agri benchmark can bring farm-level economics and sustainability analysis to GRA

Julián Chará, Ernesto Reyes, Claus Deblitz, Yelto Zimmer
agri benchmark Network

GRA Meeting
06.02.2019, Cali

Agenda

(1) **Efficient and effective GHG mitigation strategies in agriculture**

(2) **What *agri benchmark* has to offer**

(3) **Highlights from our research**

(4) **Future research**

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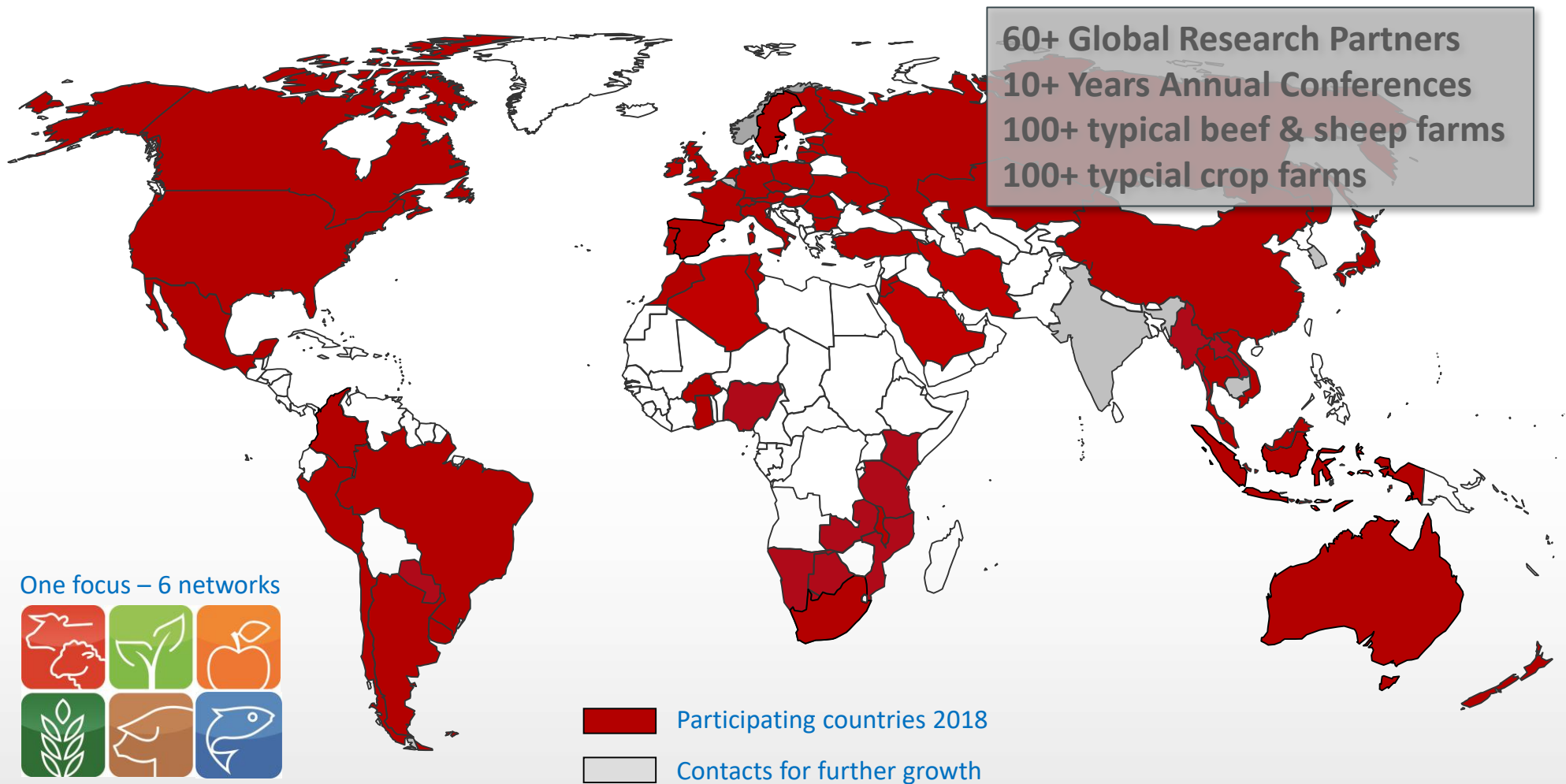agri benchmark and GRA

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Our approach

(1) Agricultural is extremely fragmented – GHG mitigation strategies that require intense and close monitoring will fail.

(2) Therefore strategies have to create a win-win.

(3) Productivity growth is <u>the</u> multiple win-win: Less GHG per unit, higher income, more food, less pressure for LUC.

(4) Globally, more productive systems are established. No rocket science is needed.

(5) What you need: in-depth understanding of current systems and obstacles for improvements and how to overcome them.

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agri benchmark – understanding agriculture worldwide

- **Our core competence:**
  Production systems and their economics, drivers and perspectives

- **An expert network which started in 2002 >>> more than just data**

- **Global, non-profit, independent >>> credibility**

- **Standardised methods >>> global comparability**

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We harvest data around the world.

60+ Global Research Partners
10+ Years Annual Conferences
100+ typical beef & sheep farms
100+ typcial crop farms

One focus – 6 networks

Participating countries 2018

Contacts for further growth

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agri benchmark typical farm approach

1

Identification
LOCAL SCIENTISTS

2

Data collection
LOCAL SCIENTISTS, ADVISERS, FARMERS

3
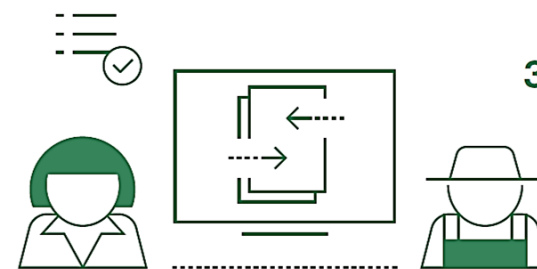
Processing and cross-checking
LOCAL SCIENTISTS

4

**Validate and publish results
to partners and clients**
LOCAL SCIENTISTS, SCIENTISTS AT
AGRI BENCHMARK CENTER

Outputs:

- Thorough understanding of the economics of the major proportion of crop and livestock production
- Access to growers and advisors

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Major clients and research partners

Food and Agriculture Organization
of the United Nations

Cooperation with other network activities

giz
Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

GLOBAL AGENDA FOR SUSTAINABLE LIVESTOCK

European Commission

WORLD ANIMAL PROTECTION

WWF

Global Network
on Silvopastoral Systems

WORLD BANK

IIASA

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Case study approach to analyse silvo-pastoral systems

Institutions participating or possible in the case studies

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Areas analysed and steps

▶ **Baseline** (status quo) and **scenarios** of silvopastoral systems

▶ Close cooperation with **producers** and **local experts**

▶ Analysis of the following areas and elements:
  - **Performance** and **productivity**
  - **Economics**
  - **Environment** (GHG-emissions, nutrients, soils, water, energy)
  - **Animal welfare**
  - **Social** impacts

▶ Calculation and aggregation of all elements in one tool

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Cost composition by production system

Legend:
- Other (grey)
- Capital (yellow)
- Land (green)
- Labour (red)
- Feed (orange)
- Animals (blue)

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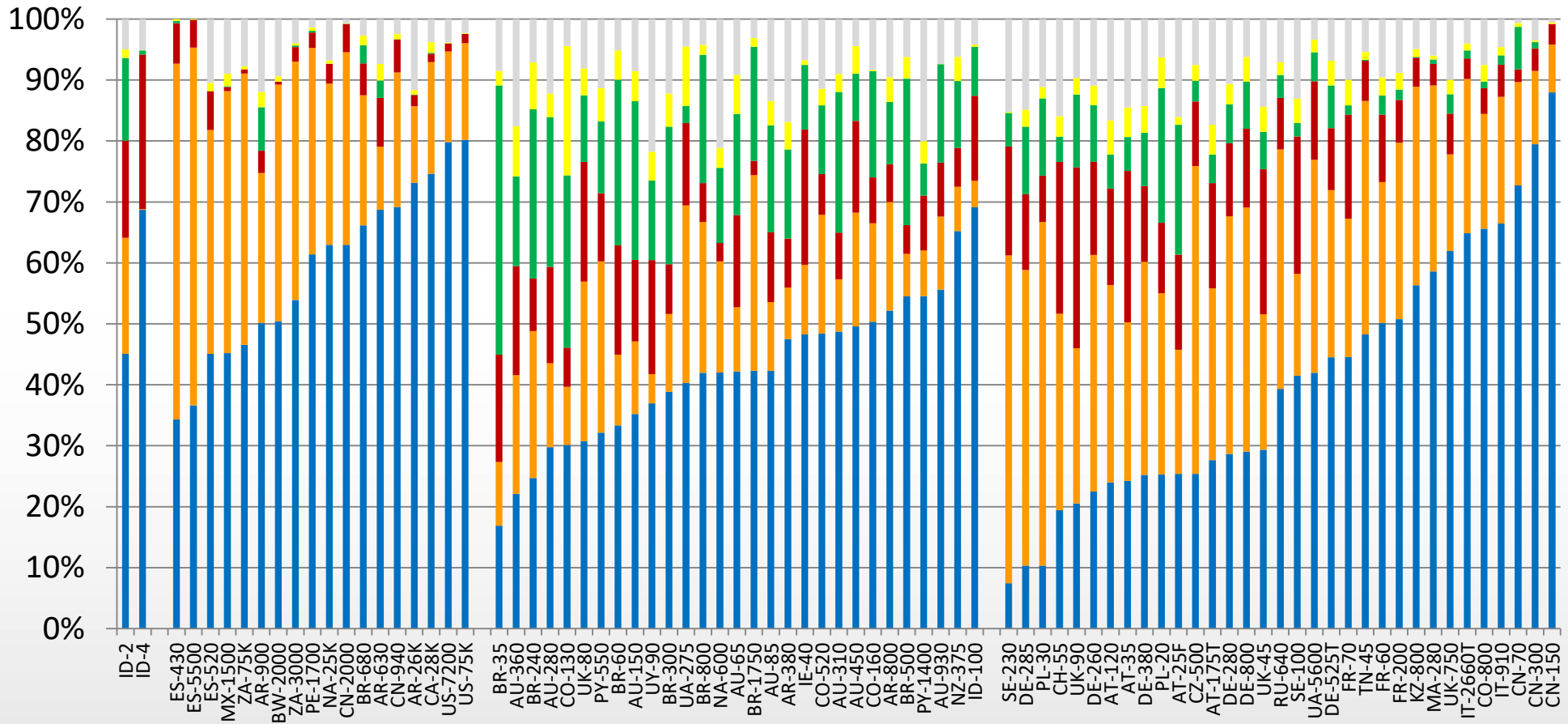
Results silvopastoral systems

COLOMBIA
Region: Cesar

Climate condition: Dry tropical

Baseline vs. SPS
From degraded soils to intensive sustainable production

SPS strategy implemented
Intensive SPS
Leucaena + Panicum + Eucalyptus

Sustainability issue to illustrate
Restoring degraded natural resources

Emphasis on SDG

8 DECENT WORK AND ECONOMIC GROWTH

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

FORAGE PRODUCTION
Ton. dry matter/ha
700%
compared to baseline

LAND PRODUCTIVITY
Kg. meat/ha
450%
compared to baseline

ANIMAL WELFARE
Feeding
Housing
Health
Behaviour
compared to baseline

Total area: 200 ha.
% Area under SPS
70%
reached: 8th year
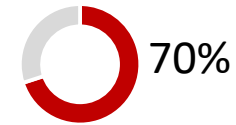
ECONOMIC RESULTS

Initial investment
USD/Ha. **1,850**

Profit (USD/year)

250,000	
200,000	
150,000	
100,000	
50,000	
0	
-50,000	
-100,000	

Base line 1 2 3 4 5 6 7 8 9
year
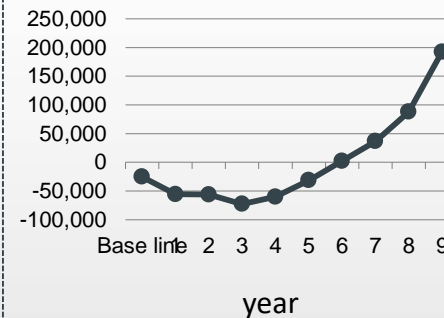
ENVIRONMENTAL IMPACT

Kg CO_2 per 100 kg LW added

- Feed
- Manure Nox
- Manure methane
- Enteric fermentation

Base line   SPS

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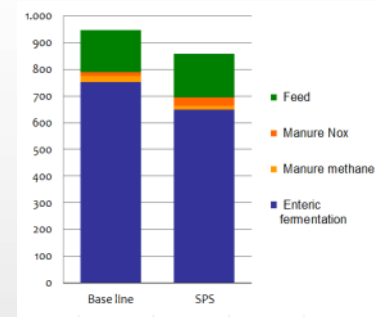
Results silvopastoral systems

MEXICO

Region: Michoacán

Climate condition: Dry subtropical

Baseline vs. SPS

From intensive production system with high dependence on external inputs to intensive sustainable production

SPS strategy implemented
Intensive SPS - Leucaena + Guinea

Sustainability issue to illustrate
Scaling up Intensive sustainable production
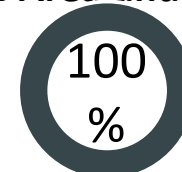
Emphasis on SDG

FORAGE PRODUCTION
Ton. dry matter/ha

⬆ **181%**
compared to baseline

LAND PRODUCTIVITY
Tons ECMilk/ha
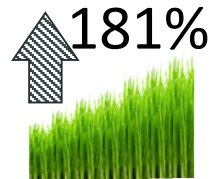
290% ⬆
compared to baseline

Total area: 50 ha.

% Area under SPS

100 %

reached: 5th year

ECONOMIC RESULTS

Initial investment
USD/Ha.

1,274 💵

Profit (USD/year)

ENVIRONMENTAL IMPACT

Kg CO_2 / 100 kg ECM

- Feed (green)
- Manure Nox (red)
- Manure methane (orange)
- Enteric fermentation (blue)

	Base line	SPS

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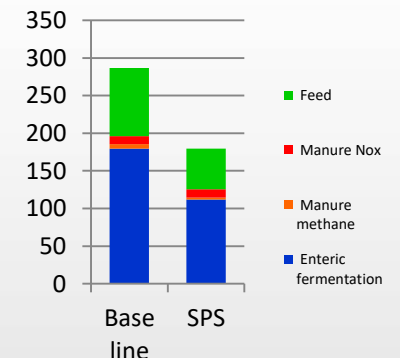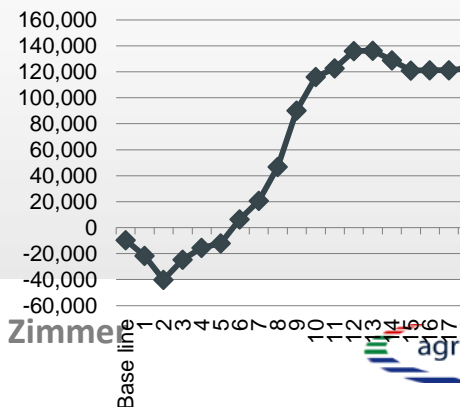
Case study results GHG emissons I

1 – BEEF FINISHING

COLOMBIA
Cesar

Increased stocking rate

Kg CO_2 per 100 kg LW added
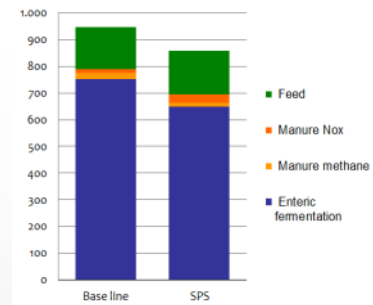
2 – DUAL PURPOSE

COLOMBIA
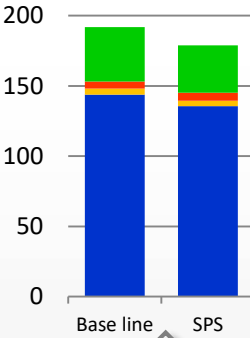Valle del Cauca

Already high milk yield in Baseline
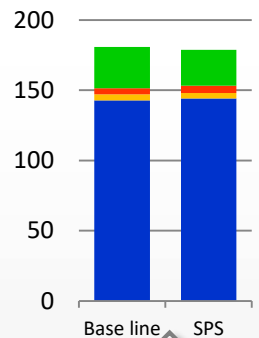
Kg CO_2 / 100 kg ECM
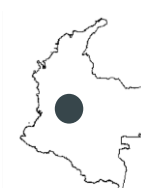
3 – Dairy

COLOMBIA
Valle del Cauca

Already high milk yield in Baseline (Lucerna breed)
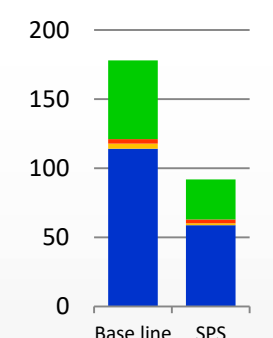
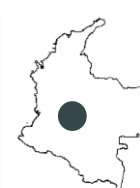Kg CO_2 / 100 kg ECM

4 – DAIRY

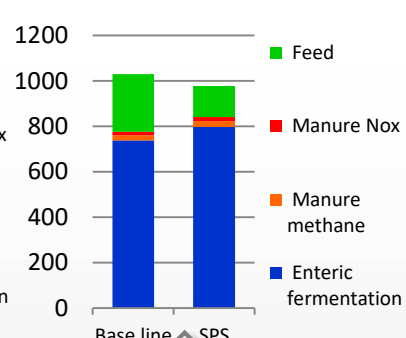**COLOMBIA**
Quindío

Change of breed

Kg CO_2 / 100 kg ECM

5 – CATTLE BREEDING

COLOMBIA
Quindío

Kg CO_2 per 100 kg LW added

Productivity increase mainly through increased stocking rates and not via individual animal performance
→ Less reduction of GHG emissions on a per kg output basis but less land needed for same production
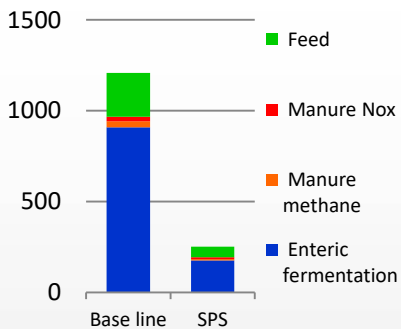
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Case study results GHG emissons II

6 – DUAL PURPOSE

COLOMBIA
Caquetá

Very low milk yield in Baseline

Kg CO_2 / 100 kg ECM

7 – DAIRY

MEXICO
Michoacán

Change of breed

Kg CO_2 / 100 kg ECM
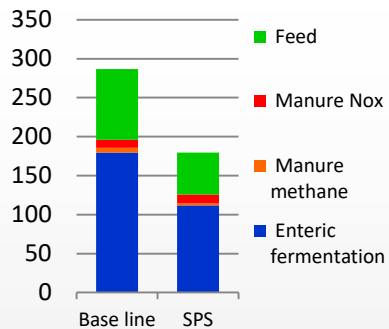
8 – BEEF FINISHING

MEXICO
Michoacán

Kg CO_2 per 100 kg LW added
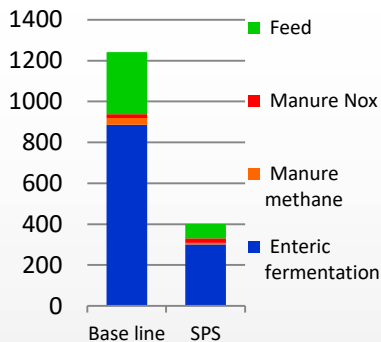
9 – FORESTRY & FIN

ARGENTINA
Misiones

Kg CO_2 per 100 kg LW added

No Baseline figures because there were no cattle in the Baseline

10 – BEEF FINISHING

ARGENTINA
Corrientes

Increased animal performance + stocking rate

Kg CO_2 per 100 kg LW added

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Main conclusions

▶ The case studies provide sound evidence that SPS simultaneously deliver gains in productivity and profitability, environmental improvements, and animal welfare benefits and thereby support a number of SDGs

▶ The same quantity of product can be produced on less land which can be released to native vegetation / carbon sinks. To avoid undesired rebound-effects, good governance, policies and incentives are required

▶ Public-private alliances, driven by strong farmer's organizations, have proven crucial in overcoming technical barriers

▶ National policies should support SPS adoption with specialized training for extension workers and technicians, dedicated credit lines and payment for environmental services and other incentives

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Approach of agri benchmark

- Production systems approach
  >>> more than financial data; reasons behind differences of economic results

- Partnership approach through networking
  >>> access local expertise and overcome language issues

- Cooperation with producers and advisors
  >>> get the story behind the data

- Global coverage
  >>> big players and emerging economies

- Using standardised methods world-wide
  >>> global comparability

- Works in countries without / with limited statistics and accounting
  >>> generate data that nobody else has

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Recent publications

Briefing paper 17/2

Measuring sustainability on cattle ranches
Silvopastoral systems

Ernesto Reyes[1], Alfredo Bellagamba[1], Juan José Molina[2], Lola Izquierdo[1], Claus Deblitz[1],
Julian Chará[2], Lesley Mitchell[3], Basia Romanowicz[4], Manuel Gómez[5], Enrique
Murgueitio[5]

[1] agri benchmark Beef and Sheep Network – Thünen Institute of Farm Economics, Braunschweig, Germany.
[2] Centre for Research on Sustainable Agricultural Production Systems, CIPAV, Cali, Colombia.
[3] Good Food Futures Ltd, Poling, UK
[4] World Animal Protection, London, UK
[5] Colombian Cattle Ranching Farmers Association, Bogotá, Colombia

**Colombia
case studies**

**Colombia,
Mexico,
Argentina
case studies**

in print

**Silvopastoral Systems
and their Contribution to Improved Resource
Use and Sustainable Development Goals:
Evidence from Latin America**

Global Agenda for Sustainable Livestock

Julián Chará, Ernesto Reyes, Claus Deblitz, Yelto Zimmer
agri benchmark - an introduction

agri benchmark – **passionate about facts**

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