

## Andean pastures in the fourth region of Chile: marginal lands and vital spaces for a transhumance system

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**Introduction** In the fourth region of Chile, the high Andean pastures between Chile and Argentina are the summer destination for transhumant shepherds and sustain a part of the regional livestock. Since 2000, Chile has prohibited the passage of livestock to Argentina for animal health reasons in spite of official registers indicating that 60 to 75% of the summer transhumance livestock had an Argentine destination. Under those conditions it is questionable whether the Andean Chilean grasslands can absorb the increased pastoral demand without suffering damage. The objective is to provide elements of an answer to this question regarding the distribution and availability of the Andean forage resource and its modalities of exploitation in the local transhumance system.

**Materials and methods** Two approaches have been used for this study. The first one, concerning the forage resource, used remote sensing tools, GIS and land occupation cartography methods (Etienne & Prado, 1982) to describe the types and distribution of the Andean pastures in two cordilleras of the Limari province, Fourth Region of Chile, during the summer of 2003-2004. For the forage availability of grasslands, floristic registers and quantitative methods (point quadrat, lineal transects, biomass harvest) were used. The second approach was based on direct observation of the pastoral practices and interviews with the users of the Andean forage resource and the different actors of the transhumance (shepherds, pastures' landowners and the regional livestock service).

**Results** Table 1 shows the extent of the different types of pastures in the area mapped and their animal use. The mapped area is dominated by strongly sloped land with bare soils and low vegetation cover (<25%). Denser shrub pastures, that constitute 25-30% of the mapped area, are of occasional use due to their low forage quality according to observations and shepherds' interviews. These types of pastures are grazed by goats mainly. The dense grasslands (>50% cover) account for less than 6% of the mapped area and its productivity is presented in Table 2. Access to the Andean pastures is determined by seniority and relationships between landowners and shepherds. In this social model, those who used Chilean Andean pastures before the close of the frontier have now access to the best pastures while those who used Argentine pastures have to accept poorer pastures. In this latter case the shepherds must consider pasture heterogeneity, forage availability and the possibility of access to dense grasslands according to the type of their livestock. Nevertheless, at the end of the season, the dense grasslands are of vital importance as they still remain grazable when others are not.

**Table 1** Type and cover of Andean pastures in the Tascadero and El Maitén cordilleras in the Fourth Region.

Cordillera	Total area (ha)	Mapped area (ha)	Pasture types in mapped area (%)			
			grasslands<25% (goats)	grasslands>50% (goats, sheep, cattle)	shrubs<25% (goats)	25%<shrubs<50% (goats)
Tascadero	23127	10292	37.0	3.6	33.3	25.4
El Maitén	3844	3844	41.2	5.7	22.5	30.6

**Table 2** Dense grasslands (>50%) productivity (t/ha) in the Tascadero and El Maitén cordilleras.

Cordillera	Dense grasslands types productivity (t/ha)		
	Non-irrigated (goats, sheep)	irrigated (sheep, cattle)	forage production ( <i>Medicago sativa</i> ) (cattle)
Tascadero	3.7 – 5.6	11.1 – 13.8	9.3 – 14.2
El Maitén	5.5 – 7.6	2.6 – 9.1	-

**Conclusions** The results of this study show that particular attention should be paid to dense herbaceous pastures even though they constitute a small area of the sampled cordilleras. The low-quality shrub pastures do not show a significant increase in their usage while dense grassland appear to be more exploited, especially in critical periods. The transhumance system has to resolve itself because eventually there will be a lack of alternative pastures to relieve the pastoral pressure in the Chilean Andes after the close of the frontier.

### Reference

Etienne, M. & C. Prado (1982). Descripción de la Vegetación mediante la Cartografía de Ocupación de Tierras. Ciencias Agrícolas N° 10. Facultad de Ciencias Agrarias, Veterinarias y Forestales, Universidad de Chile. 120 pp.