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BEYOND FOOD: NON-MARKET BENEFITS OF LIVESTOCK SYSTEMS

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Entrepreneurial horizons and sustainability of mountain livestock farming: the case of Lessinia (NE Italian Pre-Alps)

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The recognition of a historical-cultural landscape of an alpine region requires the description of the livestock systems, especially through their evolution. The mountain livestock systems of the summer pastures of Lessinia (Official Italian Rural Landscape, Verona, NE Italian Alps) were analysed. These pastures represent an area of about 6300 hectares on the top of Lessini Mountains, between 1200 and 1900 m a.s.l. The geological conditions have favoured the predominance of a pasture-based landscape on smooth morphologies ideal for cattle grazing. A survey on 169 breeders made it possible to know both the management methods and the expectations for future improvement scenarios. There are about one hundred alpine farms, mostly private, managed by one or more breeders, with 6800 cattle (of which 93% are dairy cows) kept on predominant extensive grazing during at least four months a year. The main cattle breed is the Holstein-Friesian (70%). The extensive road network has enabled breeders to move up only for milking because the milk is processed at dairies in the lowlands. Only four farms produce cheese directly. The individual high milk production and the relevant feeding rations require a considerable integration of grazing with concentrate feeds, averaging 4.6 kg head⁻¹ day⁻¹. These more intensive management choices have determined the worsening of pasture quality and the reduction of plants' biodiversity. The economic return for milk and dairy products – processed and sold elsewhere – is poor as well as the connections with consumers and tourists. The interviews with the farmers (26% under 40 years, 56% 41–60 years and 18% above) tested their willingness not to change the production orientation: 67% of the farmers indicated that they do not intend to process cheese directly on the summer pasture in the future, and 61% are not interested in starting agritourism activities there. Nevertheless, 88% of the respondents plan to continue summer pasture farming in the

next 5 years. In view of these results, information and awareness actions have been launched to improve this static and not so resilient rural scenario. We believe that the results of the survey not only precisely describe livestock farming systems of the Lessinia region but also highlight the critical points for farmers who are willing to start improvement actions towards an economically and environmentally sustainable management for maintaining a historical landscape too.

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Soil erosion patterns in Alpine and Apennine extensive farming system

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Soil erosion by water is one of the major threats to soils in the European Union, with a negative impact on ecosystem services, crop production, drinking water and carbon stocks. Much of the Italian soilscape is subject to water erosion because of the morphology, the soil parent materials, the climatic characteristics, and the anthropogenic activities. Within the agrarian surface (~12.6 million ha, 41.7% of the territory), arable land accounted for 56.7%, followed by permanent meadows and pastures (25.6%); these two different types of management have a different impact on the soil conditions. Aim of this study was to evaluate the different soil erosion patterns in two case studies of Alpine and Apennine mountains, through the Revised Universal Soil Loss Equation (RUSLE) model. Both the farms adopted extensive systems with cattle grazing. For each farm and on the same soils, two hypotheses were compared: (i) presence of permanent grasslands used for cattle grazing and for the production of fodder (real condition); (ii) presence of arable land subjected to mechanical work (plowing, harrowing, etc.) (simulated condition). In a GIS environment, the farms boundaries have been georeferenced and digitized in *.shp* format. The hydrographic basin relating to the farms parcels was reconstructed through resampling (10 m grid) of the Digital Terrain Model (DEM) with regular mesh with a grid pitch of 25 m. A cleaning procedure ('fill') of false depressions was also performed. Rainfall erosivity (R-factor), Soil Erodibility (K-factor), Topography (LS-factor), Cover Management (C-factor) and Support Practices (P-factor) were estimated as suggested by the bibliography. The results showed that in both the farms there would be an average annual erosion risk higher in the case of plowed crops, while in the case of grassy meadows (as in the real situation) the average value would be significantly lower. Farming models that adopt extensive grazing practices contribute to the maintenance of multiple ecosystem services, including those linked to the hydrogeological and landscape structure. These