Local knowledge about how ecosystem services and biodiversity conservation are related to trees in silvopastoral systems

FunciTee Final Conference

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Outline

• Why did FUNCTION TREE study local knowledge?

• How did FUNCTION TREE study local knowledge?

• What are the main results FUNCTION TREE found?

• How useful (or not) results are?
Starting points

• **Local people know best**
  – Local people have some useful knowledge that is complementary to science (e.g. phenology of tree species). This can be more efficiently and effectively used in design of AFS than attempting to collect the same information scientifically.

• **Scientists know best**
  – Local people have gaps in knowledge with respect to the role of trees in the provision of ecosystem services. Identifying and then targeting these gaps in FUNCiTREE outputs will make the outputs more effective than designing them without evaluating what people already know.

• **Talk the talk**
  – Analysis of how local people understand and communicate their knowledge can improve the design and effectiveness of FUNCiTREE outputs.

• **A local voice**
  – Documentation and analysis of what local people know can ensure that local knowledge is used to plan FUNCiTREE activities and so improve their local relevance.

• **What is transferable?**
  – Comparative analysis of local knowledge across FUNCiTREE regions will allow a rigorous analysis within and between countries of the degree of transferability of knowledge about the role of trees in ecosystem service provision and livestock production, enabling more effective targeting of future research and development initiatives.
WP 1: Project Management

WP 2: Adoption/NonAdoption of AFS

Species by region

Africa ○ Nicaragua ●

WP 3 & 4: Species Traits Identified

WP 5: Species by Function

Drought Nutrition Productivity

Function

Foundation

WP 6: Modern AFS Reassembled
Based on trait based relationship
1) Drought Tolerance
2) Increased resilience
3) Improved Animal Nutrition
4) etc...

WP 7: Field Trials

WP 8: Dissemination

Illustration of Barton (2009)
Local knowledge within Funktion Tree

• **WP3 Farmers perception of AFS tree species and their traits**
  – Task 3.2 Local knowledge of species traits (use of AKT)

• **WP2**
  – What are the critical ecosystem functions that farmers desire?
  – What are farmers hoping to get out of AFS implemented on their farms?
  – Task 2.1 Farmers production goals (Community capitals framework)

• **WP6**
  – Task 6.4 Causal network using Bayesian belief network to determine cause-effect relationships with predictive models

• **WP5** Cross regional analysis of Species, traits and classifications
AKT methodology

Acquiring Qualitative Knowledge About Complex Agroecosystems. Part 1: Representation as Natural Language

F. L. Sinclair\textsuperscript{a} & D. H. Walker\textsuperscript{b}

Secondary data
Key informants
Reconnaissance

Scoping \rightarrow Delimiting \rightarrow Generalisation

Compilation

\{ small \\
Sample \{ stratified \\
{ purposive

Semi-structured interviews
Iterative, triangulated
Qualitative

\{ large \\
Sample \{ stratified \\
{ random

Questionnaire
Quantitative analysis
Knowledge bases for published articles


Also see the Ego guide book

**Thaumatococcus danielli** (Benn.)Benth. a rhizomatous herb with a natural range extending through the Guineo-Congolian rain forest. It is a robust forest herb, usually forming extensive colonies with petioles to 3 m long arising from the subterranean rhizome. It has long been used as a non timber forest product with stems being used to produce mats and leaves used for roofing. Perhaps it is most well known as a food wrapper in markets of the region.
A total of 429 tree species!

<table>
<thead>
<tr>
<th>No.</th>
<th>Species Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Azadirachta indica</em></td>
</tr>
<tr>
<td>2</td>
<td><em>Calotropis procera</em></td>
</tr>
<tr>
<td>3</td>
<td><em>Citrus limon</em></td>
</tr>
<tr>
<td>4</td>
<td><em>Gliricidia sepium</em></td>
</tr>
<tr>
<td>5</td>
<td><em>Jatropha curcas</em></td>
</tr>
<tr>
<td>6</td>
<td><em>Mangifera indica</em></td>
</tr>
<tr>
<td>7</td>
<td><em>Prosopis juliflora</em></td>
</tr>
<tr>
<td>8</td>
<td><em>Psidium guajava</em></td>
</tr>
<tr>
<td>9</td>
<td><em>Tamarindus indica</em></td>
</tr>
<tr>
<td>10</td>
<td><em>Tecoma stans</em></td>
</tr>
<tr>
<td>11</td>
<td><em>Ximenia Americana</em></td>
</tr>
</tbody>
</table>
Increasing our knowledge regarding the complexity of local knowledge

<table>
<thead>
<tr>
<th>Tree uses</th>
<th>These classifications are regarding to tree attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firewood</td>
<td>Height</td>
</tr>
<tr>
<td>Fodder</td>
<td>Canopy phenology</td>
</tr>
<tr>
<td>Food</td>
<td>Crown openness</td>
</tr>
<tr>
<td>Medicinal (humans)</td>
<td>Leaf size</td>
</tr>
<tr>
<td>Medicinal (animals)</td>
<td>Leaf thickness</td>
</tr>
<tr>
<td>Timber</td>
<td>Root abundance</td>
</tr>
<tr>
<td>Fences</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tree functions</th>
<th>Example from Nicaragua:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil formation</td>
<td>Shade (pastures) Narrow crown, deciduous Guanacaste, Genizaro, Guacimo, Acacia, Jicaro</td>
</tr>
<tr>
<td>Drought tolerance</td>
<td>Wind protection Tall tree, dense crown, deep roots Guanacaste, Eucalipto, Mango, Espavel, Pochote, Jabillo</td>
</tr>
<tr>
<td>Stream protection</td>
<td></td>
</tr>
<tr>
<td>Biodiversity hosting</td>
<td></td>
</tr>
<tr>
<td>Cultural (Mali)</td>
<td></td>
</tr>
<tr>
<td>SHADE</td>
<td></td>
</tr>
</tbody>
</table>
Most common tree attributes related to ecosystem functions

Illustration from Cerdan (2012), inspired by De Bello et al (2010)
Complex (Nicaraguan) farmers’ knowledge related to the relation among trees and water
Outline

• Why did Funcitree study local knowledge?

• How did Funcitree study local knowledge?

• What are the main results Funcitree found?

• How useful (or not) results actually are?
Utility of the results for **FUNCiTREE**

- **WP3 Farmers perception of AFS tree species and their traits**
  - Task 3.2 Local knowledge of species traits (use of AKT)

- **WP2**
  - What are the critical ecosystem functions that farmers desire?
  - What are farmers hoping to get out of AFS implemented on their farms?
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- **WP5 Cross regional analysis of Species, traits and classifications**
Utility of the results for us

How much multiple ecosystem services are important to farmers? (Sean)

Guasimo greater than Jicaro as fodder, shading livestock, interacting with pasture (Marcel)

Can we relate physiological traits (Scientifics) to agroforestry functions (farmers)? (Philippe)

How can be local knowledge better used (IPBES)? (Nina Vik)

Examples of synthesis of local and scientific knowledge (Hubert)

Shape, size and density of crown in forage Species (Hubert)

Integration of local knowledge in agroforestry engineering (Alexandre presented and Mariel asked how to do it)
Thank you!

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