

>> SYNTHESIZE MOUNTAINS OF KNOWLEDGE <<

Submitted Abstract

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Abstract

Highland grasslands are important agroecosystems characterized by a multifunctionality involving environmental, social, and economic dimensions. Their management by livestock systems plays an important role for the maintenance of biodiversity, ecosystem services and local productions. However, the assessment of management sustainability and multifunctionality of highland grasslands is still a challenge because it requires multidisciplinary approaches, which are difficult to connect and lack a reference. The aim of this study is to build an integrated methodological approach at different scales, implementing the environmental, social, and economic dimensions to assess both the sustainability and multifunctionality of highland grasslands in the European context at the patch, farm, or regional scale. The study is part of the EU-funded HIGHLANDS.3 project (H2020-MSCA-RISE), which aims to promote inclusive sustainable development in highlands. The research involves the Parc Naturel Régional Livradois-Forez (France) and Lofotlam SA (Norway), as non-academic partners, and NIBIO (Norway), VetAgro Sup (France) and University of Padova (Italy) as academic ones. The study was conducted between spring and autumn 2021 in three study areas (the Alps in Italy, the Massif Central in France and the Lofoten islands in Norway) and involved 19 livestock farms (12 dairy cows, 5 sheep, and 2 goat). The data collection integrates three different methodologies to cover the multidimensionality of the agroecosystems and their management: 1) structured interviews to farmers are used to frame the social and economic dimensions, defining local and general aspects for farm management of animals, productions, and grassland; 2) remote sensing (Google Earth Engine) is used to describe the environmental conditions (slope, altitude, exposition, climate); 3) soil physical (texture), chemical (total and organic Carbon, total Nitrogen, Phosphorus, pH and cation-exchange capacity) and molecular analyses based on sequencing to characterize microbial biodiversity and amplification of specific genes as marker for ecosystem functions (nitrous oxide consumption, nitrification and methane production). The preliminary results are presented to offer an example of integrated approach useful to address the role of livestock farming systems for the inclusive and sustainable development in highlands.