Can silvopastoral systems be used as as a tool for adaptation and mitigation to Climate change?

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Side Event: Accesing Climate Change Finance for SLM
Yes We Can?

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Outline

- Impacts of climate change on livestock productivity and land degradation

- How can silvopastoral systems contribute to improve productivity and promote SLM

- Silvopastoral systems and their potential for accesing mitigation/adaptation funding

Facts about livestock production- grazing systems

- Livestock occupy more than 40% of agricultural land (up to 60% in some areas in Central America)
- More than half of the area of pastoral land is degraded - leading to severe environmental degradation (goods and services)
- It is estimated that the forestry and land use sector contributes close to 25% of the global emission of green house gases - with livestock production contributing significantly

Climate change and pasture land degradation

- Traditional pastoral systems are vulnerable to climate change becuase they are generally based on simplistic grass monocultures.
- More than 60% of area under pastures are degraded.
- Some studies to quantify on-site losses of degradation but there is need for more in-depth analysis to quantify off-site losses and benefits.

Silvopastoral systems and adaptation to climate change

- SPS have greater diversity of multi-purpose woody species adapted to drought conditions and they contribute to increase the resilience of livestock systems to climate change:
  - Shade trees have impacts on reducing heat stress on animals and contribute to improve productivity
  - Improved forage value and productivity and body condition of animals
  - Reduced overgrazing and hence land degradation

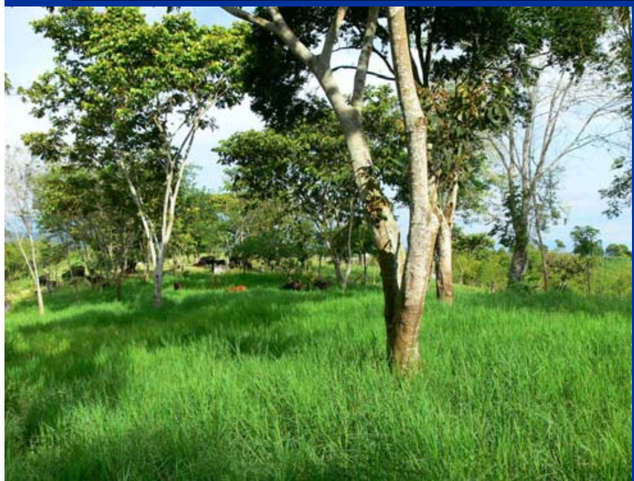
Silvopastoral systems: trees in pastures and their importance in adaptation to climate change

- Diversity of tree species in pastures
- Production of high value forage and fruits in the dry season and this contributes to mitigate shortage of feed in prolonged dry conditions
- Improved nutrient cycling
- Erosion control

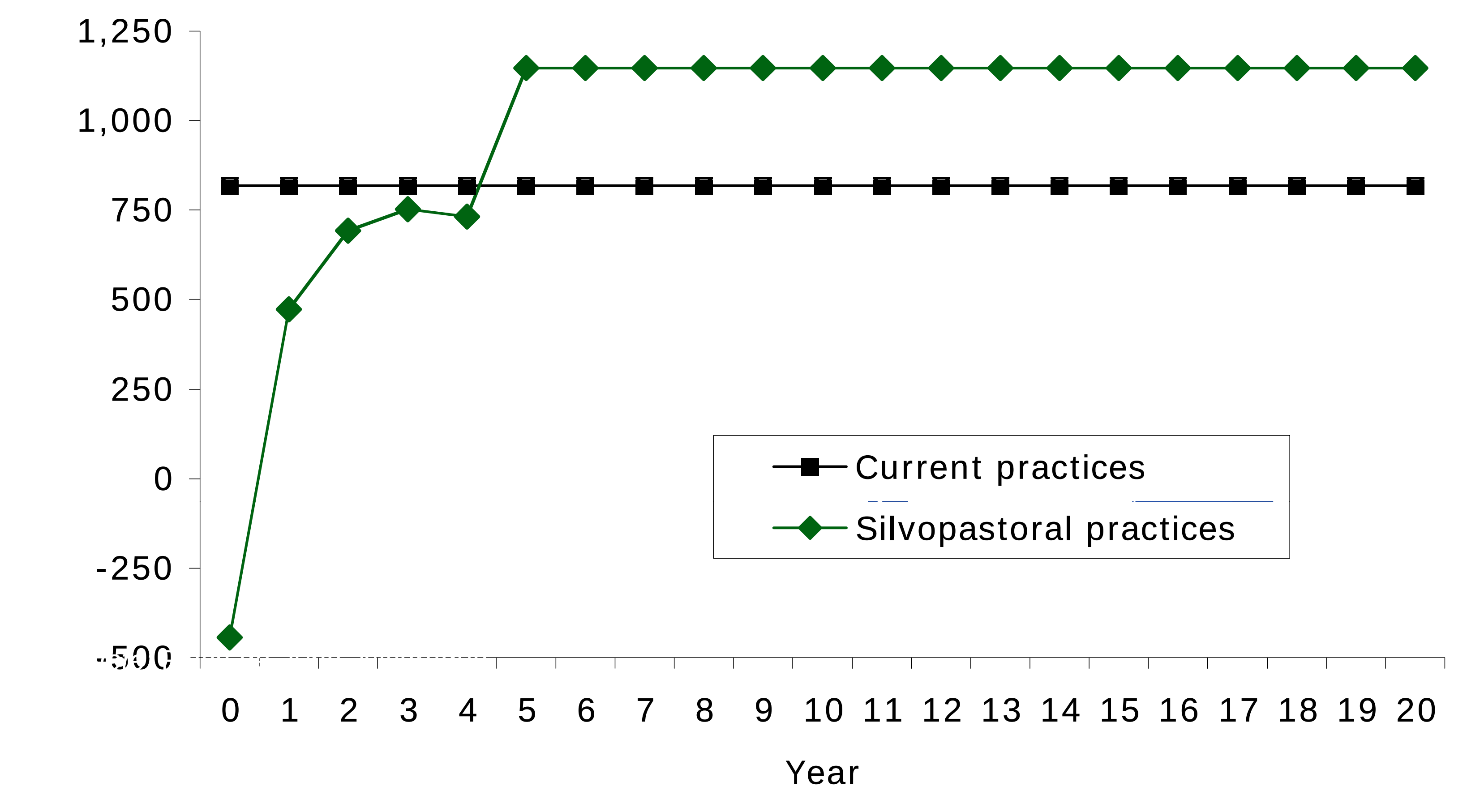
Productivity in grazing systems

Indicator	Improved grasslands without fertilization	Intensive Silvopastoril system
Carrying Capacity (UGG ha^{-1})	2,88	4,19
Milk production Lt ha^{-1} $año^{-1}$	4268	6213 (+45,57%)
Meat Production (Kg)	140	140

GEF Project



Sustainability of good practices

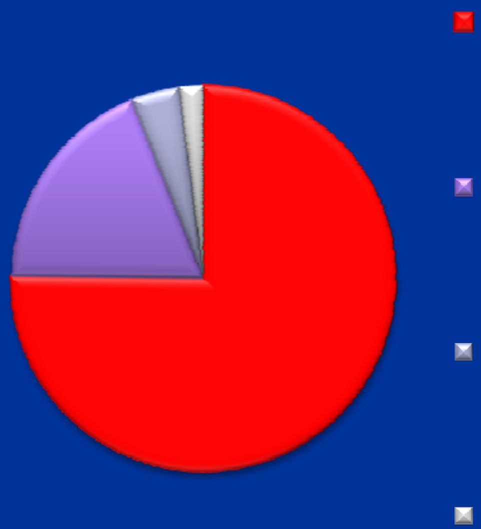


CO2-sequestration in pasture and SSP systems

Emission of GHG in livestock systems

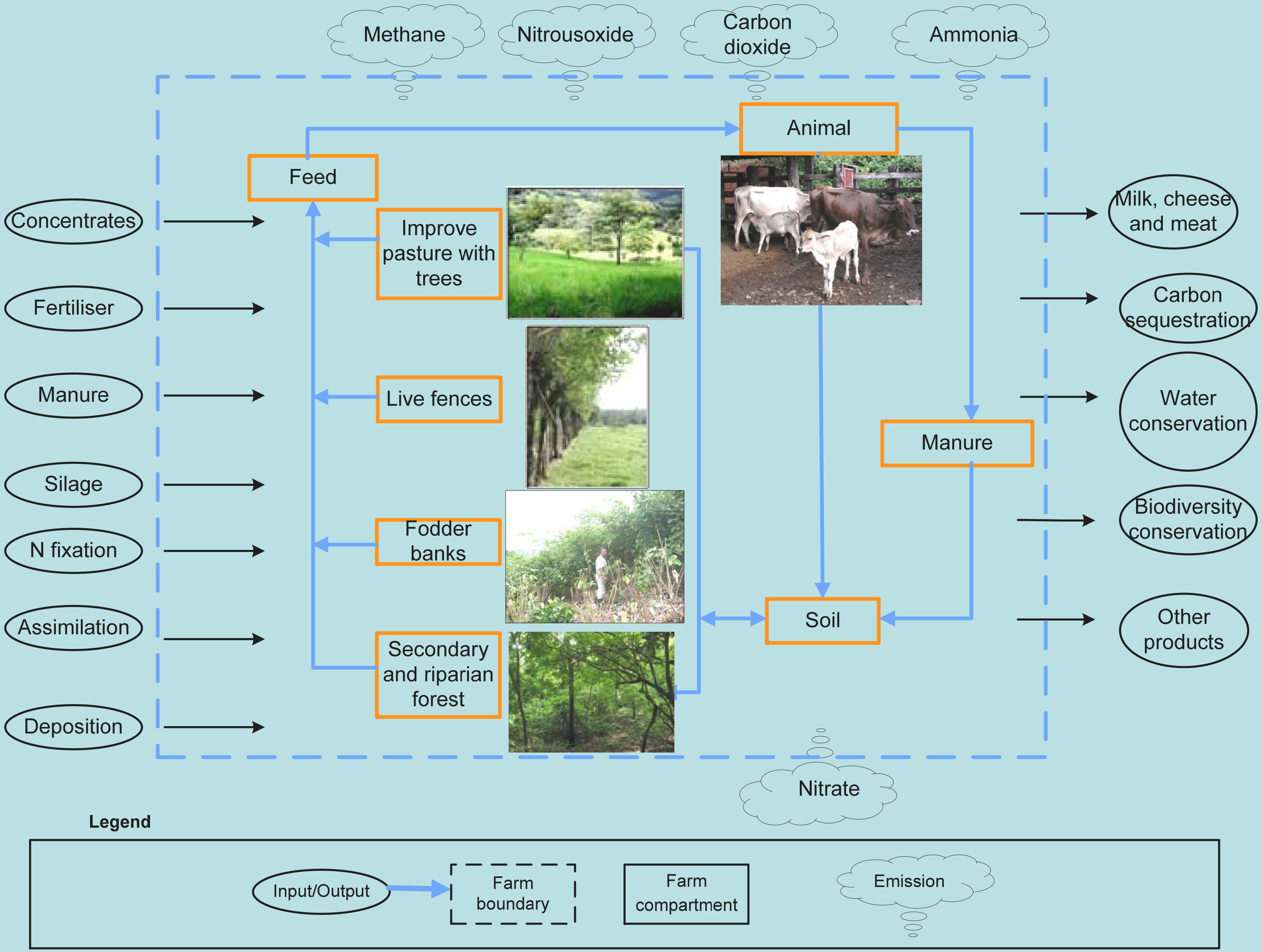
The livestock sector releases 37% of anthropogenic methane (mainly from ruminant entheric fermentation) and 65% of anthropogenic nitrous oxide, coming largely from grazing systems in Asia and Latin America *Livestock Emissions & Abatement Research Network*).

Breakdown of emissions from livestock systems. Esparza, Costa Rica.

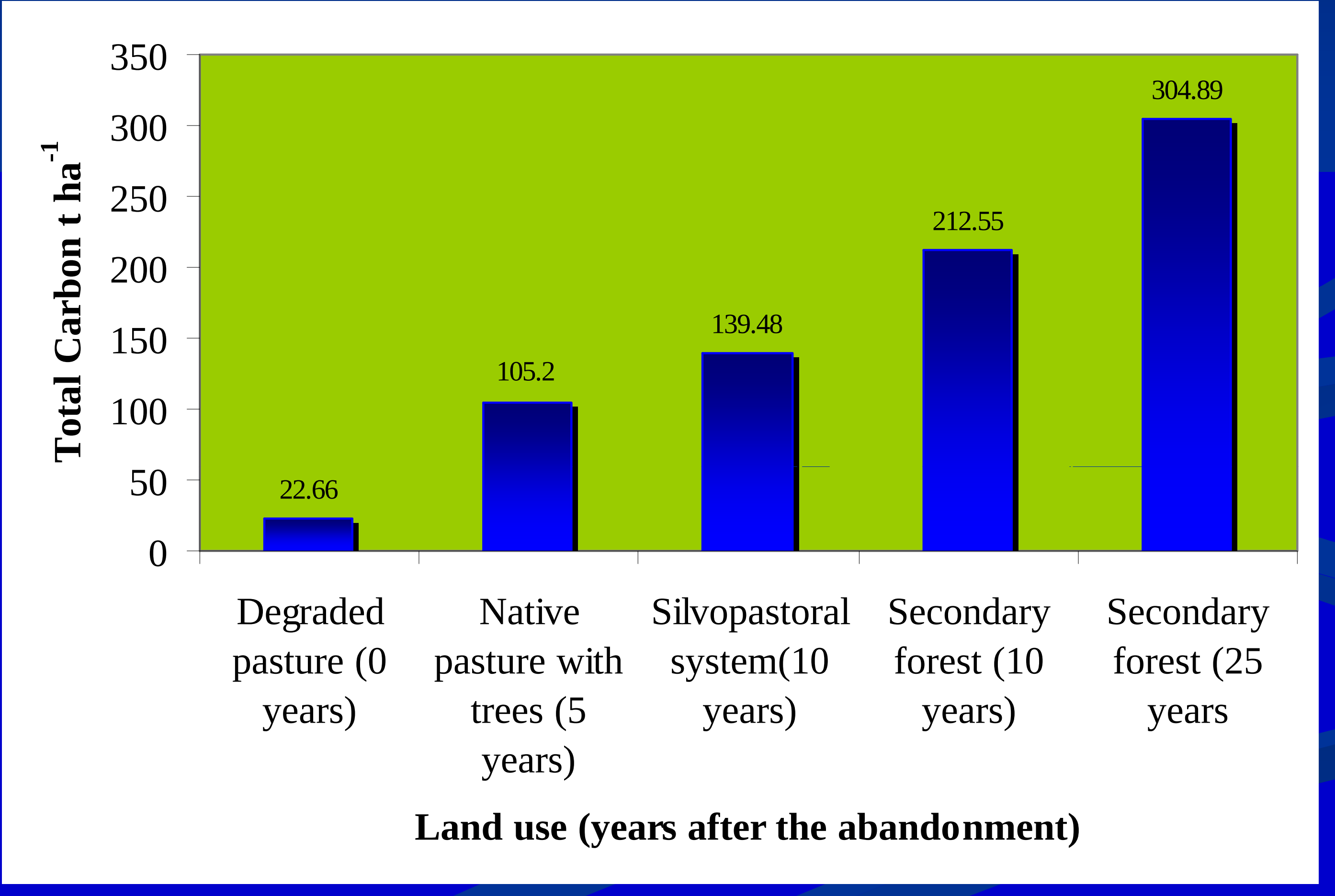


Emissions from enteric fermentation are produced by the digestion of animals, in which a large part of energy is lost through gases, instead of being transformed into meat and milk (Johnson et al 1996, citado por Mora 2000).

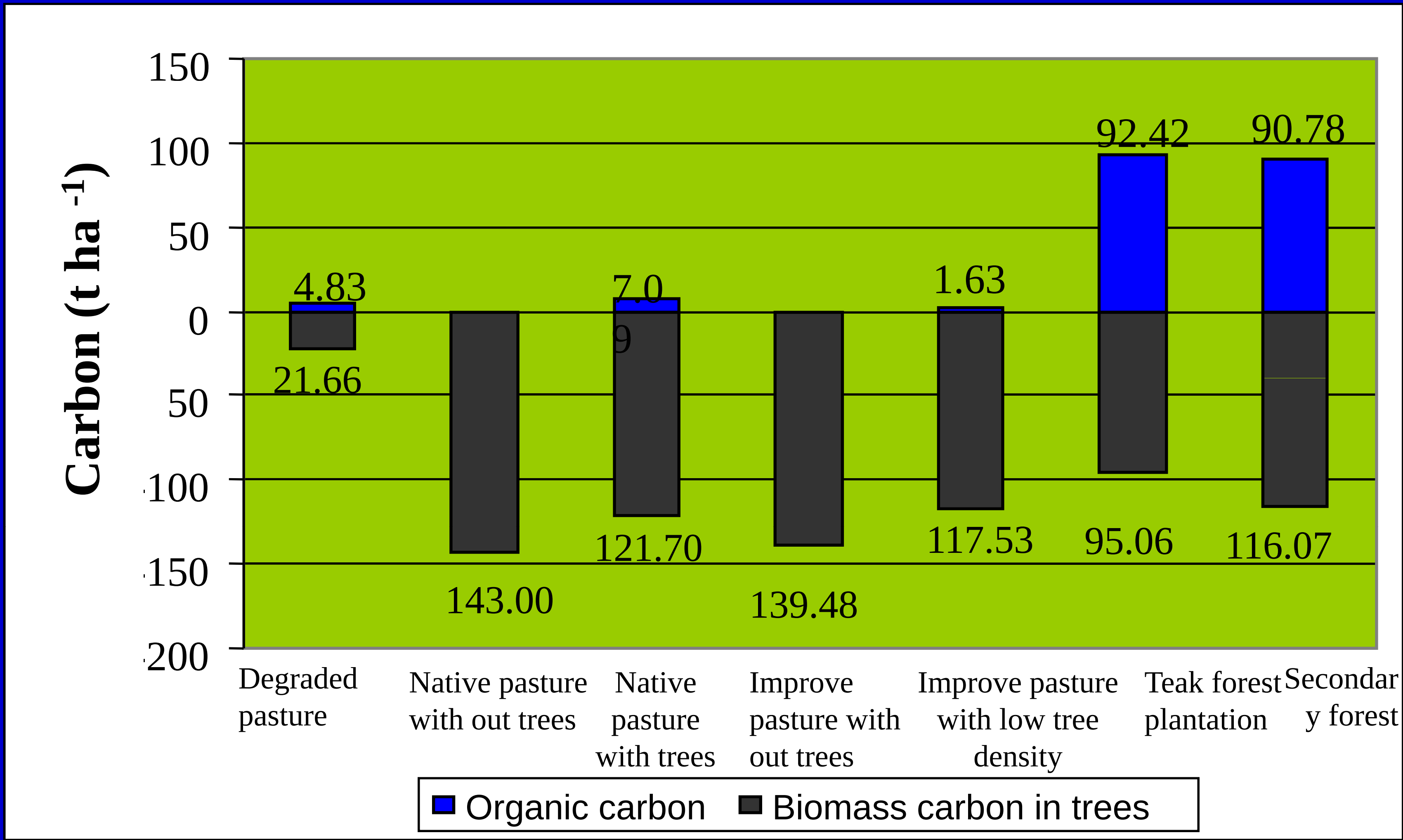
Carbon and nitrogen flow diagram of silvopastoral systems, Schils et al. 2005



Simulation of carbon stock (organic carbon and tree biomass in different land uses in Esparza, Costa Rica, 2004.



Above and below ground carbon stocks in land uses, Esparza, Costa Rica, 2004.



How silvopastoral systems contribute to reduce emissions

- Better feeding value or forage value is associated with reduced emissions of methane during fermentation, also leguminous trees fix N and therefore high levels of N20 fertlizers are not used and this contribute to a reduction in N2O emissions

- Possible offset on other gases- NH3 and NO3 can be established

- Farmers can adapt strategies: feeding to reduce CH4 and N20, and sequester C

CO2-sequestration in pasture and SSP systems

- Productive and SSP systems can be a cost effective way of offsetting C emissions:

- Wood can also substitute for fossil fuel in energy production and for building materials such as steel and cement

- Silvopastoral systems are eligible for reducion in emission of greenhouse gases – *Voluntary carbon markets*

Conclusions

- Silvopastoral systems are win-win systems in that they contribute to enhance or maintain productivity and are resilient to climate change

- Silvopastoral systems not only contribute to carbon sequestration and further reductions in emission of greenhouse gases: methane, nitrous oxides (Compliance and voluntary markets)