HIGH-LEVEL MEETING ON THE INITIATIVE FOR THE ADAPTATION OF AFRICAN AGRICULTURE TO CLIMATE CHANGE "AAA"

RENCONTRE DE HAUT NIVEAU SUR L'INITIATIVE POUR L'ADAPTATION DE L'AGRICULTURE AFRICAINE AUX CHANGEMENTS CLIMATIQUES "AAA"
TONY SIMONS

Director General
World Agroforestry Centre (ICRAF)
The Promise of Agroforestry within the AAA Initiative

Tony Simons, ICRAF
29-30 September, Marrakech
The Promise of Agroforestry in AAA

1. Why Agroforestry/Africa?
2. Past global promises
3. Showcase examples
4. Delivering on the AF promises
5. Sign up to AAA now !!!
1. Why agroforestry?

why trees in agricultural landscapes?

Nothing is better than a tree at:

- Changing microclimate
- Fixing Nitrogen from the air
- Bringing up water from depth
- Sequestering carbon from the atmosphere
- Providing framework for biodiversity to flourish
- Adding oxygen to the biosphere
- Diversifying farming enterprises
- 75% of on-farm biomass is associated with trees
Land Equivalent Ratios (LERs)

Value of ecosystem services from crop, grass and livestock components

Value of ecosystem services from tree and shrub component

Source: C. Dupraz, F. Liagre, AGROOF
Tree cover on agricultural land in sub-Saharan Africa varies.
The Right Tree for the Right Place

A. Trees for Products

fruit  firewood  medicine  income  sawnwood  fodder

B. Trees for Services

soil fertility  carbon sequestration  soil erosion  watershed protection  shade  biodiversity
2. Past Global Promises

a. keep within 2 degree temp rise

b. Land degradation neutrality

c. Net zero deforestation

d. 4 per mille soil carbon

e. AFR100

f. Forestry 1.5% of GDP
   Agriculture 6% of GDP

g. Double food yields
2. Past Global Promises

- Keep within 2-degree temp rise
- Land degradation neutrality
- Net-zero deforestation
- 4 per mille soil carbon
- AFR100
- Forestry 1.5% of GDP
- Agriculture 6% of GDP

- Reduce ambient temp by 2-6 degrees
- Positive land restoration
- Net positive afforestation
- Up to 40 per mille soil carbon
- 300 million ha greater tree cover
- Agroforestry contribute up to 10% Agric GDP
Climate Smart Agriculture

Triple win of Productivity – Mitigation - Adaptation

But is it always a win? (could be win, neutral or lose)

Then win-win-win is just one of 27 outcomes

If it is climate smart then Mitigation and Adaptation have to be either neutral or win, it cannot be a lose scenario

This leaves 12 possible outcomes (3 x 2 x 2)

What metrics do we use for each of Prodn, Mitigation & Adaptation

Productivity & Mitigation are easier and quantitative

Adaptation/Resilience more complex & includes qualitative measures
3. Showcase examples of Agroforestry
Land degradation
Benefits of agroforestry on phosphorus mining restoration
The Drylands Development Programme (DryDev):

- A farmer-led programme to enhance water management, food security, and rural economic development
- Implemented in semi-arid areas of Burkina Faso, Mali, Niger, Ethiopia, and Kenya
- Value = $50 million
- Farmers to reach = 250,000
- ICRAF convening 21 NGOs
- Aug. 2013 to July 2018
**Simple examples from southern Africa**

### Gliricidia effects

<table>
<thead>
<tr>
<th>Landscape position</th>
<th>Effect (t/ha)</th>
<th>Elevation Effect (m)</th>
<th>(t/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>foot</td>
<td>1.38</td>
<td>500</td>
<td>1.63</td>
</tr>
<tr>
<td>ridge</td>
<td>0.21</td>
<td>1000</td>
<td>0.46</td>
</tr>
<tr>
<td>slope</td>
<td>0.68</td>
<td>1500</td>
<td>-0.74</td>
</tr>
<tr>
<td>upland</td>
<td>0.81</td>
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</tr>
</tbody>
</table>

### Faidherbia effects

<table>
<thead>
<tr>
<th>Crop</th>
<th>Effect (t/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>cotton</td>
<td>-0.25</td>
</tr>
<tr>
<td>groundnut</td>
<td>0</td>
</tr>
<tr>
<td>maize</td>
<td>+3.40</td>
</tr>
<tr>
<td>soya</td>
<td>+0.70</td>
</tr>
</tbody>
</table>

### Sesbania effects

- **Probability**
  - 0.0 - 0.1
  - 0.1 - 0.2
  - 0.2 - 0.3
  - 0.3 - 0.4
  - 0.4 - 0.5
  - 0.5 - 0.6
  - 0.6 - 0.7
  - 0.7 - 0.8
  - 0.8 - 0.9
  - 0.9 - 1.0

**+ Social, economic + other performance measures**
Agroforestry
Oil Palm systems: lessons from Brazil

Mono-crop vs Agroforestry: Oil Palm

Conventional oil palm
Mono-crop system

Oil palm + agroforestry experiment, Year 5,
Tomé Açu, Pará, Brazil. Photo: Debora Castellani

Andrew Miccolis, ICRAF Brazil
Biodiverse agroforestry oil palm (yr 7), Pará, Brazil

(Photos: Andrew Miccolis)
Oil palm yields: agroforestry vs. monocrop systems (% above avg. monocrop yields at same age)

- **Oil palm agroforestry**
  - Plot 1 (81 pl/ha): Year 4 (2011) - 98%, Year 5 (2012) - 125%, Year 6 (2013) - 149%, Year 7 (2014) - 49%
  - Plot 2 (99 pl/ha): Year 6 (2013) - 99%, Year 7 (2014) - 49%


Source: adapted from Castellani et al 2014, Internal Report
Fruit characterization and germination experiments
Rural Resource Centre – New Edubiase)
First time fruiting of a 6-year old tree, producing 80 fruits
Unilever’s new AB product: Fruit d’Or 100% Vegetal

New marketing/branding approach:

• The allanblackia oil which is contained in Fruit d’Or 100% Vegetal has excellent properties to give it its creamy texture.

• Using allanblackia seed oil, Fruit d’Or 100% Vegetal contributes to restoring and conserving the forest landscape offering additional income to local farmer communities especially in Tanzania.
Cocoa Yields are too low

MARS-ICRAF-CDI Government
Public Private Partnership
V4C project implementation area with the 16 Cocoa Development Centre (CDC) and 47 Cocoa Village Centre (CVC)
Use of clones and hybrid seeds

Seedlings of improved cocoa varieties produced in V4C nursery at Soubre

Newly grafted seedlings for the establishment of clonal gardens
22 months after side grafting, from 4-5 pods to 20-30 pods per tree
4. Delivering on the AF promises

'No one leaves any more': Ethiopia's restored drylands offer new hope

Migration is no longer the only option for many young Ethiopians, as careful restoration revives livelihoods on eroded and deforested land.

Cathy Watson in Mekelle, Ethiopia

Wednesday 3 August 2016 07.00 BST
Boosting Investment and Returns in Perennial Crops

TAAT (AfDB)
<table>
<thead>
<tr>
<th>Technical Solutions</th>
<th>Evidence, Analytics</th>
<th>Planning, Design</th>
<th>Promotion, Champion, Convene</th>
<th>Capacity, Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprises</td>
<td>Datasets</td>
<td>Investments</td>
<td>Scaling Up</td>
<td>Form partnerships</td>
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<td>Practices</td>
<td>Databases</td>
<td>Trade-offs</td>
<td>Demonstrations</td>
<td>Institutional Capacity</td>
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<td>Tools</td>
<td>Diagnoses</td>
<td>Targeting</td>
<td>Interfacing</td>
<td>Individual Capacity</td>
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<td>Methods</td>
<td>Decision Support</td>
<td>Project Plans</td>
<td>Communications</td>
<td>Instruct. materials</td>
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<td>Concepts</td>
<td>Analyses</td>
<td>Strategies</td>
<td>Policy Options</td>
<td>Equipment</td>
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<td>Decision Support</td>
<td>Risk Identification</td>
<td>Group formation</td>
<td>Nurseries</td>
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<tr>
<td>Guidelines</td>
<td>Analyses</td>
<td>Value Chains</td>
<td>Social inclusion</td>
<td>Rural Res. Centres</td>
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<td>Protocols</td>
<td>Baselines</td>
<td>Rural Advisory</td>
<td>Facilitation</td>
<td>Finance</td>
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<td>Manuals</td>
<td>Indices</td>
<td>Implement Plans</td>
<td>Access</td>
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<td>Portfolios</td>
<td>Monitoring</td>
<td>Reviews</td>
<td>Negotiation Support</td>
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<td>Germplasm</td>
<td>Interpretations</td>
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<td>Networks</td>
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<td>Demonstrations</td>
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<td>Extrapolations (Advocacy)</td>
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<td>Forecasts</td>
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Welcome to the Landscapes Portal!

Our mission is to further the application of GeoScience in assessing coupled social-ecological processes in landscapes.

The Landscapes Portal provides users with a platform for visualizing and sharing spatial data and maps, as well as map stories.

Explore Spatial Data

Interactive Mapping

Tools

Latest Blog

LDSF Field Guide

Mapping the source of soil erosion

Want to know what we are up to?

In the GeoScience Lab we are constantly pushing the envelope on what we do with models and maps. This presentation gives you an idea of what we are up to at the moment:

Mapping soil functional properties using multilevel models

In this document we present examples of R functions and scripts that may be used to generate local maps of soil functional properties based on for example remote sensing data, climate surfaces and/or digital elevation models and their derivatives...
Over 1800 Datasets
Best Practices Support on:

Where to plant – trees suitable for your area

What to plant – trees suitable for your purposes

Which to plant – sources of tree seeds

How to plant – good tree nursery practices

How to engage communities and scale up
IUCN Mobile Phone App

www.vegetationmap4africa.org
System resilience depends on diversity at a range of scales.
Land Degradation Surveillance Framework (LDSF)

160 plots (1000 m²)
- Severe erosion (0/1)
- Topsoil organic carbon (g/kg)
- Sand content (%)
- Herb/grass cover (1-5)
- Tree inventory (spp identification & DBH)

http://landscapeportal.org
Soil maps generally static
Coarse resolution
Don’t reflect functional properties of the soil
But what does it mean? and how can we use it?
Soil Carbon \((30\text{m} \times 30\text{m})\)
Can guide better decisions

Merar (near Jijiga), Ethiopia
Search 6,239 records for:

Narrow by collection:
- Articles (2,028)
  - Journal Articles (1,859)
  - Magazine Articles (86)
  - Newsletter Articles (65)
  - Web Articles (12)
  - Reprints (6)
- Books (1,566)
  - Books (1,103)
  - Booklets (61)

Focus on:
- ICRAF Corporate Publications (85)
  - Annual Reports (61)
  - Financial Reports (9)
  - Strategic Plans (15)
- ICRAF Scientific Series (584)
  - Occasional Papers (23)
  - Policy Briefs (143)
  - Technical Manuals (25)
  - Trees for Change (19)
From Data to Decision Support Systems
Data

Project spatial progress updates
Models

1. Soil Map
2. Soil Erosion Prevalence - Blue Nile Basin, Ethiopia
4. Vegetation Cover (MODIS EVI) Trends, Virunga (2001-2013)
A vegetation map for eastern Africa

The map of potential natural vegetation of eastern Africa, gives the distribution of potential natural vegetation in Ethiopia, Kenya, Tanzania, Uganda, Rwanda, Burundi, Malawi and Zambia. The map distinguishes 48 vegetation types, divided in four main vegetation groups: 16 forest types, 15 woodland and wooded grassland types, 5 bushland and thicket types and 12 other types. Furthermore, a number of compound vegetation types are mapped, which include vegetation mosaics, catena’s and transitional zones. The current version is 2.0. The map is available in various formats, listed below. Before using the maps, please consult the terms of use.

Web-based maps

View the interactive online map in your browser and quickly find out more about the natural vegetation and its species for any location. Click here

Maps in mobile format

Bring the map with you in the field and know the natural vegetation wherever you are. Download the map for use on your favorite mobile map viewer - Click here.
Africa Tree Finder


• App developed with IUCN (DFID)
• Stand-alone app for basic Android smart phone
The CGIAR in support of AAA Initiative

IFPRI

CIAT: International Center for Tropical Agriculture

World Agroforestry Centre

Bioversity International

ILRI: International Livestock Research Institute

IITA: Research to Nourish Africa

IWMI: International Water Management Institute

IRRI: International Rice Research Institute

ICRISAT: Science with a human face

CIMMYT: International Maize and Wheat Improvement Center

ICARDA: International Center for Agricultural Research in the Dry Areas

WorldFish: Supported by the CGIAR

CGIAR

CIFOR: Center for International Forestry Research

AfricaRice