment group

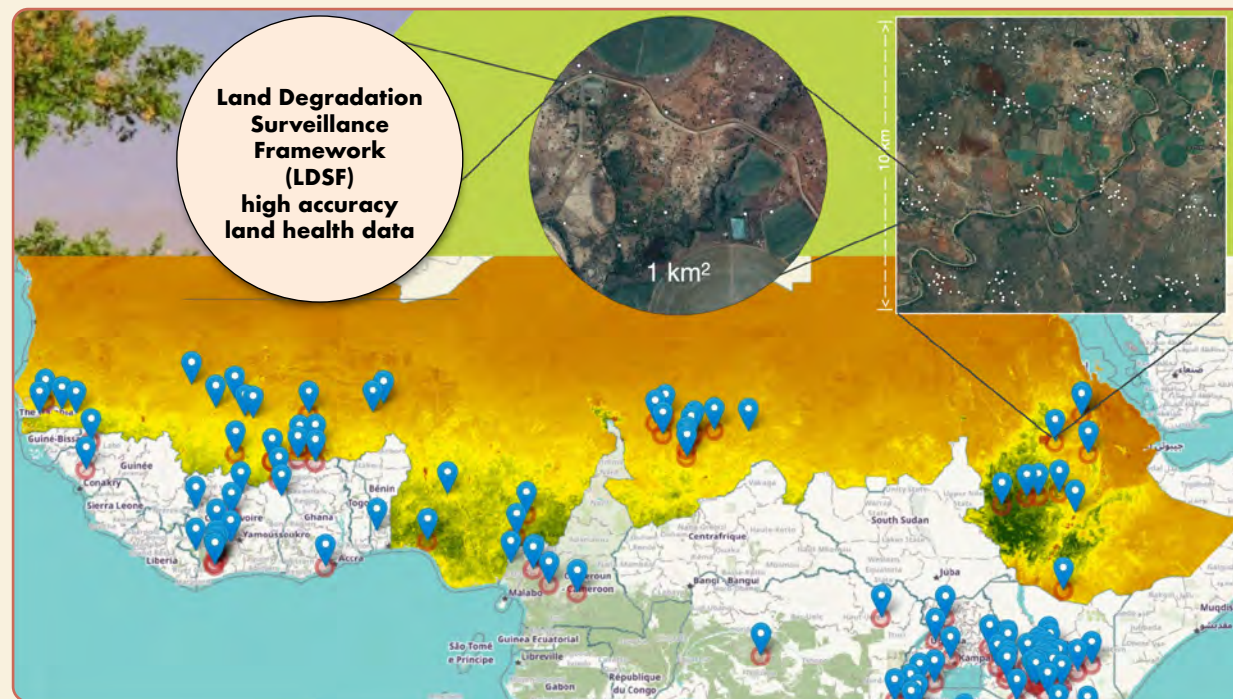


Figure 2: Land Degradation Surveillance Framework (LDSF)

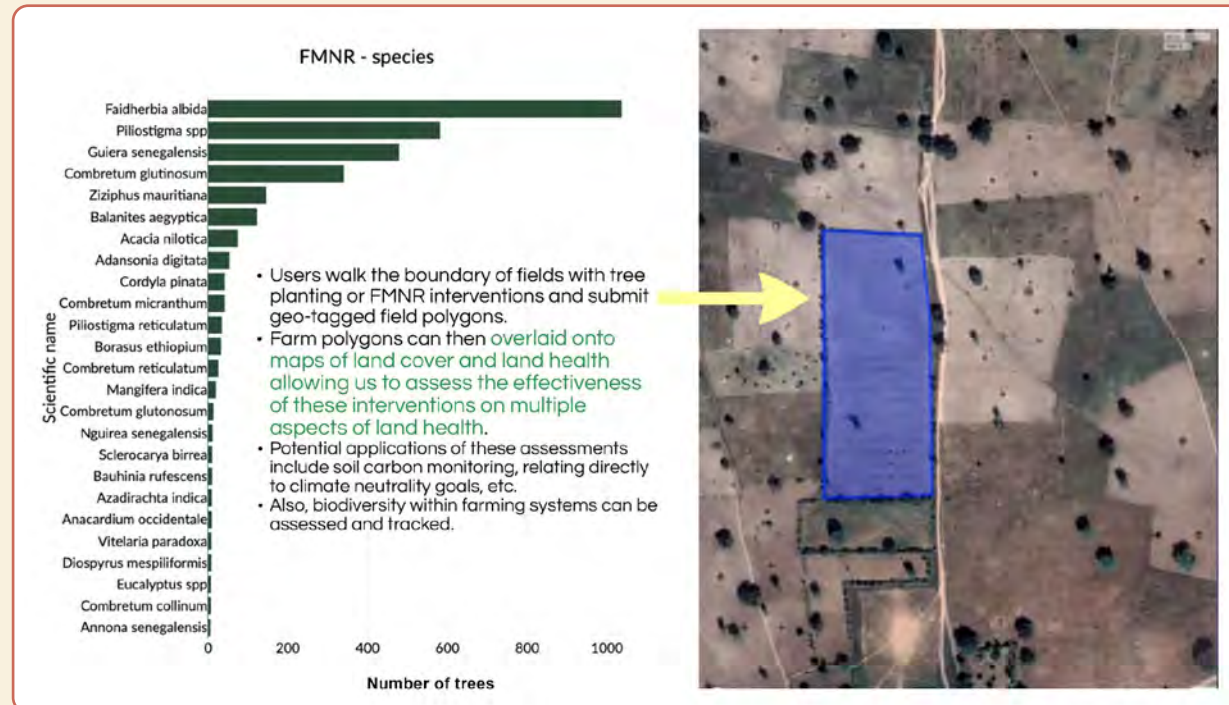
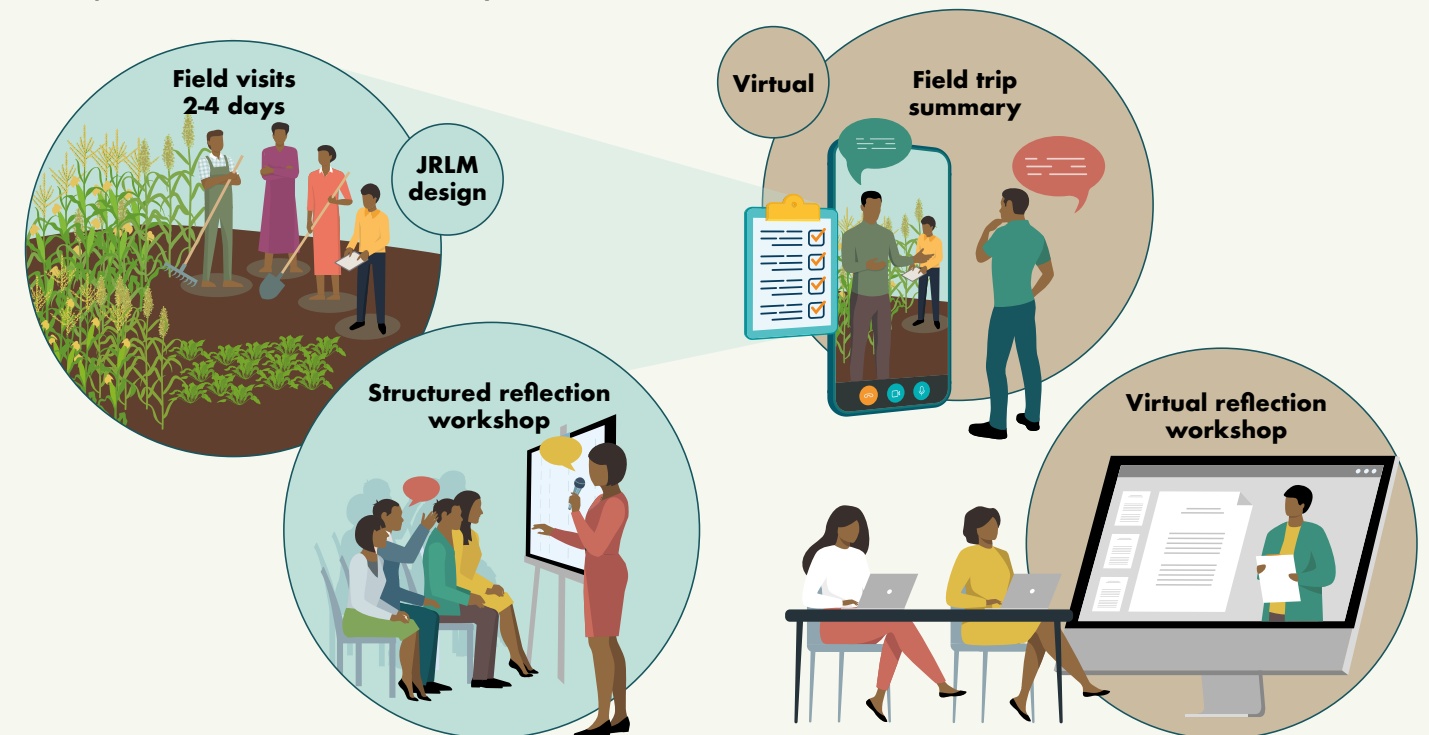


Figure 3: FMNR species



LESSON 4

Data should be accessible and available for adaptive management. Joint Reflective Learning Missions (JRLM) have strengthened the partnership between research, implementation, and community.



LESSON 5

Partnerships and inclusion – lessons to be learned across the organization on including and empowering youth and women.



Photo: Workshop participants in Rwanda



ALEX MUGAYI PRESENTED ON THE PROGRAM SUCCESSES IN RWANDA

The success of the Regreening Project has – in large part – been a result of the partnerships established thus far. Sixty-three partnerships have been created thus far, including partnerships with cooperatives, district and government ministries, schools, faith-based organizations, NOCCs and farmer organizations.



Regreening app

- Important tool to monitor and visualize trees planted.
- Promotes citizen science and local ownership of initiative.

Tree Biomass Incorporation

- Use of fertilizer trees, e.g. *Gliricidia sepium*, *Calliandra calothyrsus*, *Leucaena diversifolia*, *Senna spp.*
- Improves soil fertility, soil organic carbon, soil water storage.

Tree Management

- Pruning and Coppicing to reduce competition.
- Weeding.
- Manuring.

Tree planting

- Saplings of *Grevillea robusta*, *Eucalyptus*, and *Solanum betaceum* most common.
- Used for fruit, fodder and other non-timber product value chains, and are commonly planted as boundaries, along roads, among crops, or within home gardens for households.



FMNR

- Promoting indigenous species and management.
- Provides livestock shade, fodder, timber, and firewood while restoring landscapes.



Nurseries and Rural Resource Centers (RRCs)

- Tree nursery cooperatives are playing an important role in producing seedlings in communities for improved tree planting outputs and scaling.
- 4 RRCs were established to demonstrate and disseminate technical knowledge and improved planting materials, as well as provide training in entrepreneurship and value chains.

There has been a huge effort made to raise awareness on the programme in Rwanda, including using local media outlets such as community radio stations, print media, NATF, engaging in school and community work, as well as holding events, such as that held by the EU. Adding to this, the programme has extensively dedicated resources towards enhancing the capacity of lead farmers, cooperative members, beneficiary farmers, university staff and students. In Rwanda, building capacity in business entrepreneurship was key particularly in nurseries.

Through the **partnership with 63 farmer cooperatives**, over **9.5 million tree seedlings** have been distributed, including **6 million multi-purpose trees** and **3.5 million grafted and un-grafted fruit trees**. This has enhanced ownership and sustainability, improved farmers' knowledge and tree seedling production, and job creation. Approximately **2,700 people/households have earned season income from nursery management work, including 1, 373 women, 1, 318 men, 330 girls and 268 boys**. Three Resource Centers (RRCs) have been established in Kayonza, Gatsibo and Nyagatare districts, including the development of permanent structures for year-round education and support on business entrepreneurship and nursery development. These facilities include offices, seed storage and a permanent nursery.

Extension (?) through community lead farmers. A total of **512 lead farmers** (256 women and 256 men) as well as **154 young community members** (77 girls, 77 boys), have been trained and facilitated to do scaling of Regreening practices across their communities. Furthermore, through the Savings for Transformation Programme (S4T), a total of 520 saving groups have been formed, including 13, 638 members (9, 530 women and 4108 men), These S4T



groups have been established to improve livelihoods by creating a platform to raise awareness and scale up the Regreening practices. To date, the accumulated savings has been over 111 million RwF, and the total loans that have been given out to members currently amount to over 115 million RwF.

The programme has also been successful in supporting farmers to make more use of fertilizer trees through biomass incorporation, which has improved soil fertility and productivity. Over 200 participatory trials have been formed across the project area, which has already seen an increase in the number of farmers adopting the practice.

Another programme success has been the value chain activities that have been conducted and the product that have been selected for focus. The priority VC crops that have been identified include fruit trees (tree tomatoes and Pawpaws). In addition to these VC crops, distribution of quality planting materials has been conducted, including grafting for mangoes, avocado, pawpaw and tree tomatoes. Other activities that have been conducted include supporting producers to come together, training producers including beekeepers and establishing market linkages.



YOUTH AND WOMEN PARTICIPATION

- Female participation is higher in nursery activities.
- Youth (16 – 35 years) participate both in seedling production and tree planting.
- Children participate from schools and during planting for their parents, many have established their own orchards.



This work is a result of the commitment, dedication, and strong support from all our partners and stakeholders, and we are grateful for your efforts."

Alex Mugayi, World Vision Rwanda



ATHANASE MUKURALINDA ON CHALLENGES

A critical issue to address is access to propagation materials for indigenous species and appropriate capacity, training and extension on propagation methods. We must put effort into controlling pests and diseases. Mindset of pastoralists in Eastern Province is that we must remove trees for rangelands.

Lots of money in seedling production. If we don't involve local communities, there is no dialogue about the importance of trees. Farmer to farmer interactions are essential. Need to understand farmer priorities and needs to facilitate adoption.



"Are we coordinating together? Do we have the same tactics? There should be coordination, and we hope that the taskforce can accomplish that. Usually when we think about biodiversity, we think about protected areas, but agricultural areas are a big opportunity for increasing biodiversity. When you have a mix of species native and exotic, you have diversity, but when you just have exotic, we don't have biodiversity."



Evidence and Experience Wall Session

COMMUNITY VOICES



“
The training I received as a lead farmer helped me to change my mindset.

“

Mindset change has been observed in the areas where the Regreening project has been implemented during the 5 years.

“

Q. How is the market access for produce?

A. The market is available, but production is too low to meet demand.



“

There is a problem of lack of fertilization of lands.



“

No coordinated effort around tree management in Rwanda – implementers and scientists need to change the mindset.

“

Previously, people would plant trees and no one would be responsible. Now with lead farmers, there is commitment and accountability.



“

Having lead farmers as partner stakeholders in implementation has been an advantage in making more farmers join restoration efforts.

“

Introduction of tree shrubs has been an advantage in helping foster Regreening efforts.



“

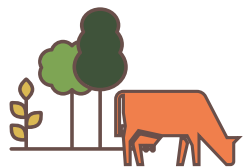
What have farmers learned and what can be scaled?



“

Increase in fruit tree production in the landscapes has been noted





FMNR

MONITORING LEARNING AND EVALUATION

Background: Loss of tree cover often signals severe land degradation in Africa

- Contributes to loss of vital ecosystem services such as water, biodiversity, soil erosion and soil nutrients cycling.
- There is negative feedback to community livelihoods e.g. low **food & nutrition security**, **soil fertility loss**, **fuelwood scarcity**, **loss of livestock forages** and frequent **conflicts** over resources.
- Under such circumstances, local land management practices often give way to the pressure to produce enough to eat.
- Communities adopt farming, herding and tree harvesting practices which destroy the natural resource base in their landscapes.



What is FMNR? How does it fit in agroforestry & re-greening interventions?

- FMNR Involves the **systematic regeneration and management of trees and shrubs** from tree stumps, roots and seeds (Rinaudo, 2012).
- The practice of **actively managing and protecting non-planted trees and shrubs** with the goal of increasing the **value or quantity of woody vegetation** on farmland (Haglund et al. 2011).
- FMNR is “when farmers actively **protect and manage the new growth** in their fields in order to **(re)create woody vegetation** (Larwanou et al. 2006).
- It is a **rapid approach to increase tree cover** through natural regeneration of wild trees on farm.

Implementing FMNR as an agroforestry approach for re-greening

- Understand **why trees were removed in the first place** and promote intervention that fits farmers' interests for current and future land use.
- Can FMNR be used to **raise farmer benefits**: e.g. **incomes** from tree product sales, household **nutrition** and **environmental benefits** e.g. watershed protection, wind erosion control, flood regulation & improved soil nutrient cycling?
- FMNR adoption involves **protection and management** of naturally regenerated trees.

FMNR Benefits

Low cost of implementation with rapid production of wood can help realize environmental & livelihood benefits:

- More income through the sales of tree products.
- Increases crop diversity.
- Improves the **density and diversity of trees** on farms.
- Can help **reduce soil erosion** depending on the arrangement in field.
- Increased **agricultural productivity** through soil improvements.
- Improved **livestock production** through forage production.
- **Food & nutrition security** role e.g. wood sales, fruits during hunger season).
- **Positive effects on women** (less difficulty gathering fuel wood).
- **Youths employment opportunities** provided by the cutting and transportation of wood.
- Can help **reduce the high costs of raising seedlings** in nurseries and avoid high seedlings mortality rates once planted out.

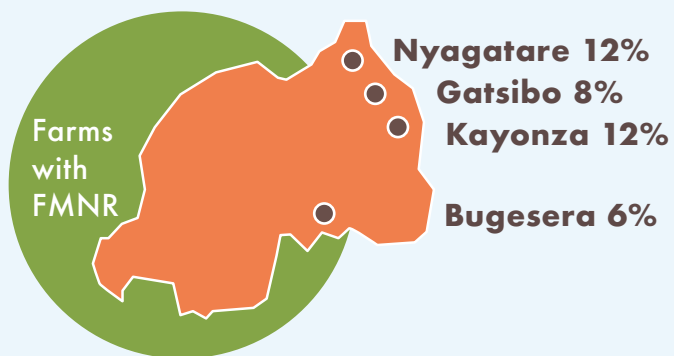


Some Limitations

- Depends on **local land and tree tenure** arrangements.
- Use of **fencing or enclosures in communal land** may conflict with **traditional open grazing practices**.
- Areas with severe top soil loss or few mature trees may have **no seed stock to regenerate**.
- Local genotypes used in regeneration may **lack genetic variation**.
- Available **seed sources** may suffer from **genetic erosion or dilution**-only few fragment tree have inbred over the years.
- Areas with excessive **charcoal burning and burnt stumps** may have **little sprouting**.
- **Labour to transplant wild regeneration** to preferred growing sites.
- Selection of wild regeneration is required to **avoid weediness problems** associated with some species.



Out of **1132 households** surveyed, only **109 (10%)** have attempted **FMNR**



Out of the 109 farms with FMNR
88 (81%) regenerate **1 tree species**
18 (17%) regenerate **2 species**
3 (3%) regenerate **3 species**

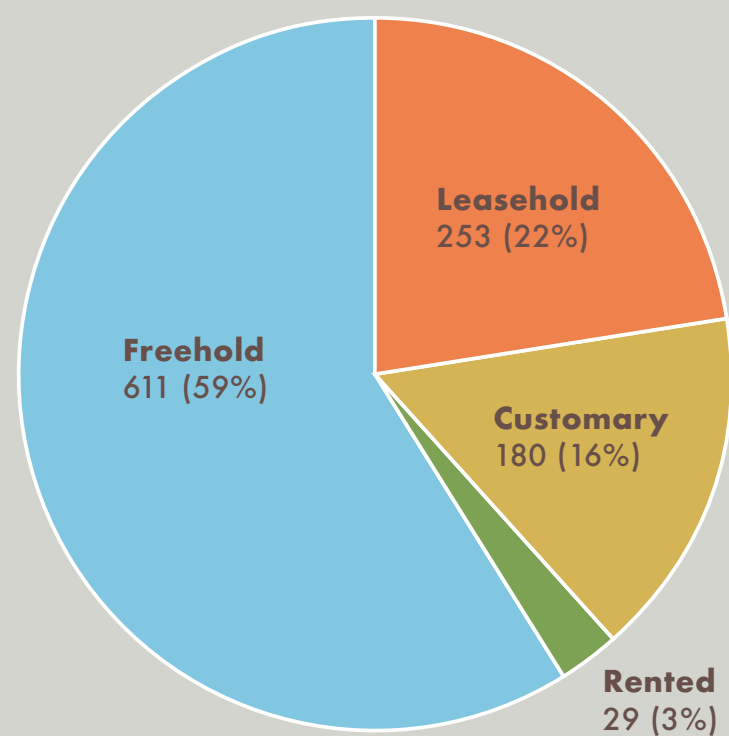












Figure 2: Land Ownership/Tenure (n= 1127)



Table 1: Land ownership type, mean farm sizes (Ha) seems to determine farms with or without FMNR

| Land Tenure Types | Bugesera (n=281; 0.26) | Gatsibo (n=283; 0.26) | Kayonza (n=286; 0.35) | Nyagatare (n=281; 0.28) | All Sites (N=1131; 0.29) |
|---|---------------------------|--------------------------|--------------------------|----------------------------|-----------------------------|
| Freehold (Outright ownership) | 155 (0.31) | 165 (0.24) | 185 (0.37) | 156 (0.29) | 661 (0.31) |
|  No FMNR | 141 (0.31) | 148 (0.23) | 157 (0.33) | 127 (0.26) | 573 (0.28) |
|  With FMNR | 14 (0.37) | 17 (0.31) | 28 (0.59) | 29 (0.43) | 88 (0.45) |
| Leasehold (Land is under lease, e.g. 99 years) | 70(0.19) | 53(0.25) | 66 (0.34) | 64 (0.24) | 253 (0.25) |
|  No FMNR | 69 (0.19) | 50 (0.21) | 63 (0.31) | 60 (0.23) | 242 (0.24) |
|  With FMNR | 1(0.06) | 3(0.87) | 3(0.93) | 4 (0.34) | 11 (0.62) |
| Customary (Owned by household in accordance with traditional customs) | 49(0.21) | 62(0.33) | 23 (0.32) | 46 (0.28) | 180 (0.28) |
|  No FMNR | 49(0.21) | 59(0.30) | 21(0.23) | 45(0.28) | 174(0.26) |
|  With FMNR | - | 3(0.95) | 2(1.25) | 1(0.14) | 6(0.92) |
| Rented (Owned by someone else but paid for in cash, goods and/or services) | 7(0.17) | 2(0.51) | 8(0.20) | 12 (0.35) | 29 (0.26) |
|  No FMNR | 5(0.05) | 1(0.02) | 8(0.20) | 11 (0.36) | 25 (23) |
|  With FMNR | 2(0.30) | 1(1) | - | 1(0.24) | 4 (0.46) |
| State owned (government owned but with granted user rights) | - | - | 4(0.44) | - | 4(0.44) |
|  No FMNR | - | - | 4(0.44) | - | 4(0.44) |
| Other land tenure arrangement | - | 1(0.30) | - | 3 (0.30) | 4(0.30) |
|  No FMNR | - | 1(0.30) | - | 3 (0.30) | 4(0.30) |

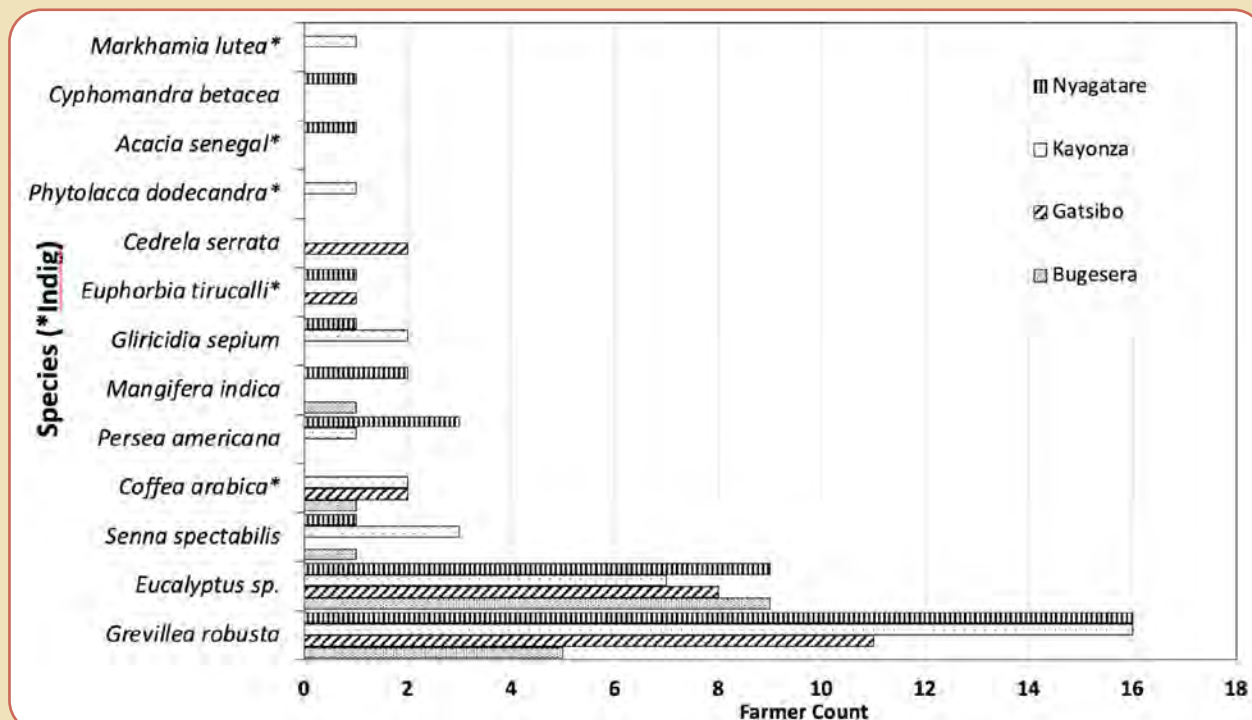


Figure 3: Land Ownership/Tenure (n= 1127)

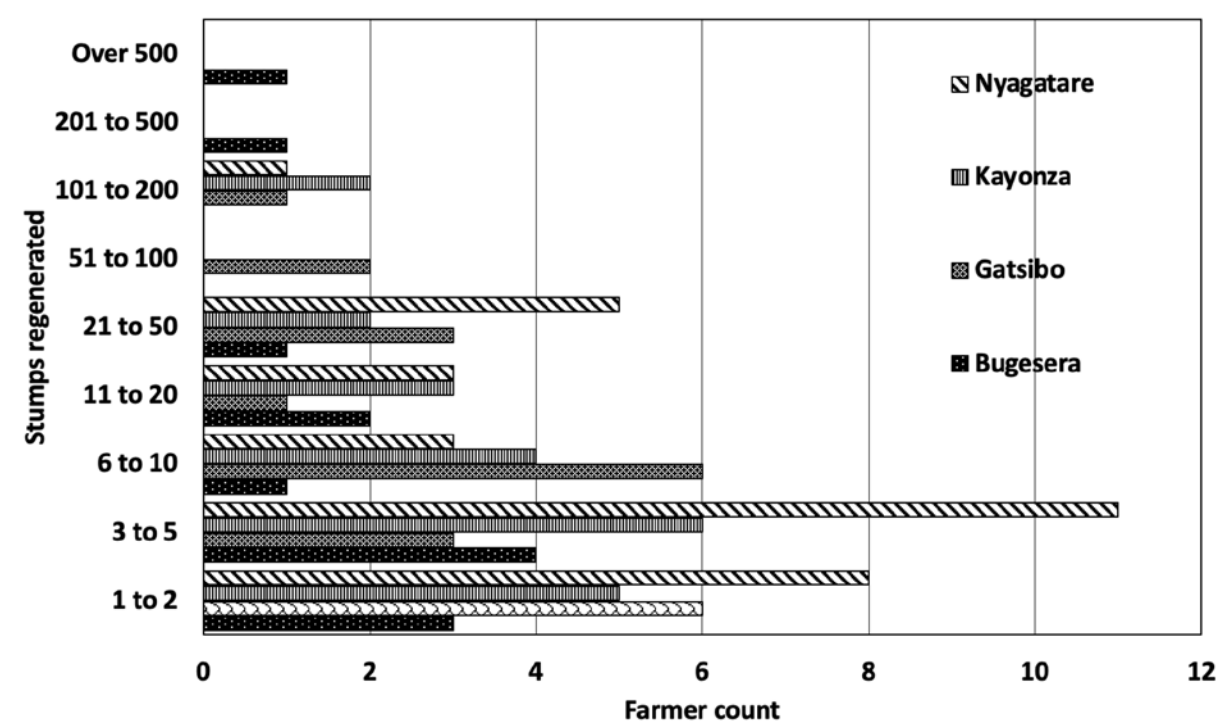


Figure 4: Number of tree stumps regenerated by farmers with FMNR (n=109)



Conclusion & Recommendations

- With only **10% of farmers** reporting FMNR activity on farm, its clear that scope and role is still very low in Eastern Rwanda.
- Findings point to **low FMNR interest** attributed to **small land holding**.
- Interest on regeneration of exotics such as **Grevillea** and **Eucalyptus** is noted but the value is not clear.
- Regeneration of **rare native shrubs** such as African soap berry is noted.
- Considering farmer **over-reliance on exotics** with **limited propagation bottlenecks** and **several local nurseries supplying materials** it's unlikely major shifts will occur towards FMNR to fill tree establishment gaps.
- Availability **indigenous seeds** and **difficult propagation** method limit adoption of FMNR.
- There seem to be **interest to regenerate native shrubs of particular values** such as medicinal and other.
- The **benefits of FMNR trainings** by projects such as Rwanda Agroforestry will need to be further evaluated.



There are plenty of projects happening on the ground, but we need to strengthen monitoring to know what impact we've had.

Need for more tree diversity is encouraged since even farmers agree to this need.

Have all stakeholders focus on sharing agroforestry knowledge to others to ensure higher reach.

Hilda



MONITORING, EVALUATION AND LEARNING COMPONENT SUMMARY

Regreening Africa Program overall Theory of Change for direct scaling sites

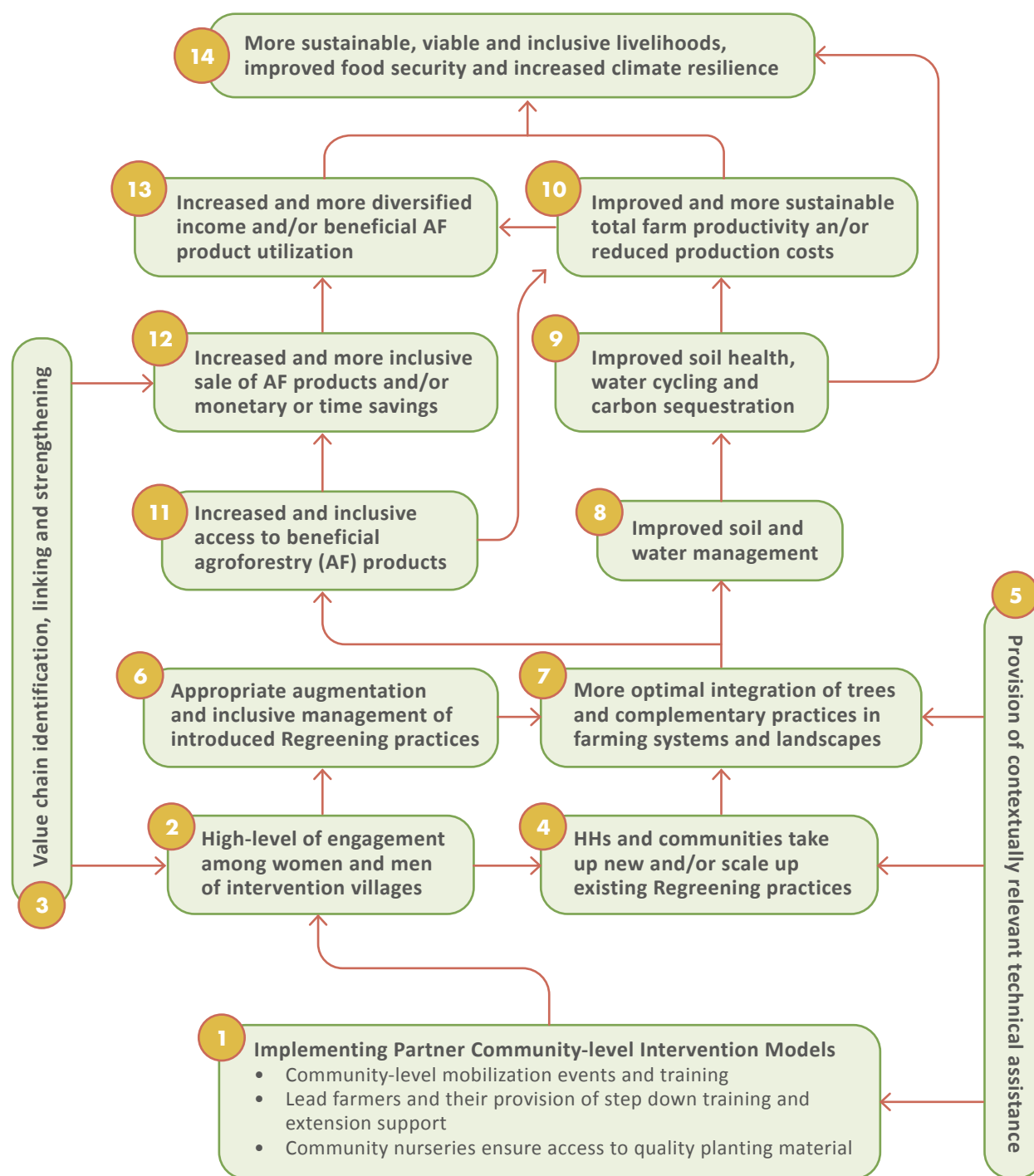


Diagram 1: Theory of change direct scaling sites

Targets and WVR scaling model

| Target Type | Direct targets | Leveraged targets |
|------------------------------|----------------|-------------------|
| 70,000 Households | 21,000HH (30%) | 49,000HH (70%) |
| 100,000 Hectares | 21,000Ha (21%) | 79,000Ha (79%) |

Regreening practices:



Restoration practices:

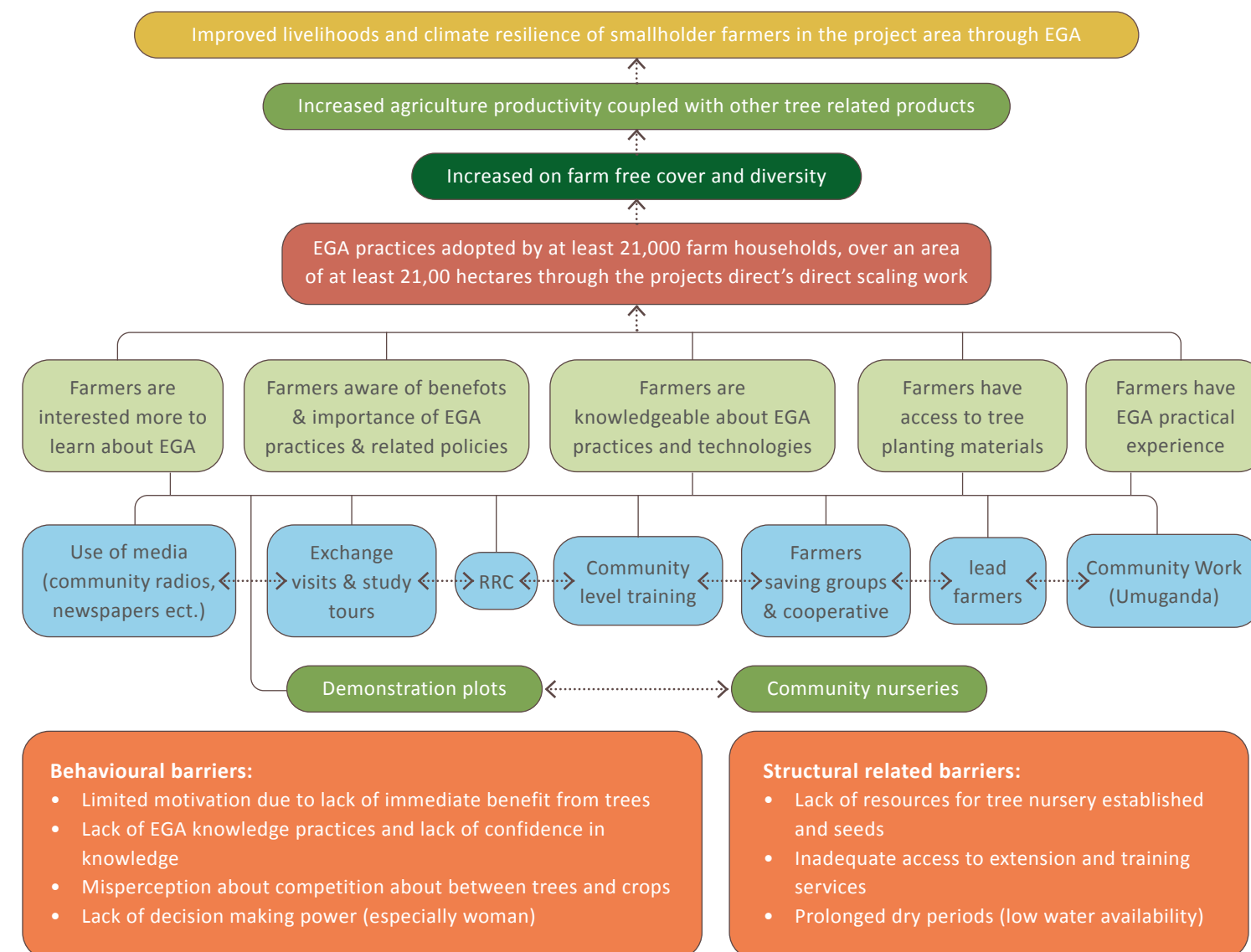
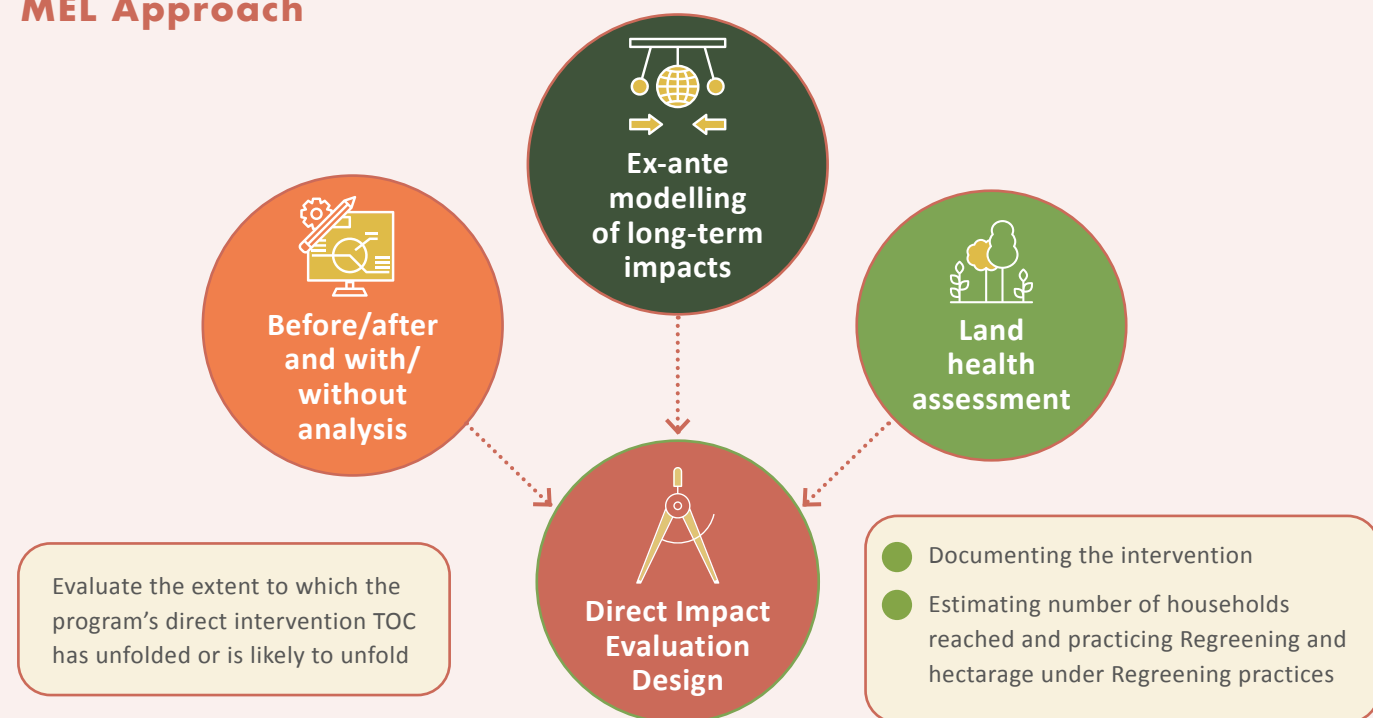


Diagram 2: Theory of change structure for direct scaling

MEL Approach



Endline survey – February 2022

Objectives

- Assess project's progress towards intended objectives (HHs and hectareage attained)
- Derive lessons and best practices for future restoration projects
- Estimate project impact on various environmental and socio-economic outcomes

Data collection

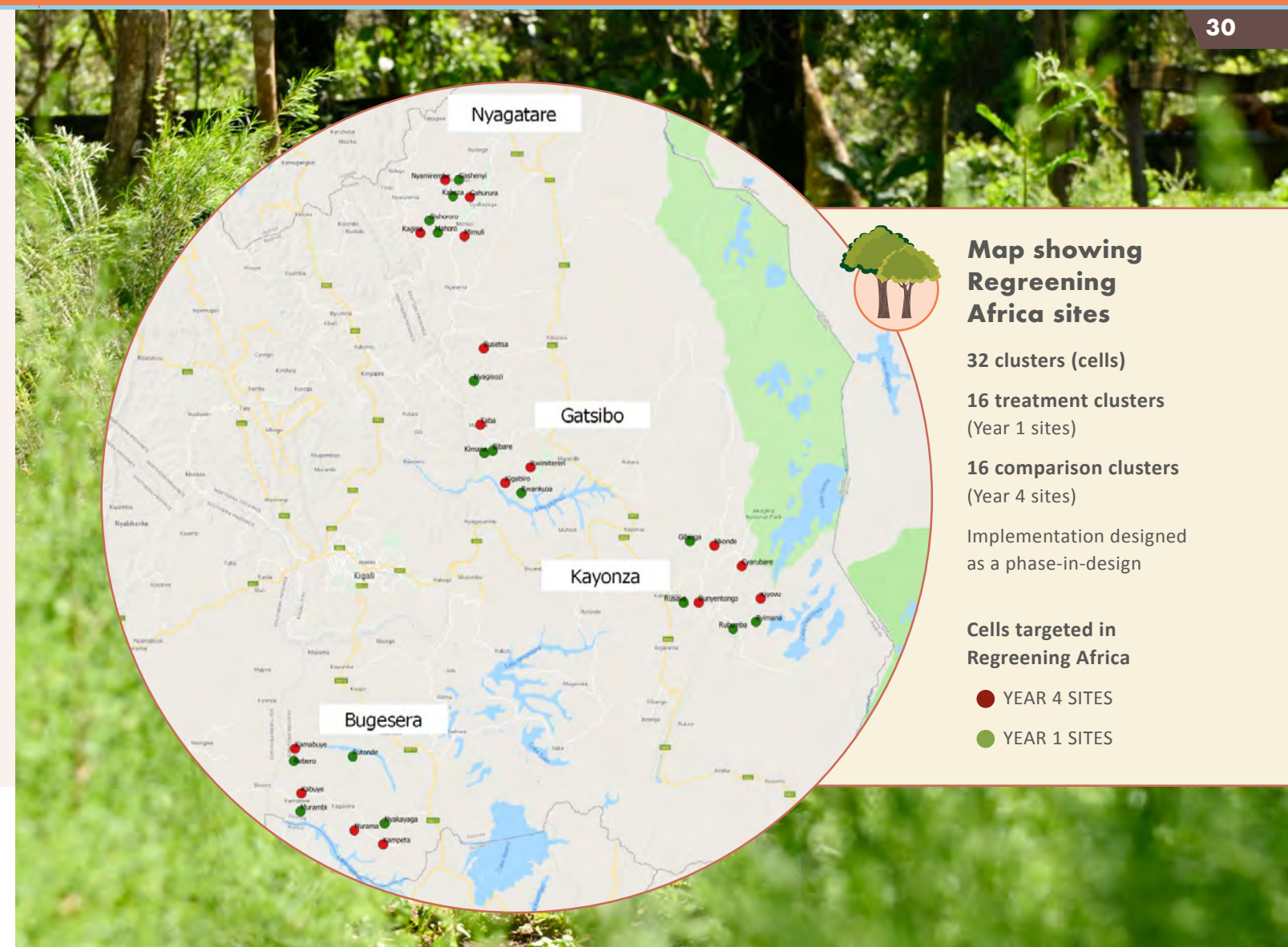
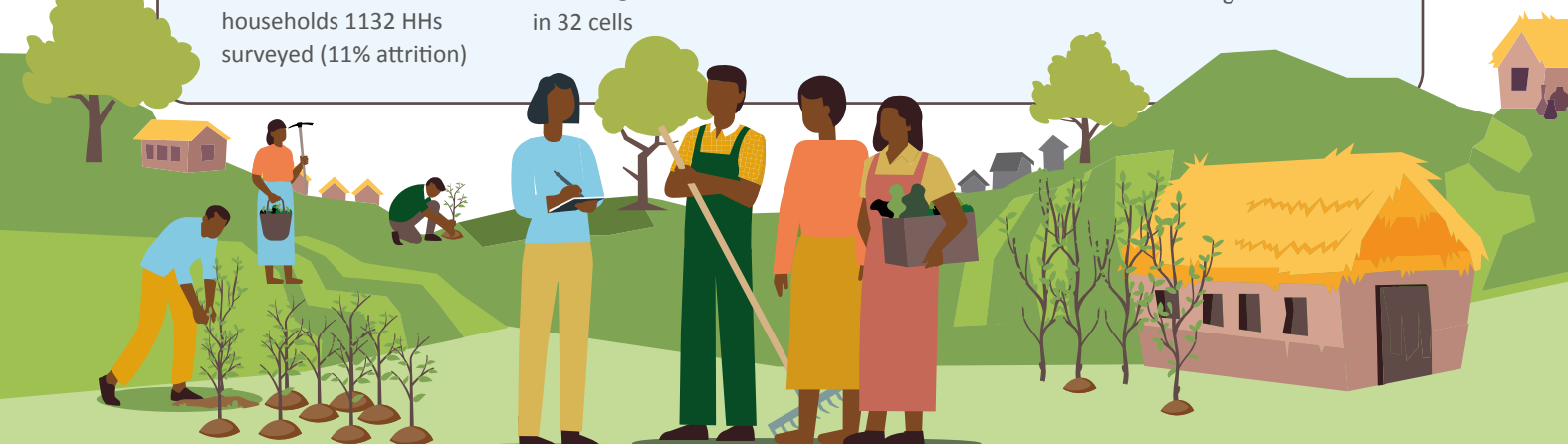
Household survey - similar to baseline
Targeted: 1268 baseline households 1132 HHs surveyed (11% attrition)

Village level surveys
127 villages in 32 cells

Key informant interviews
31 interviewed

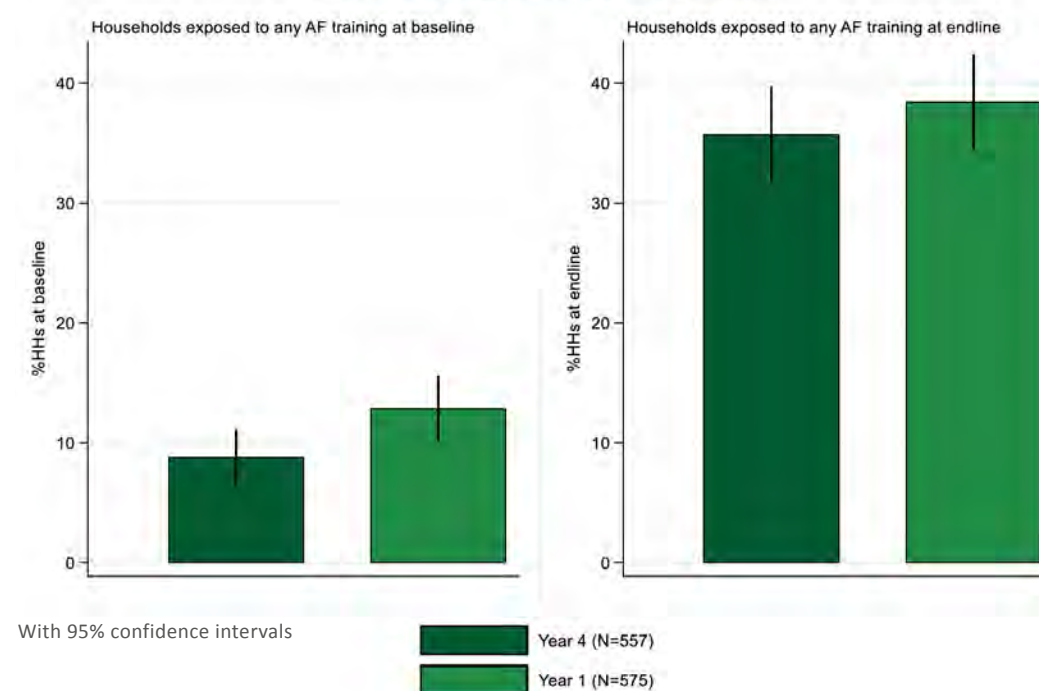
District level informants
4 interviewed

Implementation partner interviews
Pending



PROVISIONAL RESULTS

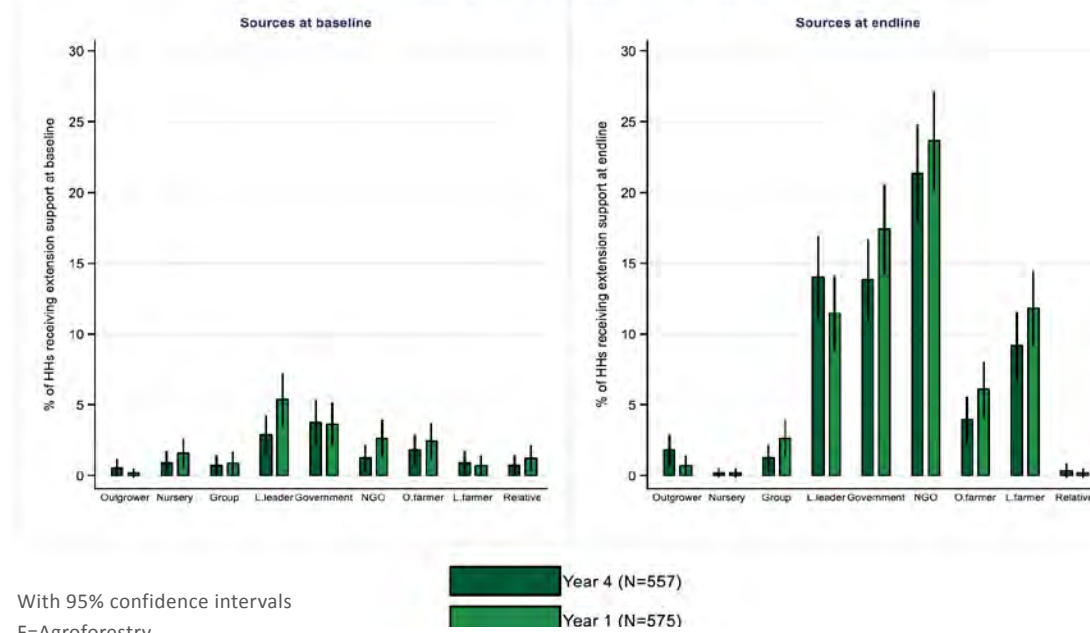
Exposure to agroforestry related training



Significant increase in # and % of HHs exposed to Regreening practices through training between baseline and endline for both treatment and control sites (11% to 37%).

Figure 5: Exposure to agroforestry related external assistance

Sources of agroforestry related training at baseline and endline

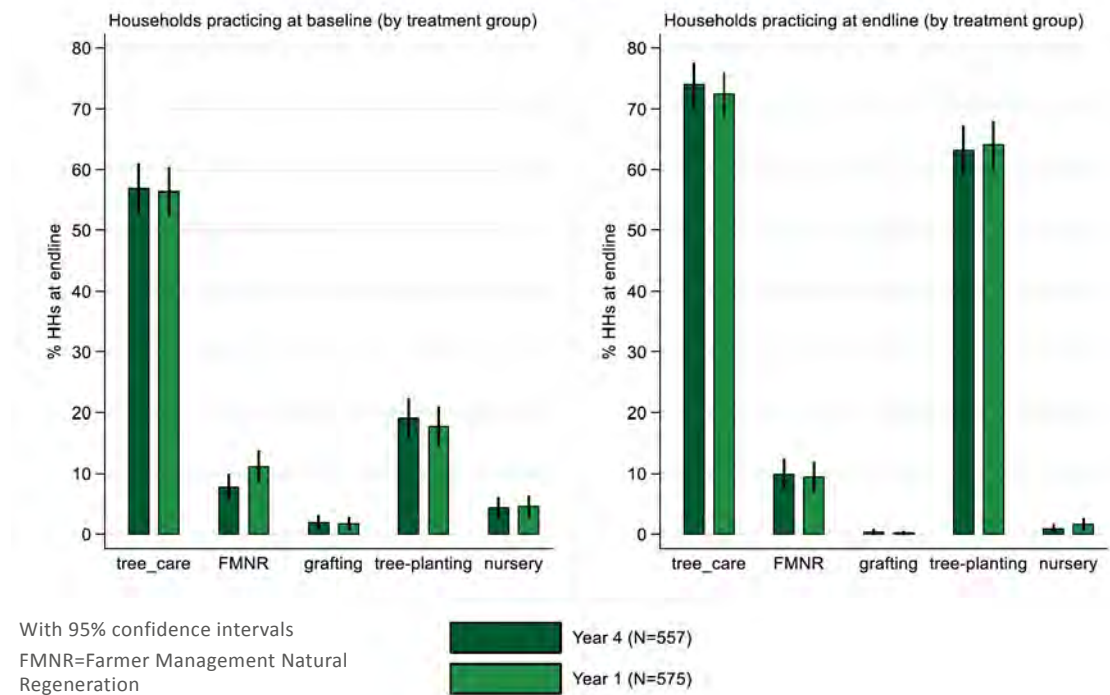


Highest percentage of households in both treatment/control sites reached through Projects/NGOs.

Lower % of households rely on relatives, other farmers, nursery operators and groups for AF related information at endline.

Comparatively more households in Year 1 sites reached through groups, government extension, NGOs and fellow farmers.

Households practicing different regreening activities at baseline

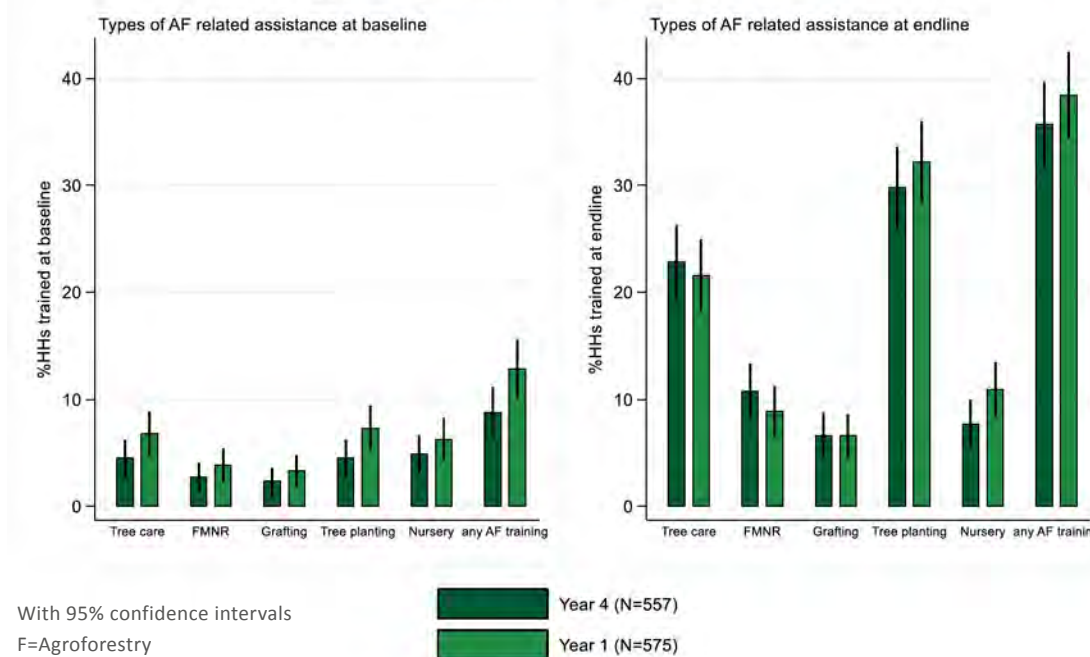


Tree planting increased significantly between baseline and endline.

Slightly higher among households in treatment sites.

FMNR practice barely changed Less tree grafting and involvement in nursery at endline.

Types of agroforestry related training provided

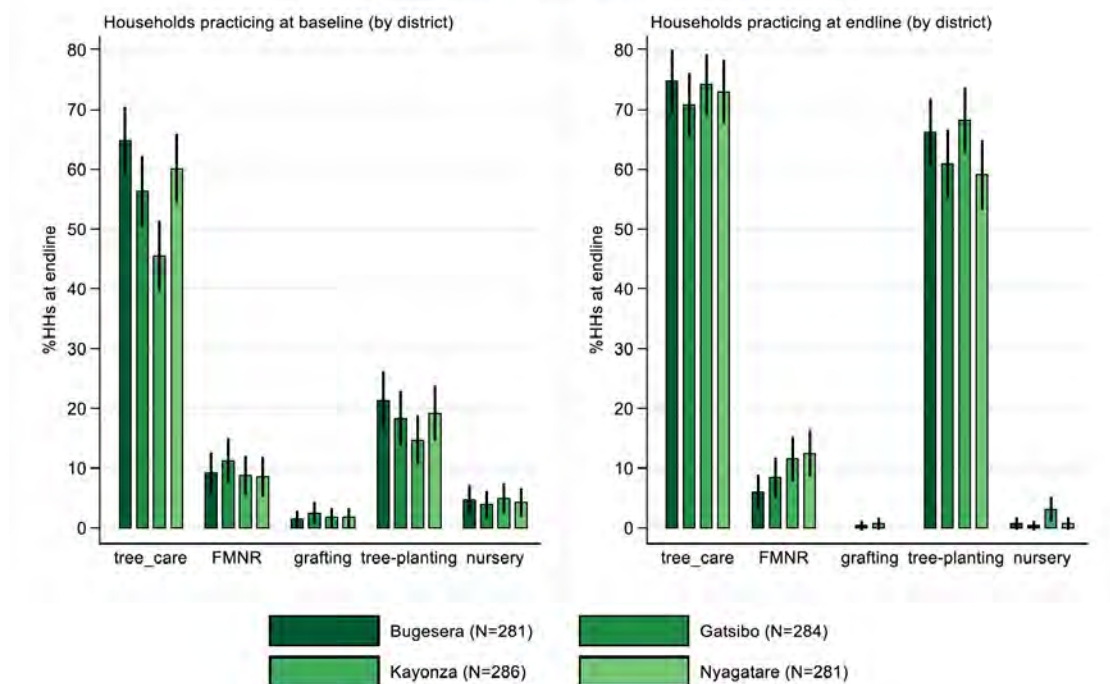


Exposure of households increased between baseline and endline.

Households in both treatment and control sites were exposed.

External support is predominantly on tree planting followed by different elements of tree care and management.

Households practicing different regreening activities



Tree planting was the single most common practice at baseline.

FMNR practice was about 10%.

Practices undertaken under tree care mainly included: Pruning Weeding Manuring.

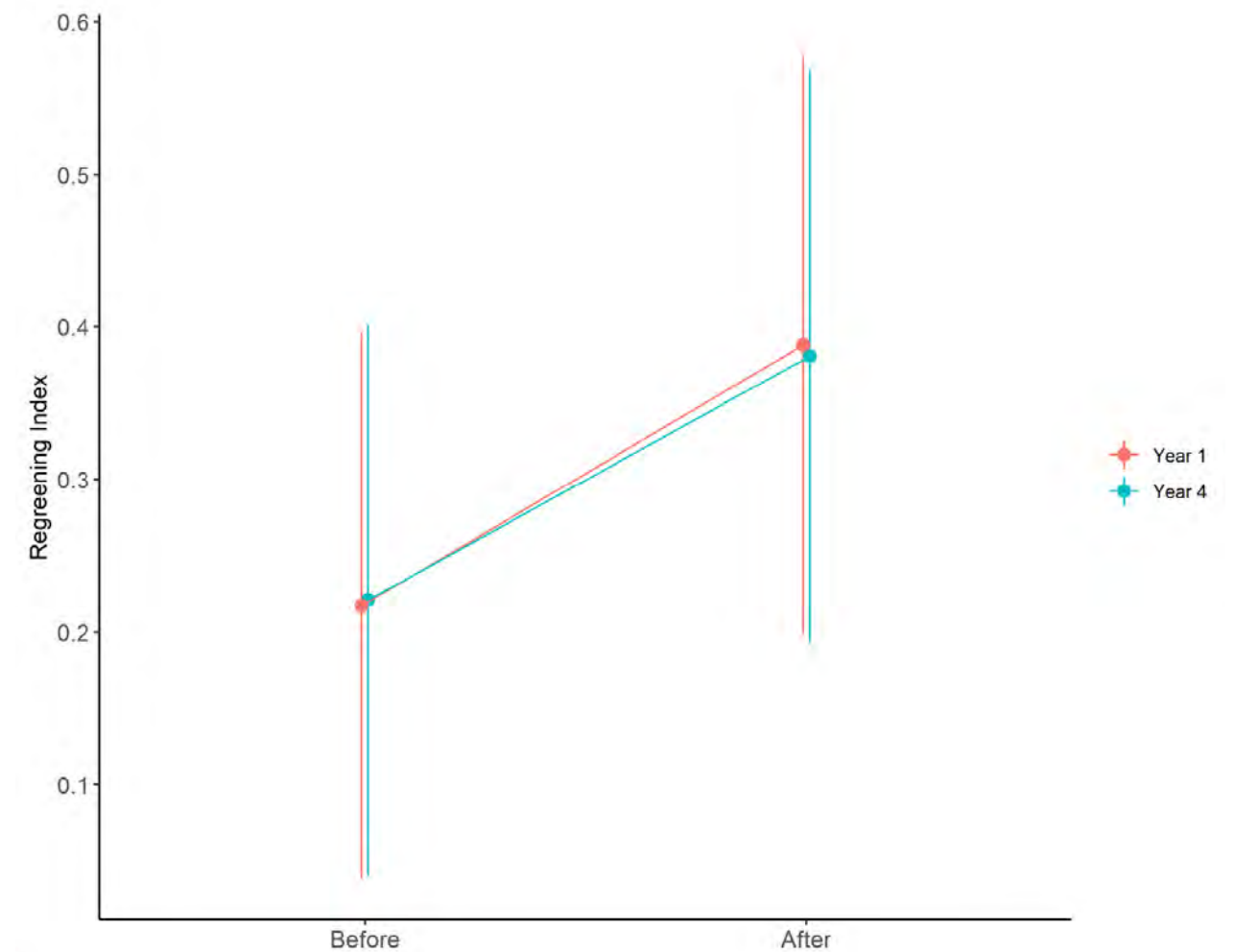
Some variation at district level.

Regreening Index: Dimensions & Indicators

| | | |
|------------------------|--|--|
| Extent of practice | | FMNR/planting on main field in last 4 years |
| | | FMNR/planting at homestead in last 4 years |
| | | FMNR/planting in other land use areas in last 4 years |
| | | HH participation in community-level regreening |
| Intensity of practice | | >= 10 new trees/shrubs on main field in last 4 years |
| | | >= 5 new trees/shrubs at homestead in last 4 years |
| | | >= 5 new trees on other land use areas in last 4 years |
| | | HH use of AF product from farm in last 12 months |
| Diversity of practice | | AF product sales in last 12 months |
| | | >= 2 distinct AF practices engaged in last 12 months |
| | | >= 2 distinct AF products in last 12 months |
| | | >= 4 tree/shrub species on farm/homestead |
| Intra-household equity | | >= 2 native tree/shrub species on farm/homestead |
| | | AF estab. with female decision-making in past year |
| | | AF activity with shared gender division of labour |
| | | Trees on farm/homestead with joint mgt. oversight |
| | | AF sales with female involvement in spending decisions |

Comparison of Regreening index between baseline and endline

| | RWANDA - ALL | | | Treatment (Year 1) | | | Control (Year 4) | | |
|------------------------------------|--------------|----------|------------|--------------------|----------|------------|------------------|----------|------------|
| | Endline | Baseline | Difference | Endline | Baseline | Difference | Endline | Baseline | Difference |
| | Mean | Mean | | Mean | Mean | | Mean | Mean | |
| Regreening uptake index | 0.384 | 0.219 | 0.165*** | 0.388 | 0.217 | 0.171*** | 0.381 | 0.221 | 0.160*** |
| Extent of practice | 0.102 | 0.070 | 0.031*** | 0.102 | 0.071 | 0.031*** | 0.101 | 0.069 | 0.031*** |
| Intensity of practice | 0.087 | 0.036 | 0.051*** | 0.089 | 0.034 | 0.050*** | 0.086 | 0.039 | 0.047*** |
| Diversity of practice | 0.094 | 0.05 | 0.044*** | 0.094 | 0.051 | 0.043*** | 0.094 | 0.049 | 0.044*** |
| Intra household equity of practice | 0.102 | 0.062 | 0.039*** | 0.104 | 0.061 | 0.043*** | 0.099 | 0.063 | 0.036*** |
| Observations | 1132 | 1132 | | 575 | 575 | | 557 | 557 | |

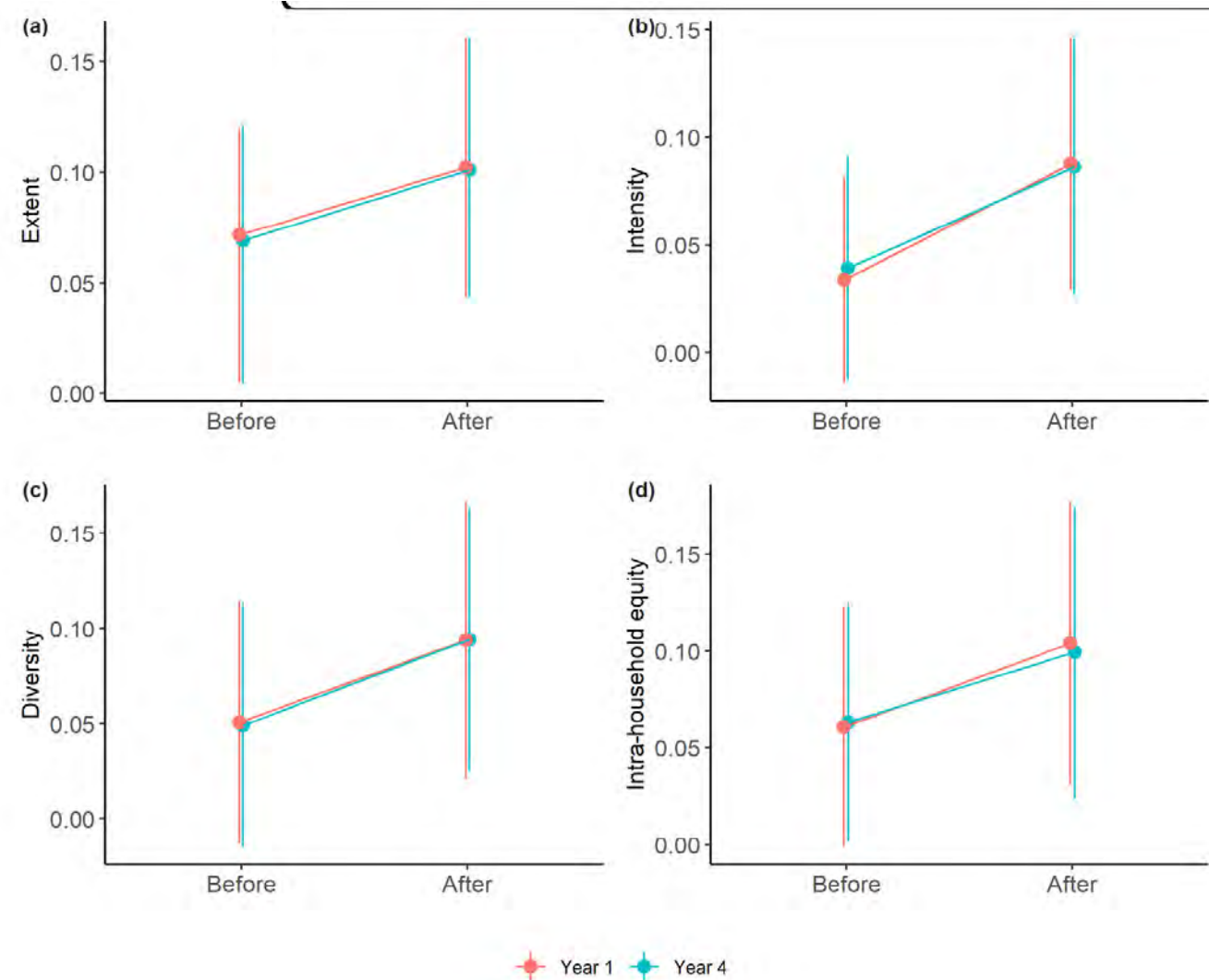


Significant increase in Regreening index, but no significant difference between treatment and comparison clusters.

Important questions or possible reasons?

1. Was the impact evaluation protocol fully adhered to?
With the exception of Kayonza, did implementation in the other districts follow the Year 1/Year 4 phase-in design?
2. Is it a case of contamination?
Are there other similar projects being implemented within the specific impact evaluation sites that could have obscured the impact of the RA program in Rwanda?
3. Or spill-over effects?
Did farmers, through their social networks or geographical proximity possibly share and influence adoption in Year 4 sites?

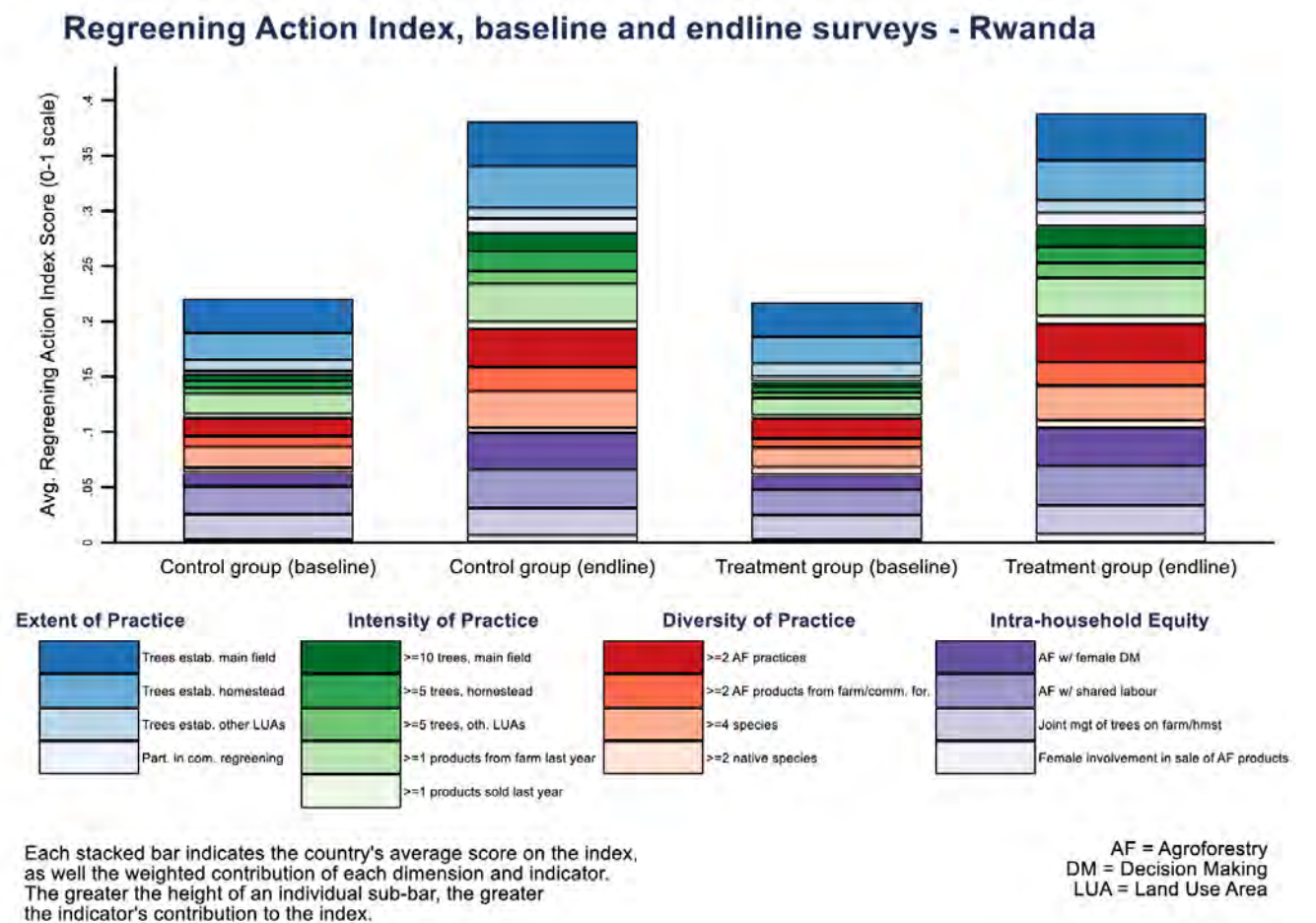
Figure 10: Change in overall Regreening index



- Significant changes in all four dimensions Highest increase in intensity of practice –farmers are establishing more trees on land.
- Increase in extent of practice – farmers taking up Regreening in more land use areas.
- Least change in participation in community level Regreening – very little or no communal lands in most sites.
- Change in diversity driven by increased number of species, however, no change observed in uptake of indigenous species.
- Intrahousehold equity increased due to participation of both men and women in agroforestry activities.

General upward trend in all dimensions for both the treatment and control clusters No significant difference between treatment and control.

Figure 11: Change in Regreening index dimensions



- Significant improvement in the overall Regreening Action index.
- Significant improvement in all dimensions.
- Largest improvement in intensity of practice (0.051).
- Least improvement in extent of practice (0.031).
- Significant improvement in most indicators.
- Not much change observed in some indicators e.g.:
 - Sale of agroforestry products;
 - Female involvement in sale of agroforestry products;
 - Adoption of native tree species by households; and
 - Participation in community level Regreening activities.

Figure 12: Baseline – Endline comparison of the Regreening Index

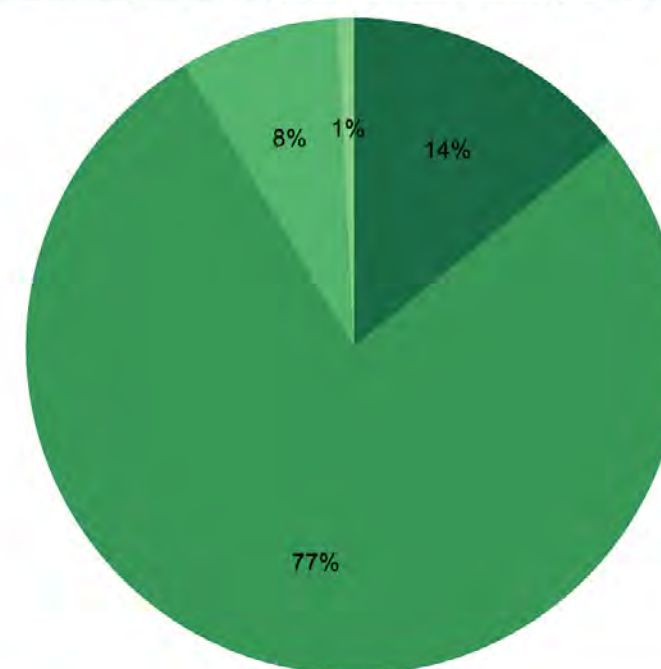
Tree indicators comparing baseline and endline

- Households undertook more Regreening practices at endline compared to baseline.
- Significantly more new trees established at homestead and in cropping fields at endline compared to similar period at baseline.
- Number of native tree species slightly but insignificantly decreased from baseline to endline, while number of exotic tree species increased significantly overall. No difference observed between treatment and comparison sites.
- Tree numbers and density increased significantly both around homestead and on farms between baseline and endline.
- Some significant differences between treatment and control sites for some of the differenced indicators shown below.

| | Treatment (Year 1) | | | Control (Year 4) | | | Difference in difference | | Observations |
|---|--------------------|----------|------------|------------------|----------|------------|---------------------------|------------------|--------------|
| | Endline | Baseline | Difference | Endline | Baseline | Difference | Mean Yr4 - Mean Yr1 | Pr(T > t) | |
| | Mean | Mean | | Mean | Mean | | | | |
| # of tree management practices practiced by households | 1.664 | 1.189 | 0.475*** | 1.696 | 1.192 | 0.504*** | 0.03 | 0.69 | 1132 |
| # of new trees established at homestead | 5.778 | 2.465 | 3.313*** | 6.276 | 2.813 | 3.463*** | 0.15 | 0.85 | 1132 |
| # of new trees established on main cropping field | 15.957 | 4.559 | 11.398*** | 11.572 | 4.56 | 7.012*** | -4.39 | 0.01** | 1132 |
| # of native tree species on household land | 0.45 | 0.51 | -0.06 | 0.39 | 0.42 | -0.03 | 0.03 | 0.70 | 1132 |
| # of exotic tree species on household land | 3.51 | 2.24 | 1.27*** | 3.65 | 2.33 | 1.32*** | 0.05 | 0.72 | 1132 |
| Change in estimated # of trees on entire farm and homestead | 79.3 | 41.8 | 37.4*** | 65.3 | 49.6 | 15.7** | -21.667 | 0.04** | 1132 |
| Change in estimated # of trees on main cropping field | 22.6 | 10.8 | 11.8*** | 18.6 | 12.3 | 6.25*** | -5.59 | 0.01** | 1107 |
| Density of trees (trees per hectare) on entire farm and homestead | 510.7 | 179.7 | 331.5*** | 417.1 | 237.4 | 179.8*** | -151.77 | 0.00*** | 1100 |
| Density of trees (trees per hectare) on main cropping field | 407.7 | 138.7 | 269.0*** | 354.9 | 176.0 | 178.9*** | -90.10 | 0.03** | 1090 |

Level of significance: * 0.10, ** 0.05, ***0.001

Percentage of cropping fields with trees in surveyed villages



Percentage of cropping fields with trees in surveyed villages

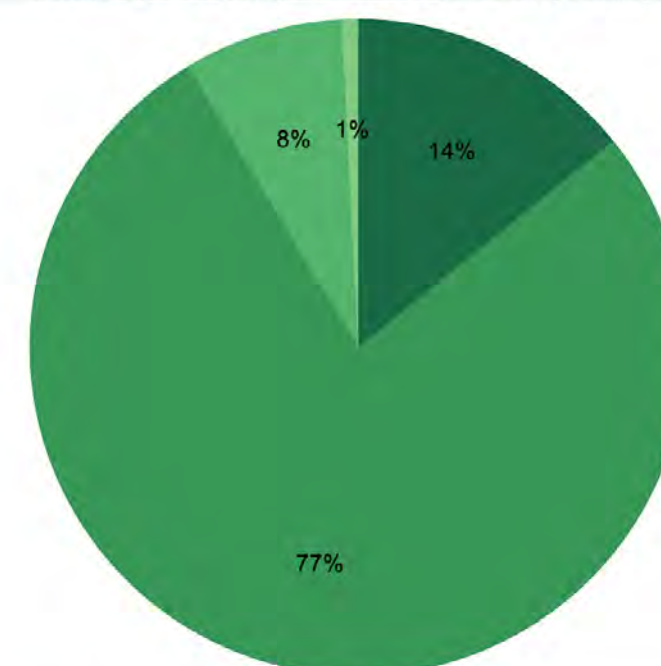
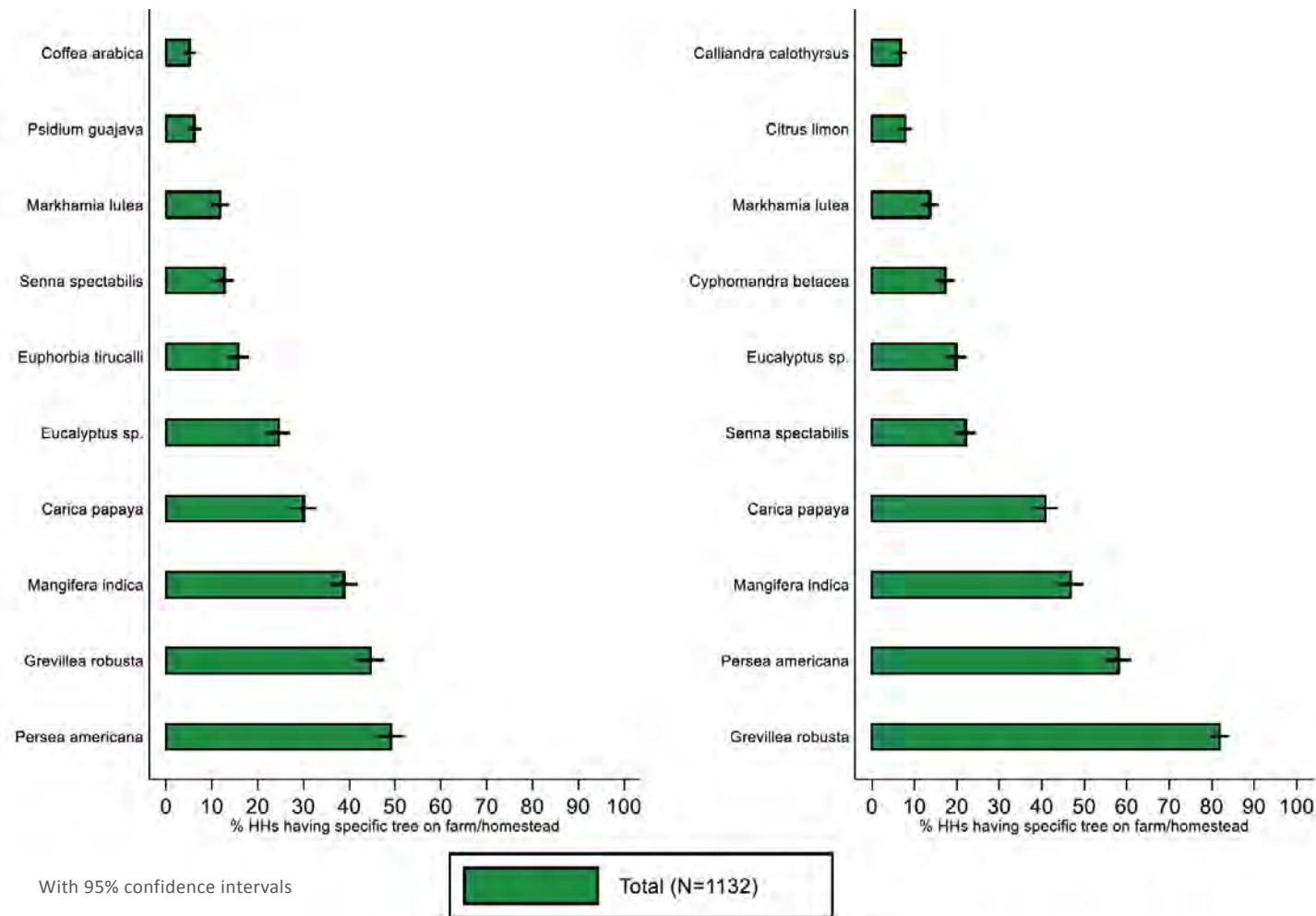


Figure 13: Village informants' observations

- Most cropping fields in surveyed villages have trees.
- Village informants observe that the number of trees have generally increased in the surveyed villages over the last 4 years.
- Only 2 villages (Gisozi and Iramiro in Kayonza) reported a decrease in tree numbers over the last 4 years.



All village level informants say: trees established on farms have changed over time.

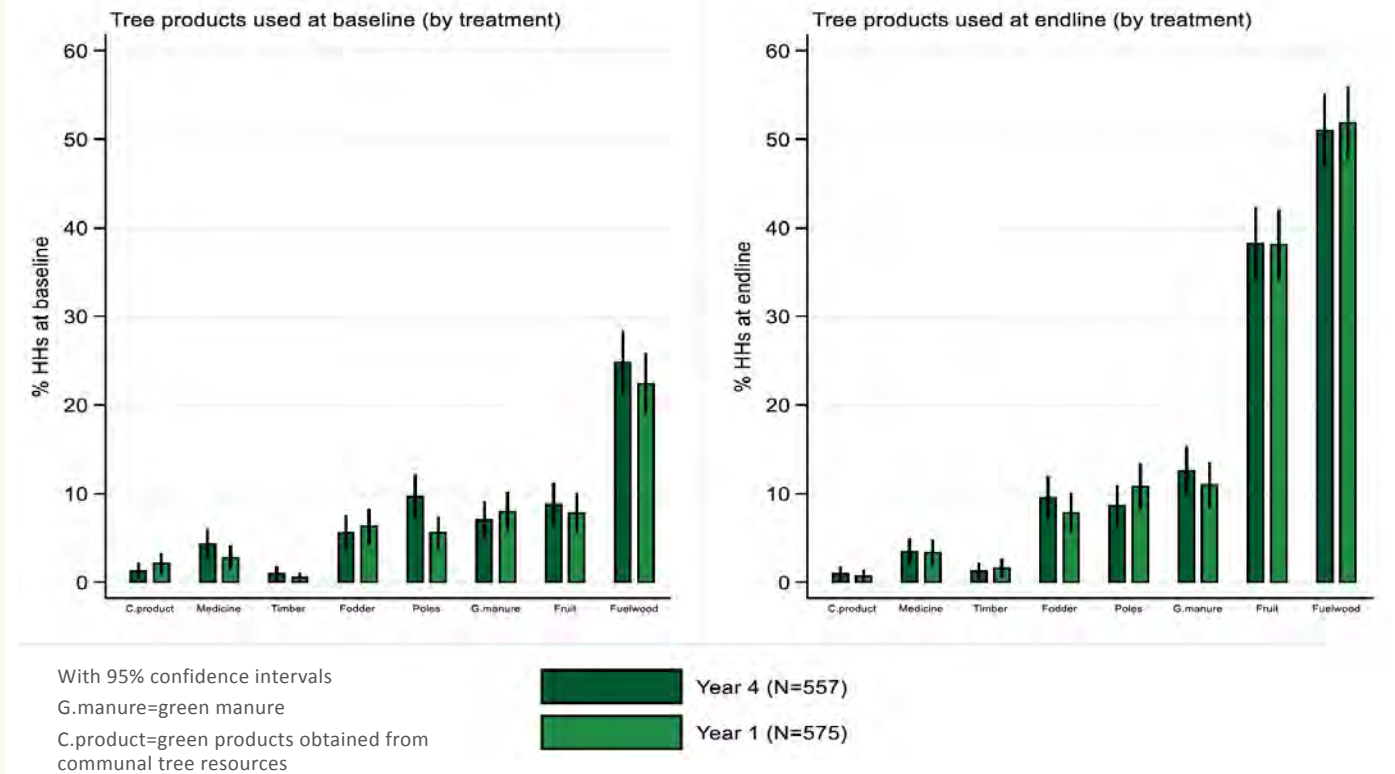
All, but 3, village informants say the same about trees on homesteads.

Household data, however, shows prevalence of same species over time.

Exotic trees (and similar specific species) still predominant in cropping fields and around homesteads.

Fruit trees including avocado, mango, pawpaw, tree tomato, guava and lemon also common among households.

Figure 14: Top 10 common tree species



Households obtain more products from farm than from communal sources.

Increased use of fruit and fuelwood from on farm sources in both treatment and comparison groups.

Does household demand for tree products encourage them to establish more trees on farm?

Does the establishment of more trees on farm lead to availability and use of more tree products by households?

Figure 15: Household use of tree products



- At baseline, about 61% of households obtained half or more than half of the fuelwood used in the household from on farm sources. At endline, this % was about 56%.
- At baseline, 15% of households obtained a very small amount of fuelwood from farm, at endline, this % was less (11%).

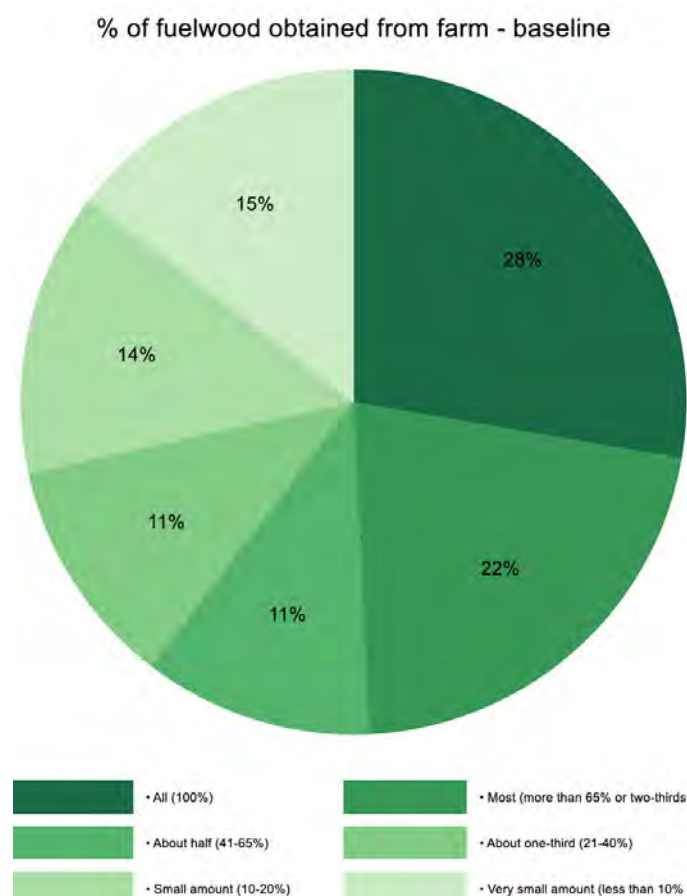
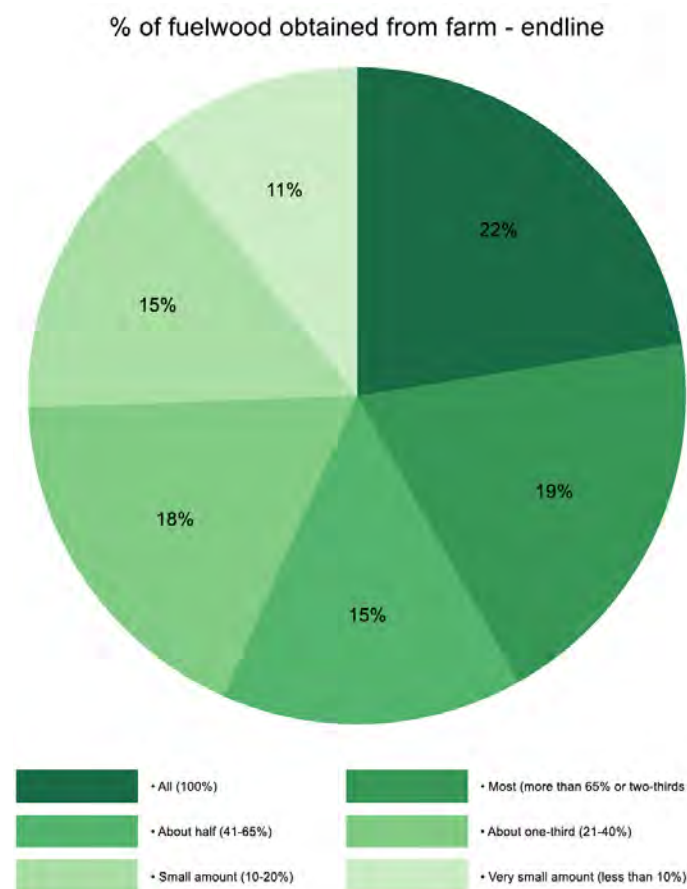
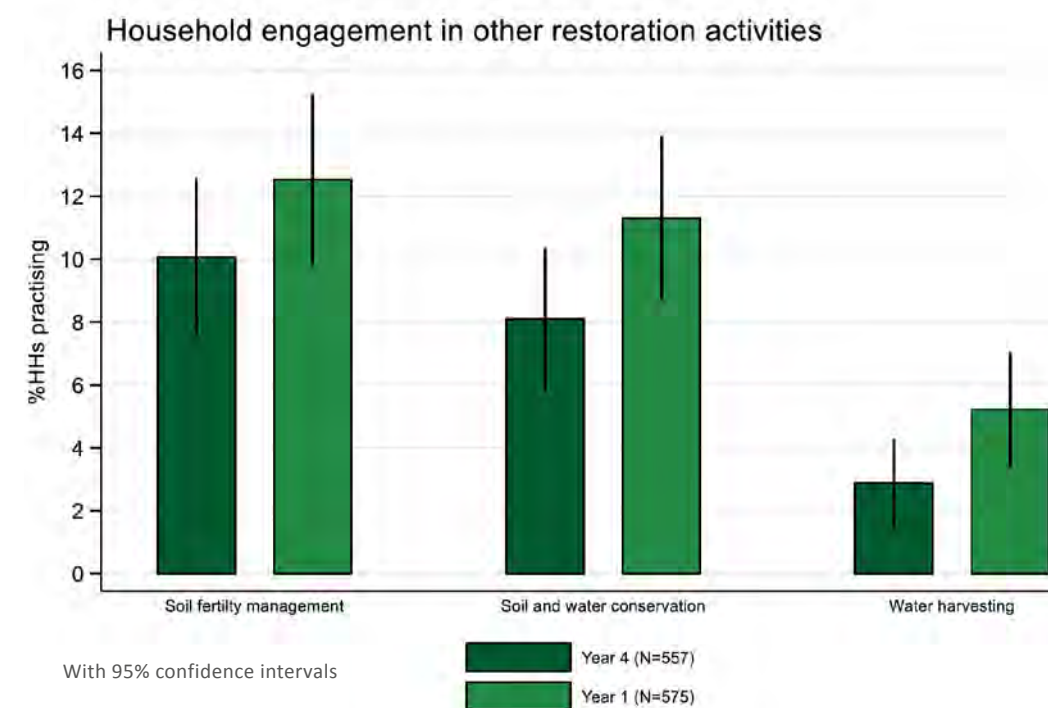


Figure 16: Household access and use of tree products



- Promotion of practices not actively done via the program.
- Restoration activities undertaken by households in treatment clusters slightly more than those in comparison clusters.

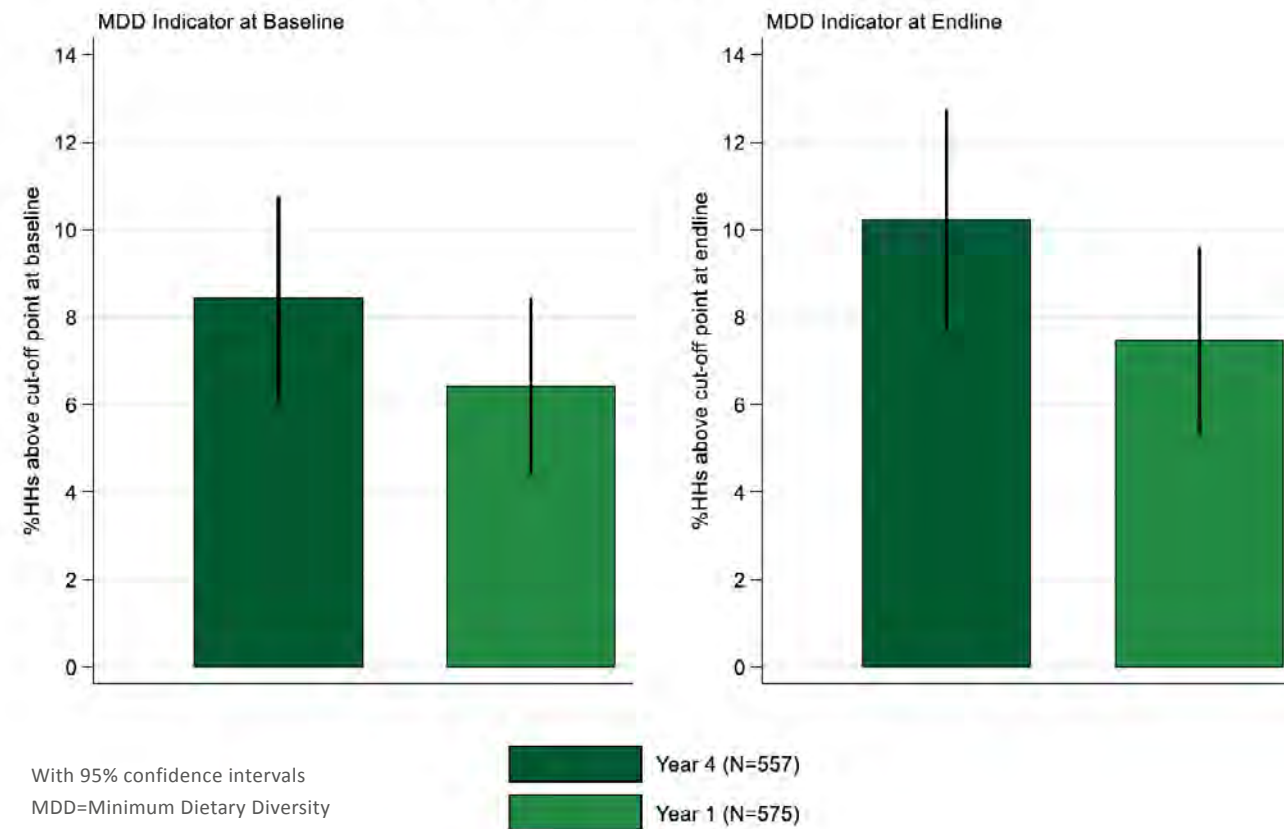
SFM included: manure, compost, crop rotation, intercropping, mulching, cover cropping and use of fertilizer trees.

SWC included: terraces, minimum tillage, use of gabions, mulching.

WHARV included: ponds, roof catchment, water pans and river abstraction.

Figure 17: Uptake of other restoration practices

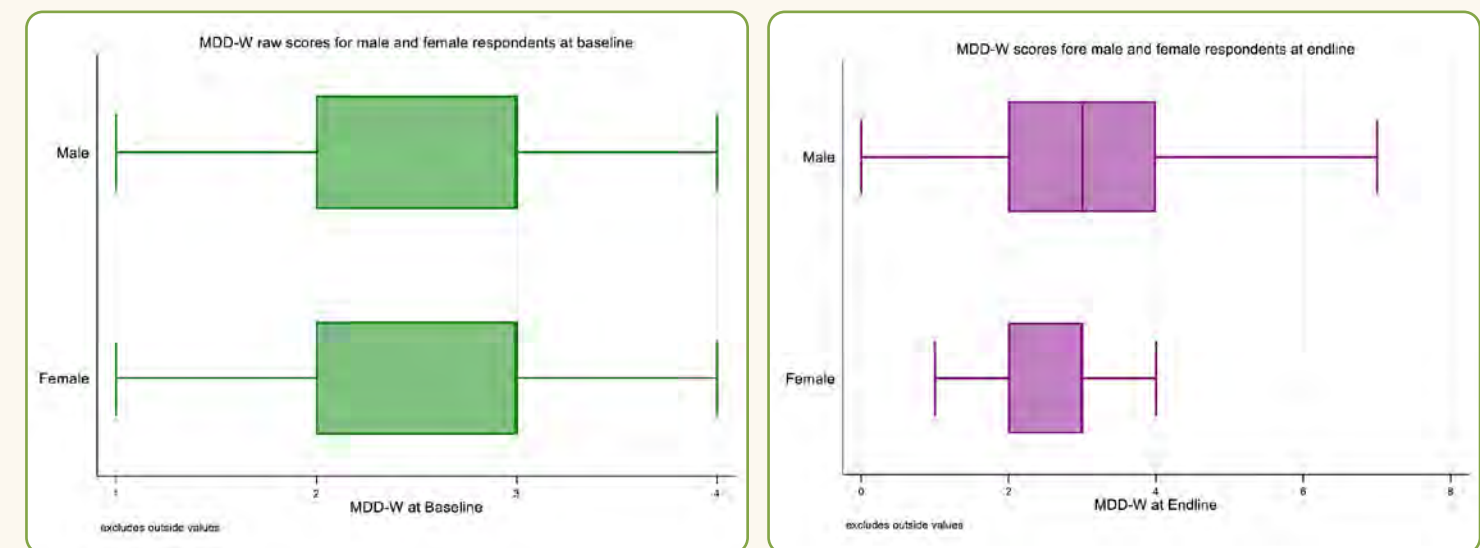
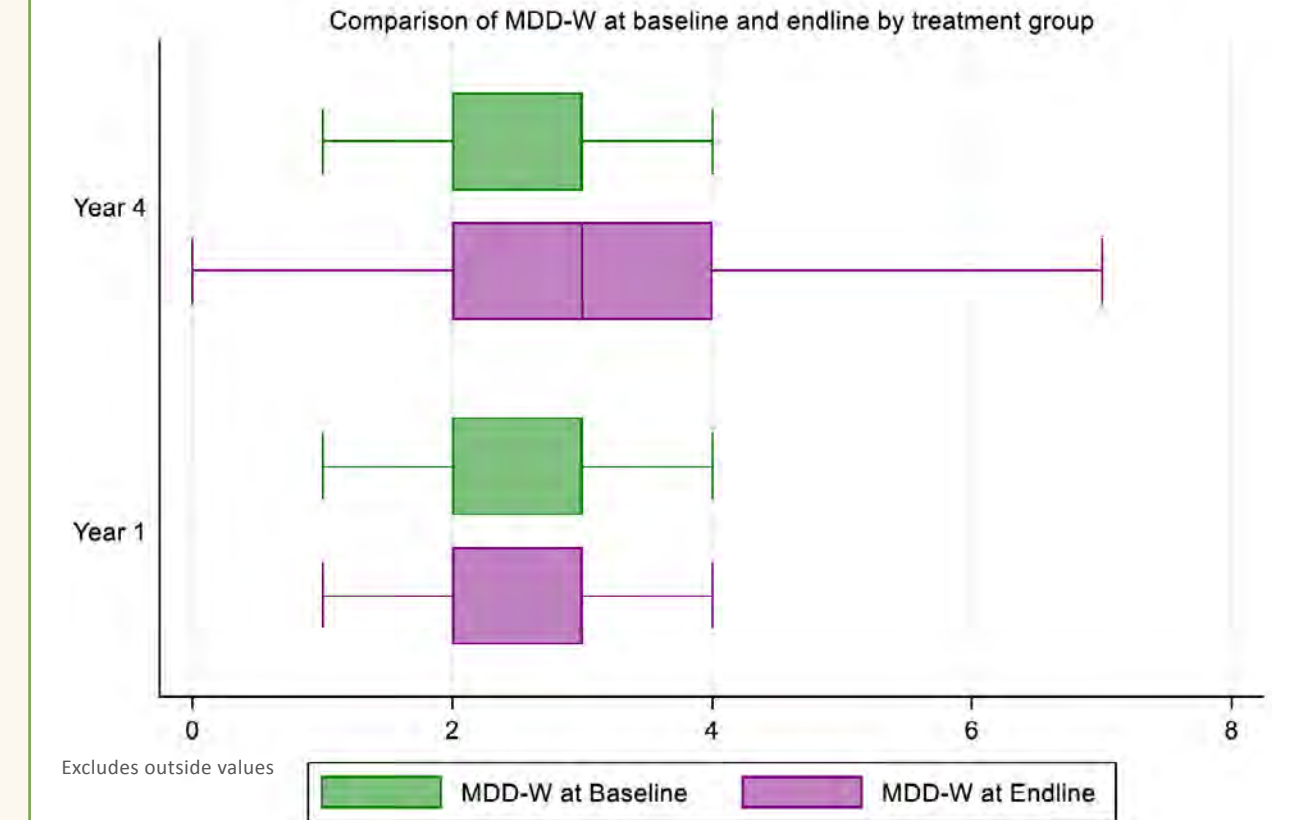
MDD Binary Indicator at Baseline and Endline



- Low dietary diversity across the implementation sites.
- Very few respondents surpass the MDD cut off point.
- Some improvement in nutrition indicators between baseline and endline for both treatment and control groups.
- A very significant difference in FIES for the control group.
- A small significant difference in FIES for the treatment group.
- No significant differences between treatment and control groups.

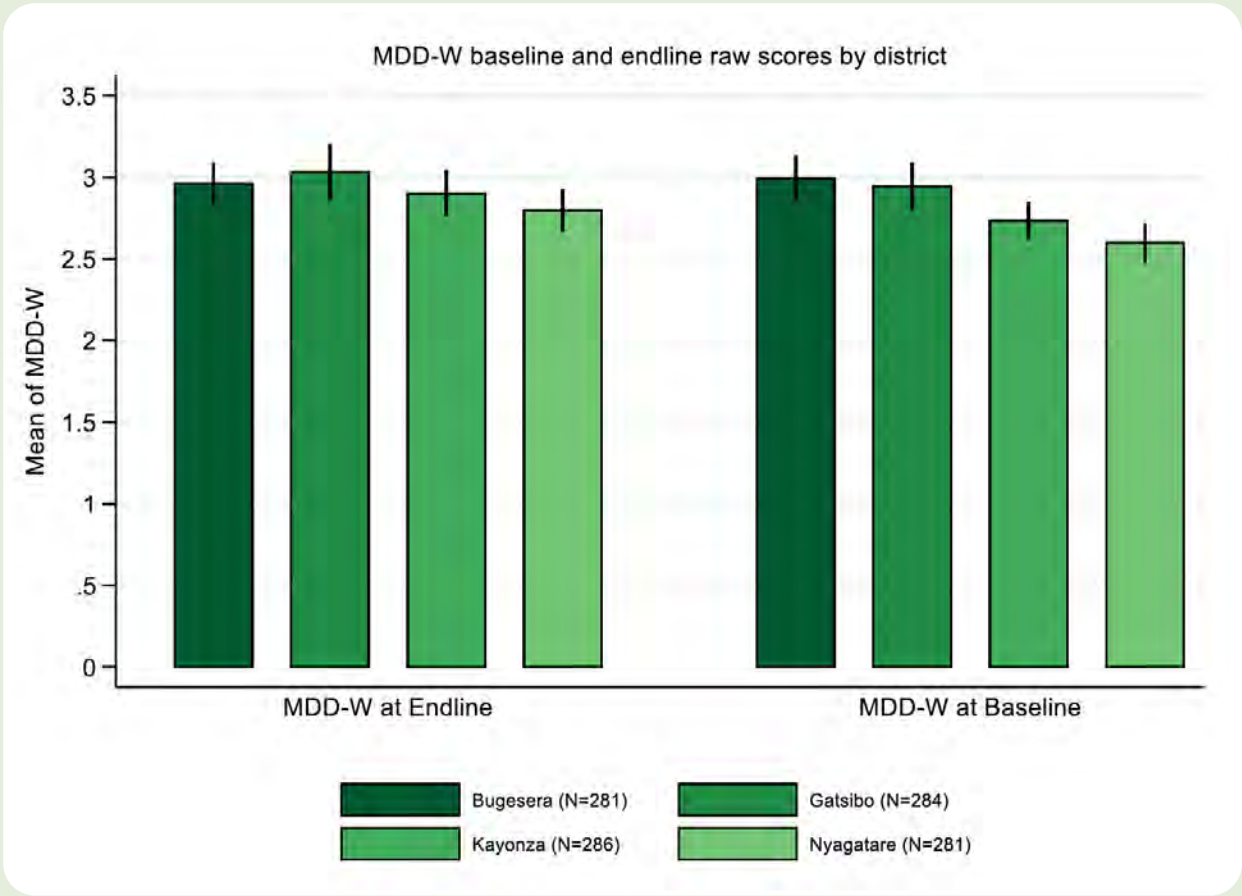
| Shows the percentage of households above the cut off point | Year 1 | | | Year 4 | | | Treatment/Control Difference |
|--|-----------|-----------|------------|-----------|-----------|------------|------------------------------|
| | Mean (BL) | Mean (EL) | Difference | Mean (BL) | Mean (EL) | Difference | |
| Minimum Dietary Diversity Raw Score | 2.77 | 2.87 | -0.10* | 2.86 | 2.97 | -0.11* | 0.01 |
| Minimum Dietary Diversity Binary Indicator | 0.06 | 0.07 | -0.01 | 0.08 | 0.1 | -0.02 | 0.01 |
| Raw Food Insecurity Experience | 5.98 | 5.75 | 0.23* | 6.1 | 5.69 | 0.41*** | 0.18 |
| Bayes | -0.32 | -0.21 | 0.10 | -0.25 | -0.25 | 0.00 | -0.1 |
| Observations | 575 | 575 | | 557 | 557 | | |

Figure 18: Nutritional indicators



- At baseline, MDD-W was similar for the treatment and comparison groups.
- Some differences observed between baseline and endline for both groups, not very significant.

Figure 19: Nutritional indicators



- Slight insignificant drop in Bugesera.
- Improvement in raw scores for Gatsibo.
- Significant increase in Kayonza and Nyagatare.

| District | Endline | Baseline | Difference |
|-----------|---------|----------|------------|
| Bugesera | 2.96 | 2.99 | -0.03 |
| Gatsibo | 3.03 | 2.94 | 0.09 |
| Kayonza | 2.90 | 2.73 | 0.17* |
| Nyagatare | 2.80 | 2.60 | 0.20* |

Figure 20: Nutritional indicators

Conclusions

- Higher exposure of households during the project period compared to baseline period.
- Significant increase in the overall Regreening index and all dimensions between baseline and endline.
- Significant increase in trees on different land use areas during the project period.
- However, exposure of households occurred in both treatment and comparison sites, both by Regreening Africa program and other actors.
- RA program had a positive impact on some tree indicators.
- However, impact of the RA program on the Regreening index in Rwanda.

Way forward

- Tracking leveraged adoption.
- Tree planting and measurement module (survey and analysis).
- Endline report.
- Modelling of long-term farm related income.



PESTS AND DISEASES

Background information

- In 2011, Rwanda committed to restoring 2 million hectares of degraded and deforested land in a global effort by 2030 — it seemed like a daunting task.
- By 2018, Rwanda, along with South Korea, Costa Rica, Pakistan, and China, was regarded one of the leading countries in the world with its successful restoration program.
- In line with national targets, the RA project has similar ambitious goals of restoring and transforming degraded ecosystems.
- The realization of this goal is through tree planting and FMNR. Tree planting is the main approach, and a large amount of high-quality germplasm is required!
- Multiple tree species are being promoted, but farmers have a strong preference for exotic species including food tree species e.g. mango, avocado, citrus spp, and tree tomato- for financial and food reasons.



Despite strong background in restoration program, major challenges

- Availability of **diverse tree species seeds is limited**, posing the risk of restoration based only on a handful of species.
- Recent **outbreaks of native and non-native pests** and diseases affecting trees, more on fruit trees, jeopardize restoration efforts and pose a threat to livelihoods and food security.

This is expected to worsen due to climate change, increased trade, porous borders, poor quality germplasm, human movement & intensified agriculture to meet food and cash demands of a growing population.

Joint efforts are needed, regionally and nationally to build capacity to combat this menace.



Design Technical Implementation (DTI) intervention

Capacity building of:

- ToTs (WVR technical team and cooperative leads) in partnership with RAB- Rwanda Agriculture Board, ICRAF GHU- ICRAF Germplasm Health Unit. RFA-NTSC-Rwanda water and Forest Authority (RFA) National Tree Seed Centre (NTSC), with aim to understand the impact, identification and mitigation tree pest and diseases.
- ToTs (WVR technical team and cooperatives leads) in partnership with RFA-NTSC on quality seed sourcing and procurement, with aim of quality sourcing of germplasm and linkages to local seed center.
- Field Visit to fruits orchards for pest and disease assessment and discussion with farmers.
- From 2 trainings, 19 ToTs have been trained, such trainings will be replicated to increase knowledge through multiplier effect.



Some of pests and diseases observed on farms

- **Native and non-native pests and disease with wide host range were observed on farms.**
- **Some of pests and diseases observed threatening main trees species on farms include:**
 - Mealybugs on *Markhamia lutea*, *Mangifera indica* and *Citrus spp.*
 - Aphids on *citrus spp* and tree tomato.
 - Fruit fly and scale insects on mango.
 - Canker and termite damage on *Grevillea robusta*.
 - Mosaic virus on cassava and tree tomato.
 - Anthracnose on mango and tree tomato.
 - Scab disease on Avocado.
 - From lit review, there is occurrence of bio invasions of bronze bug and eucalyptus gall wasp on eucalyptus.



Mango with mealybugs



Larva of citrus butterfly feeding on citrus leaves



Anthracnose on Tamarillo



Mango fruit damage by fruit fly



Whiteflies on Tamarillo leaves



Scale insects on Mango fruit

Grevillea robusta



Resinous canker



Termite damage on bark



Some of root causes for the pests not controlled

Different ways pests spread

- Spread of new pests e.g. mealy bug and mosaic viruses- Spread through markets and material exchange.

- Outbreaks going unnoticed due pest have multiple hosts.

Poor farm management

- Limited knowledge of pest management solutions.
- Farmers do not follow advice.
- Lack of practical solutions.
- Counterfeit chemicals.

Poor quality planting material

- Poor soil fertility, nutrient management and tree management.
- Misuse of chemical and over-reliance on one chemical over time.
- Seeds and other vegetative material spread of mosaic virus in tree tomato could be attributed to sharing of diseased planting material.

Lack of collective action

Climate change

- An effective management of some pests requires concerted effort and collective action.

What are key gaps?

- Knowledge gap on pesticide use.
- Insufficient surveillance and pest risk assessment.
- Lack of baseline studies on impact of pest and diseases.
- Lack of incorporation of tree health strategy in restoration programs.
- Insufficient information on current status of trees health.
- Outbreaks going unnoticed.
- Low uptake of IPM.
- Poor quality planting material.
- Poor farm management.
- Difficulty recognizing pest and disease.
- Undocumented pest of indigenous trees.
- Lack of collective action in management.

Recommendations

- Document pests and diseases of Agroforestry trees and develop mitigation strategies.
- Promotion of sustainable models to reach out to farmers with pest and disease management services.
- Strengthen the capacity of agriculture extension services.
- Introduction of cost-efficient information systems to detect and monitor pests and disease.
- Enhancing linkages with relevant government agencies e.g. RAB, CABI, ICIPE.
- Incorporate tree health in tree-based strategies.
- Collaborate and partner with other pest.
- Management initiatives.
- Training and capacity building.

Strengthened Savings for Transformation Groups
Farmers have begun practicing biomass
incorporation to increase soil organic carbon with
fertilizer trees

- Many farmers adopting on-farm trees like G.
Robusta for timber
- Fruit trees for consumption enhances diets,
reduces malnutrition
- Ownership of Regreening practices by
Government of Rwanda, embedding Regreening
into contract performance agreements between
mayors and president

Practices

and provide timber, fodder, and additional income
and soil health, additional value through firewood and timber
trees provide enhanced household nutrition and income source



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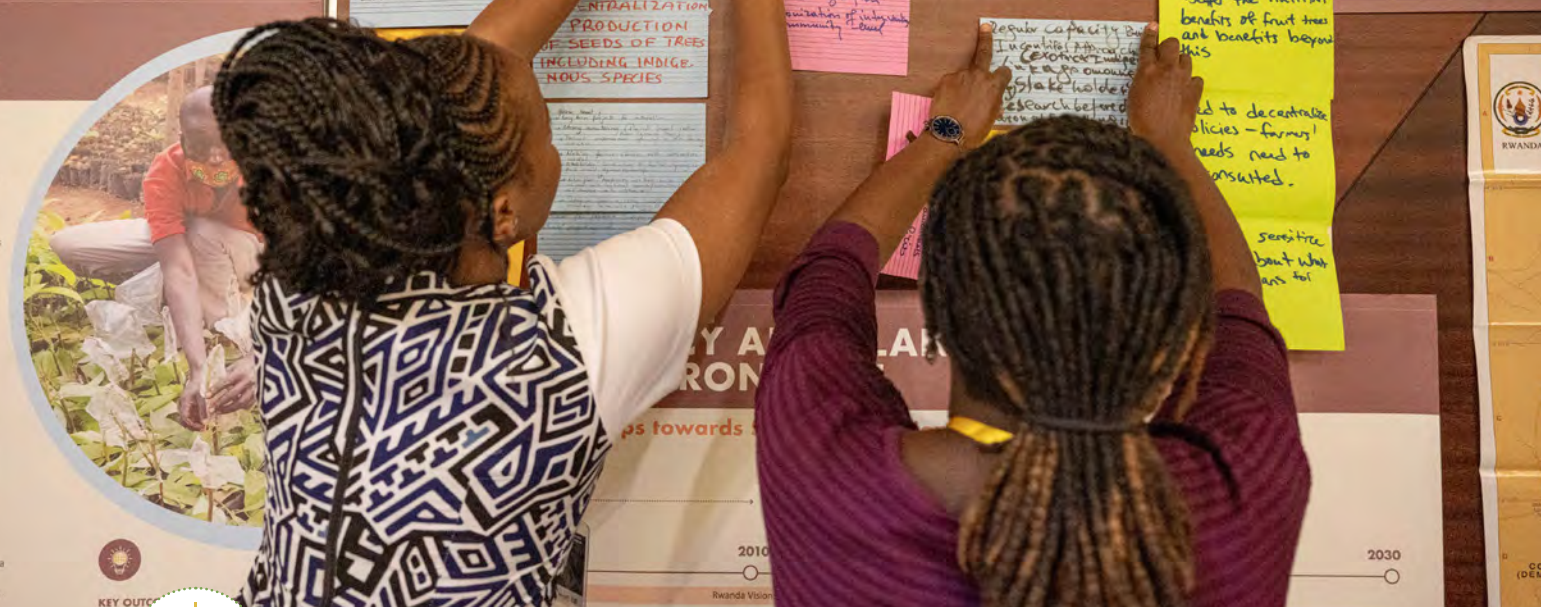
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Farmers suggest a stakeholder forum on pests and diseases



How are you going about the issue of counterfeit chemicals?

This is a big issue where we need to bring together stakeholders.

How are we going about controlling pests and diseases?

Have a stakeholder meeting to try to get more solutions to this. This has been underestimated and yet it is a major issue.

Pests and disease have been a problem all through, how come no solution has been proposed throughout the years?

We're looking into both.

What have you been doing to learn about solutions to pests and diseases between traditional knowledge and research?

How do the farmers access pesticides, with pests being the greatest threat to produce?

Pesticides are available but at times become a challenge when the trees grow too tall and are infected.

We also need to learn from farmers:
integration of science and local knowledge

TRACKING LAND HEALTH CHANGES IN RWANDA

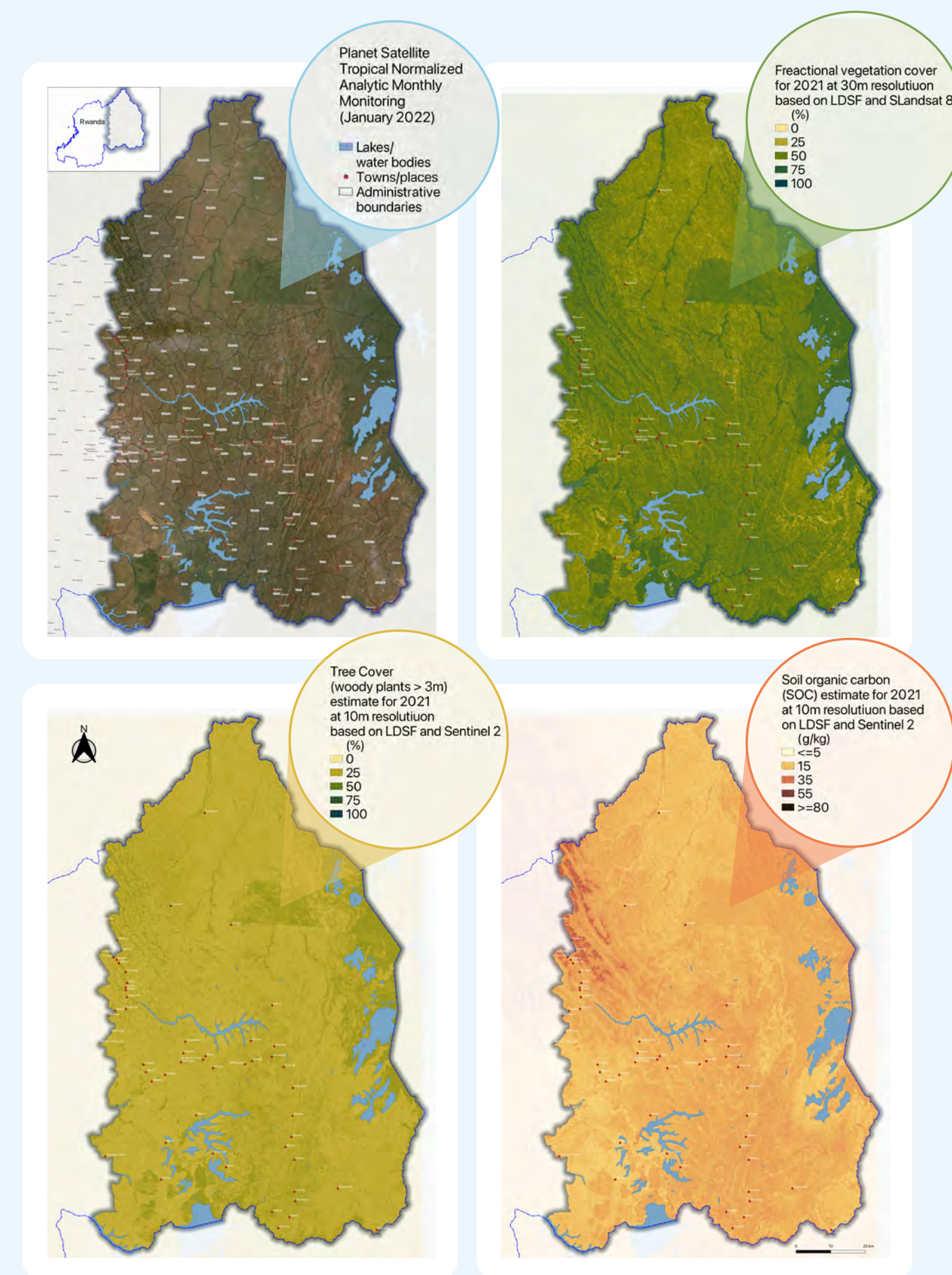


Figure 7: Land health maps



REGREENING AFRICA APP

The **Regreening Africa app** is a mobile-based android application that allows users to collect data at farm level on a range of land restoration practices that allows for robust landscape level monitoring.

Features of the Regreening Africa App



TREE PLANTING MODULE

- Record the targeted households having adopted tree planting practices.
- Record the number of hectares regreened by tree planting.
- Mapping tree planting plots.
- Identify the agroforestry systems established (objectives, disposition of the trees, density, tree species).
- Recording and analyzing management practices.
- Evaluate the performances of the planting practices.
- Tracking growth of trees by making references and management practices assessments.
- Geotagging selected trees.



FARMER MANAGED NATURAL REGENERATION (FMNR) MODULE

- Record the targeted households having adopted FMNR practices.
- Record the number of hectares regreened through FMNR.
- Mapping the FMNR plots.
- Recording tree species composition of the FMNR plot.
- Recording management practices.
- Tracking growth of trees by making references and management practices assessments.
- Geotagging selected trees.



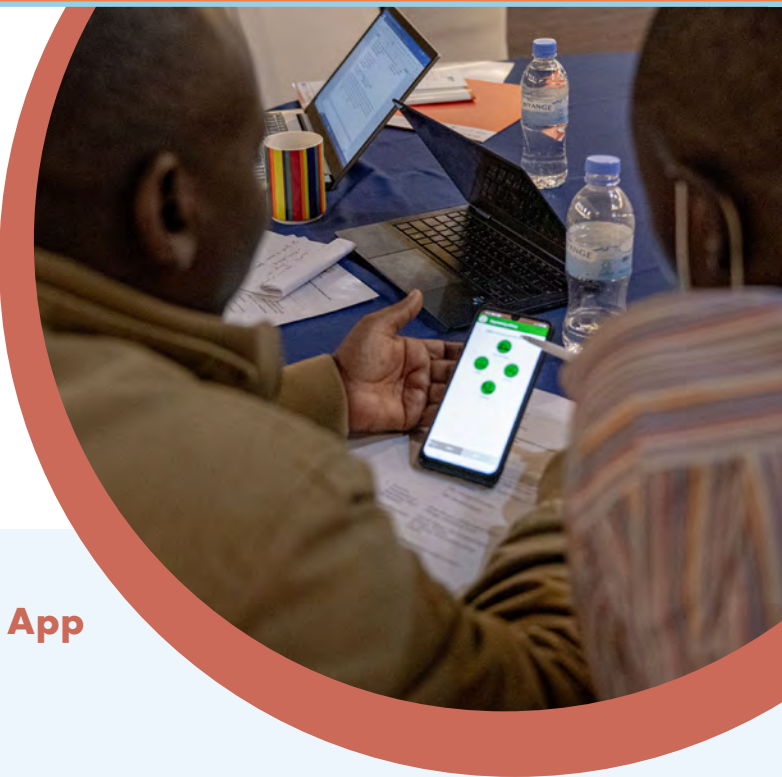
NURSERY MODULE

- Record nurseries supported by the Regreening Africa Project.
- Record seedlings production (species composition, production capacity, seedlings quality).
- Recording and assessment of the seedling production practices.
- Geotagging nurseries.



TRAINING MODULE

- Documenting the trainings carried out: the number, location, topic, etc.
- Connect the topic of the trainings carried out in a given location to the practices and issues identified that will guide the training schedule(s).
- Documenting participation in the trainings in terms of number and gender.



Why do we need it?

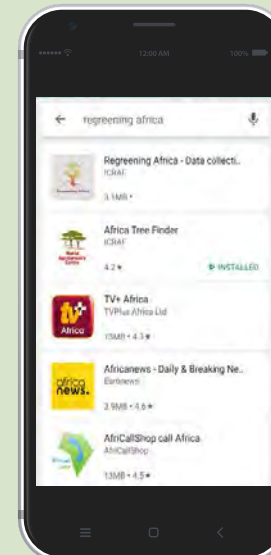
The Regreening Africa app links land restoration activities implemented by farmers and pastoralists to large global initiatives, providing evidence that can positively inform these efforts, whilst simultaneously assessing their effectiveness on the ground.

Downloading and accessing the Regreening Africa app on Google Play Store.

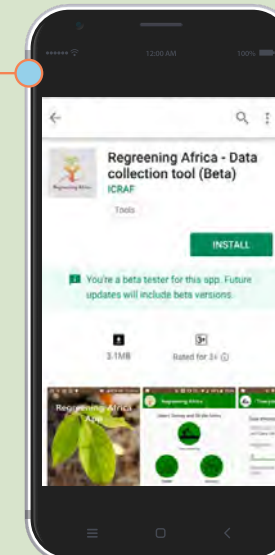


Connect your phone to Wi-Fi or to mobile network.

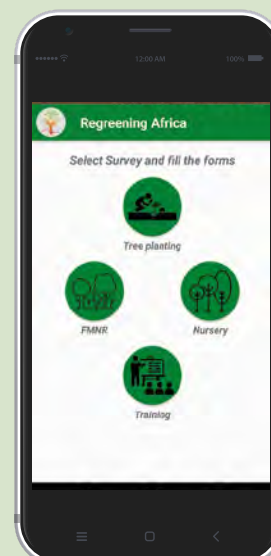
Locate app



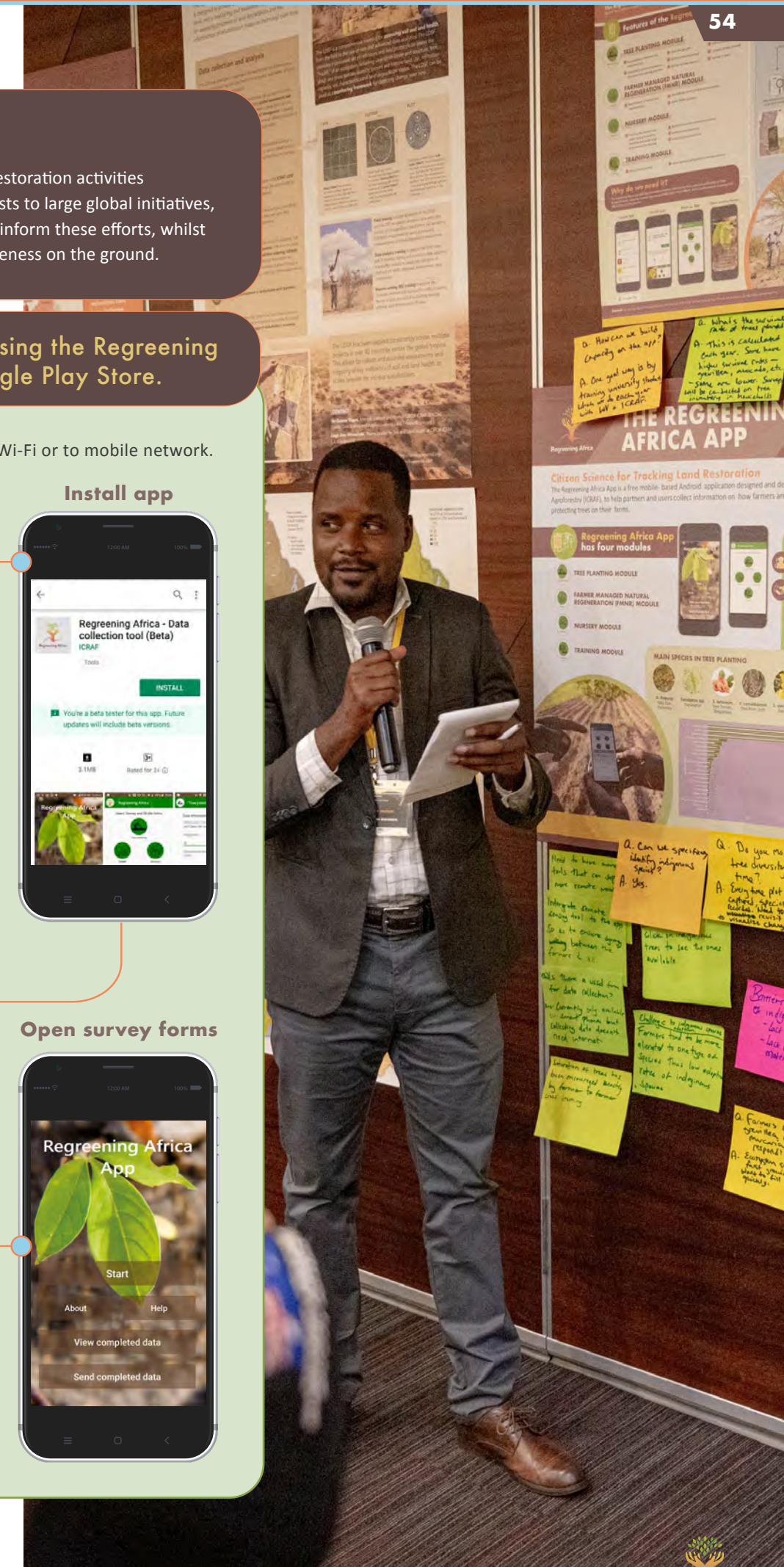
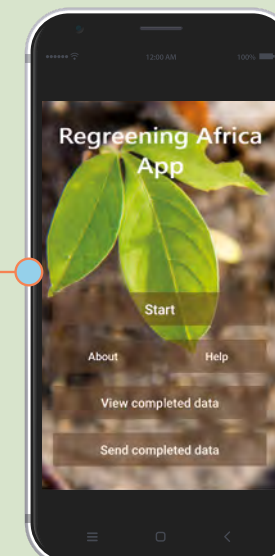
Install app



Start up app



Open survey forms



Regreening Africa app process

The data that is uploaded by the app users, can then be reviewed by project managers on the Data Reporting System developed as part of Regreening Africa. Project managers can download and review the raw data in real time.

Data displayed on data reporting system



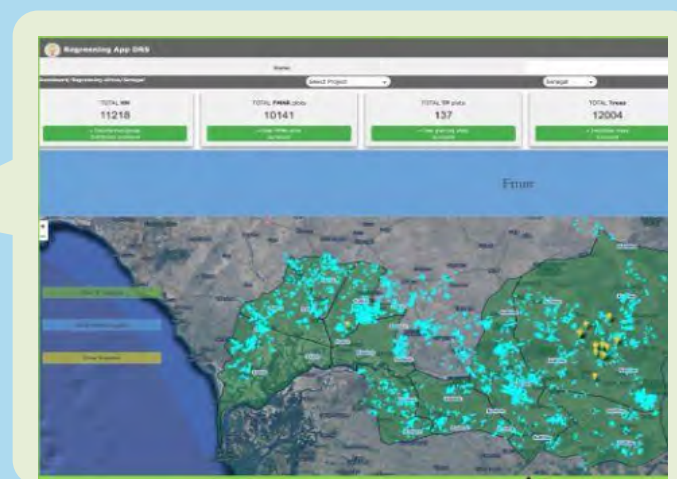
Data reviewed by users or project managers



Data uploaded to Regreening app database



Regreening app used in the field



Regreening app database connected to Data Lake Engine for advanced queries and processing of data, including normalisation of species names

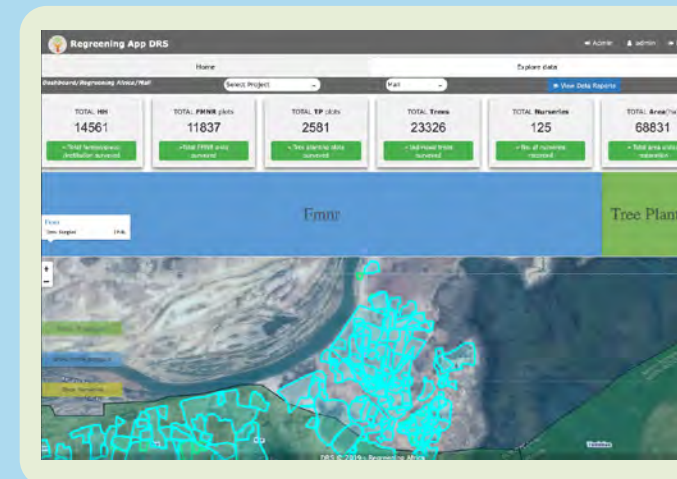


Regreening Africa Dashboard

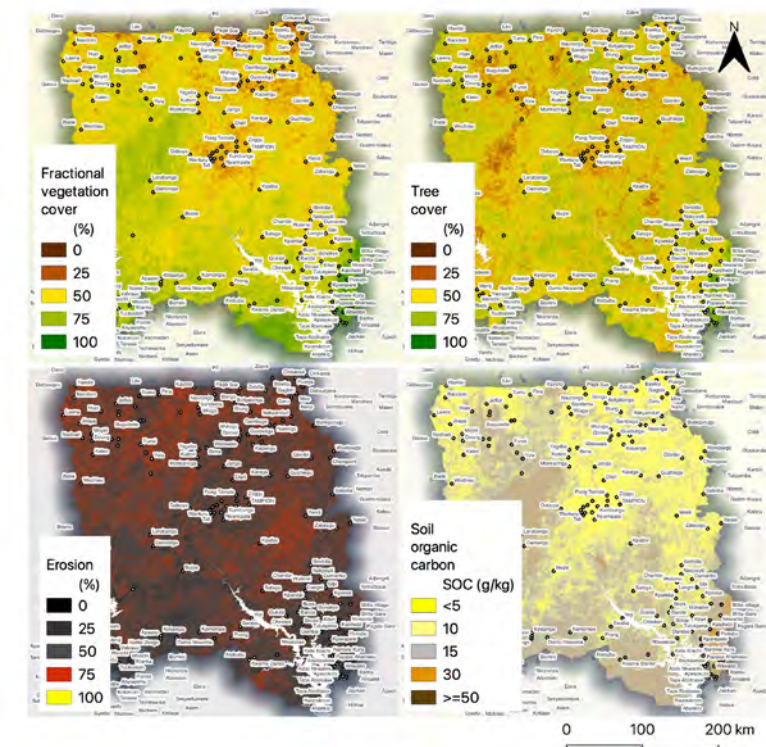


Normalisation of species names, consistency checks and modelling of data

Examples of indicator maps for northern Ghana. The maps are generated for each country at 30 m spatial resolution to assess spatial variations and changes over time



Users have access to data visualisations, results of analysis, interactive tools and maps





Rwanda vegetation trends

HOW IT'S DONE

Satellites provide frequent images of the earth's surface globally. This imagery is consistent over time and space. Therefore, it can be used to accurately detect changes in the earth's surface over time and in different regions. With the restoration plot GPS information from the Regreening Africa app, the restoration progress can be monitored. The vegetation at plot-level can be modelled by a greenness indicator such as the Normalized Difference Vegetation Index (NDVI). The restoration practices in Rwanda are expected to increase the greenness at the plots. As part of the Land Degradation Dynamics (LDD) component, the monitoring starts in 2013, prior to the restoration (started in 2016), and runs till present times (June 2022). By plotting the vegetation (greenness) over time, we can see if the restoration has affected the greenness indicating its successfulness. Here, these results are dissected per district.

Data used:

- Landsat 8 images (2013-presentence).
- Restoration plot GPS data from the Regreening Africa app.

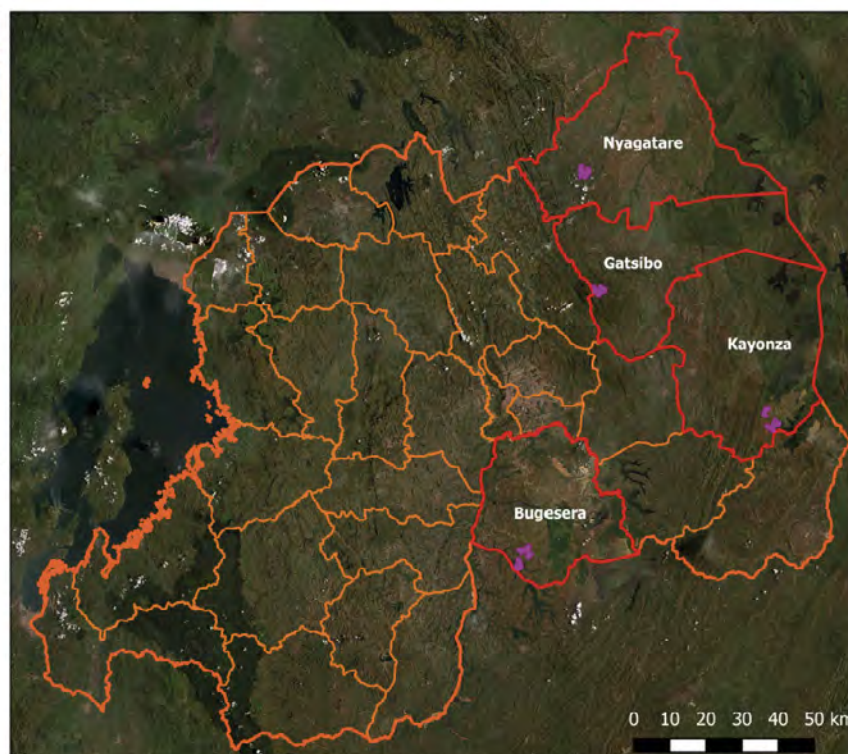
WHERE DO WE MONITOR

- We monitor at around 25,000 restoration plots across Rwanda
- This analysis uses a subset of 1033 plots in Bugesera, Gatsibo, Kayanza and Nyagatare in Eastern Rwanda

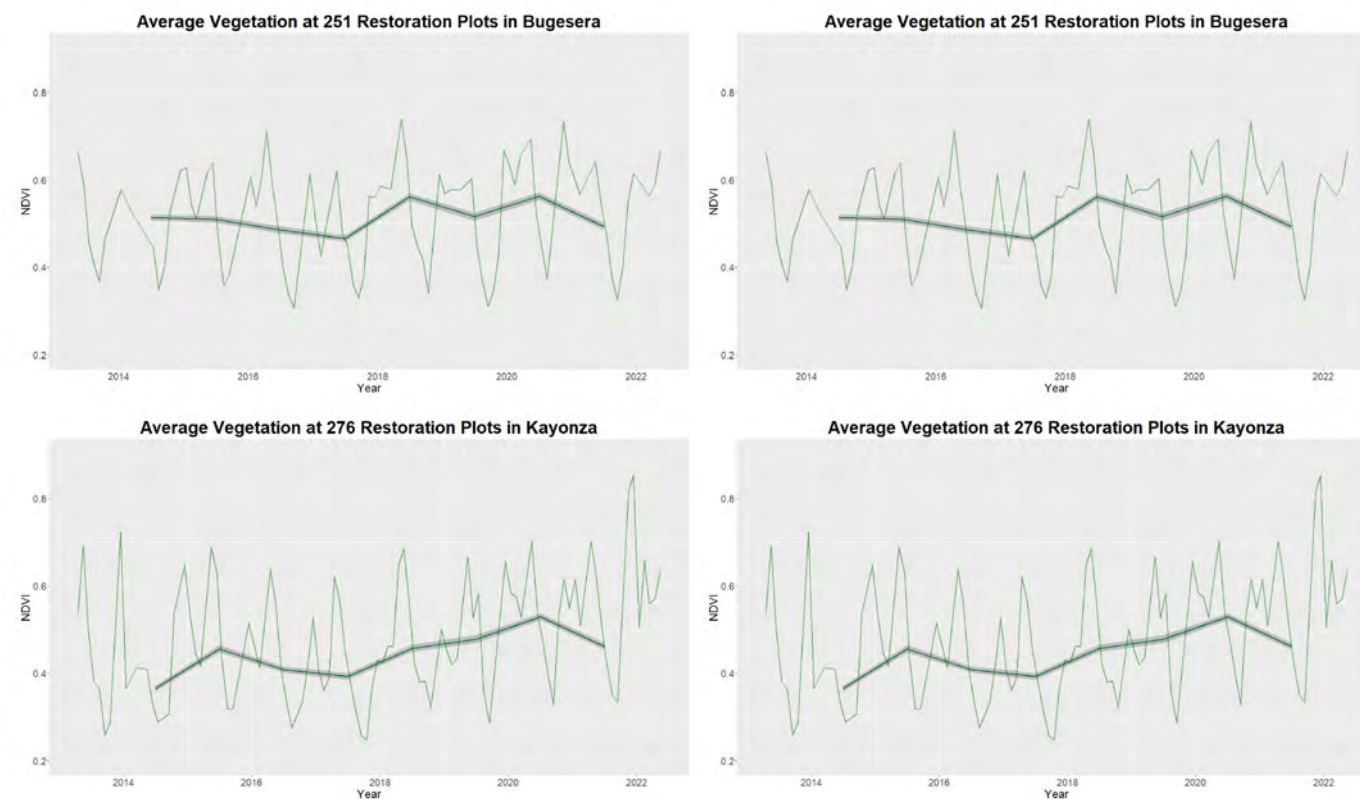


Legend

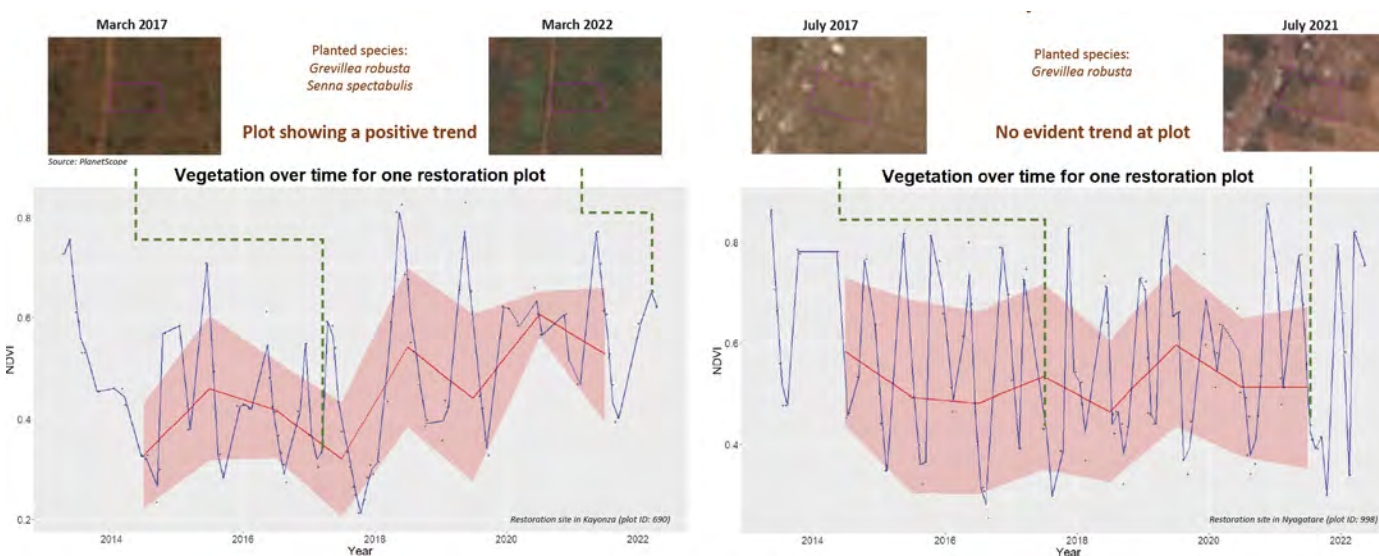
- Restoration plots
- Rwanda country boundary
- Rwanda district boundary
- Districts included in analysis



VEGETATION TREND AT RESTORATION PLOTS PER DISTRICT



EXAMPLES OF VEGETATION OVER TIME AT INDIVIDUAL RESTORATION PLOTS



Citizen Science for Tracking Land Restoration

The Regreening Africa app is a free mobile- based Android application designed and developed by World Agroforestry (ICRAF), to help partners and users collect information on how farmers are managing and protecting trees on their farms.

MAIN TREE SPECIES PLANTED IN RWANDA, AS RECORDED BY THE APP



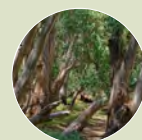
G. Robusta
Silky Oak,
Giriveriya



Eucalyptus spp.
Eucalyptus



S. betaceum
Tree Tomato,
Ibinyomoro



E. camaldulensis
Red River Gum



S. spectabilis
Ikasiya



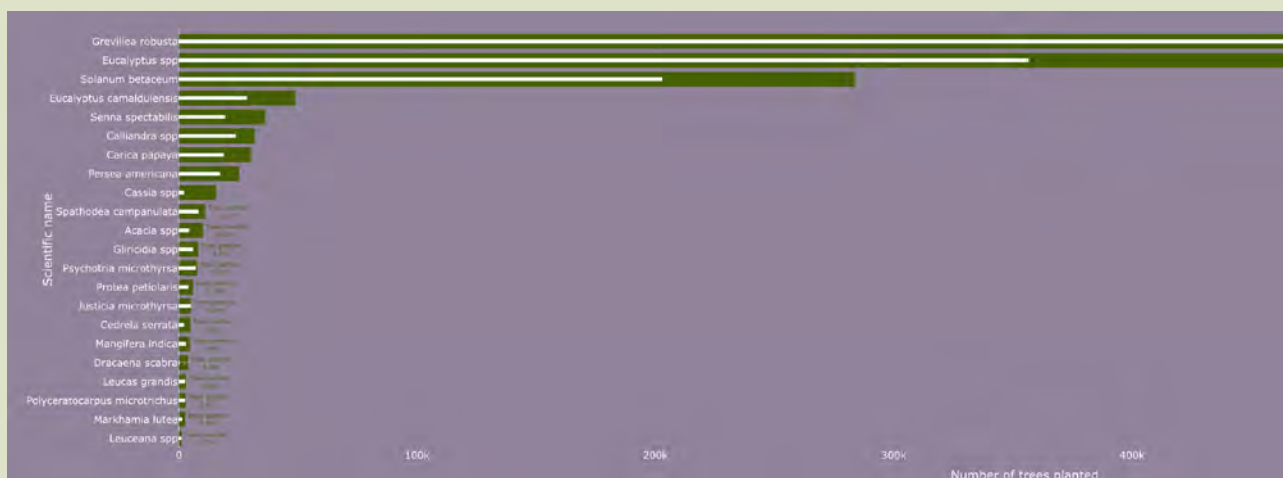
Calliandra spp.
Powder Puff,
Kariyandara



C. papaya
Papaya,
Ipapayi



P. americana
Avocado,
Avoka



“

68 youth were trained on the app and collected data

Partners wish to **continue using the app beyond the project**



26 378
Total Households
*Total farmer/ group/institution surveyed



68 891
Total Trees
*Individual trees surveyed



4
Total FMNR Plots
*Total FMNR plots surveyed



68 891
Total Nurseries
*No. of nurseries recorded



28 465
Total TP Plots
*Total Tree Planting plots surveyed

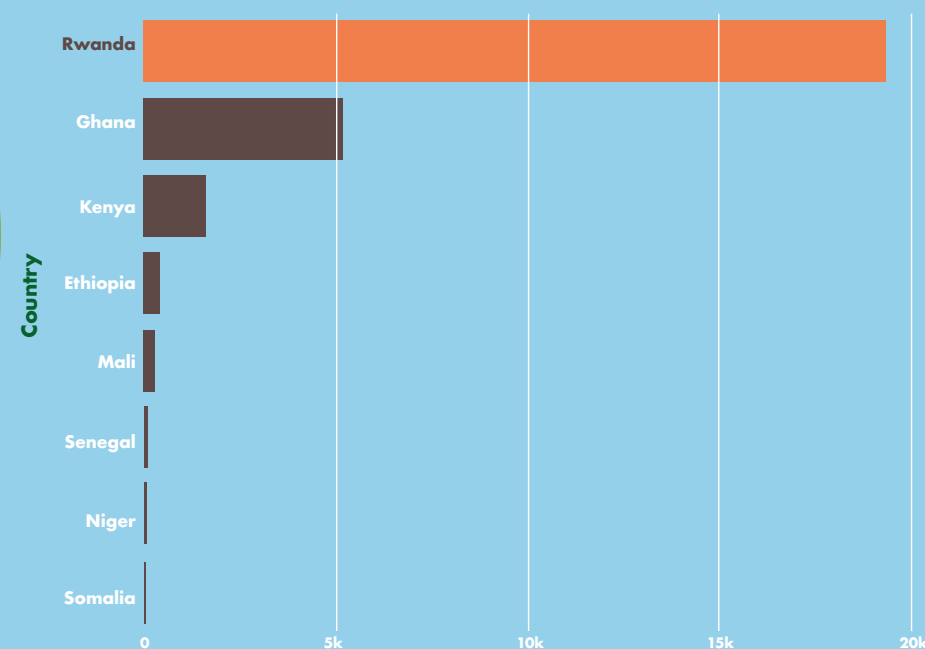


75 627
Total Area (ha)
*Total area under restoration



FARMERS USING APP FOR TREE PLANTING

Tree planting module - number of farmers



Questions and Answers

How do you know the satellite results are actually attributed to the project efforts?

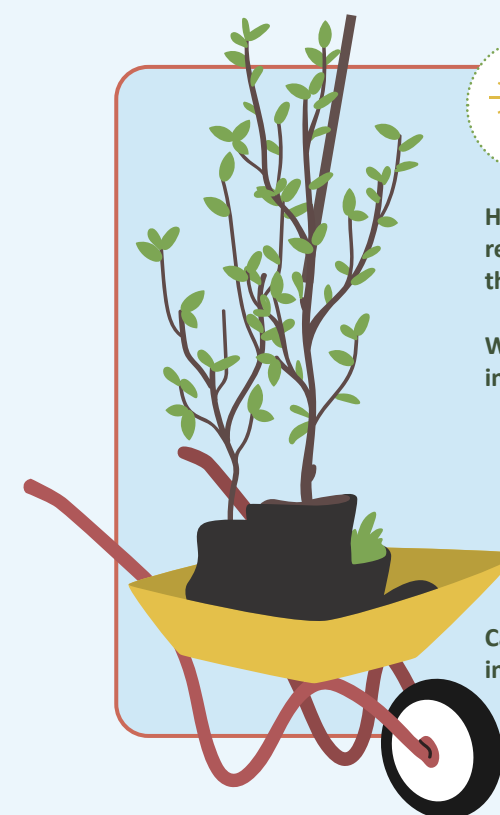
Deeper analysis is done to be able to capture precipitation and MEL data. Information from the app is used to show what the project has done.

Why are farmers not adopting indigenous trees at a high rate?

- Mindset and knowledge on indigenous species
- Nature: exotic trees grow faster than indigenous trees
- Grafting is easier with exotic species
- Saturation of trees has been encouraged mostly by farmer to farmer cross learning

Can we specifically identify indigenous species?

Yes





Questions and Answers

Do you monitor tree diversity over time?

Every time a plot is captured, species are recorded. Need to revisit the same plots to visualize change

Is there a USSD form for data collection?

Currently only available on smartphones but collecting data doesn't need internet

Farmers run for Grevillea over Maesopsis, Markhamia, how to respond?

Ecosystem services and fast growing are important. Want to fill in the gap quickly

How to influence farmers to know and adopt indigenous species as adoption is low?

Farmers know about indigenous species but there is a lack of propagation materials. There is also a lack of knowledge in scaling up production of these species. Cost-benefit analysis—there will be crops lost while integrating trees; do the trees make up for it?

How can we build capacity on the app?

One good way is by training university students, which we do each year with WV and ICRAF

What is the survival rate of trees planted?

This is calculated each year. Some have higher rates—grevillea, avocado, etc.—some are lower. Surveys will be conducted on tree inventory in households

Not all farmers have smartphones. How else can farmers access it?

Google Play, not iOS. At the moment, no capability for other platforms. The trend is towards more smartphones, and we are working on ways to print data to access

Where are the servers?

We have backups in Europe and are migrating servers to Nairobi. We can look into how data can be accessible to the Rwandan government



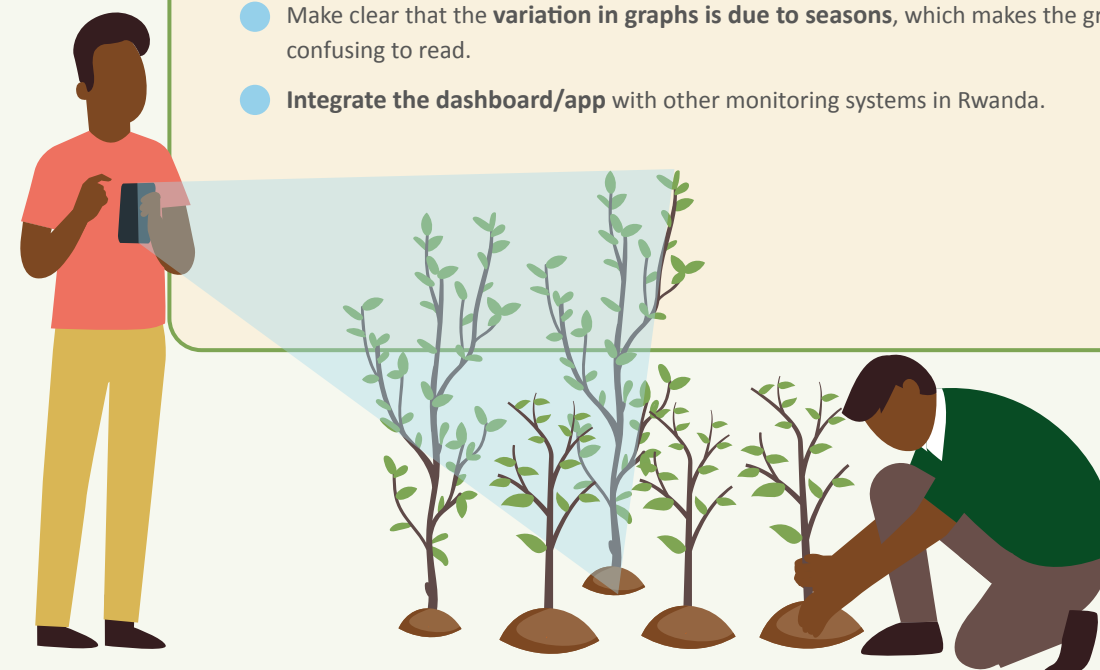
Stakeholder feedback

Have maps that highlight intervention areas to be able to clearly show project efforts on the land?

- With all these surveillance tools, we can **track the real change in program areas and non-program areas**.
- People want time series**.
- Need to have **more tools** that can support more **remote monitoring**.
- Integrate remote sensing tool** to the app so as to ensure synergy between the farmers and others.
- Click on indigenous trees to see the ones available**.

Challenges to indigenous species adoption:

- Farmers tend to be more oriented to **one type of species**, thus low adoption rates of indigenous species.
- Information around indigenous species not easily available**.
- Farmers plant exotics because they get more benefits**: staking, income, readily available market for exotics, advocacy around indigenous species is needed.
- Lack of knowledge**, lack of propagation materials for indigenous species.
- Have **incentive system** in place to encourage farmers to plant more indigenous tree species.
- Need for **longer project periods** for agroforestry/restoration projects. Not following up enough. Projects should last at least 10 years to see results. Need for sustainability past project closure and long term benefits for farmers to plant these tree species.
- AF taskforce discussing and working on making **indigenous tree seedlings more accessible**.
- Try to use **maps for imagery graphics** in place of graphs.
- Make clear that the **variation in graphs is due to seasons**, which makes the graph confusing to read.
- Integrate the dashboard/app** with other monitoring systems in Rwanda.



REGREENING AFRICA DASHBOARD

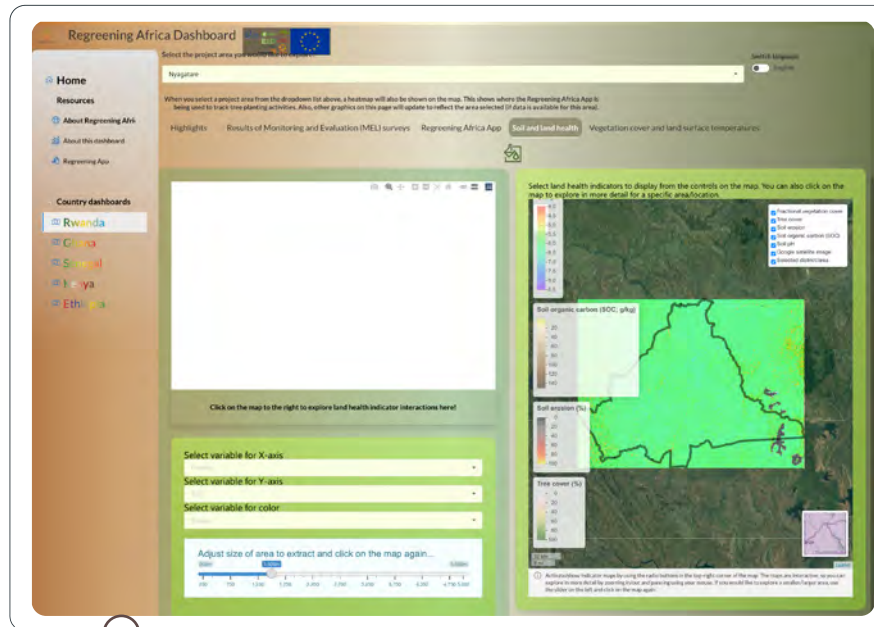


PROJECT HIGHLIGHTS

REGREENING AFRICA APP



SOIL AND LAND HEALTH



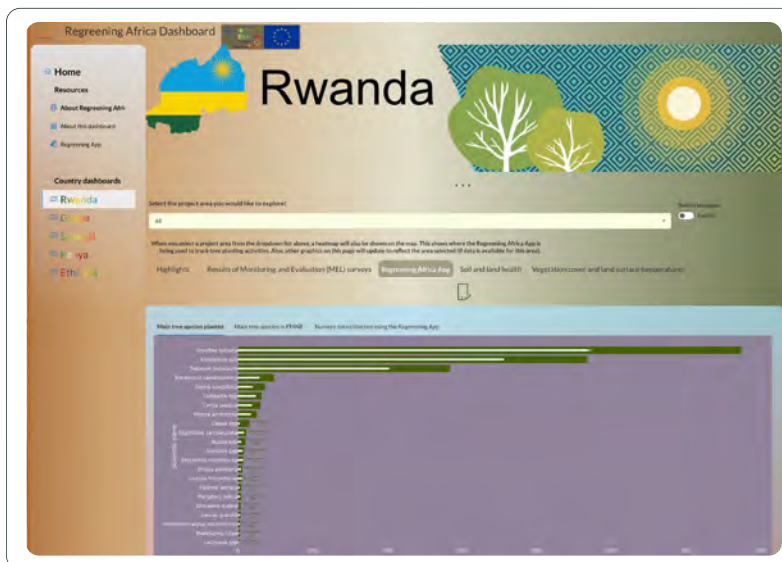
VEGETATION COVER AND LAND SURFACE TEMPERATURE



RESULTS OF MONITORING AND EVALUATION (MEL) SURVEYS

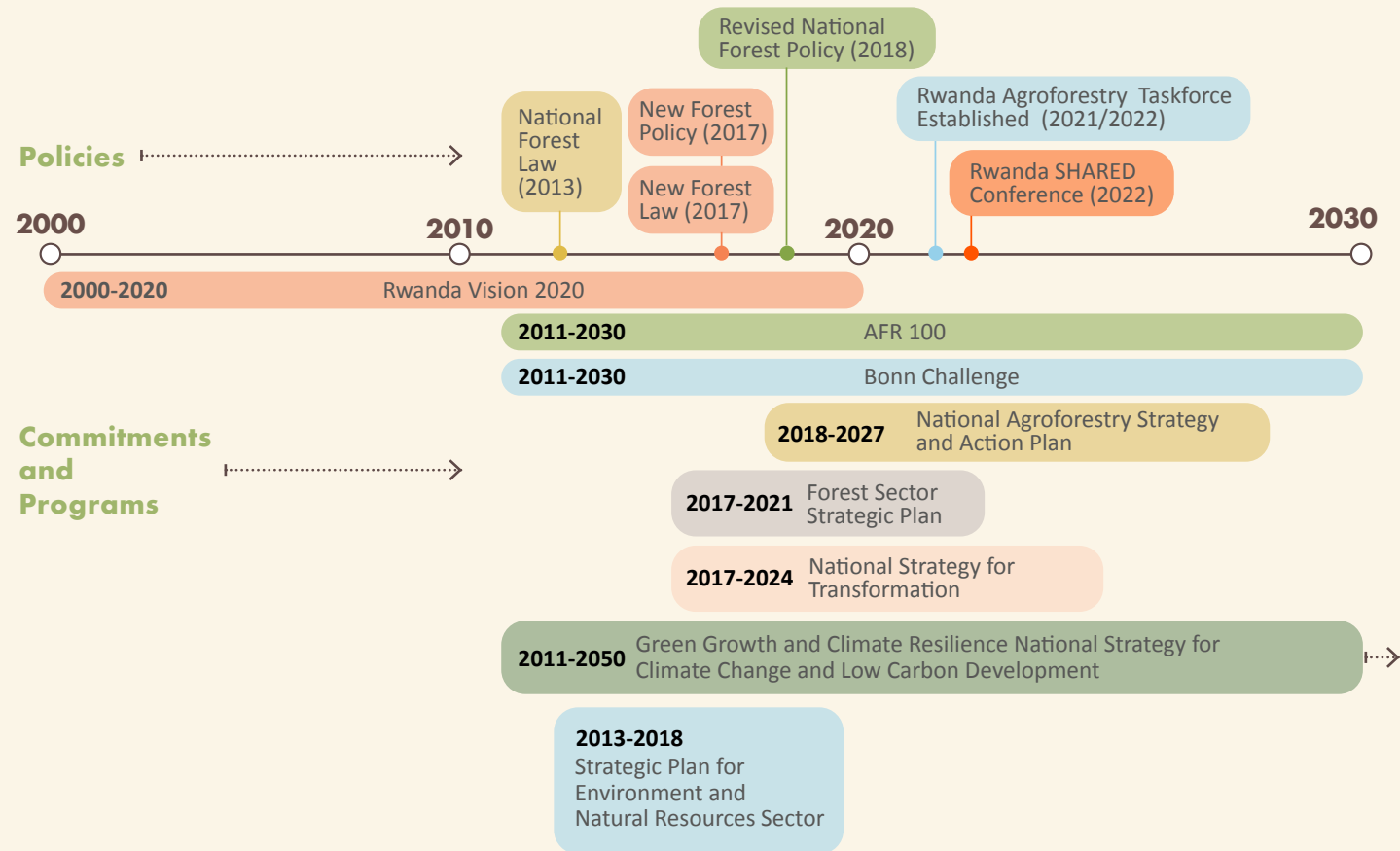


REGREENING AFRICA APP



POLICY AND PLANNING ENVIRONMENT

Steps towards Sustained, Nationwide Restoration Movement



Regreening Africa fits into a larger Rwandan effort at land restoration, evidenced by ambitious national targets for reforestation and agroforestry and growing policy and legal support of agroforestry livelihoods.

- **Bonn Challenge/ AFR 100 (2011-2030)** - Bring 2 million ha deforested and degraded land into restoration -- highest proportion of land committed by any country.
- **Rwanda Vision 2020 (2000-2020)** - rev. 2012, halt and reverse environmental degradation, includes agroforestry as contributor to sustained development of intensified, productive agriculture, private sector based rural economy, value chains.
- **Agroforestry Strategy and Action Plan (2018-2027)** - promoting leadership, synergies, coordinated action to adopt agroforestry tech at scale to enhance agricultural landscapes, watersheds, rural communities; includes Agroforestry Task Force led by Dr. Athanase Mukuralinda.
- **National Strategy for Transformation (2017-2024)** - double agroforestry coverage from 6 to 12% by 2024. Translates SDGs to national targets. "The Rwanda we want" 2050.
- **Revised National Forest Policy (2018)** - country- wide forest cover 30% by 2020, woody biomass reduced to 50% of national energy consumption, 10.25% country protected areas.
- **National Forest Law (2013)** - New Forest Policy (2017), Forest Investment Plan (2017) all support wide- scale promotion of agroforestry. Many other national policies support AF, including environment, land, land use, and energy policies -- Green Growth and Climate Resilience National Strategy for Climate Change and Low Carbon Development (2011-2050) and Five Year Strategic Plan for the Environment and Natural Resources Sector (2014-2018) -- as well as environmental law.
- **Forest Sector Strategic Plan (2017-2021)** - increase number of scattered trees on cropland and agroforestry areas to 50 trees/ha; developing and intensifying agroforestry techniques on all suitable lands, increase agroforestry in crop lands up to 85%.





Evidence wall overview

Project has generally been successful but there is room for growth in certain areas in the 8 countries. There are benefits of the tree species being planted to the farmers in terms of income generation. Questions raised during the evidence wall need to be answered if the work is to be scaled up to other areas.

- Enhance research into controlling mealy bugs, diseases, and other pests in fruit trees.
- Put efforts into **promoting indigenous species** in farmlands and pastures.
- **Decentralization of tree seed production** and access, including indigenous species.
- **Decentralize policy**—farmers need to be included in the process of revising regulations right from the beginning.
- **Stakeholder coordination to build synergies**, harmonize interventions, and avoid duplication/overlap of policies and reporting.
- Need to **diversify farmers reached**, as many programs target the same areas and farmers.
- **Farmer mobilization and sensitization about environmental protection and AF policy and laws**; need to sensitize farmers about what policy means for them.
- **Translate policy and learning materials** into Kinyarwanda.
- **Farmer empowerment**, especially in post-planting activities.
- **Improve extension services.**
- **Needs and preferences assessment for the farmers**—linking farmer choices with restoration needs.
- **Stronger monitoring and evaluation** of tree planting, with a mindset of growing vs. just planting trees.
- **Longer term projects for restoration.**
- **Action plan RATF** to be in place, aligned with national agenda/commitment to restoration shared with stakeholders.
- Putting in place a **strong incentive system** to encourage sustainable practices at farm level and reduce emissions.
- Increase **awareness on environmental protection** at community level.
- **Funds mobilization.**
- **Sharing experience on achievements.**
- **Regular capacity building.**
- **Research before distribution of seedlings.**
- **Standalone Agroforestry Policy.**
- Need to better **explain benefits of trees beyond simply nutrition benefits.**

WV Action planning session:

- There is a need to have a **targeted learning session with Rwanda Forestry Authority (RFA)** and other key players in the sector to influence their strategy especially around the areas, ensuring solid coordination and collaboration of agroforestry and land restoration initiatives.
- **Engagement with Rwanda National parks.**

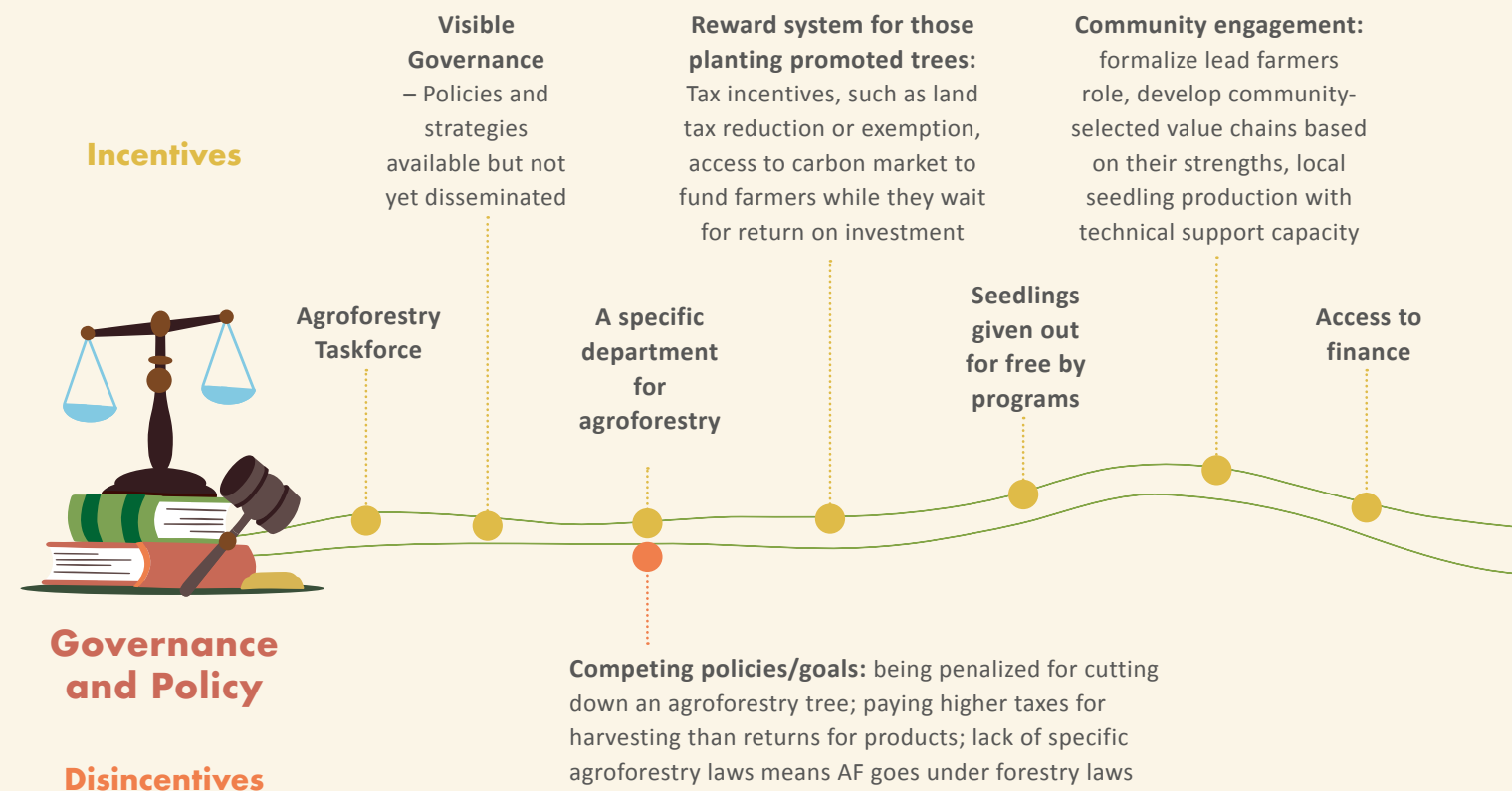
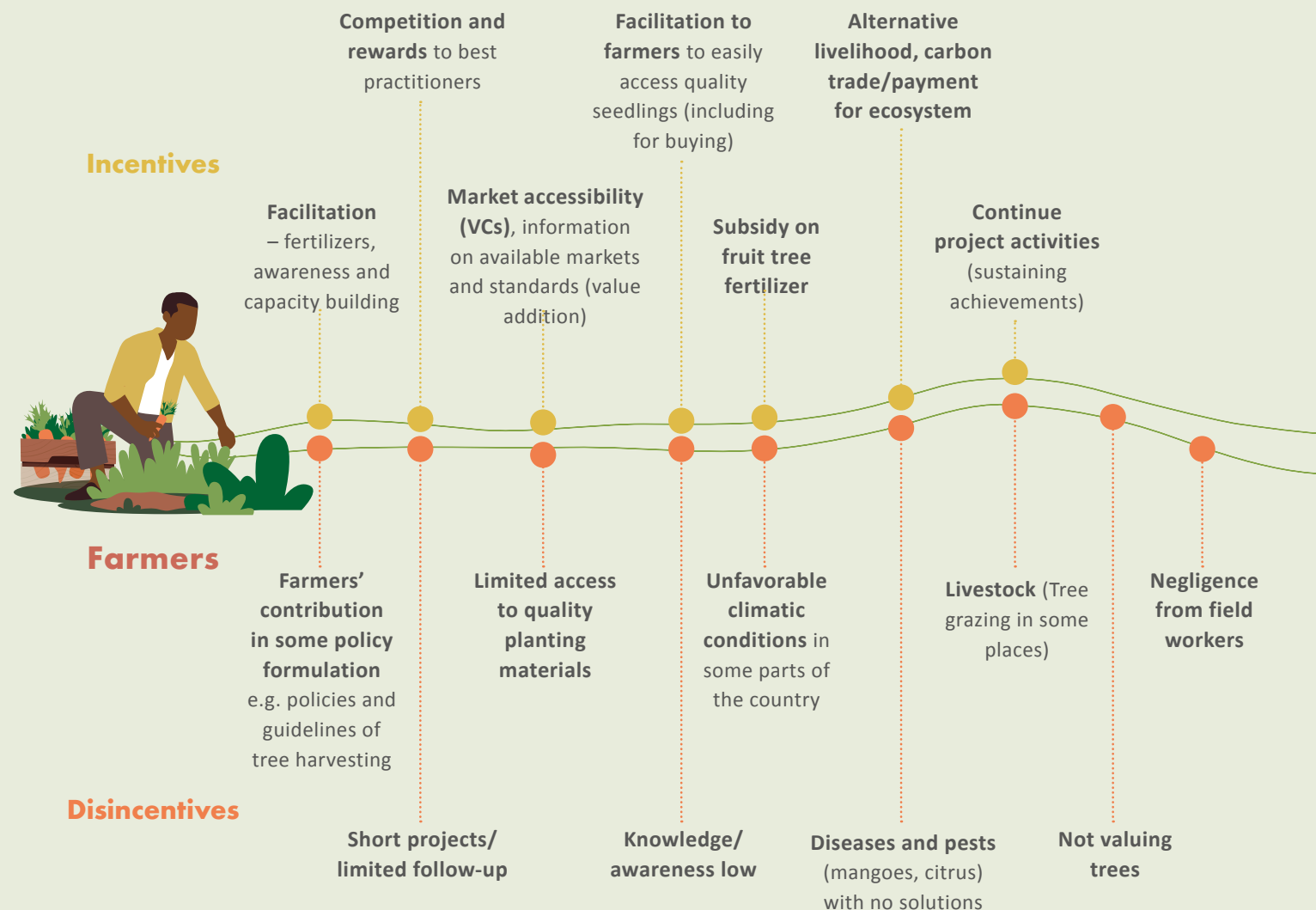




Incentives and Disincentives

Three working groups practitioners/farmers, promoters/development, policy mobilization - to identify those elements that either incentivize or disincentivize land restoration actions and scaling.

WORKING GROUPS TO ADDRESS INCENTIVES AND DISINCENTIVES FOR LAND RESTORATION





Opportunities for Scaling through Sustainability, Leveraging and the Agroforestry Task Force

Through sustainability planning communities were able to agree on their community vision, analyzed available resources and opportunities and developed an action plan for achieving the vision

Sustainability committees put in place

A 5 member committee at every sector, coordinating the implementation of the developed community sustainability action plans.

Resources and opportunities available to ensure continuity/sustainability

Network of trained Lead Farmers (Capacity on ground)

- Continue engaging with lead farmers to ensure smooth transitioning of project activities.
- Make use of the knowledge and skills given to the LF during the project period (Linking LFs to other intervention, LFs supporting trainings in other WVR interventions, and other partner institutions).

Rural Resource Centres (RRCs)

- Strengthening the capacity of farmer cooperatives managing the RRCs to be able to run the centre beyond project period. Rehabilitation of the permanent nurseries before project end.
- Linkages with other NGOs/Actors and interventions (TREPA, COMBIO, other WVR restoration activities).

Development of restoration related Value chains

Community nurseries managed as businesses

- Building on the work already done under the Fruit Tree VC, Seedlings Commercialization and Beekeeping, ensure continuation through linkages through other WVR interventions and upcoming project for both WVR & Partners (TREPA value chain work).

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A 5 member committee at every sector, coordinating the implementation of the developed community sustainability action plans.

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Tools and resources developed under the project (Dashboard, Regreening app)

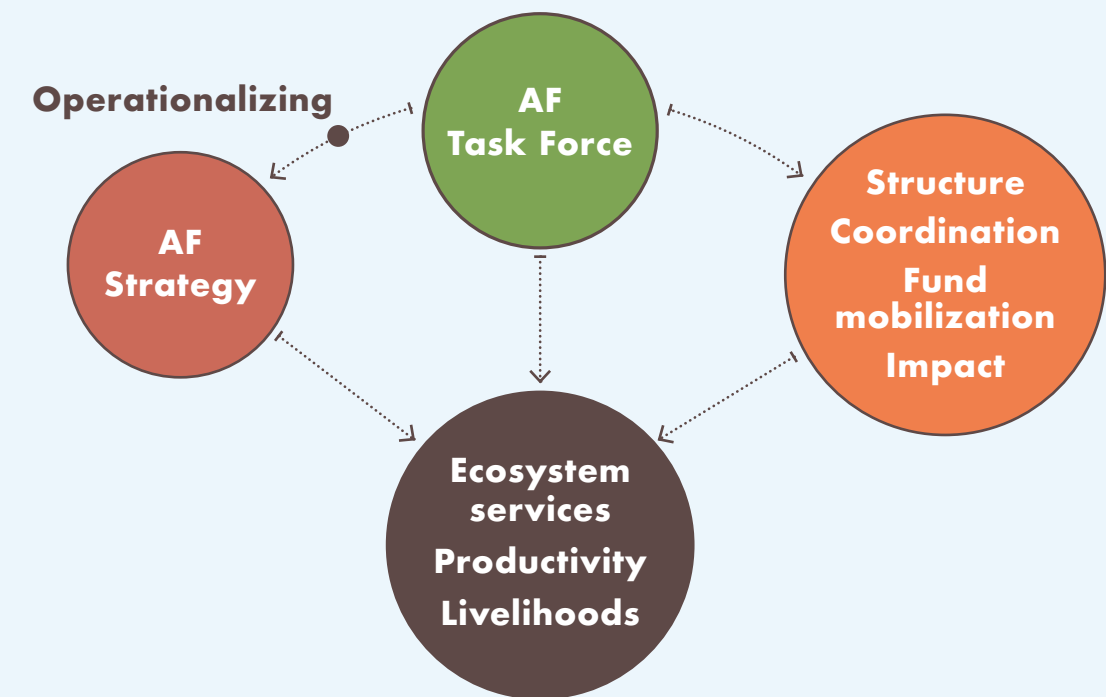
- Efforts to scaling the use of these tools (further discussions with government and stakeholders, more training on the use of tools).

Government extension staff and services available for back stopping

- Close collaboration between community sustainability committees and government extension staff.

Widely communication lessons learned from the project

- To attract further funding.
- Informing future interventions.



Proposed NAFT Roadmap

January - March 2022

- 1 Dissemination of the AFT workshop report
- 2 Production and diffusion of a concept note to MoE and MINAGRI
- 3 Nomination of focal persons by each institution

March 2022 meeting

- 4 Establishment of the ATF structure
- 5 Define ToRs of the committees (N&Tech)

Mid April 2022

- 6 Production of action plan with a budget



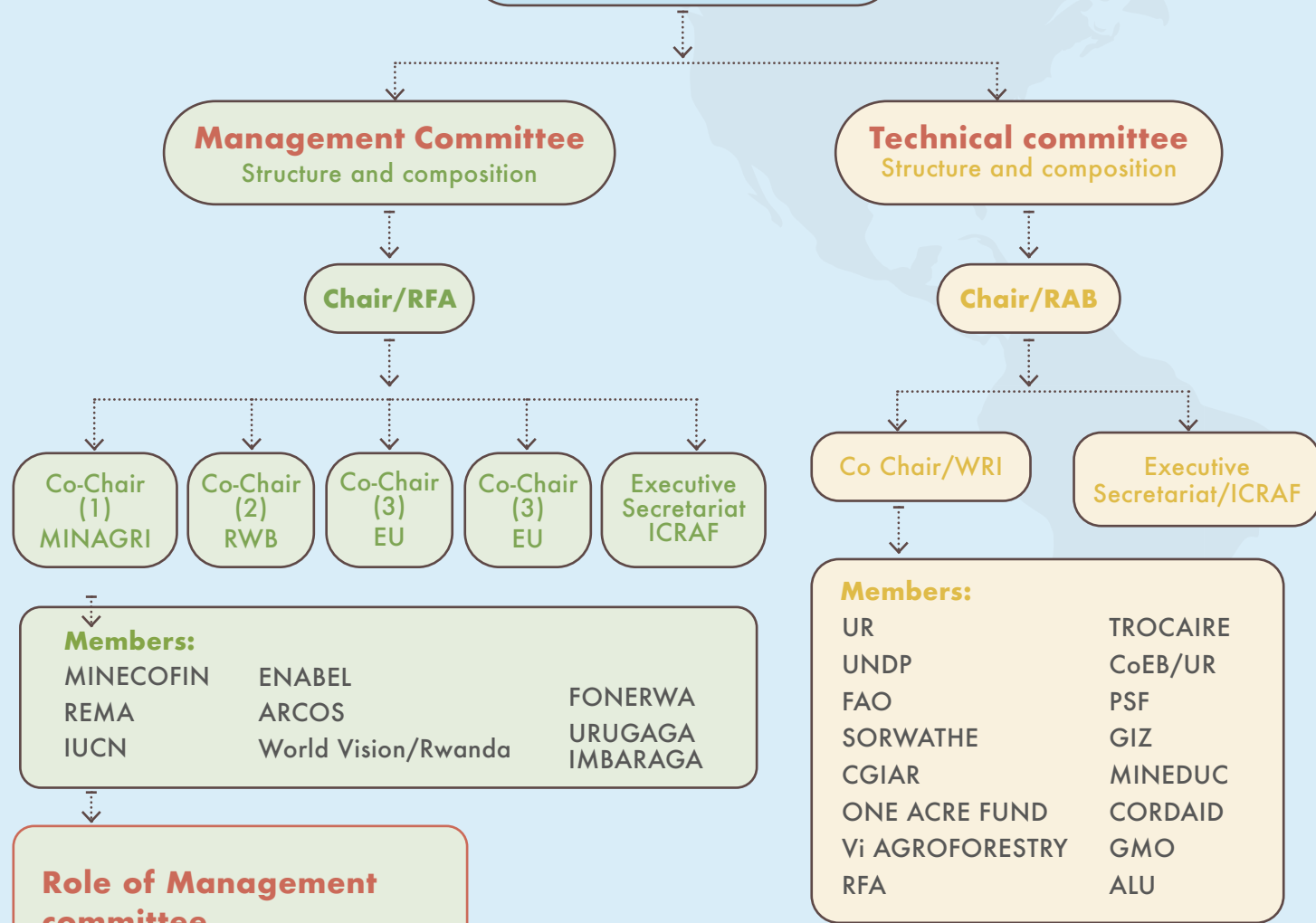
Outline

- Consultation.
- Agroforestry Creation of Task Force.
- Creation of management and technical committee.
- Chaired by RFA and co-chair by EU, Water Board, MINAGRI.
- Road 1 and 2.

Objectives of AFTF

- To operationalize AF strategy.
- Identify different partners and networking.
- Coordination and harmonization of AF intervention.
- Aligning AF interventions with Government policy.
- Funds mobilisation and communication.

Creation of committee



Role of Management committee

- Setting the strategic direction to guide and direct the activities of the RAFT;
- Ensuring the effective management of the RAFT and its activities;
- Provide strategic guidance for effective implementation of Agroforestry strategy;
- Prioritization of activities include in the action plan;
- Advise on harmonization of interventions from various stakeholders;
- Advocate for having agroforestry as a high national priority;
- Ensure the alignment of activities of RAFT within the Government priority;
- Produce and circulate the minutes by the secretariat.

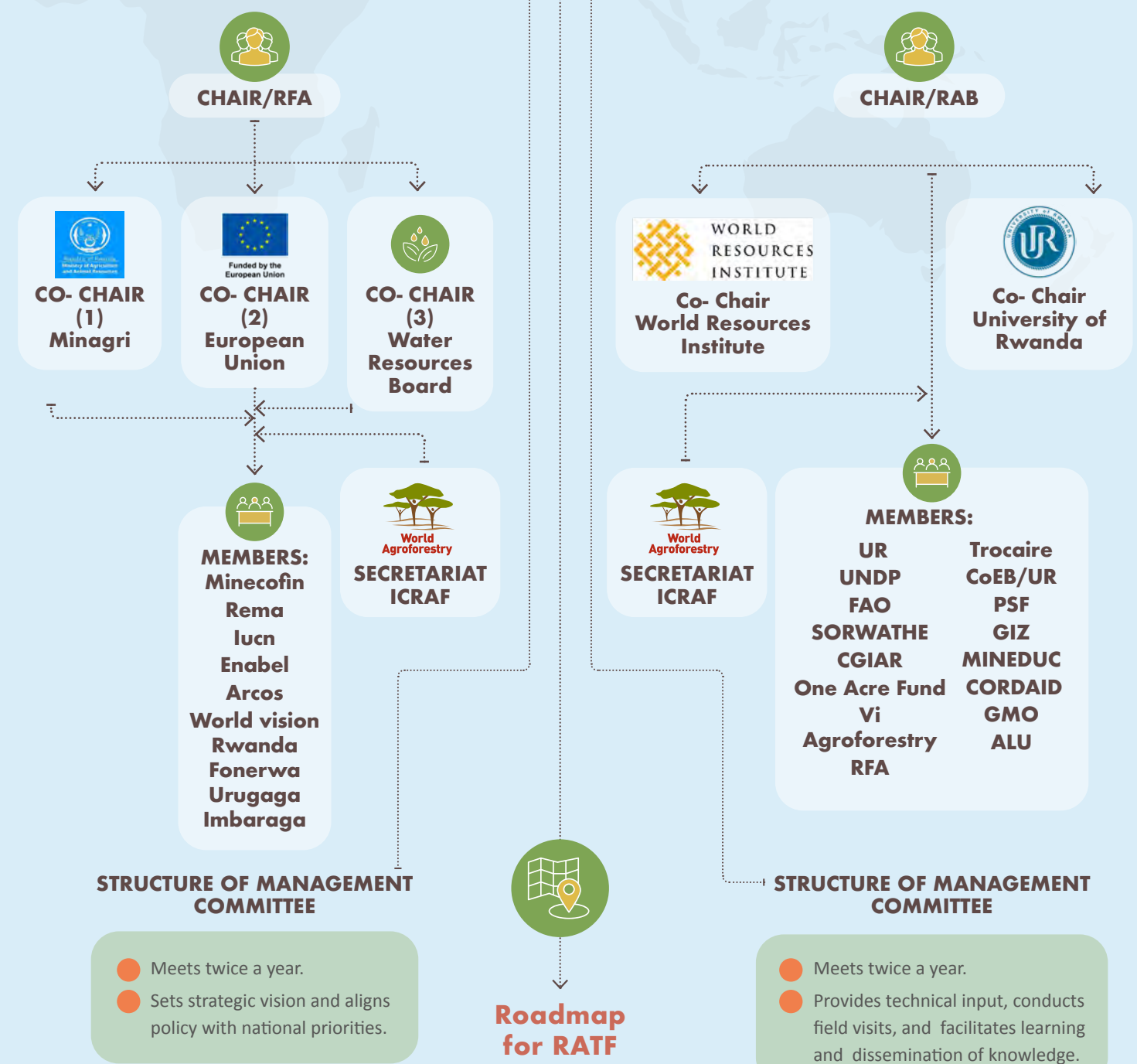
Role of Technical committee

- Review and advise the Management Committee regarding the strategic goals and objectives of RAFT;
- Provide technical input and advise on RAFT action plan and priorities;
- Implement of the action plans approved by the management committee;
- Conducting technical field visits;
- Develop agroforestry techniques and guidelines for stakeholders (field technicians, farmers, producers and investors, etc.);
- Harmonize the tools for monitoring the implementation of agroforestry strategy;
- Elaborate technical recommendations and share them with the management committee for validation, then after share with stakeholders;
- Consolidate knowledge, information and share with agroforestry stakeholders;
- Facilitate the harmonization and synergies in the implementation of Agroforestry interventions;
- Identify the issues that need the advocacy and report them to the Management committee for guidance.

ESTABLISHMENT OF RWANDA AGROFORESTRY TASKFORCE

The Task Force will:

- Contribute towards Rwanda's reforestation commitments and coordinate and monitor the National Agroforestry Strategy (2018-2027).
- Facilitate the coordination, collaboration, visibility and harmonization of agroforestry interventions among cross- sectoral stakeholders.
- Engage in capacity building, support, and tailoring incentives for farmers.
- Meet once a year for general assembly.



STRUCTURE OF MANAGEMENT COMMITTEE

- Meets twice a year.
- Sets strategic vision and aligns policy with national priorities.

STRUCTURE OF MANAGEMENT COMMITTEE

- Meets twice a year.
- Provides technical input, conducts field visits, and facilitates learning and dissemination of knowledge.

Roadmap for RATF



MARCH 2022

RATF established

RATF workshop conducted

Concept note shared with MoE and MINAGRI



MID- APRIL 2022

Official recognition of RATF (Letter of endorsement from MoE)

Formalize the nomination of RATF members (Nomination letter)



MAY- JUNE 2022

Monitoring tool selected

Action plan for three years developed

Communication strategy for the period of three years produced

Summary

- **Objectives to operationalize AF strategy**, identify different partners and networking, coordination and harmonization of AF intervention, aligning AF interventions with government policy, funds mobilization and communication. Just creating the taskforce doesn't do anything if it isn't visible.
- **Management committee**: sets strategic direction, ensures effective management, harmonize, prioritize, advise, advocate, align with government priorities.
- **Technical committee**: review and advise management committee goals, technical input, implementation of action plans, field visits, develop AF techniques, consolidate knowledge.
- **Next step is creating an action plan.**

Community-Practice-Science-Policy-Investment Dialogue

An interactive panel reflected on what they have heard from the workshop proceedings and with their expertise provided their insights on next steps and commitments.



Director of Agriculture and Natural Resources, Bugesera District
Sijyenibo Jean Damascene

Acting DG Rwanda Forestry Authority
Spridio Nshimiyimana

Bridgette Kanyamugenge
ARCOS network

Pierre Nshiyemoremye
One acre fund

Joseph Gafaranga
Rwanda Farmers

Organization IMBARAGA
Athanase Jamweshi
Rwanda Agriculture and Animal Resources Board

What do you think is needed in terms of concrete actions to scale AF work in Rwanda?



HH data: less than 50% reached. If the project is scaled and all HHs are involved, the impact can double or even triple. The need for tree planting is not only in the program districts, but with funding, all districts. There is also a gap in follow-up on already planted trees.

Pierre Nshiyemoremye

We usually fail to meet objectives because we come in with technologies without an idea of what the needs and preferences of the farmers are. We have a serious problem related to propagation materials—if a farmer wants indigenous species, are we ready to provide them? We tell farmers to plant trees in their farms, but we don't in our farms. We need to introduce other activities to benefit farmers while they wait for trees to mature: honey production, carbon trade—assess the carbon sequestration potential of existing trees. Farmers are not used to pruning fruit trees, which reduces productivity—planting trees needs to be accompanied by a package of tree management knowledge.

Athanase Jamweshi





Emphasized that restoration projects be given a long time frame to see results. Appreciation for farmers to be invited to this forum to air out their views. Appreciated the institutions for supporting land restoration and tree planning. Appreciated initiative to have an interactive session with translation—many forums where farmers were invited but unable to participate because of the language barrier.

We have 70% farmers in the country, but 80% of the poor are farmers, and yet farmers are feeding the country.

Concrete actions: awareness on tree planting and agroforestry. Economic benefit vs environmental benefit: need to explain both. Preparing farmers for tree planting—bring them into the initiative to plan where and when trees are planted. Have farmers active and not passive participants in processes.

Joseph Gafaranga

Our forests are not enough to feed the population, so we need to scale this project up. Population should phase out the use of firewood in cooking.

- Government has already taken up the approach of community tree seedlings production.
- Seed availability – 2 seed centers (Huye/Gatsibo), plan to build one in Western Province.
- Community involvement in policy – forestry policy is under review and this is being considered.
- Department is working out the issue of livestock and AF with the districts.

Spiridio Nshimiyimana



What can be added as incentives? We still have challenges in propagation of tree planting materials, especially indigenous species. We need to have adoption trials in agriculture for improved seeds on a seasonal basis. When you go to other sectors, coverage is still low, so we need to scale up in remaining sectors. Agroforestry production is not sufficient. Developing high value crops that are resilient to climate change. Involvement of farmers is critical to project success. Exchange visits.

Sijyenibo Jean Damascene

What can be done to scale up initiative: the first step is to understand what Regreening is about. Scale up can be considered in terms of geography and practices—we have to be prepared with suitable practices to make sure ecosystem functionality is restored. Engaging more stakeholders—would be happy to have private sector representatives in this room—the tendency is to forget about some key categories of stakeholders. Private sector can be donors or directly implement. Building capacity especially of local NGOs, CBOs, and communities themselves. Challenge of resource availability, so we must fund opportunities to build their technical and leadership capacity. Include as many stakeholders as possible.

Bridgette Kanyamugenge



Key Points and Suggestions from Panel

What is needed for scaling and what are the important incentives?

- Involving local communities is key for sustainability.
- Forests alone are currently not enough to feed the entire population. We need to scale spaces under Regreening.
- Government is interested in Regreening the entire country.
- Rehabilitation of degraded forests is also needed.
- Involving farmers and local communities in tree planting activities from the beginning is key to increasing ownership of the trend.
- Understanding restoration and Regreening is the first step. Landscape restoration is not only tree planting. We need practices in addition to tree planting if we are to achieve landscape restoration.
- Involve all stakeholders in the entire process.
- Inclusive and integrated approaches including governance of local institutions. Incorporate all SDG indicators in the conversations with farmers.
- Invest in building the capacity of local NGOs and CBOs as they play a key role in awareness creation and community mobilization.
- Collaborative fundraising/resource mobilization.
- Support farmers to adopt most effective indigenous tree species.
- AF and capacity building for farmers is not enough. We need to increase their resilience to climate change.
- Investment in AF should go hand in hand with investment in agribusiness.
- Integration of different activities in the project. Funding is skewed towards AF/ tree planting leaving out activities such as efficient energy.
- Include the community more in seedling production.

What is needed in terms of concrete actions to take AF work forward?

- Scale the project to all households in the districts where it was implemented. A lot more to do.
- We need to move from tree planting to tree growing: follow up and monitor planted trees.
- Recognize farmer preferences and interests for restoration.
- Make planting materials such as quality germplasm readily and easily accessible for farmers.
- Investing in tree-based value chains other than fruits – honey harvesting, carbon trading.
- Awareness creation/sensitization of existing policies and regulations.
- Create awareness across the communities on AF and restoration – why we need the intervention.
- Balance between the environmental and economic benefits of restoration in the messaging.
- Involve farmers from the planning not only when implementing the intervention, but in formation of policies/regulations.
- Over 70% of the population of Rwanda are farmers, however at the same time, 80% of the poor in the country are farmers.





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