Tailored methods for land management and soil conservation in marginal areas and/or at risk of erosion.
Tailored methods for land management and soil conservation in marginal areas and/or at risk of erosion
Tailored methods for land management and soil conservation in marginal areas and/or at risk of erosion
Tailored methods for land management and soil conservation in marginal areas and/or at risk of erosion

Finanziato dall'Unione europea NextGenerationEU
Ministero dell'Università e della Ricerca
Italiadomani PIANO NAZIONALE DI RIPRESA E RESILIENZA
agritech National Research Center for Technology in Agriculture

Spoke 7

Integrated models for the development of marginal areas to promote multifunctional production systems enhancing agro-ecological and socio-economic sustainability

7 • 1
Integrated models to develop marginal areas

T 7.1.1. Tailored methods for land management and soil conservation in marginal areas and/or at risk of erosion

Assessment of topsoil development associated to land use change in Val Camonica subalpine pastures

Silvia Chersich[3], Luca Giupponi[3], Eugenio Carlon[1] Mirko Bombardieri[3], Francesco Fava[1], Michele D'Amico[2]

[1] Department of Environmental Science and Policy, Università degli Studi di Milano, IT,
[2] Department of Agricultural and Environmental Sciences, Università degli Studi di Milano, IT,
[3] Unimont, Università degli Studi di Milano, sezione di Edolo (BS)

Introduction

Alpine pastures are agroecosystems with biological and landscape importance, protected by the EU; they faced a rapid decline in the last decades due to changes in management and/or abandonment of traditional mountain farming in the Alps.
The aim of our study is the characterization of the relationship between historical and present-day subalpine grassland management, their plant diversity, soil properties, erodibility, humus forms and biological quality.

For Whom

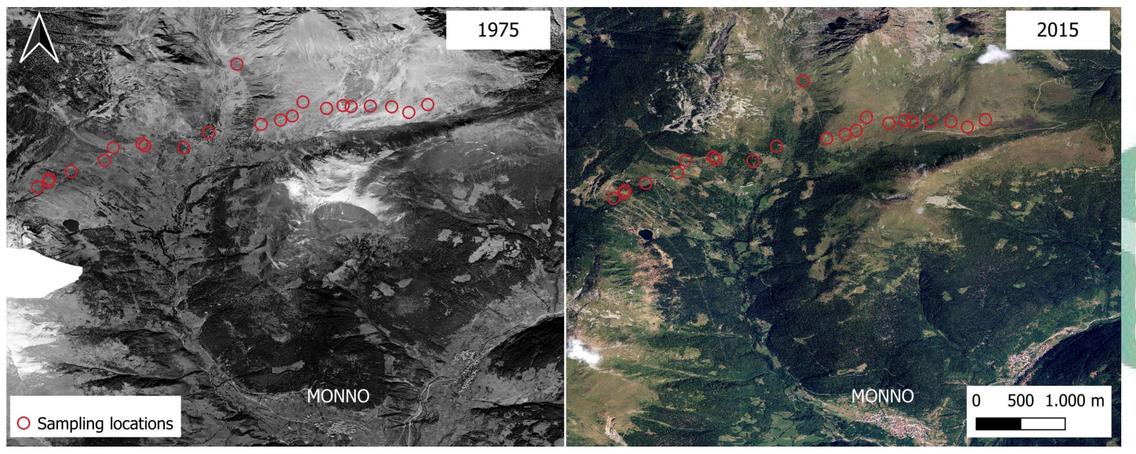
The development of indicators of soil health degradation in association to pasture management is a useful tool to **support farmers** in adopting adaptative grazing management practices and **decision makers** in incentivizing more sustainable pasture resource use. Specifically, biological quality indicators (humus form and arthropode communities), soil erodibility together with soil type and C stocks, are important indicators of soil health, easily affected by pasture management and abandonment.

Methods

From orthophotos from 1975 to today we selected 22 sites across six dynamic phases from grazed grassland to forest, in which we performed phytosociological surveys (10 m x 10 m), soil profiles and a characterization of topsoil and organic horizons to detect humus forms and properties (summer 2023). Soil texture, pH, total organic C and N were analyzed in the lab, the C stocks and erodibility were calculated from these data. The soils were described and classified according to the World Reference Base (2022). Humus was described and classified using the morpho-genetic approach (Zanella et al., 2018). The arthropodal communities were characterized with the Biological Soil Quality index (Parisi et al. 1998).

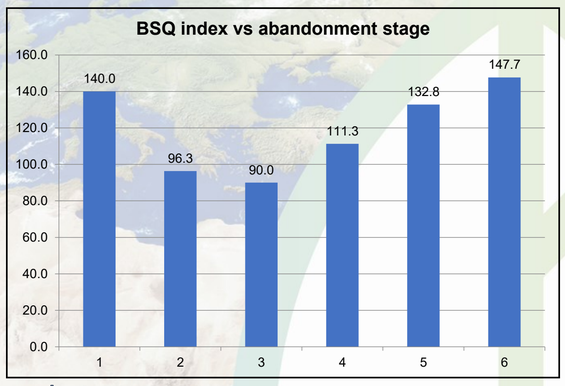
Study area

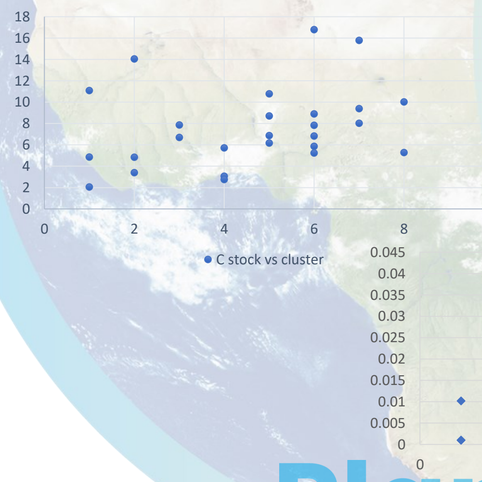
The study area of about 35 km2, is Mortirolo grassland plateau (Monno, BS), in Alta Valle Camonica, Rhaetian Alps, Lombardy, Italy (46°26'25.00''N, 10°32'62.50''E), between 1800-2000 m a.s.l., on sialic glacial till, characterized by strong land use changes, as visible in historical aerial photographs (Fig. 1).

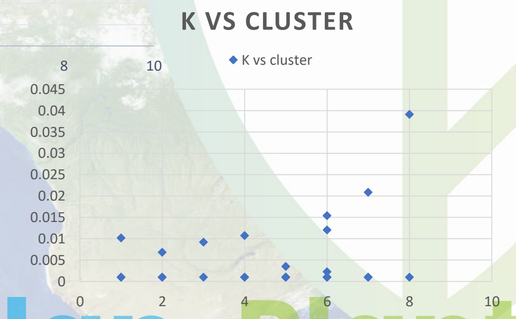


Results

The widespread decrease in grazing intensity led to an expansion of less palatable grasses (e.g., *Nardus stricta*), shrubs and even trees (in the sites which were already less grazed because of shallow soils). These processes are associated to changes in plant diversity and vegetation structure and humus forms as well. The humus forms in particular evidence a decrease in biological activity and the nutrient cycling rate, with a slower decomposition rate of the litter layer. In fact, weakly active Moder forms are frequent where the shrub cover is widespread. Biologically active Mull and Amphi are the main forms in grazed areas with the better vegetational pasture composition.
Microarthropodal communities show a decrease in diversity and adaptation to soil dwelling conditions in the first stages of abandonment, and then increase again as afforestation increases.







Plan. Plant. Planet.

www.agritechcenter.it