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Identification and valuation of ecosystem services and environmental benefits in livestock farming

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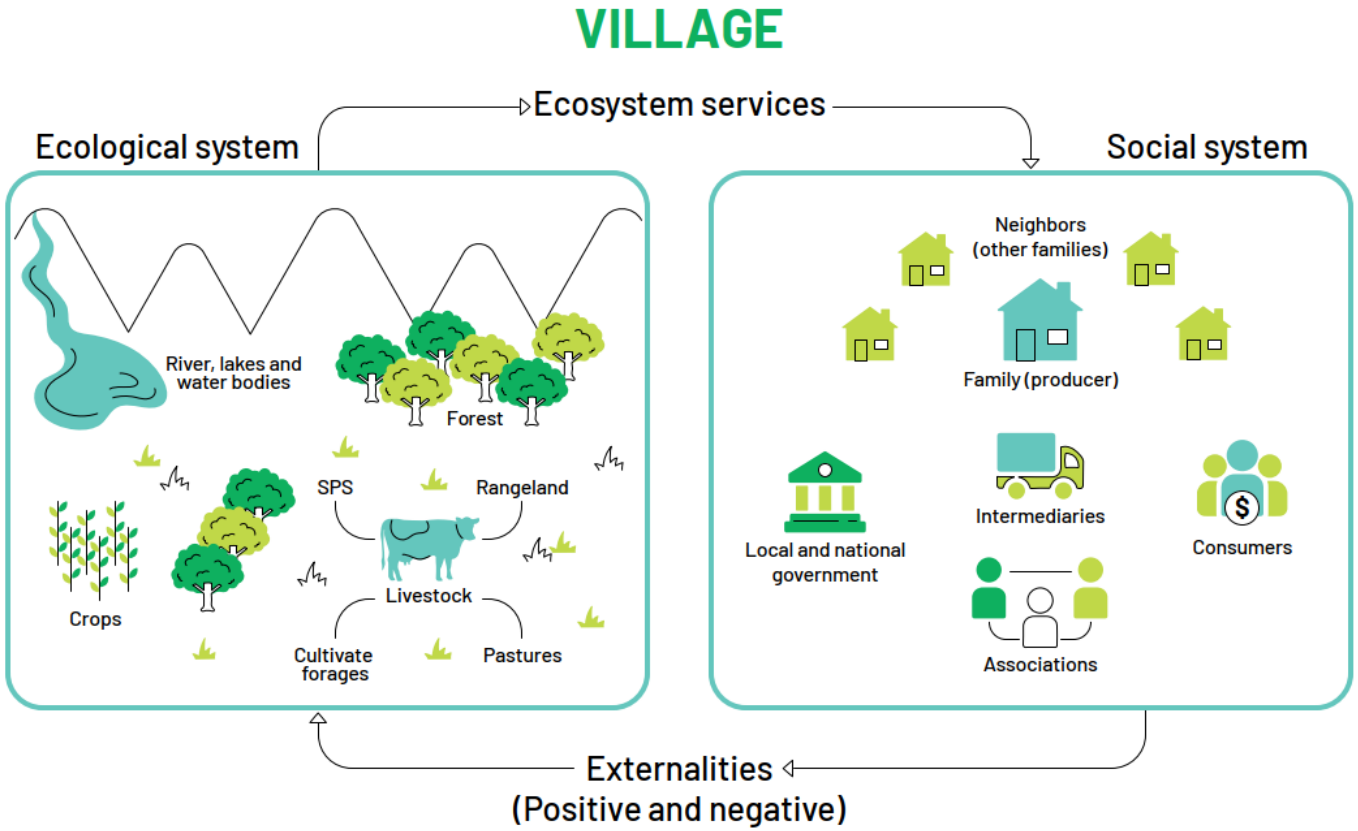
One Planet - Sustainable Bioeconomy Solutions for Global Challenges

The socio ecological system in livestock farming:
Human in nature



Flórez et al. 2023

Objective and methods

Objectives

- Identify the main ecosystem services and environmental benefits in livestock systems.
- Propose an integral valuation strategy.
- Incorporate integral value in economic evaluations of sustainable interventions.

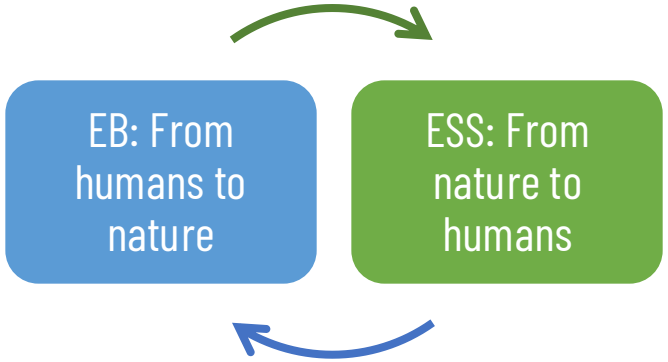
Methods

- Literature review.
- Ecosystem Services Advisory Group.
- Applications and validation in field studies in Colombia and Kenya.

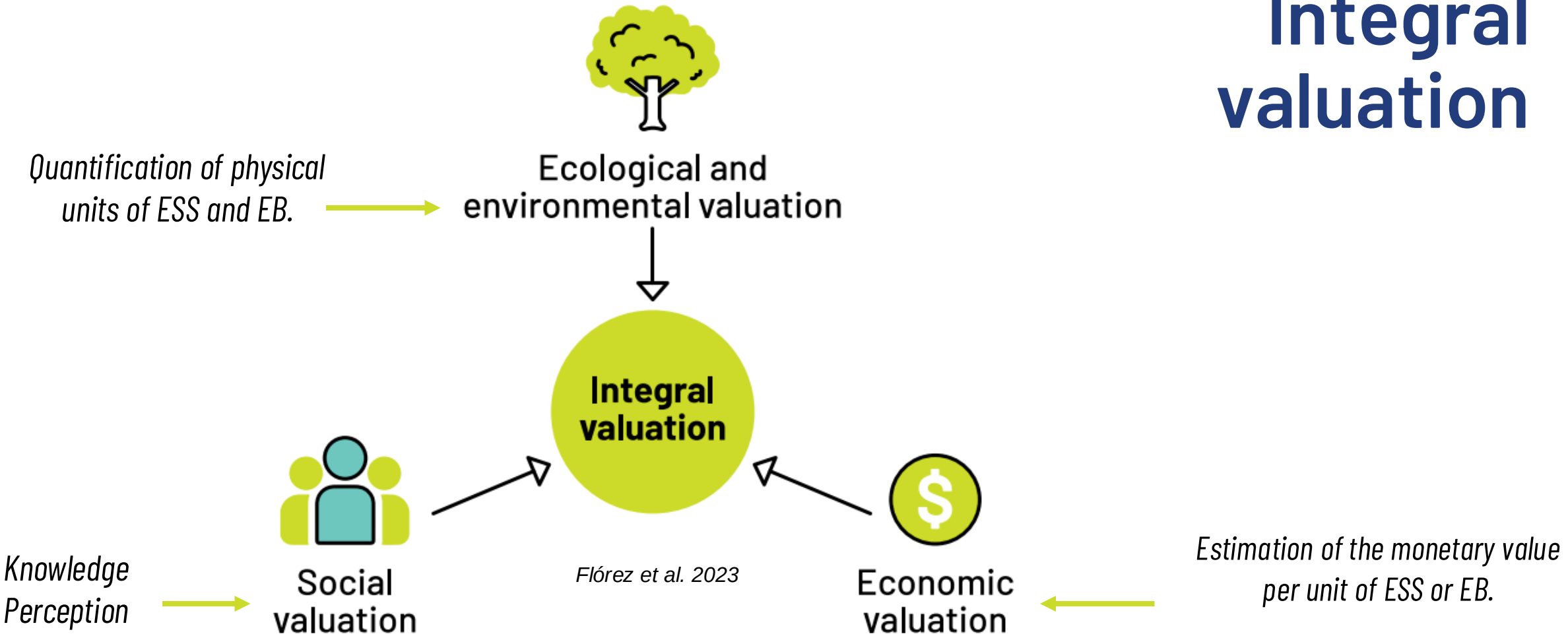
Identification of ecosystem services and environmental benefits

Name	Type	Pastures	Cultivated forages	Rangelands	Agro-Silvo-Pastoral Systems
Food	Ecosystem service	✓	✓	✓	✓
Feed	Ecosystem service	✓	✓	✓	✓
Carbon storage and sequestration	Ecosystem service		✓	✓	✓
Microclimatic regulation	Ecosystem service			✓	✓
Soil fertility	Ecosystem service	✓	✓	✓	✓
Habitat for species	Ecosystem service		✓		✓
Aesthetic appreciation	Ecosystem service			✓	✓
Methane emissions reduction	Environmental benefit	✓	✓	✓	✓
Water use reduction	Environmental benefit			✓	✓
Land use reduction	Environmental benefit	✓	✓	✓	✓

Flórez et al. 2023



Integral valuation



Implementation in Colombia and Kenya

Reference	Implementation	Country	ESS and EB	Ecological value	Economic value $US
Sandoval et al. 2023	Silvopastoral system Improved pastures Beef production	Colombia	Methane emissions reduction	144 $KgCO_2eq$/animal/year	6
			Microclimatic regulation	Shade coverage 60.4%/ha/year	2,026
Gonzalez-Quintero et al. 2024	Silvopastoral system Improved pastures Dairy production	Colombia	Milk carbon footprint reduction	1,813 $KgCO_2eq$/animal/year	58
			Microclimatic regulation	Shade coverage 5.9%/ha/year	411
Gonzalez-Quintero et al. 2023	Improved pastures Good cattle husbandry Pasture management practices Beef production	Colombia	Beef carbon footprint reduction	239 $KgCO_2eq$/animal/year	9
Gonzalez-Quintero et al. 2024	Improved pastures Dairy production	Kenya	Milk carbon footprint reduction	In process Life cycle analysis	In process Carbon market prices
Flórez et al. 2024	Improved pastures Dairy production	Kenya	Milk carbon footprint reduction	In process Social valuation: knowledge, perception and use	In process Discrete choice experiment and public goods game

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Conclusions

The integral value of ecosystem services and environmental benefits will provide crucial support for informed decision-making on specific restoration initiatives, considering the project's objectives and the potential return on investment. In particular, integral valuation represents an opportunity for the design of economic instruments that allow financing sustainable technologies, for example carbon credits, biodiversity bonds, and Payment for Ecosystem Services (PES).

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Thanks!

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