Silvopastoral systems (SPS) – A sustainable option for beef production

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agri benchmark Beef and Sheep Network
World Meat Congress – Beef Committee

Punta del Este, Uruguay, 07.11.2016
1. **Context**

2. *agri benchmark* Beef and Sheep Network

3. Silvopastoral Systems (SPS) as a sustainable option for beef production (Case studies)
Livestock, compelling figures

Sustainable options

Practice change

Regional evidence

1/4

+70%

40%

1 Bn

poor people depend on livestock

15% calories
25% protein

33% crop land
26% grazing land
14,5% gas emissions
8-15% of agr. water use
62% pathogenes
Practice change

“Is a significant alteration of a production system against the background of specific objectives”

- Mitigate greenhouse gas emissions
- Contributing to ecosystem services
- Reduce overgrazing, erosion and degradation of grasslands
- Improve animal welfare
- Maintain or increase productivity and profitability
- Improve working conditions of producers and their employees
- Food systems
- Sustainable diets
To analyze practice change you need knowledge, competence and capacity

- Production systems, economics, framework conditions and perspectives
  - Environment
    - CIPAV
    - GASL, LEAP, GRSB
    - IIASA, ...
  - Animal welfare
    - World Animal Protection
  - Social
    - to be confirmed
## Participating countries 2015

<table>
<thead>
<tr>
<th>Category</th>
<th>Countries</th>
<th>Farms</th>
<th>Years in Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef and Sheep</td>
<td>31</td>
<td>109</td>
<td>14</td>
</tr>
<tr>
<td>Cash Crop</td>
<td>41</td>
<td>100</td>
<td>11</td>
</tr>
<tr>
<td>Horticulture</td>
<td>15</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>Pig</td>
<td>10</td>
<td>30</td>
<td>3</td>
</tr>
<tr>
<td>Organic</td>
<td>6</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Fish</td>
<td>4</td>
<td>10</td>
<td>2</td>
</tr>
</tbody>
</table>

We harvest data around the world.
The approach: Efficiency matrix

<table>
<thead>
<tr>
<th>FORAGE &amp; GRAIN PRODUCTION</th>
<th>ANIMAL FEEDING</th>
<th>LIVESTOCK PERFORMANCE</th>
<th>ANIMAL HEALTH</th>
<th>MANURE MANAGEMENT SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td></td>
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<tr>
<td>Prevention health schemes</td>
<td>Fresh/dry matter intake</td>
<td>Reproductive performance</td>
<td>Mortality distribution by age group</td>
<td>Methane emission per unit/year</td>
</tr>
<tr>
<td>Herd management</td>
<td>Feed ration composition</td>
<td>Nº. Animals transferred or sold to other production units</td>
<td>Yield per unit per year</td>
<td>Manure applied as % total produced</td>
</tr>
<tr>
<td>Increase conversion ratio</td>
<td>Feed digestibility</td>
<td>Nº. of production periods per year</td>
<td>% disease incidence by age group</td>
<td>Synthetic fertilizer applied/ha/year</td>
</tr>
<tr>
<td>Strategic feeding practices</td>
<td>% Home grown feed</td>
<td>Yield/unit per period</td>
<td>% disease prevalence by age group</td>
<td>Manure applied per ha/year</td>
</tr>
<tr>
<td>Strategic cropping</td>
<td>Protein, energy and fiber content/ingredient</td>
<td>Co-products per unit/year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvopastoral systems</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Balancing inventories/forage offer</td>
<td></td>
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</tbody>
</table>

**Natural Resources Used**

- N, P, K, M, Ca...
- Land
- Nutrients
- Water

**Reference Scenario - baseline** Vs. **New Scenario after intervention**

**Economic** → **Animal Welfare** → **Social Impact** → **Environmental**
Silvopastoral Systems (SPS)

Principles

1. Increasing plant biomass
2. Reducing soil degradation
3. Protecting water sources
4. Increase animal productivity
5. Conserve regional biodiversity
6. Ensure animal welfare
7. Ensure economic stability
Regional evidence - Case studies

Reference Scenario - baseline Vs. New Scenario after intervention

Economic → Animal Welfare → Social Impact → Environmental

1. Beef Finishing
2. Dual Purpose
3. Dairy
4. Dairy
5. Cattle Breeding

Colombia

Regional evidence - Case studies
Feed Production and land productivity

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Feed production (tons dry matter per ha)

Land productivity (kg meat or milk per ha)

1. Beef Finishing
2. Dual Purpose
3. Dairy
4. Dairy
5. Beef cattle Breeding

Reference Scenario - baseline Vs. New Scenario after intervention

Economic → Animal Welfare → Social Impact → Environmental
Total farm: returns and costs

FORAGE & GRAIN PRODUCTION
ANIMAL FEEDING
LIVESTOCK PERFORMANCE
ANIMAL HEALTH
MANURE MANAGEMENT SYSTEM

Whole farm costs ('000 US$)
Whole farm returns ('000 US$)

Reference Scenario - baseline
Vs.
New Scenario after intervention

Economic
Animal Welfare
Social Impact
Environmental

1. Beef Finishing
2. Dual Purpose
3. Dairy
4. Dairy
5. Beef cattle Breeding
CO₂ emissions

Reference Scenario - baseline

Vs.

New Scenario after intervention

Economic ➔ Animal Welfare ➔ Social Impact ➔ Environmental
Animal welfare

Reference Scenario - baseline Vs. New Scenario after intervention

1. Beef Finishing
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Economic → Animal Welfare → Social Impact → Environmental
Preliminary conclusions

1. Results provide evidence for the ability of SPS to create ‘triple-win’ solutions:
   (a) Productivity and profitability gains (b) Environmental improvement © Animal welfare benefits

2. The overall uptake of SPS has been limited by the level of investments, access to capital, and investment risk.

3. As intensive SPS are management-intensive, capacity building (advisory services) is a key component of successful delivery.

4. The benefits from such investment are clear and this is an area where international and local policy mechanisms, donors and governments can play a crucial role.
SPS as a sustainable alternative for reducing deforestation.

Improving natural resource use efficiency and profitability on a wider scaling up (12,000 has.)

The Amazonian region (Colombia)

México (12,000 has on SPS)
Improving land use, combining complementary enterprises under SPS schemes

Argentina (forestry + beef cattle)

Colombia and Paraguay (Palm oil / Soy bean vs. sustainable cattle ranching)

Sustainable land use alternatives (WWF)
Next steps

1. In order to better define critical periods and main cash flow needs, a **detailed analysis of level of investment is required**, as well as for risk evaluation.

2. At local level, will be necessary to **increase coverage of case studies**, where regional and production system differences and farmers reactions, can be measured and illustrated when adopting SPS.

3. It will be also essential to analyze the **impact of financial and incentive measures**, when adopting SPS.
Thanks

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