World Agroforestry Centre

Livelihoods and wider social benefits. Experiences from the Trees For Food security Project

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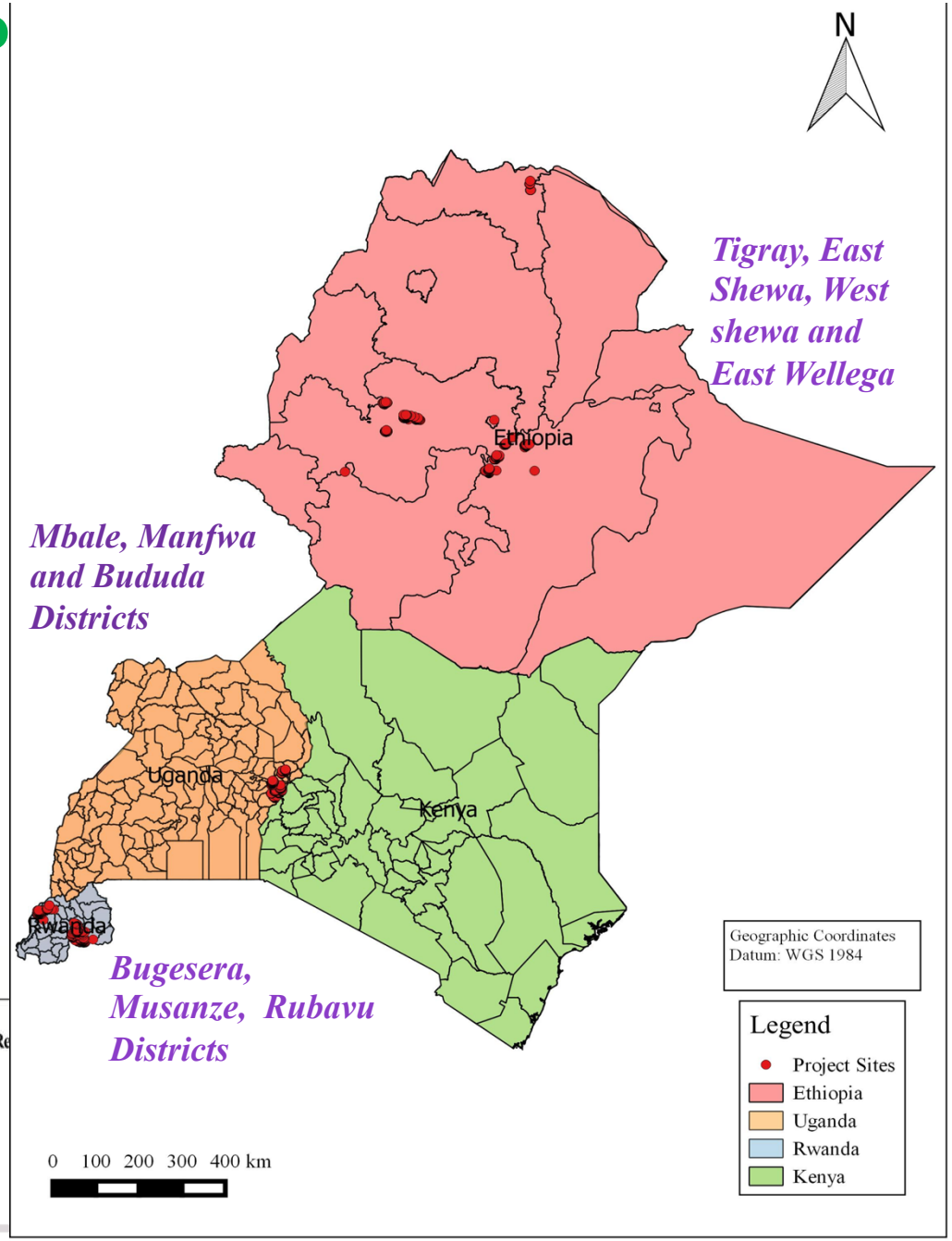
Session: Agroforestry, Food Security and Nutrition

When, Where & Who?

A four year (2017-2021) Regional project)
Countries Rwanda, Ethiopia, Uganda
Funded by ACIAR

Aim: To improve food security and smallholder livelihoods through the widespread adoption of appropriate locally adapted agroforestry practices



TREES FOR FOOD SECURITY PROJECT SITES

The Context

Environmental degradation, fragile ecosystems, water scarcity, landslides, low systems productivity.

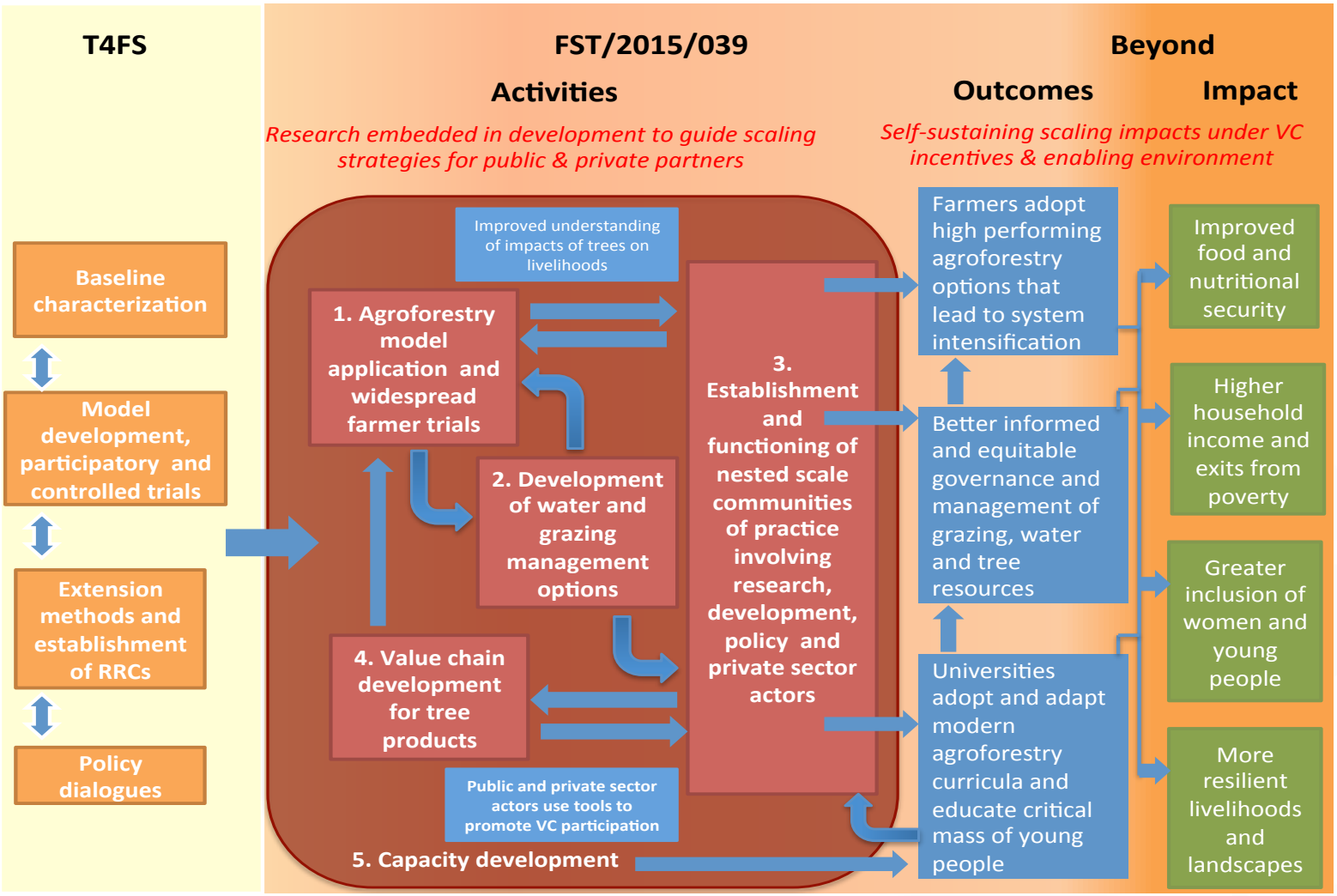
Variability in climate, markets, policy, Institutions, knowledge.

Low quality, less diverse and inadequate planting material germplasm.

Great demand for tree products

Capacity gaps in various institutions

Projects Theory of Change

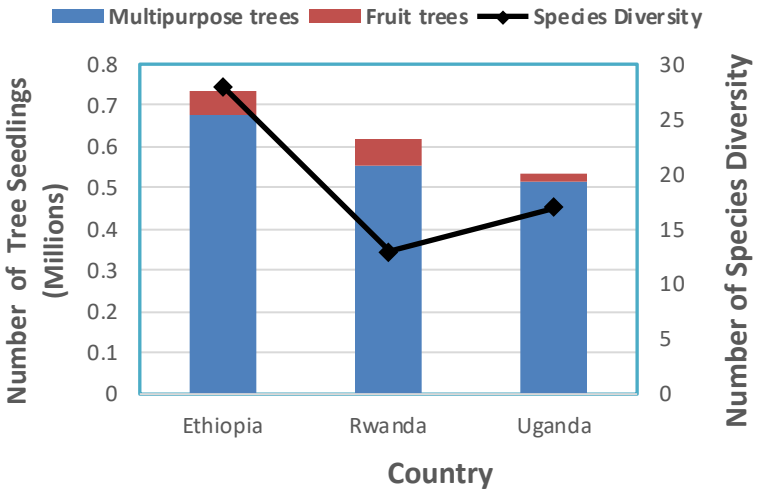


Theory of change. Activities in red boxes, outcomes in blue, impacts in green

Rural Resource Centres and satellite nurseries

The challenge

- Limited quantity and quality germplasm
- Low species diversity
- Limited capacity



Trees seedlings produced and species diversity

Achievements

- **Five RRCs and 18** satellite nurseries established.
- Production of over **1.8 million** diverse (14-28) tree seedlings; from satellite nurseries over 80%
- **Training hubs, with 817, 1505 and 1250 farmers (with the female – male) rations of 1:2; 1.1 and 1:3** been trained in Ethiopia, Rwanda & Uganda respectively
- **Peer learning,** social gathering and demonstration plots
- Income generation from seedlings






Ethiopia RRC- Business, partnerships, and scaling





Ziway RRC 2015

Megerissa group **10 members** 50% female & male

- Jobs for women and youth,
- Income in 2018 from sale of fruits & vegetables sales, 35,080 Birr- (1250 $)
- Operate a demonstration plot
- Trainings and peer learning

Bako RRC- 2016

Replicated from Ziway

Job for women and jobless youth,

income fruits & Coffee seedlings trainings and peer learning

Farmer trials



SCALING

New RRCs requests

Government committed to scaling up RRC

Projects, AGBIO project, Government Other NGOs, Private Mine companies

Tree tomato for income & nutrition in Rwanda

'Over a third of the Rwandan population experiences food insecurity. Nationally, 38 per cent of children under 5 years are stunted …With this stunting rate, Rwanda needs to accelerate progress under nutrition and fruits play a a crucial role in tackling stunting and wasting in children' ***Dr Patrick, DG RAB***

Why tree tomato

- **Mulnutrition** 38% among children under five years
- **Short growing** period unlike other fruits 10-12 months
- **Great demand** BUT **low yields**
- Poor and limited quality **germplasm and varieties-**
- **Poor management and disease**

The Intervention

- Provision of **quality germplasm** of various varieties,
- **Training** of proper management for disease control
- **Scaling out** of Tree tomato growing in Bugesera

Outcome

- 6000 farmers growing tree tomatoes (20-3000 plants/ farmer)
- **Increased production 15-20 kg tree tomato per tree**
- Increased consumption- 0.5-1 kg per day per family
- Adopted in model villages

The Change

- **Pay school fees**
- Pay **health insurance** for the entire family
- **House rehabilitation**
- Buy clothes
- **Reduce malnutrition**
- **Open an account** in local Bank Sacco

Emmanuel Tuyizere (Rweru) "I started with 500 trees and now I have more than 15,000 trees on my 2.5 ha piece of land this success has been as a result of the training I received from the project on tree planting, tree management and record keeping'. On average I earn a net of 150,000 RWF (185$) per month.

Clemena Mukarugwira (Kadahenda)

"I planted tree tomatoes through the support of the project and after selling the produce, I was able to acquire health insurance and membership in a SACCO. This enabled me pay school fees for my children I harvest at least 20kg of tamarillo fruit every season, three times a year and sells at RWF 500 per kg (USD $0.64).

Agroforestry boosting climbing beans yields in Rwanda

The issue

Great demand for beans- 29 kg person^{-1} Yr^{-1} Highest
Limited land- 0.3 ha to 0.6 ha
Limited stakes for Climbing beans- *Pennisetum purpureum (Weak) and less durable*- besides also in great demand as fodder.- One cow per poor family
Climbing beans produces -0.5-2 times more

Project Interventions

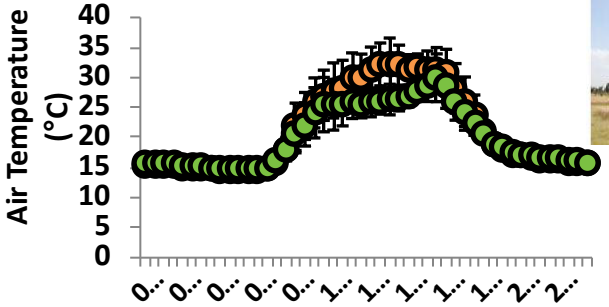
Alternative sources of stakes *Acacia augusitissima, Alnus acuminata and Vernonia amygdalina.*
More durable, strong, vigorous growth & *green*
Scaled out climbing beans production to Bugesera district, 83 farmers.
Average yields 0.9 tha^{-1}-1.1 tha^{-1}, compared to bush bean yield is 0.4 t ha^{-1} - 0.6 tha $^{-1}$
Increases household income / saving by 50-100% from beans, 30 stakes of *Alnus 4$* dollars while 45 *Pennisetum* costs 1.7 $.
Additional source firewood, green manure and fodder

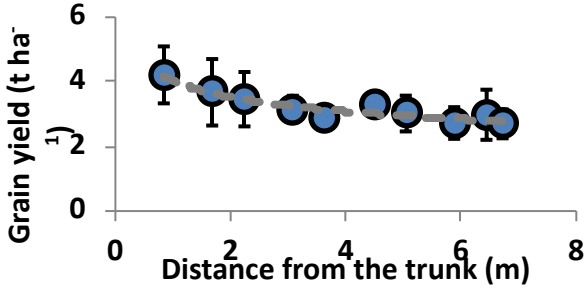
Wheat under *Faidherbia canopies, to pollard or not*

Why Faidherbia?

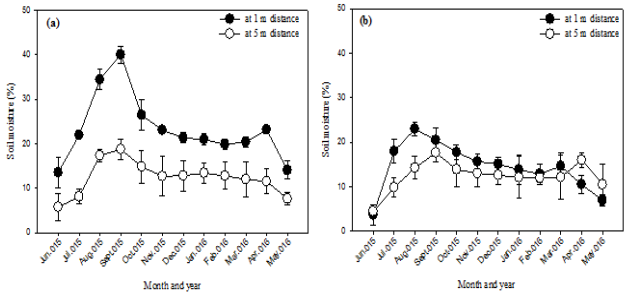
Important AF parkland species in Ethiopia
Has reverse phenology
Diverse uses including fodder and fencing
BUT: Farmers in Mojo heavily pollard it

Faidherbia wheat – microclimate effect

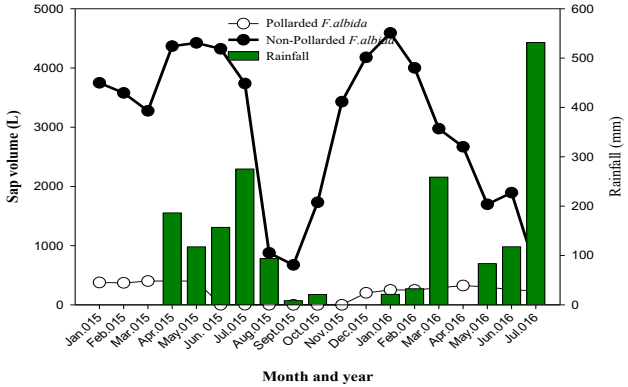




Water use- To prune or not to prune -*Faidherbia*



Monthly soil moisture % non-pollarded (a) and pollarded (b)



Monthly sap volume and corresponding rainfall for non-pollarded and pollarded faidherbia

1. Pollarding should be discouraged
2, Training on right level of pruning required
3. Alternative for fencing necessary

In *F. albida influences microclimate-cooling and enhances wheat yields* wheat yield under the tree (,Sida et al 2017, Asseffa

Pruning significantly decreases tree water uptake and wheat yield and soil moisture tree canopy (Assefa under rev Agric systems)

Pruning *G. Robusta*, saves water & Increases maize yield

Context

Bugesera-Low rainfall and limited land

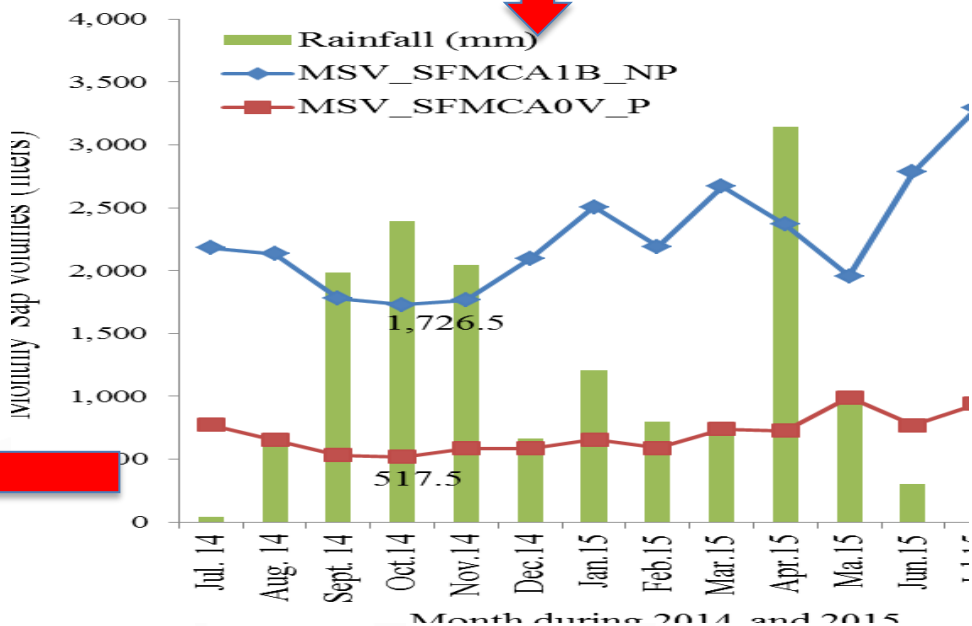
Competition between trees- *Grevillea robusta* and crops

Maize yields under trees low- crop failure

Limited knowledge on tree pruning

Aim

Impact of tree pruning on Water use and maize productivity – 36 farmers



Monthly sap volumes in unprunned (NP)and prunned (P) *G. robusta* in Bugesera- Rwanda

Implication

Pruning **reduced water use** of Grevillea by over 100%

Increases maize yield **4. 7t** ha $^{-1}$ (P) against **2.8 t** ha $^{-1}$ (NP); under canopy

Farmers taken up tree pruning in Bugesera- socio change

Pruning's source of firewood & Income

Comparable tree crop interactions studies going on in in Uganda, where *Cordia africana* and *Albizia coriaria* monthly total sap volumes are 360-450L and 600-960L respectively. (Buyinza et al. 2018)

Uganda Coffee IP - Social & economic benefits

Specialty coffee. Two IPs: **Mt. Elgon women** in coffee IP and **Chema coffee IP** in Kapchorwa
Partners Adelaide University, coffee roaster/buyer from **Australia** Adam Marley & Makerere University
Key elements – Trainings (3) on land care, conflict management, business skills, managing dairy for profit, training on quality picking (103 pickers, 470 producers)

Benefits

Income - **Four** tons quality cherries processed to **800 Kg** specialty coffee- Income UGX 9.6m- 2550$
Bought a new electronic coffee grinder, repair of old pulper, new pulping machine
Saved to buy more cherries and equip the station
Cohesive farmer groups able to engage with buyers and sellers

THANK YOU

Project webpage: http://www.worldagroforestry.org/project/trees-food-security-improving-sustainable-productivity-farming-systems-and-enhanced

Trees for food security Data repository site in: Dataverse https://dataverse.harvard.edu/dataverse/T4FS

Forests, Trees and Agroforestry (FTA): http://www.foreststreesagroforestry.org/

World Agroforestry Centre

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Mekelle University

IQQO

Mount Elgon Tree Growing Enterprise Ltd

CSIRO