Regreening Africa

RWANDA

Country Information Brief

Best practices, opportunities and bottlenecks for scaling-up regreening practices

Brief prepared by Alex Mugayi (World Vision, Rwanda), Athanase Mukuralinda (ICRAF), Mieke Bourne (ICRAF), Sammy Carsan (ICRAF), Dennis Garrity (ICRAF) and Susan Chomba (ICRAF).

Funded by European Union

World Agroforestry

World Vision

ELD
THE ECONOMICS OF
LAND DEGRADATION

Contents

Image: Farmer preparing potting tubes in readiness for the provision of tree seedlings.
Photo: Elisee Bahati/ World Agroforestry.

Regreening Africa

Introduction

This document provides a brief synthesis of best practices and opportunities for scaling up regreening /land restoration and sustainable land management, learnt from the implementation of the Regreening Africa program and the experience of implementing partners. It is intended to inform future European Union (EU) programming efforts to support regreening in Rwanda, notably EU programming at the country level upon request and other initiatives.

In Rwanda, the EU Delegation is currently focusing their support on the following areas that are being directly addressed by the Regreening Project:

- The promotion of high-value cropping systems for employment and income generation in rural areas through a 'feeding the cities' program. Support is given to the private sector in fresh product value chains, including agro-processing services and logistics - with a focus on women and youth.

- Support to green and climate smart research to underpin sustainable value chains.

- Support to the provision of inclusive and effective decentralised services in rural areas, in particular for agricultural transformation and the environment, in the form of extension services, irrigation, feeder roads, organic agriculture and agroforestry (including related value chains), terracing, land management, including woodlands, and clean renewable energy fuels and technologies.

- Support to the relevant authorities (national, regional, district) to develop and increase conservation, green tourism, and biodiversity, accompanying this support with the development of new curricula matching these new jobs (especially for youth).

- Support to the development of diversified ecosystem/wildlife-based sustainable business models, including tourism and community-based conservancies at national and regional level.

- Support to the implementation of the National Determined Contribution (NDC) partnership.

Image: Mango tree seedlings growing in a newly established RRC in Rwanda.
Photo: Felix Mulindangabo/ World Vision.

[1]Regreening refers to an increase in tree/vegetation cover as a step towards full landscape restoration, through the promotion of planting/growing a diversity of tree species and farmer-managed natural regeneration (FMNR) in agricultural and pastoral systems, including associated sustainable land management/soil and water conservation measures, livestock management and other related policy engagement processes.

Regreening Africa

What have been the main restoration successes achieved under Regreening Africa in Rwanda?

The ultimate aim of the EU-funded Regreening Project in Rwanda is to foster a massive, sustained landscape restoration movement with nationwide uptake. The project has built on the successes of existing restoration programs providing a solid basis for nationwide scale-up. Restoration efforts have been established in several districts namely Bugesera, Kayonza, Gatsibo and Nyagatare, located in the Eastern Province of Rwanda. A coalition of local, national, and international non-governmental organisations (NGOs) and civil society organisations has been formed. The coalition collaborates with government at all levels and receives technical support and overall coordination by World Agroforestry.

Mindset change is a fundamental aspect of building a restoration movement. Thus, the project has focused on shifting the attitudes of all stakeholders by improving their understanding of the many benefits received from investing time and effort in landscape restoration. For example, low soil organic carbon was identified as a key driving factor for landscape degradation in the regreening sites of Rwanda, during the Land Degradation Surveillance Framework (LDSF) survey. Farmers are now practicing biomass incorporation to increase soil organic carbon levels using fertiliser trees such as Calliandra, Leucaena, and Gliricidia. A participatory approach spearheaded by lead farmers has proven a powerful means for accelerating the adoption of these practices and for changing mindsets.

- Large numbers of farmers are adopting on–farm trees like Grevillea robusta for timber production. This indicates a positive change of mindset towards regreening agricultural landscapes.

- Consuming fruit to enhance diets and reduce malnutrition has been a critical mindset change, as previously all fruit was sold at markets.

- Ownership of regreening practices by the Government of Rwanda, where regreening activities are embedded in the contract performance agreements that Mayors sign with the President of the Republic of Rwanda. This is a significant mindset change as previously performance contracts only considered the improvement of annual crop production.

A strong technical capacity is imperative for the successful restoration of agricultural land, forested areas, grazing land and watersheds. The project has focused on building technical capacity among government experts, development agents and beneficiaries through continuous awareness creation, training, experience-sharing visits, and peer-to-peer learning opportunities. This capacity building focuses on lead farmers (men, women, and youth) who are contributing to the scaling-up of regreening solutions. Seventy lead farmers have been trained and are actively working to train other farmers.

Image: Healthy banana plantation on a farm owned by one of the project beneficiaries.
Photo: Elisee Bahati/ World Agroforestry.

Regreening Africa

Successful regreening uptake in Rwanda has mainly been catalysed through:

- **Lead farmers** who accelerated the uptake of many regreening practices.

- **Annual community tree planting days** (Umuganda) which have involved the high authorities of the country including the President of the Republic of Rwanda as well as local authorities, innovation platforms, cooperatives, churches, youth clubs, women groups, and cooperatives.

- **Media efforts through radio, TV, and newsletters** have further contributed to the large uptake of regreening practices.

- **Joint Action Forums** are held monthly at the district level for all development partners. This is an important channel for sharing the messages of the Regreening Program. Proposed actions, such as the adoption of regreening practices and other agricultural activities are signed-off by each Mayor for inclusion in their work programs. This is important because each district has a target to achieve and must report on the progress to the high authorities.

Project support was critical to the formulation of the National Agroforestry Strategy. This inter-ministerial initiative will provide leadership and coordination for landscape restoration in the coming years. It aims to achieve the country's target of restoring two million hectares of degraded land. The project is currently working to assist government in cascading this target downwards to enable each district to establish and implement its own unique landscape restoration target.

A task force on agroforestry has brought together the ministries of Agriculture and Animal Resources, Environment, local government, NGOs involved in agroforestry, the nutrition department, cooperatives, innovation platforms and the private forestry sector. The taskforce was created to mainstream the strategy in different government structures and to promote and coordinate the scaling-up of the Regreening Africa project across the country. The task force will facilitate the coordination of regreening activities among the Ministries of Agriculture and Environment and local administration.

During the past three years, the Regreening Africa project partners' scaling-up action has put a total of 47,6130 ha under restoration throughout Rwanda. There were 19,550 households directly facilitated and 11,040 with leveraged adoption. This rapid success will allow for an accelerated rate of adoption in the coming years.

One of the most important advances of the project has been the widespread action by farmers to protect, manage and implement naturally regenerating trees on their farmlands and rangelands. This is a very effective and affordable option for restoration practices in farmlands and rangelands. The project has been able to spearhead its spread throughout the nation, providing a pathway for accelerated adoption during the coming decade.

In farmlands, FMNR provides ecosystem goods and services such as firewood, timber, soil fertility improvement and shade for animals thereby contributing to climate change resilience. Trees established in farmlands include *Vernonia amydhalina, Markhamia lutea* and *Acacia spp*. (indigenous species).

In the rangelands, the growth of timber and fodder trees will add value such as income generation through the harvesting of timber and increased milk production due to improved fodder availability. Further, soil productivity will be enhanced through the incorporation of manure. The trees established in the rangelands include T*erminalia superba, Gliricidia sepium* and *Markamia lutea*. The trees are maintained and managed by the farmers. Much effort was put into awareness creation and knowledge sharing through lead farmers and government extension services to highlight the benefits of trees in farm and rangeland systems.

The successful engagement with female project beneficiaries who have established fruit orchards in their home gardens. The fruit produced enhances family nutrition and provides an additional income source.

The project has promoted various regreening practices depending on the local land restoration settings and the expressed needs of farmers. Several successful regreening practices were identified:

- Fruit trees (tree tomato, pawpaw, avocado, mango) were the most desired by farmers, farmer cooperatives and the private sector;

- Boundary planting of trees for timber and fruit, and soil fertiliser improvement;

- Farmer-managed natural regeneration of trees (FMNR);

- Home gardens;

- Hedge rows where fertiliser shrubs are planted for improving soil productivity and for controlling soil erosion;

- Roadside planting for road stabilisation and wood production;

- Biomass incorporation for improving soil fertility and soil water storage;

- Upper story tree pruning (70% of total branches) to reduce competition for water with annual crops beneath the tree canopy; and

- Combination of fertiliser trees planted on the risers of bench terraces (mechanical structure for soil erosion control) to restore soil organic carbon and to provide ecological goods such as fodder, firewood and timber.

Supporting decentralised access to tree planting material. A major constraint faced by tree growers in Rwanda is access to affordable, quality planting material. Reliance on free government supplies is limiting given that there is a focus on only a few species (of dubious quality) that are intended for plantation or woodlot forestry rather than an agroforestry setting. By working with more than 60 farmer cooperatives to set up nurseries in the Eastern Province, access to better quality tree planting material has improved. This has also provided a new opportunity for enterprise development in the trade of quality tree planting material.

Value chain approach to farm tree enterprise development. Appreciation of tree nurturing enterprise opportunities has risen, allowing for movement away from the more stagnant traditional agricultural commodity value chains. Renewed interest has seen local stakeholders take advantage of the opportunity to diversify household income streams by developing fruit enterprises and others that involve trade in timber for construction materials.

Regreening Africa

What are the best regreening practices and scalable models for Rwanda?

Rural Resources Centers (RRCs) for improving germplasm quality and accessibility have been developed by cooperatives. Four RRCs were launched in the implementation areas, and more are due to be established across the country.

Promotion of on-farm and rangeland timber production using the following tree species *Grevillea robusta, Terminalia superba, Markhamia lutea* and *Maesopsis eminii*. This is a regreening solution to reduce the gap in domestic timber production, because all naturally forested areas are protected. Promoting on-farm timber production is reducing encroachment into the protected areas.

Promotion of progressive terraces to reduce soil erosion on hillslopes.

Promotion of the growth of fertiliser trees and shrubs in degraded agricultural areas to improve soil fertility and restore soil organic matter through biomass incorporation. The species promoted are *Gliricidia sepium, Calliandra calothyrsus, Leucaena diversifolia*, and *Senna spp*.

Promotion of tree pruning in agricultural fields to reduce shading and improve water uptake by 70%.

Promotion of fruit trees for improving nutrition and income generation for smallholder farmers. The main fruit trees promoted are tree tomato, avocado and mango.

Image: Tree nursery operator getting rid of weeds at a newly established RRC in Nyagatare district. **Photo:** Elisee Bahati/ World Agroforestry.

Regreening Africa

What are the social, cultural and technological issues that may hinder the adoption of regreening activities?

Social barriers include attitudes of resistance to change. This is often linked with farmers' mindsets on competition between trees and annual crops.

Indigenous trees are sometime regarded as naturally self-regenerating and thus farmers do not try to manage them.

Access to quality germplasm. For the entire country we have only one Tree Seed Centre (TSC). The accessibility of quality germplasm is still a problem for most farmers. Inaccessibility to quality germplasm, particularly for fruit trees, inhibits the investment in regreening practices.

Poor management (pruning, coppicing, thinning) of trees associated with annual crops discourages farmers from continuing to plant trees in farmlands.

Limited knowledge and capacity on disease and pest management, particularly for fruit trees. There is no quarantine system in Rwanda to prevent the spread of pests and diseases. The absence of strategies to control pests and diseases discourages farmers from planting fruit trees.

Agricultural dependence on rainwater discourages farmers from irrigating/watering trees during the dry season, affecting the survival rate of trees.

Very small farm sizes and a fear of trees negatively affecting crop production.

Agroforestry products like timber, poles, and firewood typically fetch low prices at markets and so are not attractive to investors. The value chains of most agroforestry products are insufficient and limit the motivation to plant trees.

Image: Tree nursery operator getting rid of weeds at a newly established RRC in Nyagatare district. **Photo:** Elisee Bahati/ World Agroforestry.

Regreening Africa

What are the main policy, regulatory and governance barriers to regreening activities and how can they be addressed?

Agroforestry does not have its own standalone policy, it is hidden within forestry, agriculture, and environment policies.

The Agroforestry Strategy and Action Plan has not yet been translated into local languages for rural farmers' ownership. It is exclusively written in English.

The channels for mainstreaming agroforestry policies and strategies are not well defined. The impetus remains at the central government level, with poor implementation realised at the ground levels.

Poor promotion of indigenous species is having a negative effect on biodiversity. The propagation methods for some indigenous species are difficult and some species are slow growing. This pushes farmers to adopt exotic species, which have a negative impact on biodiversity.

In agricultural landscapes there is conflict between agriculture and biodiversity. The agricultural sector compromises biodiversity, but planting trees in agricultural landscapes attracts birds, and insects as pollinators that benefit crops. In addition, planting trees on-farm improves belowground biodiversity, with positive effects on agriculture through better nutrient cycling.

There is a gap in policy to articulate the benefits of planting trees on-farm for improving both crop production and biodiversity. This needs to be addressed to meet the country's commitments to the Convention on Biological Diversity (CBD).

There is also a gap in policy on FMNR promotion in rangelands, showing that planting trees in rangelands adds value to the rangelands and improves climate resilience for both livestock keepers and livestock (shade and fodder).

Image: Farmer narrating the high's and low's of the restoration journey, during the projects' JRLM visits. **Photo:** Felix Mulindagabo/ World Vision.

Regreening Africa

What are the most promising value chains and investment opportunities that could incentivise regreening activities, and how could they be supported?

Rwanda's tree-based value chains are smallholder-driven and locally geared to serve a high rural and a rapidly growing urban population. The smallholder production efficiencies are based on small land holding sizes of less than a hectare, spread across the country.

The preference for short-cycle agroforestry enterprises that provide household income streams and nutritious diets have emerged from priority-setting activities involving producers, cooperative groups, small traders (SMEs) and local government actors. These enterprises provide much needed financial resources, some of which are invested in land care management practices involving soil maintenance and water conservation structures, as steep slope farming is widespread in the country.

Fruit

Market: mainly domestic.

Fruit production and marketing is a natural choice, supported by strong socio-economic factors involving income largely from the domestic market, household nutrition, and supporting government policies. Past technological interventions involving improved fruit varieties, even though limited, have been recently accelerated by the Regreening Africa project in the Eastern Province districts of Gatsibo, Kayonza, Bugesera and Nyagatare. They have engaged over 60 farmer cooperatives and their nurseries to offer real opportunities for industry transformations in the next 5 to 10 years.

Key value chain products

- **Fresh avocado fruits and avocado oil (after boosting current resource levels)** - Favorable agroclimatic conditions in the Eastern Province, improved farmer knowledge on handling varieties for domestic and export markets, grafting expertise through RRC support, nursery infrastructure and supporting government policies offer real opportunities to increase production capacity. Domestic market outlets in rural areas and urban centers remain under served. Proper handling of varieties and knowledge on disease control are key considerations for improvement. There is great opportunity for product diversification involving avocado oil, this will require export market outlets.

- **Mango** - Favorable growing conditions and a strong domestic market offer real opportunity for growth. There is need to match varieties to diverse site conditions. Market growth has in the past been constrained by low production volumes and pest and disease incidence. There remains a gap to diversify available genetic resources provided by the Rwanda Agricultural Board (RAB).

- **Tree tomato** - These fruits are well-produced in the West and Eastern parts of the country. Given the very short production cycle, and small land holdings, tree tomatoes provide a perfect fit for home gardens and for intercropping in small spaces in bean cropping food systems. The fruit is popular in rural areas and urban centers, fetching good prices in hotels for fresh fruits, juice making and fruit puddings. Neighboring countries' markets offer potential for growth and expansion even though there are still gaps to satisfy domestic markets. Planting materials offered in the past by Rwanda Agricultural Board need to be diversified to ensure pest and disease problems do not persist. ICRAF is demonstrating fresh genetic resources from New Zealand within the RRCs to evaluate the performance of additional cultivars.

Regreening Africa

Key constraints for sustainable commercialisation

These commodities experience similar production and marketing challenges to those faced by other major agricultural commodities. The past lack of support from government policies and dedicated development project support have meant continued sector neglect despite immense contributions to thousands of rural households and small traders. Some of the key challenges include:

- Production of limited volumes to meet domestic market and export demand;

- Produce of mixed quality due to use of inferior planting materials and poor management techniques;

- Disaggregated smallholder production;

- Low value-addition to products;

- Lack of finance access by small producers and traders;

- Poor road infrastructure, increasing transport costs, and lack of storage facilities;

- Poor post-harvest and produce handling techniques to minimise wastage; and

- Emerging pest and disease challenges.

Potential methods for overcoming key constraints

- Regreening Africa has recorded some success in the Eastern Province involving working with farmer cooperatives to strengthen production capacity through trainings, improved tree nursery infrastructure, RRCs to support actors at the primary level, and improved access to quality-disease free planting materials. The project has mapped farmers for aggregation into producers' groups. Initiatives have focused on raising the importance of value chain approaches in order to build confidence through negotiation support with traders, exposure to National Agri-shows and exchange visits to emerging enterprises to link them to potential markets and buyers.

- An important step involves innovations to help increase access to finance by producers so they can afford loans to purchase inputs. So far, Regreening Africa has supported 256 savings groups involving 6,548 adult members (4,972 female/ 1,576 male), and 16,583 youth members (10,178 male/ 6,405 female) in the Eastern Province to help accumulate savings for borrowing.

What are the best practices for gender and youth inclusion in the regreening movement?

Image: Farmers keenly following discussions during the JRLM visits in 2020. **Photo:** Elisee Bahati/ World Agroforestry.

The Regreening Africa project ensured a meaningful and equal participation of both men and women of different characterisation, as well as youth, in decision-making at all stages of project implementation (i.e., planning, tree production and planting, and reflection). Currently, 51% of lead farmers are female, and women make up 75% of the total saving group members. Youth in schools are reached through environmental clubs and they participate in tree planting. Out of school youth make up a large number of farmers involved in tree seedling production and tree planting.

What are some key tools and methods for monitoring regreening activities?

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.
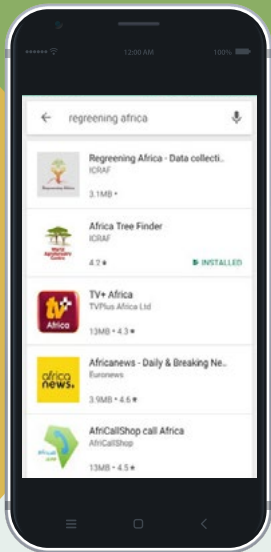
Locate App

Install App
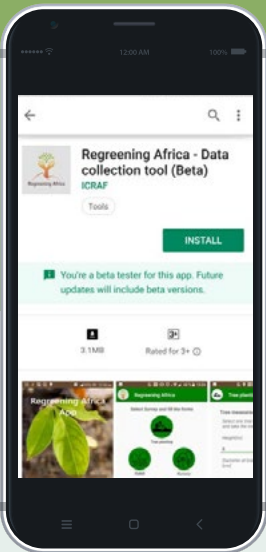
Start up App

Open survey forms

Google Play

Why do we need it?

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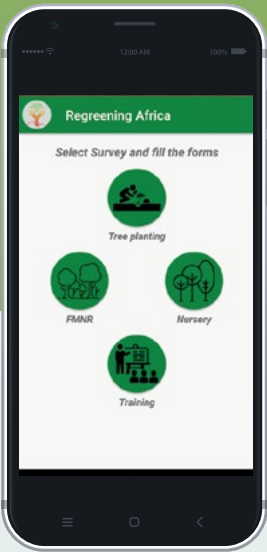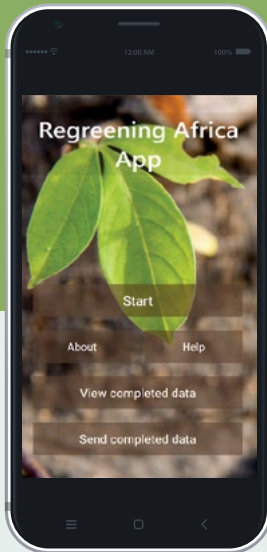
What is unique about the Regreening Africa app?

The App is a data collection and monitoring tool. The information collected can be integrated into various types of analytics and combined with information on land health and other thematic data.

The App enables stakeholders including farmers to record and track their land restoration practices. The locations of their activities are geo-referenced and species diversity and growth are recorded in real-time.

Data collected through the App is freely and instantly available to the users and various outputs from the synthesis of the data, such as

critical land health indicators, are then shared with the public through the Regreening Africa Dashboard.

The App is continually updated and the design and interface amended, based on farmers, extension agents and project implementing teams to add requested data and ensure the design and functionality match the user needs.

The Regreening App was developed in close consultation with stakeholders, with continual interaction between the World Agroforestry development team and users.

Project implementors are able to use the data for real-time decision support in project implementation and monitoring.

Data collected using the App is combined with spatial assessment of land health and can be applied in soil carbon monitoring, relating directly to climate neutrality goals or restoration targets.

"The beauty about this App is its simplicity. I have used it to record trees on many farms and have been fascinated to see what the data looks like once it is processed".

Mohamed Dicko, project officer, Oxfam Mali.

Photo: Joseph Bidiar/ World Vision Senegal.

Regreening Africa
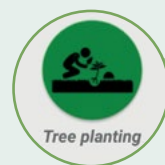
TREE PLANTING MODULE

- Record details of farmers and regreened plot
- Chatacterise species composition and assess tree planting practices

- Track tree growth
- Field boundary recorded
- Number of trees planted

- Date(s) planted
- Location of trees planted
- Survival of trees

Field boundary

Individual trees

FARMER MANAGED NATURAL REGENERATION (FMNR) MODULE

- Record details of farmers and regreened plots
- Characterise dominant species composition

- Assess FMNR practices

Photo: ©Kelvin Trautman

NURSERY MODULE

- Ensuring that farmers have access to quality planting materials and a wide range of species for tree planting
- Record nursery information and location

- Record nursery practices
- Record nursery production

Regreening Africa

Select Survey and fill the forms

Tree planting

FMNR   Nursery

Training

TRAINING MODULE

- Record training details
- Record gender participation in training sessions
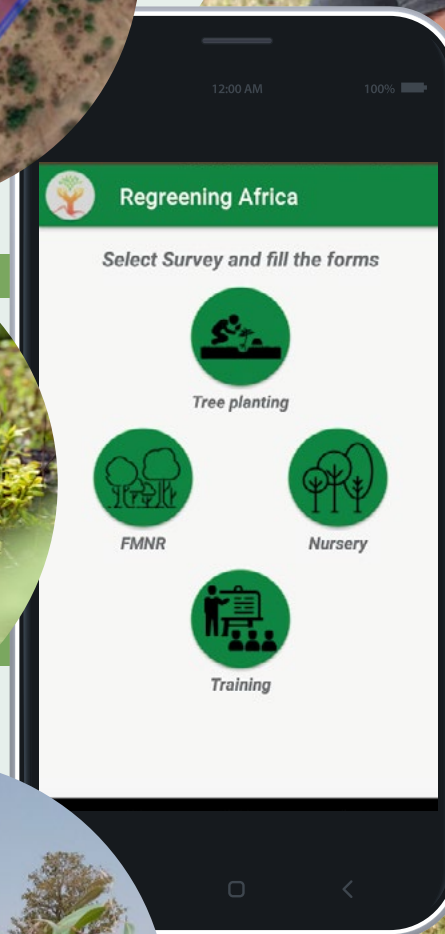
Assisted crowd sourcing, through data collection across multiple countries and contexts is giving critical insights into drivers of land degradation. This will allow for more effective restoration efforts to be designed and implemented on the ground.

Photo: Felix Mulindagabo/ World Vision Rwanda.

Regreening Africa

A Regreening Rwanda dashboard is under development and will be available in 2021 to make monitoring results from the project baseline survey, the App, land health and climate information publicly available. The dashboard could be further developed to make additional monitoring results publicly available.
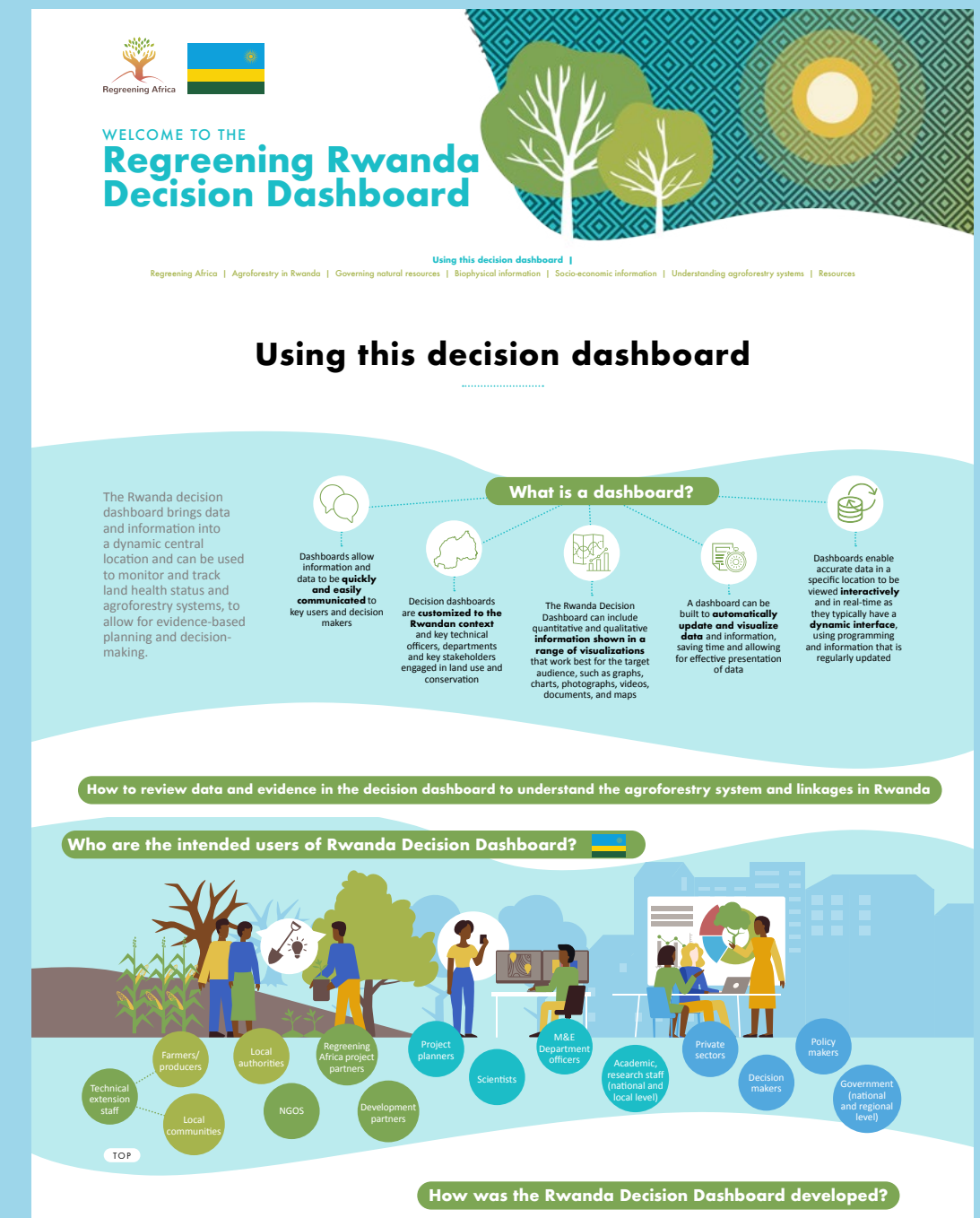
Simplified excel spreadsheets are used for tree seedling distribution - to record the number of trees planted and the beneficiaries.

To assess intermediate results and produce robust estimates of the number of households undertaking regreening initiatives, annual short **uptake surveys** are conducted over a sample of households drawn using a Lot Quality Assurance Sampling (LQAS) technique in the intervention sites.

Image: Project staff reviewing data keyed in the Regreening Africa App.
Photo: Felix Mulidagabo/ World Vision Rwanda

Image: Farmers demonstrating tree nursery etsblishment and management practices. **Photo:** Felix Mulindagabo/ World Vision.

Valuable resources that can be consulted for further information:

- The Rwanda Agroforestry Strategy and Action Plan

- Rwanda Nationally Determined Contribution

- Annual report of Regreening Africa

- The Economics of Land Development Final Report

- The Forests and Landscapes Restoration Report

- Reversing Land Degradation by Scaling Up Evergreen Agriculture Country Baseline Survey Report, Rwanda

- ELD Report

Regreening Africa

Regreening Africa

www.regreeningafrica.org

twitter.com/RegreenAfrica

www.facebook.com/RegreenAfrica

RegreeningAfrica@cgiar.org

M.Bourne@cgiar.org