Sustainable Food Systems: 
Mainstreaming Natural Resource Management

USAID: Dr. Emily Weeks (RFS), & Kristi Tabaj (BHA); Consultants: Diane Russell, Michael Colby, Jennifer Harte
Speakers

Dr Robert Nasi, Chief Operating Officer, CIFOR-ICRAF

Alison Macalady, Water and Marine Team Lead, RESG, USAID/Peru

Emily Weeks, Senior Policy Advisor Bureau of Resilience and Food Security, USAID

Moffatt Ngugi, Natural Resources Team Leader, Resilient Econ Growth Office, USAID/Mozambique
Background

- USAID supported multiple innovative and important approaches to the integration of NRM in agriculture and food systems over decades.
  - Integrated rural development approaches of the 1980s focused on ag; had few ENRM components
  - Ag and “environment” have been in a dance at USAID over the last couple of decades
    - (Environment Center—>EGAT—>BFS/E3—>RFS/DDI—>REFS)
- We can learn a great deal from these experiences and resources for REFS.
What is the challenge?

- Protecting the natural resources and ecosystems that underpin agriculture and food systems is currently ad hoc and uncoordinated.
- Welter of sector requirements inhibits coordination (priority zones, targets, indicators).
- Need to show and measure benefits to people AND to nature.
Purpose:

- To get a comprehensive understanding of NRM within RFS and Mission portfolios.
- To further mainstreaming of natural resource management (NRM), including water resources management (WRM), climate change mitigation and adaptation, environmental policy, and land & resource governance (LRG) into food security, agriculture, and resilience programming.
WHY MAINSTREAM?

“To achieve USAID’s ambitious food security and climate goals, NRM interventions should be expanded, coordinated and monitored across scales and sectors.”
What did USAID do to review ...

- Covered **11 countries in depth**, including literature reviews and mission staff interviews, **plus 6 with just literature reviews**.
  - **17/33 RFS priority countries** (FTF, Resilience, Water)*

- Incorporated **group interviews with staff of all RFS technical centers and offices**.

- Described **key programming that integrated NRM/WRM, climate change, and LRG** into agriculture and food security activities.

- **Identified gaps at country level** that may be significant across RFS.

- Elicited **recommendations from Mission staff** on RFS support, integration, valuation and monitoring.

- Sought **indicators and measures** for NRM/WRM integration/value.
What is USAID doing?

- **Resilience** programming generally, including co-programming with BHA (e.g. Ethiopia)

- Conflict-sensitive climate and ag programming to address pastoralist-farmer and interethnic conflict. (Sahel, Kenya, Uganda)

- **Safety net programming including watershed restoration** (BHA; Ethiopia)

- **Large-scale farmer- & pastoralist-led vegetation regeneration** (RISE/BHA/Sahel)

- **Co-programming around Protected Areas** (DRC, Mozambique, Ghana, Guatemala, HEARTH)

- Support to Malawi’s National Resilience Strategy

- **HEARTH and Sustainable Intensification Innovation Lab MEL approaches**
What is needed?

• Mobilize leadership and high-level support to prioritize NRM and
• Align funding streams to achieve mutual results.
• Increase some forms of RFS funding, particularly for resilience, climate change adaptation, LRG.
• Develop mechanisms that foster integration across topics, projects, offices, and/or contractors and grantees.
• Bolster mission staffing to support NRM and on-site support from RFS staff for design and strategy development.
• Identify and deploy better indicators and measures of NRM value and impact.
What is needed?

• Structure Zones of Influence (ZOI) around agroecosystems, watersheds and/or landscapes

• Synchronize watershed work across Mission offices (e.g., FTF, economic growth, health, water, conflict, biodiversity, democracy and governance, humanitarian assistance).

• Synergize NRM actions across Implementing Partners working in one zone.

• Increase support for environmental compliance (Reg 216) and consider risks of agricultural expansion in Environmental Mitigation and Monitoring Plans.

• Incorporate NRM approaches to reduce food loss and waste and greenhouse gases in ways that benefit farmers.
What resources are available ...

- Policy Review

- Portfolio Review - three products:
  - Full Review (internal USAID)
  - Leadership Brief
  - Mission Technical Note
Today’s Agenda

• **Opening Remarks:**
  – Dr Robert Nasi, Chief Operating Officer, CIFOR-ICRAF

• **Panel Session:**
  – Alison Macalady, Water and Marine Team Lead, USAID - Peru
  – Moffatt Ngugi, Team Lead, Environment, USAID - Mozambique

• **Q&A**
Thank you!
Forests, trees and food security: The multiple benefits of system-oriented, transformative action research

Ravi Prabhu
(with colleagues at CIFOR-ICRAF, African Orphan Crops Consortium, African Plant Breeding Academy)
24th May 2023
Your take home messages today

- System approaches **Multiple Benefits**
- Trees & Forests feed the present *and* the future
- When you hear ‘*action research*’, think transformative adaptive learning based on actionable evidence

*I will start with a quick recap...*
In March 2023, my colleague Amy Ickowitz introduced Nutriscapes – landscapes that serve nutrition needs of the under nourished - right here

Agrobiodiversity
- Fruit Tree Portfolios that Link Agriculture with Nutrition
- Fruit and vegetable biodiversity for nutritionally diverse diets
- Dietary Diversity and Ag production diversity

Forest & Diets
- Forest foods and healthy diets
- Sustainable wild meat
- Links Between Dietary Transition, Food Security, and Forests

Landscape Change & Dietary Change
- Agricultural intensification, dietary diversity and markets
- Growing food vs growing cash
- Impacts of land use change on diets

Consumer Behaviour
- Understanding the drivers of food choice in LMICs
- Urban food environments
- Food choice motives

Together for global challenge
Forests are not ‘the silver bullet’ to solve malnutrition. BUT…

Cutting forests (including mangroves) for food security can make diets worse for local communities

If there is no measurement of benefits, hard for policy makers to value forests’ & dietary benefits

Need information on individual intake and on food composition to understand nutrient contributions

While explaining the vital importance of wild foods to food and nutrition security…
I found this recent USAID report useful and thought provoking…

…but propose we add these 3 steps today (after incentivize and before measure and monitor):

- Hypothesise
- Consult, innovate, co-create
- Act

**Technical Note:**

Natural Resource Management in Resilience and Food Security (NRM-RFS) Portfolio Review
But ... are we really looking in all the right places for the roots of our present insecurity? (And I don’t just mean ignoring the trees and the forest, obviously!)

Harris et al. 2021. Equity in agriculture-nutrition-health research: A scoping review

<table>
<thead>
<tr>
<th>Level of equity</th>
<th>Agriculture</th>
<th>Nutrition</th>
<th>Health</th>
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<td>Primary production (on farm)</td>
<td>Value chains (off farm)</td>
<td>Food safety</td>
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<td>Unequal outcomes</td>
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<td>14</td>
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<td>Structural determinants</td>
<td>43</td>
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<td>3</td>
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* Total number of studies looking at each level of equity (Does not add up from the row numbers because some studies cover multiple levels of equity)
Let’s get started…

This is going to be a gallop across a variety of different landscapes … buckle up?
Across 7 countries in Africa – **proof** that systemic action research to restore tree cover & NRM functions has **worked** in multiple ways

Baseline (2018) and Endline (2022) survey data

*Regreening Africa (2017-23) Impact Assessment…*
… worked across several landscapes using systemic indicators …

**Ghana (n=1225)**

Baseline

Endline

5 years

**Bawku west (n=394)**

Baseline

Endline

5 years

**Garu-Tempate (n=416)**

Baseline

Endline

5 years

**Mion (n=415)**

Baseline

Endline

5 years

Consistently positive gains
... these systemic indicators ...

**INDICATORS**

- **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**
- **>= 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**
- **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**
- **>= 2 native tree/shrub species on farm/homestead**
- **AF established 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**

**DIMENSIONS**

- **EXTENT OF PRACTICE**
- **INTENSITY OF PRACTICE**
- **DIVERSITY OF PRACTICE**
- **INTRAHOUSEHOLD EQUITY**

**Abbreviations**

- FMNR: Farmer managed natural regeneration
- HH: Households
- AF: Agroforestry
Senegal

- Over 100 species in FMNR
- Large number of individual trees identified and measured using the App
- Mostly indigenous species

Mali

- Over 100 species in FMNR
- Mostly indigenous species

FMNR data from the Regreening Africa App:

Tree species

- Faidherbia albida
- Pilostigma reticulatum
- Combretum glutinosum
- Guiera senegalensis
- Combretum spp
- Ziziphus mauritiana
- Acacia nilotica
- Balanites aegyptiaca
- Cordyla pinata
- Adansonia digitata
- Combretum micranthum
- Sclerocarya birrea
- Borassus aethiopum
- Psychotria sp, nov, aff. humilis
- Mangifera indica
- Pilostigma theonningii
- Morella senegalensis
- Acacia spp
- Solanum betaceum
- Eucalyptus spp
- Campylospermum reticulatum
- Anacardium occidentale
- Azadirachta indica
- Preila tetragona
- Diospyros mespiliformis
- Tamarindus indica

Species name

- Acacia nilotica
- Adansonia digitata
- Guiera senegalensis
- Ziziphus mauritiana
- Anacardium occidentale
- Vitellaria paradoxa
- Faidherbia albida
- Pilostigma reticulatum
- Combretum micranthum
- Diospyros mespiliformis
- Parkia biglobosa
- Cassia sieberiana
- Balanites aegyptiaca
- Sclerocarya birrea
- Mangifera indica
- Khaya senegalensis
- Tamarindus indica
- Combretum spp
- Pterocarpus erinaceus
- Oldfieldia macrocarpa
- Boscia senegalensis
- Lawsonia inermis
- Terminalia avellanoides
- Argyrolobium friesianum
- Eryca similis
- Psychotria sp, nov, aff. humilis
- Acacia sieberiana
- Azadirachta indica
- Galinsoga spp
- Borassus aethiopum
- Combretum nigrum
- Combretum glutinosum
- Terminalia spp
- Prosopis africana

Count of trees measured

... and this kind of data ... (Regreening App: >150,000 participating farmers and counting)
Key attributes to keep in mind...

- Scale matters! *Spatial, temporal and social*

- Costs (and benefits) matter! *Harnessing ecology and the power of complex adaptive systems lowers costs (and increases benefits)*

- The is **always** need to innovate from one adaptive cycle to the other: *We use a range of tools and approaches that speed up evidence gathering as a basis for understanding*

*Let’s start by looking at scale: multiple, nested scales*
Starting at the top – leveraging policy change: India’s Agroforestry Policy (2014) and knock-on effects

Breaking news! QPM Initiative of Government of India (2023) USAID TOF(I) Project

About 70% of country’s timber requirement met from trees on-farm

Generates about $25 billion/year

During 2015-2019, India’s tree cover increased by about 2%. About 1.7% of this comes from trees outside forests

Agroforestry Mission $146 million

Bamboo Mission $197 million

Finance commission $9 billion

CSR $104 million
Scale: landscapes, long term engagement, diversity of partners
e.g. #1 Andhra Pradesh EL – Natural Farming

What is an engagement landscape?
Engagement landscapes are geographical locations where we carry out concentrated, long-term work to support transformation and enhance resilience. Included in engagement landscapes are:
- Partners who are interested in collaboration and engagement, because they see themselves as benefiting from or contributing to generating opportunities for themselves, their organisations or their communities.
- Different types of land-uses, agro-ecological zone and climates.
- Multiple layers of governance.
- Diverse groups of stakeholders, from farmers to governmental and non-governmental partners to value chain actors etc.

Tracking influence on policy

What is an exemplar landscape?
Exemplar Landscapes are smaller geographic areas within the Engagement Landscape where focused work can take place
- Common land and landless people
- Linkages between urban and rural areas
- Differing socio-economic and cultural aspects, health and nutrition status
- Ecosystem services
- Varying value chains and collectives
The scale of the APCNF programme is massive!

**Largest agroecology farming programme in the country, in terms of farmers participating (which is why influence matters)**

Transformation driven by –
- More than 10,000 (58% women) champion farmers and their mentors
- 200,000 women self-help groups and their federations
- Research support – national and global
- Govt ownership and support

<table>
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<tr>
<th>Year</th>
<th>Farmers</th>
<th>Villages</th>
<th>Area</th>
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<tr>
<td>2016-17</td>
<td>40,656</td>
<td>704 (v)</td>
<td>220,000</td>
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<tr>
<td>2020-21</td>
<td>480,000</td>
<td>3730 (v)</td>
<td>290,000</td>
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<tr>
<td>2021-22</td>
<td>630,000</td>
<td>3730 (v)</td>
<td>460,000</td>
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<td>2022-23</td>
<td>1,060,000</td>
<td>3730 (v)</td>
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- Number of farmers in 2021 - increased 15x
- Number of villages increased 5x
- 27% of villages
- 10% of farmers
- 4% of area

- 86% - small and marginal farmers 1 ha per capita

**Funds:**
- Govt, KfW Bank – 235 million USD upto 2024
  2. Co Impact – 15 million USD)upto 2027

1. Transition of a farmer – 3 to 5 years
2. No cash incentives during transition, and,
3. No promises of market premia after transition
In Peru: Agroforestry concessions offer a sufficiently complex entry into food and income security, along with forest conservation and restoration over land claimed by 120 thousand family farmers across the Amazon, > 1.2 M ha.

78% Small-scale farmers
<15 ha lowland jungle

22% Medium-scale farmers
15-115 ha lowland jungle

44% Conserve
55% Restore

AVOIDED DEFORESTATION
Emission reduction potential -20.3% of LULUCF emissions (2012 GHG inventory)

AGROFORESTRY BASED RESTORATION
Increases the potential of carbon storage in 3345 Gg CO₂ per year

* Cenagro 2012, Robiglio, Vargas and Suber 2018

Permanent crops (coffee, cocoa) 44%
Forest 14%
Pastures 14%
‘Purma’/fallows 11%
Other 7%
**Partners in SMART EL (in Peru)**

1. **CHARACTERIZATION OF OPTIONS, DEVELOPMENT OF TOOLS, AND MEASUREMENTS**
   - PUBLIC FUNDING INCENTIVES
   - SAFEGUARDS AND BENEFITS SHARING

2. **REVIEW AND FORMULATION OF REGULATIONS AND METHODOLOGIES, ROADMAP AND ALIGNMENT WITH PNRA**
   - PUBLIC FUNDING GUIDELINES AND REGULATIONS
   - FARM REGISTRY
   - MONITORING
   - ZONING
   - MITIGATION NDC
   - REVIEW OF PUBLIC FUNDING SCHEMES, TECHNICAL ASSISTANCE AND INCENTIVES PROGRAMMES, PES MECHANISMS.

3. **SHARING PLATFORMS**
   - AF AND SSF OPTIONS MANUALS
   - DECISION MAKING SUPPORT TOOLS
   - PLATFORMS

**National and regional Forest Authorities**

**Ministries at National level**

**Partners in SMART EL (in Peru)**

- CIFOR
- World Agroforestry
#3 Para EL in Brazil: linking and scaling key innovations for multiple benefits. (Incomes, carbon, biodiversity, nutrition, food security...)

1. **Restoration with Agroforestry** for livelihood, land and carbon

2. **Fruit trees portfolios** for food and nutrition security

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1. **Agroforestry system**: example here with oil palm, cocoa and açai in the Brazilian Amazon. Photo: ICRAF/Martin Meier

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**2 - Fruit trees portfolios**

Learning from our work in East Africa

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**MONTHS OF FOOD INSECURITY**

<table>
<thead>
<tr>
<th>Months</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<tr>
<td>Insecure</td>
<td>100%</td>
<td>80%</td>
<td>60%</td>
<td>40%</td>
<td>20%</td>
<td>0%</td>
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**FRUITS**

- MANGO
- LOQUAT
- WATERBERRY
- QUINUA
- LEMON
- ORANGE
- AVOCADO
- PASSIONFRUIT

**Available Vitamin C and Vitamin A rich fruit species**

Notes:
- Assessed as Vitamin A rich equivalent:
  - Vitamin A = 1/3 beta-carotene + 1/12 lutein-zeaxanthin
  - Vitamin C = 1/2 lutein-zeaxanthin

Contacts: sc.mcclun@cgiar.org
Leveraging on the “Agroforestry and Restoration Accelerator” project to scale out to the whole state …

• The ARA project (2022-2025) was originally designed as a land restoration (working on degraded pastures) with agroforestry initiative, together with a carbon crediting scheme for the climate benefits.

• Now adding a nutrition dimension to one of the landscapes of the project: Tomé-Açu municipality (Northeast Pará).

• This is a unique mobilization of two of CIFOR-ICRAF’s key delivery mechanisms: a Transformative Partnership Platform (here, Nutriscapes TPP) working in an engagement landscape (here the Pará EL)
Public policy signed by Brazilian Ministry of the Environment and Ministry of Social Development and Fight Against Hunger.

The Ordinance on Sociobiodiversity is the first to define and support nutritionally important native species:

- Ordinance n. 163 (2016):
  - Lists 82 native plant species with food value
  - Government encourages development of value chains: processing and marketing
  - Direct market outlet: Food Acquisition Program (PAA)

- Ordinance n. 284 (2018):
  - Updated list of 101 species
Zooming in on harnessing diversity ...

- Restoring diversity, tree and forest cover for multiple benefits
- “The right tree, for the right place, for the right reason”
- Within a ‘whole of system’ approach
Harnessing ecology & diversity to build resilience: Think ‘portfolios’ not ‘species’

Climate Appropriate Portfolios of Tree Diversity

CAPTD are mixes of tree species’ planting materials, delivered to growers, that are environmentally-matched to planting sites and purpose-matched to planting requirements. They are necessary to supply tree diversity to respond to climate change and other challenges that tree planting can address.

Where are they being used?

Currently mainly in Africa, shortly in Asia and Latin America as well.
And one of the less obvious benefits ... **reversing undernutrition amongst the most vulnerable**

Example. Tree Portfolios for Food and Nutrition

- Customized Food Tree Portfolios **promote diversity** to provide micro-nutrients in staple-based systems

- Combination of **indigenous** and **exotic** species (cultivated & wild) – food trees & crops

- **Seasonal availability**, each month at least 1 fruit/food species is ready for harvest, (lean season)

- **Micronutrients** - vitamins A + C supply (+ iron, folate, zinc with GLV) – scored low, medium, high source

*Food trees include those that provide fruit, nuts, seeds, oils, leafy vegetables*
Engaging communities in co-development of Portfolios: *realizing social diversity is an asset*

**Community Priority Setting and Validation**

- Empower communities (by using their own knowledge)
- Centred around their participation
- Social values and diets
- Resource mgt. & use
- Species preferences
- Decision-making
- Overall livelihood priorities

Gender, generation disaggregation
Tree diversity portfolios within a larger systems view – e.g. thinking through how to unroll the ‘doughnut’ (Raworth et al)?

Enabling environment to facilitate transformation

- Normative re-orientation of NTSCs from seed/seedling suppliers to enablers of networks that exchange information and seed/seedlings
- Inclusive low-input breeding programmes and long-term investments in quality material
- Documentation of seed sources and recommendation domains (current->future)
- Integration of formal and informal seed systems (seed source custodians, -dealers, small-scale nurseries)
- Support to knowledge networks - informal entrepreneurs and smallholders
- Support to smallholder value chain participation
- Government policies and regulations in support of smallholders

Tree planting in forest landscape restoration
Supply driven - with low productivity and low quality

- Seed sources not documented and not made available
- Tree varieties not identified
- Recommendation domains not published
- Smallholders use sub-optimal planting material
- No support from NARS/NTSCs to informal tree seed sector

NTSCs - with help from NGOs and other tree planting projects - support an ISSD process of change from supply-driven to demand-driven tree seed systems

Some examples of this situation for specific tree crops in specific locations (e.g. tea in Kenya, acacia in Vietnam, poplars in India, rubber in Thailand, also cases in Europe and North America)
Along with species (and life form) diversity, genetic diversity needs to be harnessed too...for effective adaptation & development

... the African Orphan Crops Consortium

Forgotten food crops in sub-Saharan Africa for healthy diets in a changing climate

Maarten van Zonneveld, E., Boelens Kindt, S., Stefa McMullin, Enoch G. Achigan-Dako, S., Sogbile N'Darikou, Wei-Hsun Hsieh, Yann-Irong Lin, and Ian K. Dawson

Authors Info & Affiliations

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March 27, 2023 120 (14) e2205794120 https://doi.org/10.1073/pnas.2205794120

McMullin, S., Njogu, K., Wekesa, B. et al. Developing fruit tree portfolios that link agriculture more effectively with nutrition and health: a new approach for providing year-round micronutrients to smallholder farmers. Food Sec. 11, 1355–1372 (2019).
58 Prioritized Forgotten Food Crops Selected from across Food Groups: Covers over 95% of Major Staples’ Novel Climate Conditions in the Year 2070

Standouts

- **Iron**
  - Amaranthus hybridus
  - Gynadropsis gynandra
  - Anacardium occidentale
  - Spider plant
  - Cashew

- **Zinc**
  - Anacardium occidentale
  - Amaranthus cruentus

- **Folate**
  - Celosia argentea
  - Amaranthus graecizans
  - Vigna radiata
  - Celosia
  - Mung bean

- **Vit A**
  - Moringa oleifera
  - Gynadropsis gynandra
  - Xanthosoma sagittifolium
  - Drumstick tree
  - Arrowleaf elephant ear

- **Vit C.**
  - Psidium guajava
  - Sclerocarya birrea
  - Carissa spinarum
  - Guava
  - Marula
  - Bush plum

Jon and Terase Curtis
Benefits include systemic capacity strengthening of partners:

**e.g. for African plant breeders and national programs**

- 5 cohorts including 150+ scientists from 28 countries across the African continent: 90% PhDs, 40% women
- 125 crops including 60 African Orphan Crops
- 520+ breeding programs – truly Pan African!

New!

AfPBA CRISPR Course
Food and income security are emergent properties of a complex adaptive system, as are climate, biodiversity and restoration gains: no silver bullets!
Intercropping maize with legume trees to supply Nitrogen-rich green manure is Climate Smart Response to mineral fertiliser is enhanced with green manure fertilisation!

Reduced GHG and household economic savings!

Intercropping maize with legume trees to supply Nitrogen-rich green manure is Climate Smart Response to mineral fertiliser is enhanced with green manure fertilisation! Unless you consider harnessing tree diversity and nature a silver bullet!
In East Africa, farms with lower SOC values and higher erosion prevalence rely more on off-farm income on average. In E Africa, farm households with higher soil organic carbon and less erosion are more likely to be food secure.
By connecting insights to transformation through actionable evidence - data, information and knowledge
And gathering data through diverse tools and channels: *e.g.* soil and land health with LDSF and spectroscopy
Mean SOC = 2.72 g/kg
Mean SOC = 3.73 g/kg

Using the LDSF-based models we can map and monitor changes in vegetation and SOC even in very marginal areas. • Combined with the farmer polygons

Understanding and following changes through nested scales – e.g. changes in Soil Organic Carbon (the technology helps us to track impacts without blowing the budget)!
Finally, bringing it all together in management dashboards to visualize, share and interrogate data

• Platform to unify and bring together data, evidence and learning from the different project components.
• Over 200,000 users of the Regreening App

Regreening Africa dashboard: https://dashboards.icraf.org/app/ra_dashboard
In closing, a personal look back ... to look forward

- **Learn fast to adapt**  
  From C&I for SFM, through adaptive collaborative management to linking data to wise choices

- **Embrace diversity**, resilience and our future depend on it  
  We have the models and understanding to muddle through now, nature is still an ally!

- **Faced with uncertainty, learn to fail small and fail safe**  
  While trying to win more often and more equitably

- **Reward stewardship** *(think Aldo Leopold and the Sand County Almanac)*  
  and move to a Stewardship Economy?
Thank you

cifor.org | worldagroforestry.org

The Center for International Forestry Research (CIFOR) and World Agroforestry (ICRAF) envision a more equitable world where trees in all landscapes, from drylands to the humid tropics, enhance the environment and well-being for all. CIFOR-ICRAF are CGIAR Research Centers.
USAID/Peru - Natural Infrastructure for Water Security
2017-2027, Co-funded by Canada and USAID, Implemented by Forest Trends and partners
LAC Countries are Vulnerable to Degradation of Water Quality and Water Scarcity

- **Lack of water storage** - 30% reduction in glacier area in the tropical Andes since 1980s (50% or more in many areas of Peru).

- **Poor governance** - Increasing reliance on groundwater by cities, mining and agriculture without sufficient regulation is increasing contamination unsustainable withdrawals.

- **Lack of equity** - rural/urban divide in service delivery and water management and allocation are persistent development challenges and undermine trust in government and food security and poverty alleviation efforts.
By intercepting, infiltrating, and filtering water where it rains and stabilizing soils, **natural infrastructure** like **forests, grasslands, and wetlands**, complemented by soil & water conservation practices like **amunas, qochas, and terraces**, play a critical role in managing water risks like drought, floods, and contamination.
The overall value of NIWS’ portfolio of natural infrastructure investments under development is currently $440 million.
Sustainable Food Systems: Mainstreaming Natural Resource Management

Highlights from African examples
Moffatt K. Ngugi,
USAID/Mozambique Environment Officer
Sustainable Food Systems: Mainstreaming Natural Resource Management

We need to reform food systems for both nourishment and environmental sustainability.

– A country's agricultural biodiversity provides culturally appropriate and locally adapted nutritious foods, as well as traits for climate-resilient crops and animal breeds.
– Agricultural biodiversity is already widely integrated into global farming and breeding systems.
– The Agrobiodiversity Index supports policymakers and the private sector in assessing agricultural biodiversity for informed interventions and investments in sustainable food systems.
Regenerative food systems that work for people, nature and planet
Natural Resources Management as a lynchpin of food systems that work for people, nature and planet

- Resilient Gorongosa
- RCC: Resilient Coastal Communities
- PLANETA