

Table S1. Analytical composition of the feed used in the Massese farm expressed as % on fresh matter, and flock intake expressed as kg dry matter per head per day.

Feed	DM	CP	EE	CF	Ash	NFE	GE (MJ/kg)	Lactating sheep intake	Dry sheep intake	Young sheep intake	Rams intake
Polyphytic hay	92.11	8.31	1.20	30.77	7.70	44.13	16.08	-	0.42	0.42	0.41
Alfalfa hay	90.36	15.49	1.16	32.08	7.47	34.17	16.18	1.36	-	0.32	-
Pasture of alfalfa, clover, ryegrass and oat	20.75	3.35	0.63	6.50	2.18	8.10	3.69	0.40	0.80	0.60	1.30
Oat grain	88.00	11.00	4.50	10.50	4.00	58.00	16.60	0.35	-	0.26	-

DM: dry matter; CP: crude protein; EE: ether extract, CF: crude fiber; NFE: nitrogen-free extractives; GE: gross energy

Table S2. Analytical composition of the feed used in the Sarda farm expressed as % on fresh matter and flock intake expressed as kg dry matter per head per day.

Feed	DM	CP	EE	CF	Ash	NFE	GE (MJ/kg)	Lactating sheep intake	Dry sheep intake	Young sheep intake	Rams intake
Clover and oat hay	90.59	6.61	0.87	32.11	5.58	45.41	16.05	1.13	0.91	0.91	0.91
Pasture of clover and oat	23.50	3.20	0.55	5.00	2.10	12.65	4.15	0.31	0.20	-	0.49
Triticale grain	87.00	11.80	2.00	3.30	2.00	67.90	16.13	0.22	0.22	-	-
Dehydrated beet pulp	90.00	8.80	1.20	20.00	7.50	52.50	15.61	0.14	-	-	-
Purchased feed for lactating sheep	86.00	18.00	3.50	9.00	7.50	48.00	15.72	0.22	-	-	-

DM: dry matter; CP: crude protein; EE: ether extract, CF: crude fiber; NFE: nitrogen-free extractives; GE: gross energy

Table S3. Analytical composition of the feed used in the Lacaune farm expressed as % on fresh matter and flock intake expressed as kg dry matter per head per day.

Feed	DM	CP	EE	CF	Ash	NFE	GE (MJ/kg)	Lactating sheep intake	Dry sheep intake	Young sheep intake	Rams intake
Alfalfa hay	85.03	11.56	1.14	22.58	7.72	42.03	14.85	0.85	-	-	0.43
Oat, ryegrass and clover hay	87.63	8.82	1.24	26.64	8.12	42.81	15.19	0.88	1.05	0.44	0.87
Pasture of oat, ryegrass and clover	21.67	2.80	0.57	6.67	2.23	9.40	3.81	0.30	0.25	0.20	0.25
Barley straw	89.00	3.70	1.50	38.00	6.50	39.30	15.70	-	0.45	0.10	0.45
Barley grain	88.00	10.50	2.00	6.00	2.30	67.20	16.23	0.70	-	0.62	-

DM: dry matter; CP: crude protein; EE: ether extract, CF: crude fiber; NFE: nitrogen-free extractives; GE: gross energy

Table S4. Life cycle inventory (LCI) metadata from Ecoinvent v3.9.1

Input	LCI name
Sugar beet pulp dehydrated	sugar beet pulp dehydrated, animal feed, at plant/FR U - FR
Alfalfa dehydrated	alfalfa, dehydrated, conventional, at feed plant/FR U - FR
Barley grain	barley grain, feed production barley grain, feed Cutoff, S - RoW
Maize grain	maize grain, feed production maize grain, feed Cutoff, S - RoW
Oat grain	oat grain, feed production oat grain, feed Cutoff, S - RoW
Molasses	beet sugar production molasses, from sugar beet Cutoff, S - RoW
Soybean meal	soybean meal and crude oil production soybean meal Cutoff, S - RER
Wheat bran	wheat flour, animal feed, at plant/FR U - FR
Calcium carbonate	calcium carbonate (>63µm), processing/RER S - RER
Dicalcium phosphate	dicalcium phosphate, animal feed, at retailer gate/FR U - FR
Barley seed	barley seed production, for sowing Cutoff, S - RoW
Oat seed	oat seed production, for sowing Cutoff, S - RoW
Clover seed	clover seed production, Swiss integrated production, for sowing Cutoff, S - CH
Sowing	sowing Cutoff, S - RoW
Harrowing	tillage, harrowing, by rotary harrow Cutoff, S - RoW
Ploughing	tillage, ploughing Cutoff, S - RoW
Rolling	tillage, rolling Cutoff, S - RoW
Subsoiling	tillage, subsoiling, by subsoiler plow Cutoff, S - RoW
Harvesting	combine harvesting Cutoff, S - RoW
Haying	haymaking, by rotary tedder Cutoff, S - RoW
Mowing	mowing, by rotary mower Cutoff, S - RoW
Manure spreading	solid manure loading and spreading, by hydraulic loader and spreader Cutoff, S - RoW
Electricity	electricity, low voltage, residual mix Cutoff, S - IT
Transportation by lorry	transport, freight, lorry, all sizes, EURO5 to generic market for transport, freight, lorry, unspecified Cutoff, S - RER
Transportation by ship	transport, freight, sea, container ship Cutoff, S - GLO