Cocoa agroforestry for farmers

Eduardo Somarriba
CATIE, Turrialba, Costa Rica
19 May 2021
Key questions

• Is agroforestry farmer-centric?
• What are the biggest challenges to farmers to retain agroforestry?
• What are the biggest challenges to farmers to create new agroforestry?
Trees on farms are commonplace...

30% of all agricultural land (some 7 million km$^2$) have up to 20% tree cover
Farming with trees in Nicaragua

- **Coffee**: 138 trees ha\(^{-1}\)
- **Cacao**: 79 trees ha\(^{-1}\)
- **Pastures**: 67 trees ha\(^{-1}\)
- **Homegardens**: 52 trees ha\(^{-1}\)
- **Food crops**: 32 trees ha\(^{-1}\)
The use of shade trees in cocoa cultivation varies widely between producing countries.
<table>
<thead>
<tr>
<th>Country</th>
<th>Cocoa</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area (ha)</td>
<td>Shade (%)</td>
<td>Sun (%)</td>
</tr>
<tr>
<td>Brazil</td>
<td>720,053</td>
<td>93</td>
<td>7</td>
</tr>
<tr>
<td>Côte d’Ivoire</td>
<td>2,851,084</td>
<td>26</td>
<td>74%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1,701,351</td>
<td>na</td>
<td>90+</td>
</tr>
<tr>
<td>Ecuador</td>
<td>537,410</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>Colombia</td>
<td>173,016</td>
<td>75</td>
<td>25</td>
</tr>
<tr>
<td>Ghana</td>
<td>1,683,765</td>
<td>25</td>
<td>75</td>
</tr>
<tr>
<td>Peru</td>
<td>125,580</td>
<td>90+</td>
<td>*</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>4,000</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>Mexico</td>
<td>58,734</td>
<td>90+</td>
<td>*</td>
</tr>
<tr>
<td>Haiti</td>
<td>26,975</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Honduras</td>
<td>1,889</td>
<td>90+</td>
<td>*</td>
</tr>
<tr>
<td>Guatemala</td>
<td>4,333</td>
<td>90+</td>
<td>*</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>152,261</td>
<td>100</td>
<td>*</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>9,310</td>
<td>90+</td>
<td>*</td>
</tr>
<tr>
<td>El Salvador</td>
<td>941</td>
<td>85</td>
<td>15</td>
</tr>
<tr>
<td>Venezuela</td>
<td>64,462</td>
<td>90+</td>
<td>*</td>
</tr>
</tbody>
</table>
Coffee/cocoa cultivation systems are classified into six broad, shade canopy and crop management typologies.
Cocoa farmers plant or recruit trees from natural regeneration because they are useful....
Standing timber in Central American cocoa plantations (dbh > 30 cm)…timber trees are a savings account
Bread fruit, mango, coconuts, avocado and timber trees (Swietenia macrophylla, Cedrela odorata, Guarea spp., Callophyllum brasiliensis) in cocoa plantations in Haiti
Food and nutritional security: nutrients from fruits in the shade canopy of cocoa

Fe and Zn

Vitamins A and C

Proteins and carbohydrates

Folic acid missing
Monthly fruit production help families to avoid seasonal hunger....lower vulnerability.
Family benefit (FB in US$/ha)

FB = cash flow + self-consumption

Complexity

- +

Bar chart showing the composition of family benefit components:
- FB_Timber/ha
- FB_Fruits/ha
- FB_Banana/ha
- FB_Cacao/ha

Legend:

- a
- b

Graphical representation of complexity on a scale from - to +.
Most cocoa shade canopies are sub-optimal in design and management…

For farmers to take full advantage of their cocoa agroforestry systems they need to redesign and improve the management of the shade canopies, but…
Farmers (and many agronomists) “flunk” in shade regulation
Educate farmers…and professionals
- Explore the feasibility of using digital technologies to reach large number of farmers
- Engage youth

Digital Farmer Field Schools?
How to counter the growing appetite for full sun cocoa?

How to retain shade canopy trees?
To do...

1. Develop sustainable intensification approaches that preserve trees in the shade canopy.

2. Aim at creating a culture among farmers to consider timber trees as crops.

3. Design and enforce supportive legislation (e.g. tenure rights), policies, and financial mechanisms to stimulate farmers to plant timber and other valuable trees in their cocoa farms.

4. Simplify regulations and procedures to harvest, transport and use farm timber.

5. Support certification schemes promoting the use of trees in cocoa agroforestry systems (e.g. bird friendly, sustainable, timber trees planted in cocoa farms, etc.)
How to avoid declining cocoa areas to the benefit of other crops
Increase the profitability of cocoa farms

1. Sustainable intensification of crop husbandry (better genetics, fertilizers, plant protection measures, agroforestry);
2. Valuing fruits and timber from shade canopies;
3. Improving the value chains of on-farm fruit and timber production;
4. Increased market prices of cocoa and price volatility through certification (quality, environment, origins, social, etc.); and
5. Payment of ecosystem services rendered by shaded cocoa agroforestry systems
Thank you