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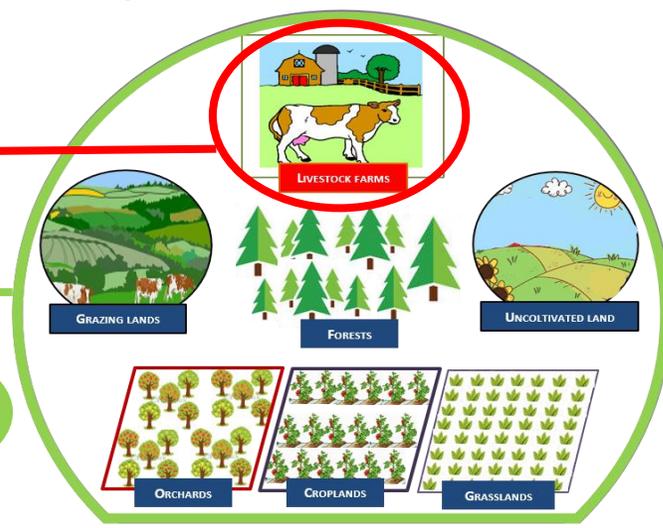
EGU 2021-7959 - Session ERE1.5 Land use dynamics, land degradation and insights for land sustainability in agriculture and forest landscapes



A land-based approach for climate change mitigation in the livestock sector

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Carbon neutral livestock systems:
Land-based mitigation options applied at small-scale rural landscape level can reduce and completely offset the GHG livestock emissions of the same area



STEP 1 - Livestock GHG emissions (Life Cycle Assessment – LCA)

STEP 2 - Mitigation potential from sustainable land-use options

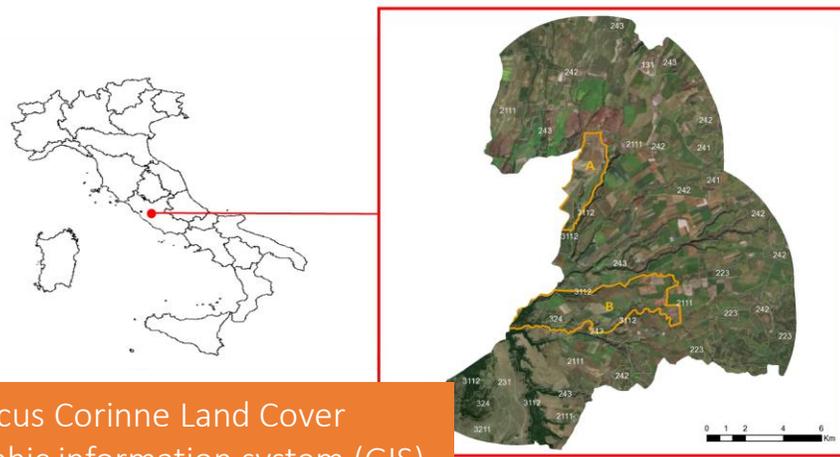
- 1) Improvement of the diet in ruminants (*feed additives – lipids*)
- 2) Biogas production from manure management
- 3) Sustainable use of synthetic nitrous fertilizers
- 4) Sustainable management of agricultural soils (*minimum/no tillage*)
- 5) Maintenance of natural herbaceous cover in orchards
- 6) Sustainable agricultural wastes management (*soil incorporation/bioenergy*)
- 7) Land use change from annual to perennial croplands
- 8) Land use change with afforestation (*coppice/high forests*)

- Increase C sink
- Emissions reduction
- Avoided emissions

	Area	Dimension	Mitigation potential (Mg CO ₂ eq year ⁻¹)	GHG emissions
Livestock GHG emissions	Livestock farm A+B	850 heads of beef cattle, 150 heads of dairy cattle, 60 horses		3,932
Land-based mitigation options	1) Improvement of the diet in ruminants	Livestock farm A+B	1,000 heads of beef and dairy cattle	370
	2) Biogas production from manure management	Livestock farm A+B	1,000 heads of beef and dairy cattle	830
	3) Sustainable use of synthetic nitrous fertilizers	Livestock farm A+B	800 ha	97
		Extra-farms area	20% of available arable land in the extra-farms area of the pilot	185
	4) Sustainable management of agricultural soils	Livestock farm A+B	800 ha	664 - 1024
		Extra-farms area	10% of available arable land and annual crops in the extra-farms area of the pilot	650 - 1010
	5) Maintenance of the natural herbaceous cover in orchards	Extra-farms area	20% of available land in the pilot	235
	6) Sustainable management of agricultural residues	Extra-farms area	20% of available land in the pilot	140 - 557
7) Land use change from annual to perennial croplands	Pilot area	2% of available arable land in the farms' area and extra-farms area of the pilot	450	
8) Land use change with afforestation/ reforestation	Extra-farms area	50% of natural grasslands of the pilot	290 - 320	

GHG emissions from livestock activities in the pilot area 3,932
Total maximum mitigation potential achievable in the pilot area 3,925 - 5,090

Rural district: case study in Viterbo (Italy)



Copernicus Corinne Land Cover Geographic information system (GIS)