SUSTAINABLE LIVESTOCK PRODUCTION SYSTEMS AND POLICY OUTCOMES IN LATIN AMERICA

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BUILDING TOGETHER SUSTAINABLE LIVESTOCK for people, for the planet
Sustainable livestock production is a complex issue

- Multi-stakeholder (sectors)
- Multiple scales (spatial, temporal)
- Multiple themes....for instance
  - Application of good management practices (silvipastoral Systems, herd and pasture management, animal welfare, manure management, etc.)
  - Climate Smart (mitigation and adaptation)
  - Inclusive value chains (farmers organizations, markets, footprinting, certification, etc.)
  - Landscape restoration and management
  - Biodiversity conservation and provision of ecosystem services (e.g. water)
  - Governance, both public and private (laws, institutions, policies, programs and projects)
Sustainable livestock production is knowledge-intensive...: local and scientific knowledge.

Policy development must be grounded on solid science...

Some examples from Meso-America
Proyectos GAMMA

Coordinate System: Central Meridian:
Trees on farms
Silvopastoral systems
Forage trees and shrubs- adaptation to climate change

- Regrowth capacities of trees
- Productivity and quality in prolonged dry season
- Use of functional nutritional traits of species to design feeding strategies
- Evaluate impacts on animal performance and emissions
Fruits as dry season fodder for cattle in Central America

<table>
<thead>
<tr>
<th>Especie</th>
<th>kg arbol$^{-1}$</th>
<th>% PC</th>
<th>% DIVMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrocomia aculeata</td>
<td>8.6</td>
<td>5.5</td>
<td>66.4</td>
</tr>
<tr>
<td>Guazuma ulmifolia</td>
<td>26.4</td>
<td>7.5</td>
<td>62.8</td>
</tr>
<tr>
<td>Samanea saman</td>
<td>36.1</td>
<td>15.6</td>
<td>71.5</td>
</tr>
<tr>
<td>Enterolobium cyclocarpum</td>
<td>86.0</td>
<td>13.2</td>
<td>67.8</td>
</tr>
<tr>
<td>Brachiaria brizantha (grass)</td>
<td>4.9</td>
<td></td>
<td>46.2</td>
</tr>
</tbody>
</table>

Fresh fruit production (kg/tree)

- coyol
- guacimo
- genizaro
- Guanacaste

Collection week:
- 1/27
- 2/3
- 2/10
- 2/17
- 2/24
- 3/3
- 3/10
- 3/17
- 3/24
- 3/31
- 4/7
- 4/14
- 4/21
- 4/28
- 5/5
- 5/12
Small Farms managing fodder banks have higher milk productivity and resilience to climate change.

Fuente: Chuncho (2010)

Farms with fodder Banks Retained more animals in prolonged drought

Fuente: Campos (2011)
El biogás es una fuente de energía térmica y eléctrica

Disponibilidad de nutrientes para cultivos agrícolas a partir del compostaje y del biol

Territorios saludables contribuyendo con el bienestar sostenible de las familias

El manejo integral del estiércol de los sistemas ganaderos significa beneficios para el suelo, el aire, el agua y la salud pública.
Ecosystem services
Conservation of biodiversity (birds)

- **Pastures with high tree cover**
- **Pastures with low tree cover**
- **Live fences**
- **Secondary forests**

Legend:
- **Yellow**: Colombia
- **Green**: Costa Rica
- **Blue**: Nicaragua

**Sites**:
- Degradado
- PNSA
- PMSA
- PNBD
- PMBD
- CVPOD
- CV
- FRU
- PNA
- PMAD
- SUV
- GUA
- BR
- BS
- BPRI

**Number of species**

- **X-axis**: Sites
- **Y-axis**: Number of species
**Conservation value increased by adoption of SPS**

<table>
<thead>
<tr>
<th>Intensification</th>
<th>Total (ha)</th>
<th>Project</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BCI 2009</td>
<td>BCI 2012</td>
<td>Total (ha)</td>
</tr>
<tr>
<td>Small</td>
<td>677</td>
<td>0.31</td>
<td>0.34</td>
</tr>
<tr>
<td>Medium</td>
<td>1212</td>
<td>0.24</td>
<td>0.28</td>
</tr>
<tr>
<td>Large</td>
<td>2089</td>
<td>0.27</td>
<td>0.30</td>
</tr>
<tr>
<td>Total</td>
<td>3978</td>
<td></td>
<td>1742</td>
</tr>
</tbody>
</table>

BCI: Biodiversity conservation Index
Water runoff

PNS = Native pasture overgrazed; PNA = Native pasture with trees; PMA = Improved pasture with trees; BS = Secondary forest.
## Adaptation and mitigation strategies

<table>
<thead>
<tr>
<th>Action</th>
<th>Adaptation</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of shade trees to reduce heat stress</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Compatibility between grasses and woody</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Use of tree to N fix</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Use of tree and pasture resistance to dry season</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Food resources diversification on farm</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Animal genetics</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Reduction of chemical inputs</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Solid waste management</td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>
Reduced emissions

Carbon capture and storage

Fijación de carbono

Reduced emissions

BUENA ALIMENTACIÓN

LEGUMINOSAS EN PASTURAS

DESCARTE DE ANIMALES

MANEJO DE RESIDUOS: BIODIGESTOR

Fijación de carbono

Siembra de Sistemas silvopastoriles

BANCOS FORRAJEROS

CERCAS VIVAS

BOSQUES SECUNDARIOS

CERCAS VIVAS

BOSQUES SECUNDARIOS
Carbon stocks (capture 1-2 t C/ha/year)

<table>
<thead>
<tr>
<th>Land use (years after the abandonment)</th>
<th>Total Carbon t ha⁻¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degraded pasture (0 years)</td>
<td>22.66</td>
</tr>
<tr>
<td>Native pasture with trees (5 years)</td>
<td>105.2</td>
</tr>
<tr>
<td>Silvopastoral system (10 years)</td>
<td>139.48</td>
</tr>
<tr>
<td>Secondary forest (10 years)</td>
<td>212.55</td>
</tr>
<tr>
<td>Secondary forest (25 years)</td>
<td>304.89</td>
</tr>
</tbody>
</table>

Carbon stocks (capture 1-2 t C/ha/year)
Reduced emissions of greenhouse gases

Tradictional vs SPS

- Solid waste management
- Enteric fermentation
Farms with silvopastoral systems

Kg/vaca/día

Carbon, Co2 eq/ha

farms with pastures
GHG emissions are influenced by feeding strategies and diets.

- Farms on pasture management tend to have a higher footprint.
- Fodder crop production reduces the footprint.
- Farms with higher use of by-products tend to have low footprint.
- Income higher (but statistically significant) for farms on pasture and concentrate diets.
The role of tree shading (10-15% tree canopy cover) on dairy production and respiration rates in Jersey cows

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Milk (kg/vaca/día)</th>
<th>Respiration rate (breathing/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without tree</td>
<td>11.37 b</td>
<td>80 a</td>
</tr>
<tr>
<td>With tree*</td>
<td>12.48 a</td>
<td>65 b</td>
</tr>
</tbody>
</table>

Increase in financial yield
215 $US /ha/yr
Crossbred cows, such as Jersey x Holstein x Sahiwal and Jersey x Gyr, have more dairy production than Jersey breeds.

More adaptation to climate change
Reduce GHE
Supporting policy development
GEF/SPS: Payment for Environmental Services in cattle farms (2003 - 2007)
Standard for Sustainable Cattle Production Systems

© Sustainable Agriculture Network
Success story of Costa Rica policy measure

- **1970s**: CR one of the most deforested country - hamburger connection

- **1997**: policies – forest law, Payment for environmental services

- **2000**: innovation for the agriculture/livestock sector

- **2014 to date**: Carbon neutral 2021, NAMAS-livestock- institutional framework, silvopastoral systems
### Evolution of area under pastures, production and forest cover

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pasture, ha</strong></td>
<td>2.4</td>
<td>2.2</td>
<td>1.4</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td><strong>Beef Prod (thousand TM)</strong></td>
<td>76.5</td>
<td>87.5</td>
<td>82.3</td>
<td>97.5</td>
<td>85.0</td>
</tr>
<tr>
<td><strong>Milk Production (Thousand TM)</strong></td>
<td>308</td>
<td>434</td>
<td>722</td>
<td>953</td>
<td>1066</td>
</tr>
<tr>
<td><strong>Forest cover, %</strong></td>
<td>26</td>
<td>25</td>
<td>43</td>
<td>56</td>
<td>58</td>
</tr>
</tbody>
</table>

1Sepsa, MAG, CATIE, CORFORGA; 2CORFORGA, CNP, IICA, 3 CNPL, CNP, 4. FAOSTAT, 5. FONAFIFO- base de datos

Ibrahim- in preparation
Linking sustainable livestock production to sustainable landscape management: The experience in Sico Paulaya, Honduras
High deforestation rate

2010-2013

Multi-stakeholder negotiation platform (MAPSP)

MAPSP

Strategic Plan

2010-2030

Land use planning

Political – environmental context
The RCCP work in Sico Paulaya includes:

1. Strengthening capacities of the Environment and Productivity Table for Sico Paulaya (MAPSP), to ensure participative processes aimed at making sustainable use of natural resources.

2. Promoting implementation of sustainable integrated forest management plans (forest and non-wood forest products)

3. Developing integrated agro-forestry and silvo-pastoral plans


5. Communication and incidence activities to increase the scale and scope of the pilot project.
Sustainable livestock production systems: current actions

- Participation in political spaces and incidence in national policy based on local experiences
- Building local capacities (Farmer schools)
- Baseline for carbon stock and livestock emissions
- Good livestock production practices guide and GHT tools.
Key partners

- Municipality of Iriona
- Ministry of Agriculture, Ministry of Environment
- Fundación Madera Verde
- Instituto de Formación Profesional (INFOP)
- Others
LESSONS LEARNED

The work of RCCP/CATIE in Sico Paulaya has shown the importance of:

- Investing time and resources to strengthen local governance
- Link local actions with existing national processes (such as the REDD+ National Strategy and the Agroforestry Program on Sustainable Productive Landscapes)
- Strengthen the presence of the national institutions at the local level (SAG, MiAmbiente)
- Promote local capacity building through practical tools, such as the Farmer Schools (ECAs).
And more......the future
Opportunities

- Sustainable development goals
- Global Strategy for the Conservation of Biological Biodiversity 2030 (Aichi targets)
- Restoration of degraded landscapes (e.g. 20x20, Bonn Challenge)
- Climate Smart Livestock (e.g. EC LEDS, Unconventions, FAO livestock global agenda, etc.)
- Food and nutrition security
- Value chains with gender equity and inclusion
Thank you