A FRAMEWORK FOR THE ECOLOGICAL REHABILITATION OF DEGRADED SOILSCAPES IN EASTERN ROMANIA

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- **Soil degradation, as 21-st century global problem, occurs under a wide variety of conditions and circumstances leading to decline in soil quality and health, with a reduction in ecosystem functions and services. Soil degradation has significant environmental, economical and social impact.**
- **In the last 20 years, particularly in the Eastern part of Romania, anthropogenic unreasonable and aggressive actions corroborated with soil water erosion, accentuated the processes of environmental degradation and decreased the productive potential of the soilscapes. The erosion phenomena in the Eastern part of Romania are very aggressive. Water erosion is influenced and favored by the temperate continental climate with torrential rainfalls and by anthropogenic impact, mainly due to overgrazing.**
- **This research starts from the practical necessity to increase the functional efficiency of these soilscapes, through the assessment of the risk factors.**

Goals: i) to diminish the negative impact of soilscape degradation; ii) to increase the life conditions of the people.

Degraded pasture ecosystems from Plopana Bacău, Dobrovăț and Victoria Iași, Eastern Romania, on the map (*Google Earth*)

Hazard Analysis in Critical Control Points (HACCP) of a suitable study areas with natural and anthropized ecosystems

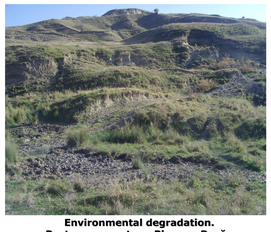
Screening of negative, limiting and stress environmental factors and determinants

Matrix of quality and intensity of the environmental impact in degraded pasture ecosystems

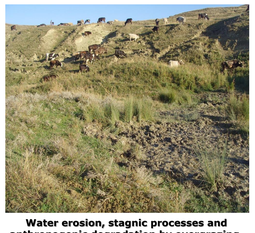
S T A G E S

Analysis and identification of the soil limiting factors and determinants using the environmental diagnosis

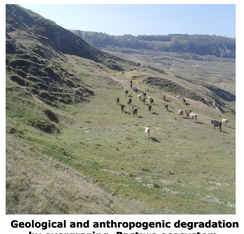
Sustainable Management Plan based on a major set of concrete measures for the ecological rehabilitation of these degraded pasture ecosystems



Environmental degradation. Pasture ecosystem, Plopana Bacău



Water erosion, stagnic processes and anthropogenic degradation by overgrazing. Pasture ecosystem, Plopana Bacău



Geological and anthropogenic degradation by overgrazing. Pasture ecosystem, Plopana Bacău

Anthropogenic impact by overgrazing. Pasture ecosystem, Plopana Bacău

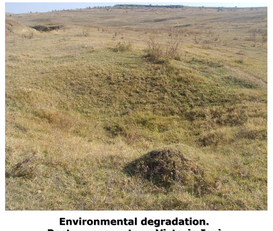
- **The target of this work was to develop a Sustainable Management Plan based of a general matrix description of the environmental factors in the Eastern part of Romania, to intervene in terms of scientific, technological, administrative-economical and managerial aspects for the ecological rehabilitation of the soilscapes.**
- **Thus, the research has an applicative character, establishing a major set of concrete technological, organizational, economical and scientifical measures for decreasing the soil vulnerability to degradation and increasing the soil resilience.**

Anthropogenic impact by overgrazing. Ruderal vegetation. Pasture ecosystem Dobrovăț Iași

Anthropogenic impact by overgrazing on soil and vegetation. Pasture ecosystem Dobrovăț Iași

Gleyc processes. Pasture ecosystem, Dobrovăț Iași

Anthropogenic impact by overgrazing. Pasture ecosystem ,Dobrovăț Iași



Environmental degradation. Pasture ecosystem, Victoria Iași

Stagnic processes – pasture ecosystem, Victoria Iași

Groundwater in the soil profile. Gleyc processes. Pasture ecosystem, Victoria Iași

Water erosion and anthropogenic impact by overgrazing. Pasture ecosystem, Victoria Iași

IDENTIFICATION AND ANALYSIS OF HAZARD RISKS IN CRITICAL CONTROL POINTS. NEGATIVE, LIMITING AND STRESS ENVIRONMENTAL FACTORS AND DETERMINANTS

GEOCLIMATIC FACTORS
- low summer rainfalls
- slope relief with very active morpho-genetic processes
- torrential rain and hailstone
- underground water in soil profile
- stagnant rainwater

PEDOLOGICAL FACTORS AND DETERMINANTS
- fine soil texture
- poor air-water regime
- hard soil consistency in summer
- high plasticity
- stagnic and gleyc processes
- nutrient depletion

ANTHROPOGENIC FACTORS
- overgrazing
- lack of anti-erosional works
- lack of drainage and draining works
- lack of maintenance works
- lack of organic-mineral fertilization

ENVIRONMENTAL AND ECONOMICAL NEGATIVE EFFECTS
- excessive and prolonged summer drought
- disruption of vegetative and reproductive cycle of plants
- covering the pastures with noxious species, in spite of valuable graminaceae and leguminous
- soil trading and soil compaction due to overgrazing, particularly on the moist soil
- surface and gully erosion; decapitation and reducing the topsoil on the slopes; destruction of soil structure
- decline in soil organic matter and biological activity
- decline in Net Biome Productivity

S U S T A I N A B L E M A N A G E M E N T P L A N
(major set of concrete measures for restoring the soil quality and health through sustainable management)

1. T E C H N O L O G I C A L M E A S U R E S

lands with excessive humidity
- unclogging the canals
- network of draining - drainage canals
- sowing the fodder leguminous and graminaceae

slope lands
- anti-erosion strip crops on level curves
- planting the forestry species on the top slope

- cleanup works of nouxious species in the pastures
- rational planning of grazing
- eliminating the grazing on humid lands
- organic fertilization

2. O R G A N I Z A T I O N A L M E A S U R E S
- unclogging the draining-drainage canals and their maintenance
- developing the agro-pasture works before starting the fodder cycle in the spring
- plotting the pasture surface for a rational grazing
- organic-mineral fertilization of the pastures before starting the fodder cycle in the spring, and after ending the grazing in the autumn
- ensuring the necessary quantities of organic-mineral fertilizers and their application
- ensuring the necessary quantities of fodder seeds for resowing the areas without vegetation
- monitoring the rational grazing according to the plan of the ecological rehabilitation of degraded areas, without vegetation or neglected, that represent outbreaks of infection with noxious species

3. E C O N O M I C A L M E A S U R E S
- ensuring the financial sources for the acquisition of fodder seeds, organic-mineral fertilizers, maintenance and agro-hydro-pedo-ameliorative works
- network between local authorities, research institutes and universities in the frame of European projects (EU Framework Programme for Research and Innovation - Horizon 2020) to get the funds for ecological rehabilitation of these degraded pasture ecosystems

4. S C I E N T I F I C A L M E A S U R E S
- organizing the experimental field with different techno-pasture measures: fodder mixtures, systems of fertilization, systems of maintenance
- field and lab observations and analysis for the regulation of air-water regime, nutritional regime and soil biological activity
- monitoring and control of invasive weeds species for limiting their expansion
- respecting the rational grazing conditions: alternating the fodder plots depending on the vegetation; eliminating the grazing on the humid soils; calculating the optimal number of animals and optimal number of fodder days per plot
- network between local authorities, research institutes and universities in the frame of European projects (EU Framework Programme for Research and Innovation - Horizon 2020) to get the funds for ecological rehabilitation of these degraded pasture ecosystems