Towards the sustainable transformation of cattle value chains in Nicaragua

Van der Hoek R., Paul B., Birnholz C., Mena M., Mora A., Notenbaert A.

CIAT

CGIAR Research Program on Livestock and Fish

The livestock sector in Nicaragua

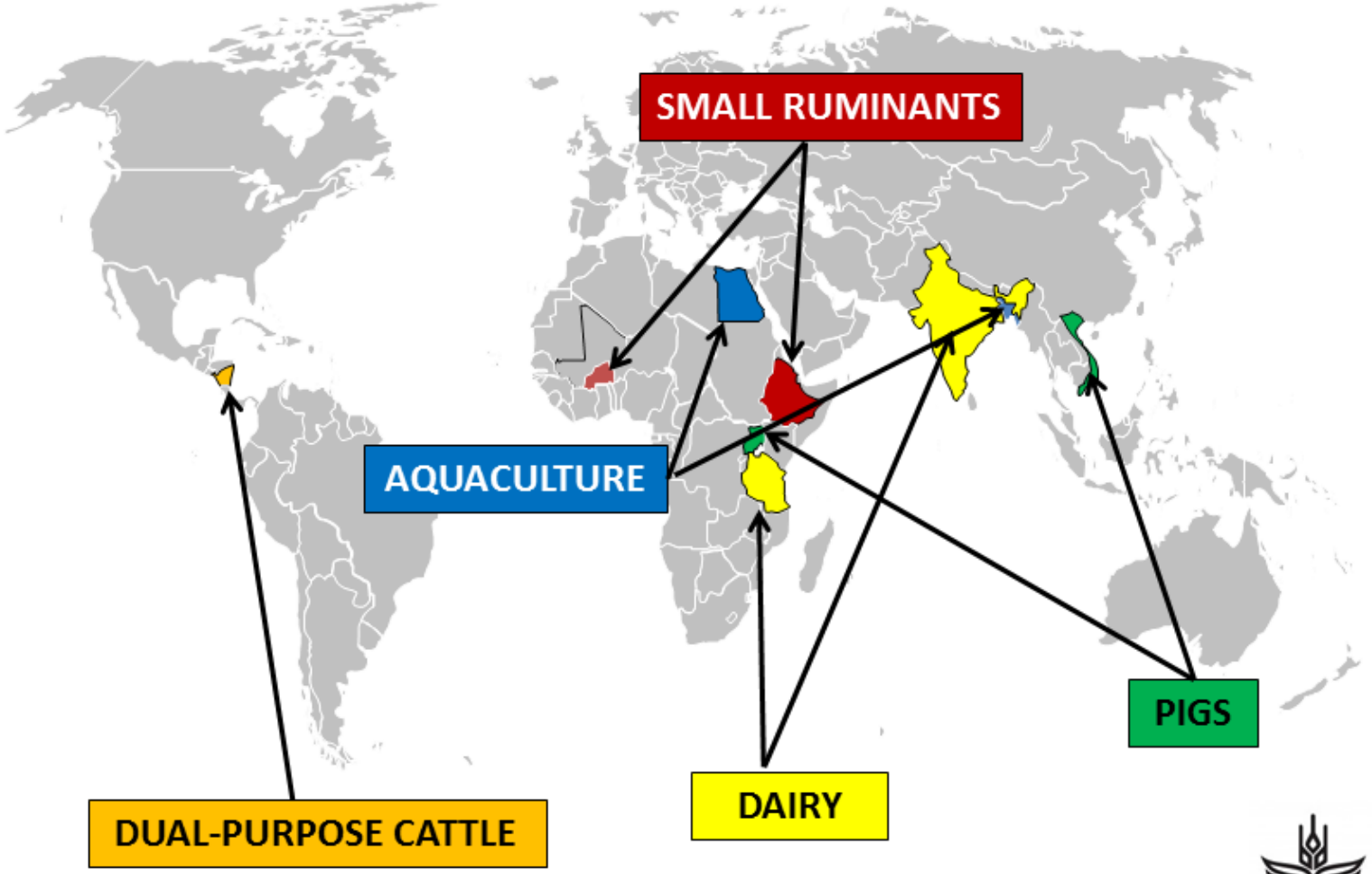
- Major pillar of the economy + increasing demand
- Extensive production, soil degradation, deforestation
- 63% of GHG emissions

→Opportunities for **income** and **employment** along the value chains

→Interventions to **mitigate GHG emissions** and **recuperate degraded soils**.

→Improved **pasture systems** for increased productivity and reduced GHG emissions

The CGIAR Research Program on Livestock and Fish



→Pro-poor and sustainable transformation of animal-source food value chains

CGIAR Research Program on Livestock and Fish

Environmental impacts along value chains

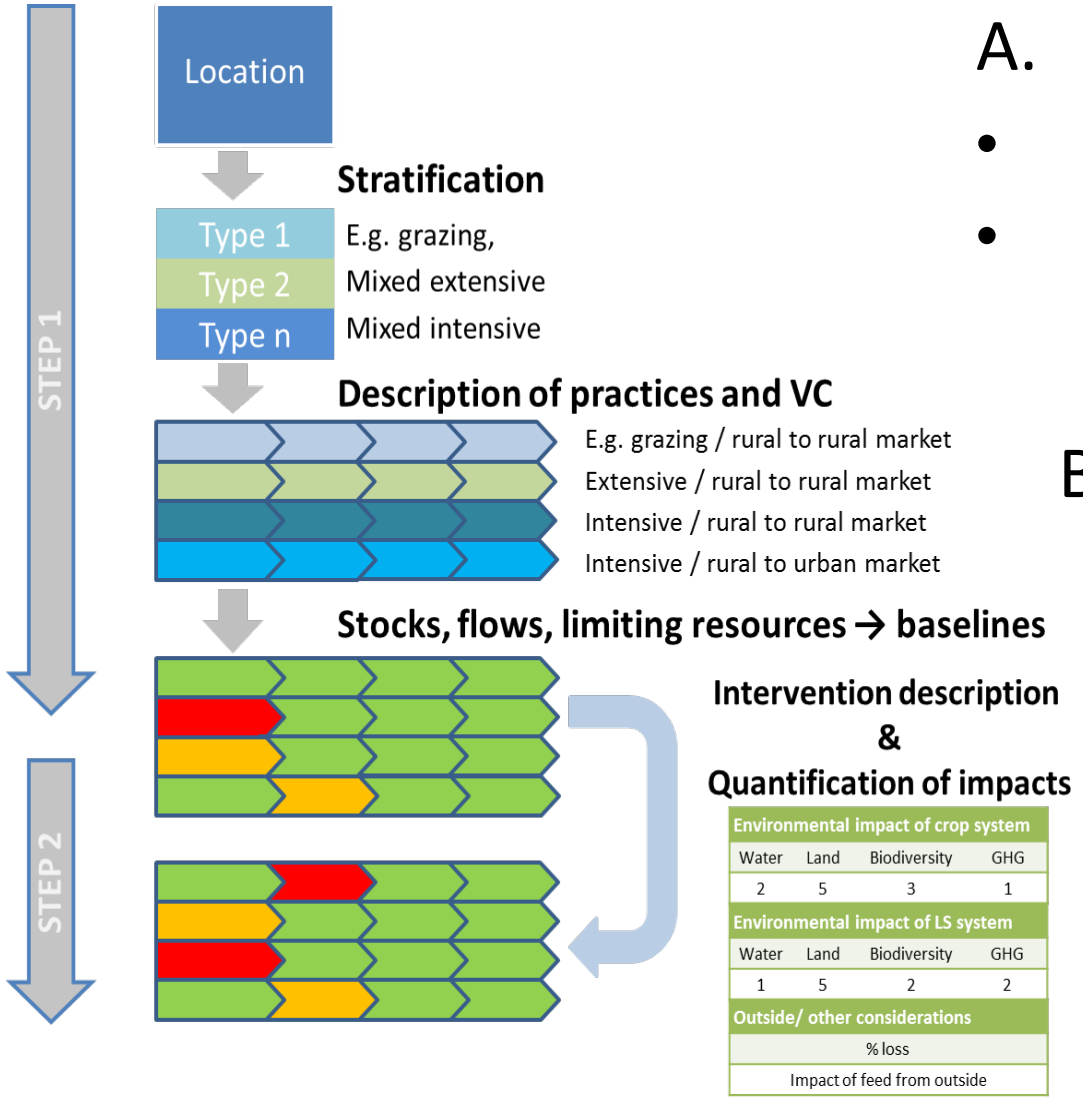
1. Feed cultivation/ Grazing land man.

2. Livestock rearing, including manure man.

3. 'Multiplied' by losses/waste, along the value chain all the way to actual consumption

Greatest environmental impacts = 1 + 2

Operationalizing the framework



A. Setting the baseline
- Stratification
- Description

B. Ex-ante assessment
- Intervention description
- Local impact assessment
- Out-scaling

Scenario of change: sustainable intensification

- Improved pastures (e.g., Brachiaria)
- Planting of trees and forage shrubs on farm
- Improved breeds
- 100% milk yield increase (700 - 1400 kg/yr)

(Ex-ante) assessments

1. Productivity:
   - Area dedicated to feed production
   - kg Fat and Protein Corrected Milk (FPCM)/ha/yr

2. GHG emissions:
   - Total emissions of methane, nitrous oxide, carbon dioxide - IPCC Tier 1 and 2

Intervention scenarios

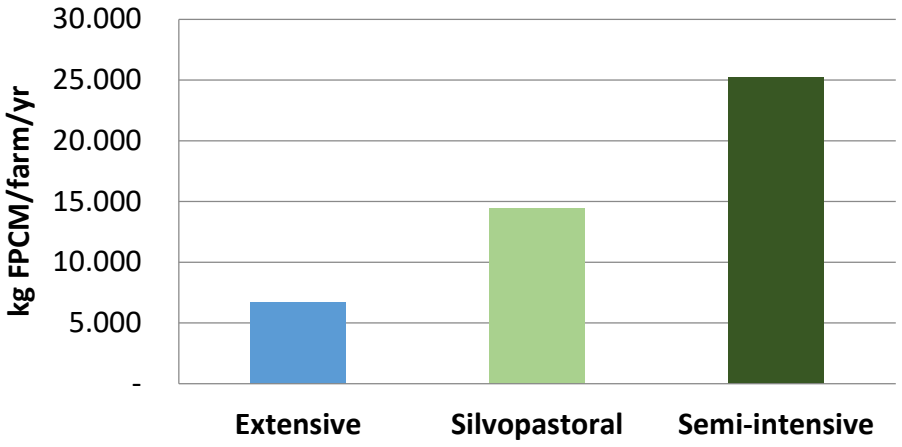
	1. Traditional extensive system		2. Silvopastoral system with improved pastures		3. Silvopastoral system with improved pastures and improved cattle	
Livestock category	N	Annual milk production (kg/animal/yr)	N	Annual milk production (kg/animal/yr)	N	Annual milk production (kg/animal/yr)
Traditional dairy cows	8	700	12	1000		1400
Improved cows	-	-			15	
Other adult cattle	14	-	8		10	
Calves	8	-	9		10	

Intervention scenarios

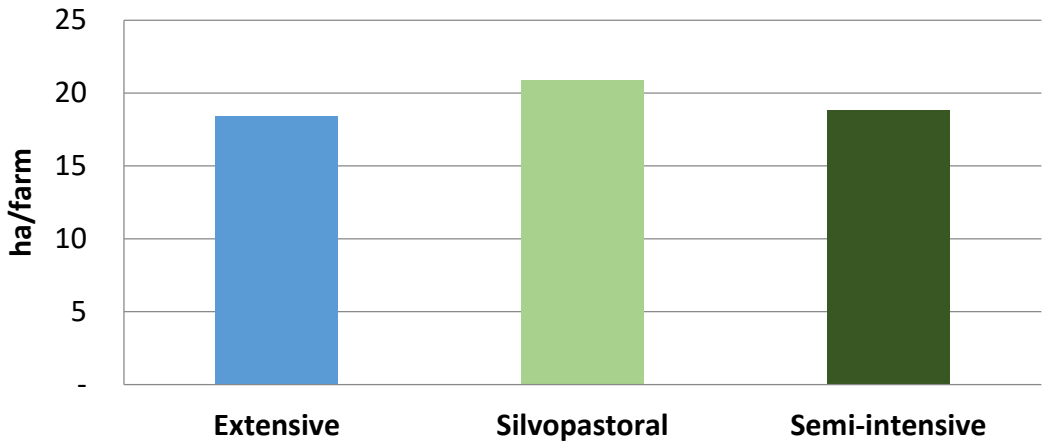
	Scenario	proportion of feed item in feed basket (%)	
		wet season	dry season
Traditional pastures	all	100%	30%
Improved (*Brachiaria*) pastures	3	100%	40%
Maize - crop residues	all	0%	10%
Napier grass (*Pennisetum purpureum*) - green fodder	all	0%	50%
Leucaena leucocephala (tree legume)	2, 3	10%	20%

Productivity

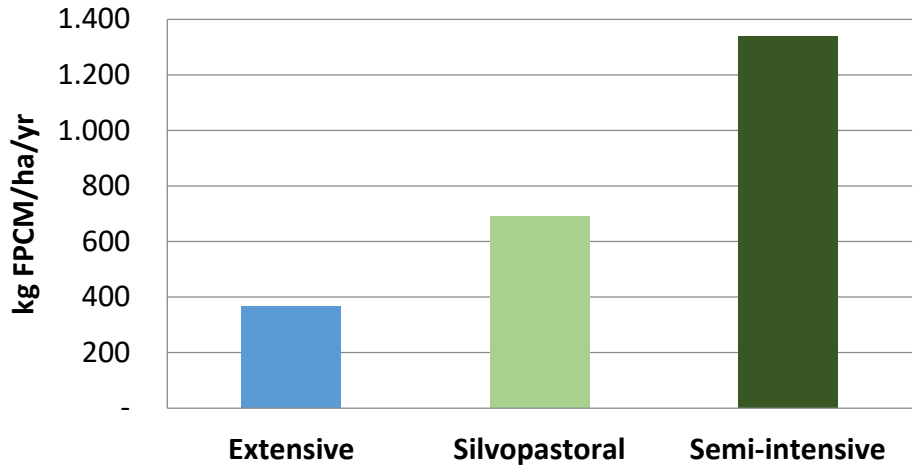
milk production increases

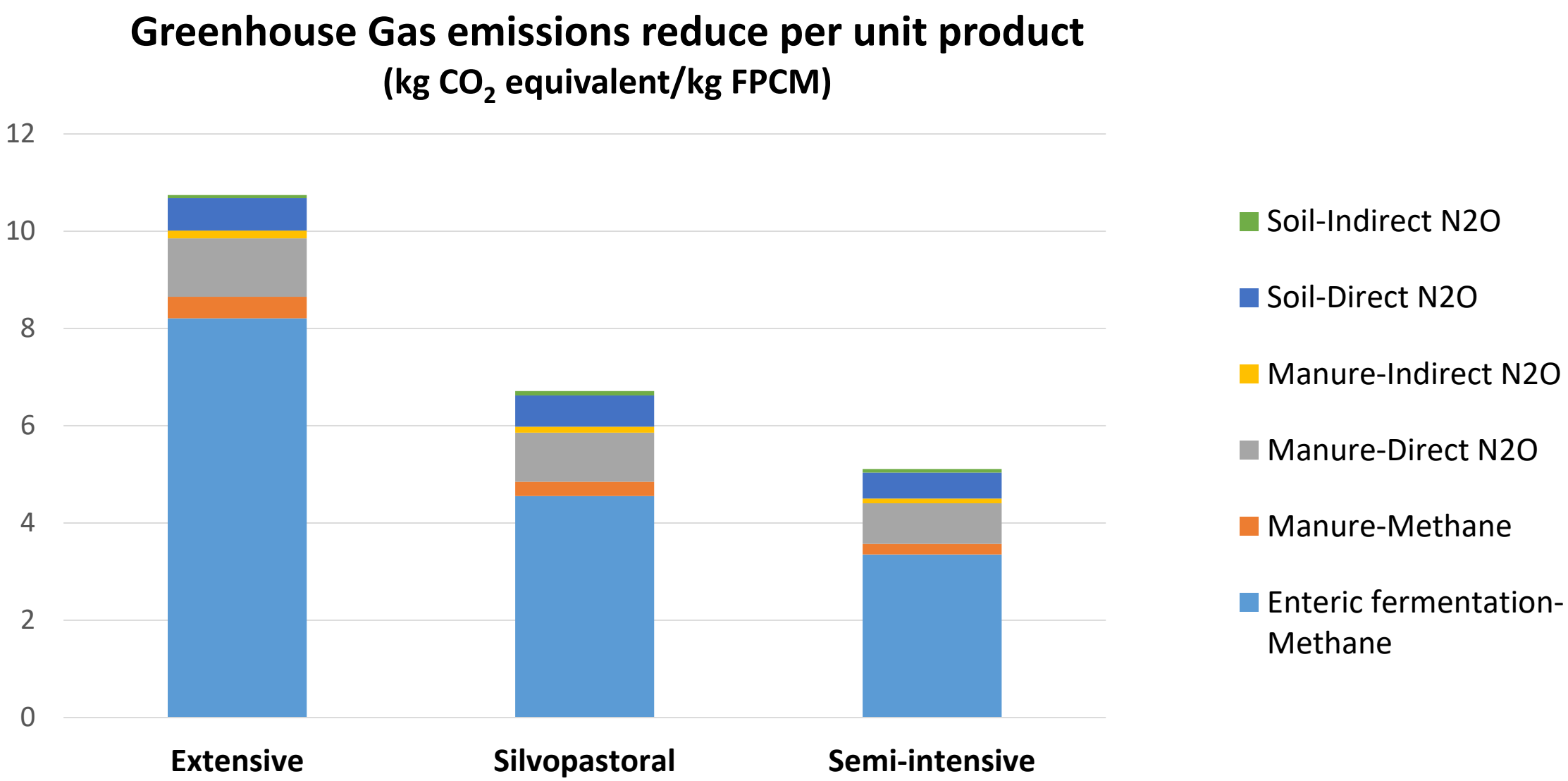


area for feed remains constant



milk productivity improves




Greenhouse Gas emissions reduce per unit product
(kg CO_2 equivalent/kg FPCM)
12
10
8
6
4
2
0
Extensive
Silvopastoral
Semi-intensive
Soil-Indirect N2O
Soil-Direct N2O
Manure-Indirect N2O
Manure-Direct N2O
Manure-Methane
Enteric fermentation-Methane

Conclusions and next steps

- Allows for rapid feedback (farmers and other value chain actors)
- Input data
- Additional farm types and intervention scenarios
- Ground-truthing through stakeholder feedback
- More user-friendliness for participatory running of scenarios


Thank you!