

DEVELOPMENT OF SOIL QUALITY INDICATORS IN RANGELANDS OF SW IBERIAN PENINSULA

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This paper proposes a methodology based on indicators that seek to assess the current state of soil and vegetation degradation and the influence of natural and human factors in rangelands of Extremadura (Spain).

Key words: indicators, soil quality, rangelands.

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МЕТОДИКА ВИБОРУ ІНДИКАТОРІВ ЯКОСТІ ҐРУНТУ НА ПРИРОДНИХ ПАСОВИЩАХ ПІВНІЧНОГО ЗАХОДУ ПІРЕНЕЙСЬКОГО НАПІВОСТРОВА

Пропонується методика створення індикаторів, які використовуються для оцінки стану ґрунту, рівня деградації рослинності та впливу природних та антропогенного факторів на природних пасовищах Естремадури (Іспанія).

Ключові слова: індикатори, стан ґрунту, природні пасовища.

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МЕТОДИКА ВЫБОРА ИНДИКАТОРОВ КАЧЕСТВА ПОЧВЫ НА ЕСТЕСТВЕННЫХ ПАСТБИЩАХ ЮГО-ЗАПАДА ПИРЕНЕЙСКОГО ПОЛУОСТРОВА

Предлагается методика создания индикаторов, используемых для оценки состояния почвы, уровня деградации растительности и влияния естественных и антропогенного факторов на природных пастбищах Эстремадуры (Испания).

Ключевые слова: индикаторы, состояние почвы, естественные пастбища.

This paper proposes a methodology based on indicators that seek to assess the current state of soil and vegetation degradation and the influence of natural and human factors in rangelands of Extremadura (Spain). In the study area with Mediterranean type climate conditions, dehesas, a traditional land use system is widespread. They are wooded rangelands grazed by sheep, cattle, pigs and goats. Beside treeless rangelands do also exist. Soils are frequently shallow, have a sandy silt texture and low organic matter contents. The dominant reliefs are old erosion surfaces giving rise to undulating landscapes, interrupted by small mountain ridges. Soil quality is considered a key element for sustainable agriculture and should be interpreted as the utility of land for a specific purpose, in our case to support livestock, but also a rich diversity of wildlife. Studies on soil quality are carried out since 1980 and have mainly focussed croplands.

Research is carried out in farms representing the most important type of rangelands in the region of Extremadura. Different spatial scales are considered, ranging from the farm to the plot scale. Physical, chemical and biological parameters are being studied, analysed and related with pasture productivity data, land use and livestock management. The degradation phenomena considered include physical degradation (compaction, soil structure deterioration, water holding capacity, infiltration capacity and water erosion), fertility decline and biological degradation (decrease in organic carbon, biological activity). The human interventions are a key for determining the causes of soil degradation and are studied, including pasture management, cultivation, forestry activities, livestock type and grazing intensity. It is hypothesized that the latter is of outstanding importance and is therefore investigated in detail.

A methodology for land degradation assessment is being developed applying a large number of parameters, which represent either the present state of soil quality or degradation risk. Data obtained include information on bulk density, aggregate stability, organic matter content and erosion features. Compaction indicators are bulk density and resistance to soil penetration, determined by soil ring samples and Penetrologger measurements, respectively. Bare soil surface is estimated in two ways, field observations and using aerial photographs and image classification methods. Soil depth is measured by either soil profile description or by drilling with an auger. Aggregate stability is estimated with dry and wet aggregates using the CND (Counting Number Drops) and dip methods. Chemical indicators, such as organic matter content or cation exchange capacity, are determined by standard laboratory analysis. With respect to water erosion different features, easily recognizable in the field, are considered, including root exposure, tree mounts or the presence of rills and gullies. Soil parameters used for indicating degradation risk include, amongst others, the abundance of livestock paths and excrements, vegetation cover, slope gradient, soil texture, rainfall and livestock species and density in each land unit. Of particular interest is categorizing the indicators and establishing the relationships with human factors in farms with *a priori* different degradation states (ranging from non-degraded or slightly degraded farms to strongly degraded farms).

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