



Progetto di Ricerca

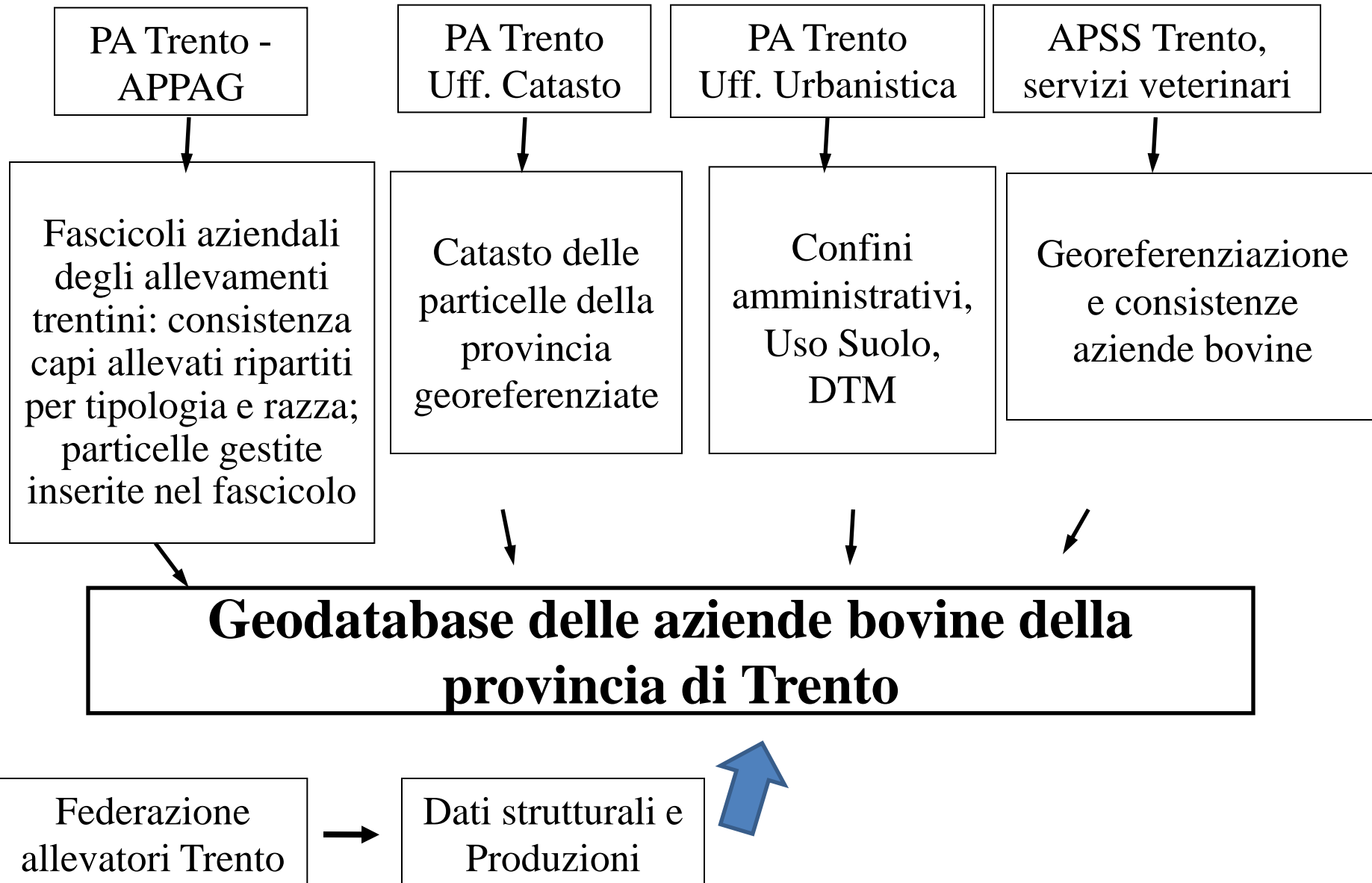
COWABILITY: “Adaptability of dairy cattle reared in Alpine territory “

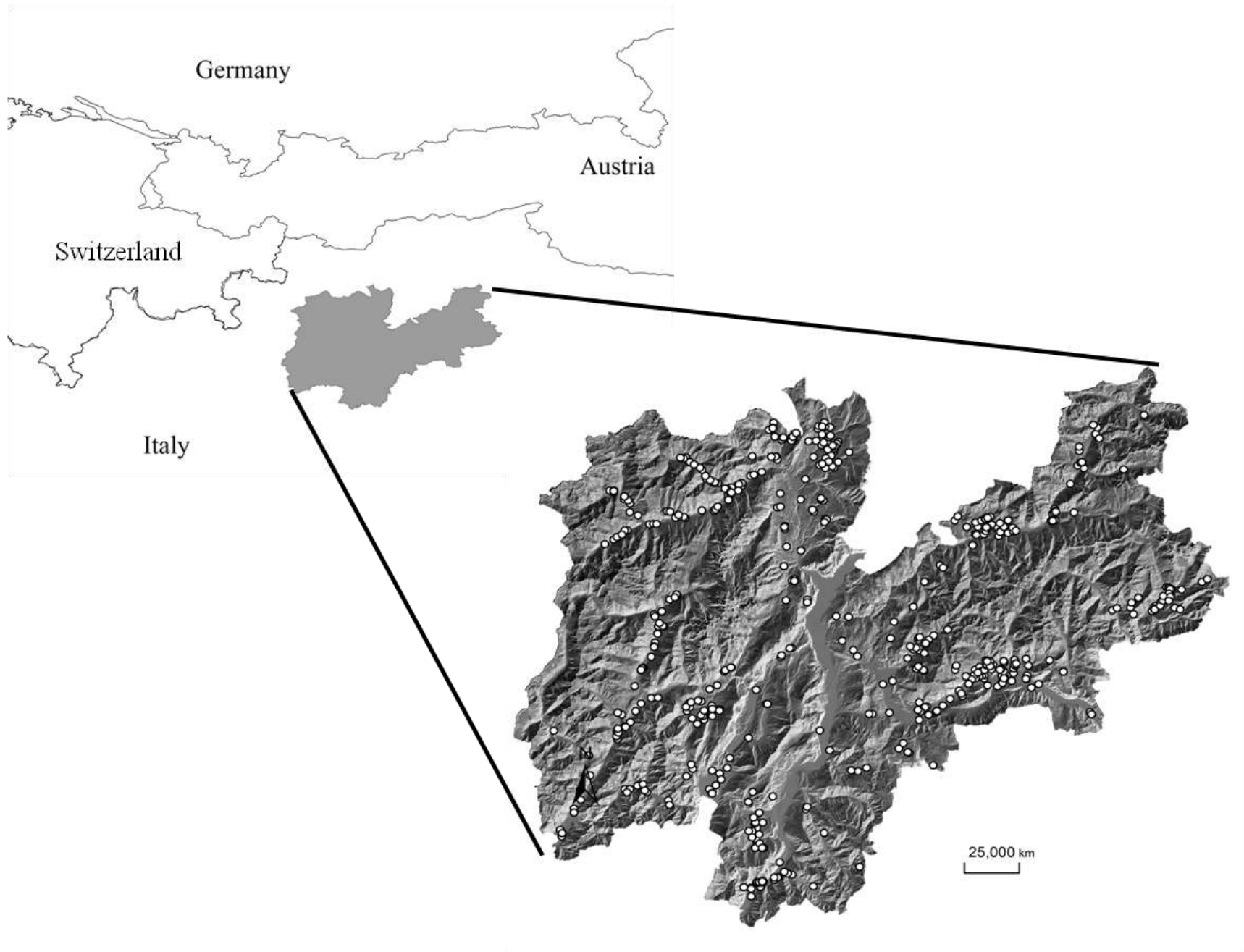
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Obiettivo generale e organizzazione

- selezionare una popolazione di bovini da latte in equilibrio con le risorse disponibili e con il territorio montano, e che sia garante della sanità degli animali e delle loro produzioni.
- *4 workpackage:*
 - 1) **Pianificazione territoriale e valutazione della suscettibilità aziendale in termini di impatto ambientale ed efficienza di utilizzo dell'azoto**
 - 2) Miglioramento genetico dell'attitudine casearia
 - 3) Valorizzazione della produzione della carne bovina
 - 4) Training and Workshop

Base Dati





Schema di lavoro proposto

- 1° obiettivo: carta della “vitalità zootecnica” della provincia di Trento (proposta articolo su Animal)

Dati cartografici: fascicoli aziendali, catasto, DTM, georeferenziazione aziende

Dati zootecnici: UBA allevati per categoria e razza (da BDN), dati strutturali su 719 aziende da latte e dati produttivi (test days su 680 aziende, dati FA)



Analisi multivariata per individuare tipologie di aziende zootecniche da mettere in relazione al territorio (es unità amministrative, comunità di valle)

Descriptive

	Complete databases		Sampled dairy farms	
	Total	Average /farm	Total	Average/ farm
National cattle register:				
Dairy farms (n)	1071	-	610	-
Cattle reared (heads)	38,214	35.7	29,645	48.6
Dairy cows reared (heads)	24,934	23.3	19,472	31.9
CONCAST ¹ database:				
Dairies		-	18	-
Associated farms		-	321/610	-
APPAG ² database:				
Agricultural parcels recorded (n)	281,980	25 ³	83,343	137
Surface of agricultural parcels (ha)	251,865	22.0 ³	23,085	37.8

Tipologie aziendali

- Individuazione delle tipologie aziendali sulla base di dati strutturali e gestionali (questionario federazione):
 - UBA aziendali
 - Stabulazione (fissa/libera)
 - Unifeed (si/no)
 - Silomais (si/no)
 - Alpeggio della vacche in lattazione (si/no)
- Analisi di raggruppamento non gerarchico (FASTCLUS)

Profili dei cluster

	Total sample	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Farms, No	610	307	153	36	114
Variable (% within cluster):					
Tie stall	73	86	100	78	0
Use of TMR	19	1	5	78	69
Use of Silages	18	0	19	100	40
Highland summer pastures ¹	55	100	0	51	8
Definition of dairy systems	-	Traditional (original)	Traditional without summer pastures	Traditional with silages	Modern

Dimensione della mandria

Item	All farms (mean)	Traditional dairy systems:			Modern dairy system	R ²
		original	without summer pastures	with silages		
Herd size ¹ , (LU×farm ⁻¹)	42.0	19.0 ^a	23.0 ^a	57.2 ^b	72.4 ^b	30.5
Dairy cows ¹ , (heads×farm ⁻¹)	31.9	14.0 ^a	17.7 ^b	42.8 ^c	55.5 ^c	30.3
Replacement calves and heifers ¹ , (heads×farm ⁻¹)	16.7	7.2 ^a	7.7 ^a	19.7 ^b	30.0 ^c	28.6
Replacement cattle for every 100 cows	52.3	50.2 ^{ab}	46.2 ^a	52.8 ^{ab}	56.4 ^b	1.5

Razze

Item	All farms	Traditional dairy systems:			Modern dairy system
		original	without summer pastures	with silages	
Holstein Friesian	21	8 ^a	22 ^b	42 ^c	50 ^c
Brown Swiss	46	50 ^b	50 ^b	28 ^a	36 ^a
Simmental	10	12 ^b	11 ^b	12 ^b	4 ^a
Alpine Grey	7	10 ^b	4 ^a	4 ^b	1 ^a
Rendena	7	11 ^b	4 ^a	5 ^{ab}	2 ^a
Other/crossbred	8	8 ^b	9 ^b	9 ^b	6 ^a
Single-breed farms (%)	31	37	24	14	31

Produzioni

Item	All farms	Traditional dairy system:			Modern dairy system	R ²
		original	without summer pastures	with silages		
Milk yield, (kg×d ⁻¹)	20.4	18.8 ^a	19.2 ^a	22.3 ^b	25.7 ^c	27.6
Casein,(%)	2.71	2.69 ^a	2.72 ^{ab}	2.73 ^{ab}	2.75 ^b	2.3
Fat,(%)	3.94	3.90 ^a	3.97 ^b	4.01 ^b	3.98 ^b	2.6
Somatic cell score	3.22	3.22	3.22	3.42	3.15	0.5
PDO cheese producers ¹ ,(%)	53	64	48	8	41	-

Means with different superscripts within row differ significantly: a,b,c=P<0.05

¹ Percentage of farms associated to cooperative dairies producing mainly traditional ripened PDO cheeses.

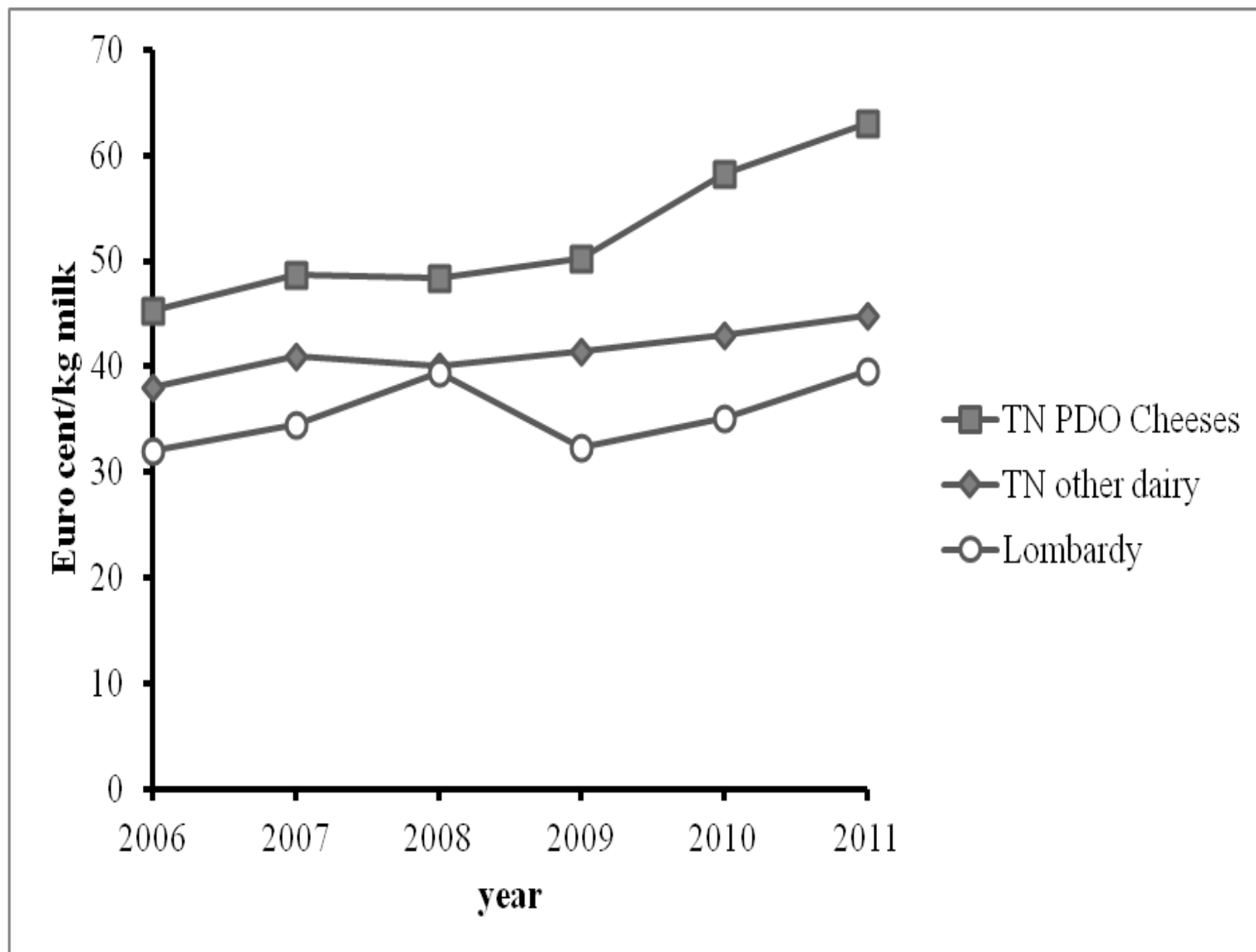
Zootecnia e territorio

Item	All farms	Traditional dairy systems:			Modern dairy system
		original	without summer pastures	with silages	
Elevation (m asl)	812	895 ^c	768 ^b	620 ^a	712 ^{ab}
Total surface (ha UAA)	16.7	12.3 ^a	14.6 ^b	24.6 ^c	31.0 ^c
Grassland (meadows and pastures, ha)	13.2	10.5 ^a	11.6 ^a	14.5 ^{ab}	22.0 ^b
Arable land (farms with/all farms)	209/610	68/307	61/153	29/36	51/114
Arable land, (ha)	2.9	0.7 ^a	1.9 ^b	9.6 ^c	8.0 ^b
Grassland available (ha ×LU ⁻¹)	0.45	0.51 ^b	0.47 ^b	0.26 ^a	0.31 ^a
Arable land available, (ha ×LU ⁻¹)	0.05	0.03 ^a	0.06 ^b	0.14 ^c	0.07 ^b
Stocking rate (LU×ha ⁻¹)	2.46	2.21 ^a	2.41 ^{ab}	2.86 ^{bc}	3.10 ^c
Land productivity (kg milk×m ² UAA ⁻¹)	1.34	1.16 ^a	1.19 ^a	1.55 ^b	1.93 ^b

Landscape metrics

Variable	All farms	Traditional dairy systems:			Modern dairy system
		original	without summer pastures	with silages	
Land management units (LMU):					
Availability (LMU, N×farm ⁻¹)	44	33 ^b	38 ^b	60 ^a	75 ^a
Geographic fragmentation (LMU, N×ha ⁻¹)	4.26	4.51 ^a	4.00 ^a	3.23 ^b	3.57 ^b
Economic fragmentation (LMU, N×LU ⁻¹)	1.54	1.73 ^a	1.63 ^a	1.06 ^b	1.04 ^b
Average surface (ha × LMU ⁻¹)	0.31	0.29 ^a	0.32 ^b	0.36 ^b	0.33 ^b
Perimeter/surface ratio	0.15	0.16 ^a	0.15 ^b	0.14 ^b	0.15 ^b
Shape Index (SI)	1.58	1.57	1.57	1.60	1.61
Average slope of agricultural areas (°)	11.3	13.0 ^a	10.7 ^b	7.7 ^c	8.8 ^c

Prezzo del latte



Descriptive statistics of Trento dairy farms

	Rendena	Holstein Friesian
Single-breed farms, No	25	34
Lactating cows, No	34.0±35.1	87.8±65.3
Milk yield, kg /day	16.4±3.1	28.0±4.4
Tie stalls farms, No	20	8
Farms using total mixed rations, No	2	28
Summer transhumance of cows, No	22	2

Geographic features of Trento dairy farms

Features	Rendena	Holstein Friesian
Elevation, m asl	823±197	519±256
Slope of agricultural areas, degrees	11.3±2.8	8.2±4.5
Meadows, ha/farm	14.3±9.3	18.6±16.3
Meadows/LU, ha/LU	0.45±0.27	0.21±0.22
Crops, ha/farm	0.9±0.3	17.0±17.9
Crops/LU, ha/LU	0.00±0.01	0.13±0.13
Stocking rate, LU/ha	2.09±0.93	3.03±1.8

Landscape metrics in Trento dairy farms

Metrics (based on Land Management Units - LMU)	Rendena	Holstein Friesian
LMU availability, No/farm	46.9 ± 29.8	83.4 ± 53.9
Geographic fragmentation, LMU, No/ha	4.35 ± 1.49	3.21 ± 3.21
Economic fragmentation, LMU, No/LU	1.51 ± 1.16	0.85 ± 0.64
Agricultural surface, Ha × LMU ⁻¹	0.25 ± 0.08	0.34 ± 0.11

Landscape of “typical” Rendena dairy farm



Landscape of “typical” Rendena dairy farm

