RESTORATION OF DRYLANDS FOR IMPROVED LIVELIHOODS AND ENVIRONMENTAL RESILIENCE IN EASTERN AND SOUTHERN AFRICA: THE ROLE OF AGROFORESTRY

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Structure of presentation

- Introduction
- Objective
- Case studies
- Current ICRAF work
- Concluding remarks
Multi Functional LANDSCAPES
Agroforestry Products

Fruits and nuts

Nutrition and health

Livestock

Fodder

Income, Livelihood, Envt services

Fertilizer

Soil health & food security

Combating diseases, industrial produce

Medicinal, gums, etc

Shade, energy

Timber, fuelwood

Varieties of fruits

Allanblackia

Calliandra

Prunus africana

Faidherbia albida

Tectona grandis

Varieties of fruits

World Agroforestry Centre
TRANSFORMING LIVES AND LANDSCAPES
Drylands in Africa

- Drylands in Africa = 1.96 billion ha in 25 countries
- 65% of total land mass
- 45% of the population = 325 million live in dryland areas
- Severe land degradation
- Experience floods & drought
- Lowest levels of human well being
Drylands in Eastern Africa

- 81% of total land mass (5,083,000 km²)
- Kenya = 75%
- Tanzania = 50%
- Ethiopia = 50%
- Uganda = 30%
- Rwanda = 20%
Drylands in Southern Africa

- Botswana = 100%
- Malawi = 53%
- Mozambique = 52%
- Namibia = 90%
- S. Africa = 92%
- Zimbabwe = 98%
- Swaziland = 78%
Challenges

- High vulnerability of drylands to degradation
- Shortage of fuel wood & other forest products
- Population growth outstripping food production
- Threat to survival of biodiversity
- Soil erosion, overgrazing
- Conflicts over resources
- ASL population highly impoverished, live below poverty line
Agroforestry and landscape restoration

Science-based solutions to problems faced by farmers

Farmers and Production systems

- Improved on-farm productivity
- Building assets
- Generating income
- Livelihood options

Benefits and rewards

Environment, Biodiversity

- Reduced pressure on natural habitats
- Landscape connectivity
- Habitat restoration
- Ecosystem resilience

Leveraging Benefits

Rio Earth summit 1992, identified AF as one way of rehabilitating degraded drylands
Responding to 3 Key Conventions

- Biological Diversity
- Trees and Agroforestry
- Combating Desertification
- Climate Change
Objective

• Share with you some strategies / technologies adopted to turn dry and degraded unproductive lands into productive and profitable use in Eastern and Southern African regions, thereby improving livelihoods while sustaining the natural resource base
Case studies 1: Reclaiming degraded lands in the dry savannah – Shinyanga, Tanzania

- Severe desertification up to 1980s despite of interventions
- Adoption of traditional enclosure system
- *Ngitili*: Community based regeneration of woodlands and grazing lands.
- Indigenous silvo-pastoral technology
- 500,000ha in 934 villages
- Increased fodder; 4-8 tons/ha
- Increased milk production
- Shortage of firewood and water reduced
- Reduced soil erosion
Livelihood improvement

Money grows on trees:
Direct values from biological products through communal resource management (Ngiiiti) in the Bukombe district of Shinyanga Region, Tanzania.

- Nutritional Fruits and Vegetables, $5
- Thatch Grass, $2.2
- Fodder, $1.1
- Bush Meat, $0.7
- Medicinal Plants, $11
- Fuelwood, $13
- Timber and Woodcraft, $84

Values are expressed as average household income from sales and domestic use, per year in US$.
Total value = $116

The total value of Ngiiiti services (including added value and non-species based services, such as pottery and water) represents three quarters of the total household income ($1574) in this district.

Case study 2: Mixed Land use system in West Pokot - Kenya

- Area of Concentration Approach’ (AoCA) – Vi Agroforestry
- One extension agent to 200 – 350 farmers / pastoralists for 5 yrs
- Enclosures to rehabilitate degraded lands – At first rejected by community
- Demonstration sites in schools and hospitals
- Soil conservation & planting of trees
Case study 3: Operation Mwolyo Out, Yatta, Kenya

- Model adopted was community mobilization, water harvesting, market linkages
- Each household has a water pan: 300 water pans in 2000 ha
- Zai beds constructed to harvest rain water
- Able to grow food crops, fodder, fruits, fodder, fertilizer trees, timber
- Biogas for energy
Case study 4: LRIM in Tigray, Ethiopia
80,000 km², pop =4.3 million

- Construction of erosion control and water conservation structures.
- Communal hill side plantation in degraded elevations
- Trees and fodder crops planted in combination with soil and water conservation
- Livestocks excluded from enclosures
- System adopted by Tigray Regional government as a means of allocating land in degraded hillsides to landless members of communities
- 20-30% of Tigray region rehabilitated and > 1 million benefited from improved soil and water management
Case study 5: Malawi National Agroforestry Food Security Programme
**Impact of fertilizer trees on maize yield under farmer management**

<table>
<thead>
<tr>
<th>Plot management</th>
<th>Yield (t/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize only</td>
<td>1.30</td>
</tr>
<tr>
<td>Maize + fertilizer trees</td>
<td>3.05</td>
</tr>
</tbody>
</table>

2011 Survey of farms in six districts (Mzimba, Lilongwe, Mulanje, Salima, Thyolo and Machinga)
Long-term maize yield without fertilizer in a *Gliricidia* system

[Graph showing maize grain yield (t/ha) over years with annotations for events such as P stopped, Flood, Drought, and P addition resumed. The graph compares maize yield with and without fertilizer.]
ICRAF’s current work

Evergreen agriculture for food security and environmental sustainability
ICRAF Current project

- Creating an Evergreen Agriculture in Africa: Scaling-up Conservation Agriculture with Trees for Improved Livelihoods and Environmental Resilience in Eastern and Southern Africa
Opportunities & strategies for managing drylands

- Integration of trees into annual food crop systems
- Soil fertility & Soil conservation
- Continuous provision of soil cover
- Protection against wind
- Source of food, fodder, firewood, building materials, medicinal, shade for livestock
- C – Sequestration
- Conservation of above and below ground biodiversity
Work packages of the project

- Baseline survey and site selection
- Seed and seedling supply system
- Build the capacity of smallholder farmers and partners for effective adoption of Evergreen Agriculture practices
- Development of knowledge and information sharing products
Medium term seed storage at ICRAF
Seed and seedling distribution

**Goal** is to ensure proper exchange and delivery of germplasm to farmers.
Expected outputs

- Documentation of information on best practices in conservation agriculture and agroforestry for selected target areas
- Inventories of priority tree species and diversity, seed/seedling sources
- Establishment of sustainable tree seed/seedling supply systems through the development of rural resource center
- Building the capacity of smallholder farmers and partners for effective adoption of Evergreen Agriculture practices
Expected outcomes

- Establishment of strong functional institutional and community partnerships
- Development of knowledge and information sharing products for scaling out/up of evergreen agriculture innovations.
Expected outputs

- Intended outreach:- Total of 50,000 smallholder farmers including livestock keepers in 3 EA countries (Kenya, Tanzania and Rwanda) countries by end of 2013.

- Scoping study:- Lesotho, will provide basic information on the potential of conservation agriculture and agroforestry in natural resource management
Sustainable market
Key issues for ASL restoration

- A clear understanding of dryland ecosystems
- Methods, tools, concepts, materials (e.g. germplasm)
- Robust evidence/results underpinned by good science
- Actionable knowledge
- Capacity for partners built and mobilized
- Up and out-scalable results
- Networking
- Enabling policies
THANK YOU