Research on the Structure, Quality and Measures to Prevent and Combat Soil Erosion in the Village Stejaru from Teleorman County

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Abstract
This study is part of a research project on the influence of agro-livestock activities on surface water quality in Teleorman County. The paper presents structure, quality and measures to prevent and combat soil erosion in relation to agro-livestock activities in this area. The paper presents structure, quality and measures to prevent and combat soil erosion in relation to agro-livestock activities in this area. The research has been done in the whole locality, and took soil samples to determine the type and soil texture and soil supply status with major nutrients (N, P, K). Based on these results and knowing the types of main crops and livestock structure, at Stejaru level, recommendations were made about avoiding the risks of pollution of surface water by nitrates from agricultural and livestock activities.

Keywords: erosion, nutrients, soil structure, soil and water pollution

1. Introduction

Stejaru cadastral territory is located in the central-western county in Teleorman Plain subdivision. Stejaru territory belongs to the Danube river basin by Vedea river.
Land drainage is by the river water that collects on Bratcov several valleys of this area and flows into the saw. This is an especially low rate realativ summer and winter.
Largest flow in spring when it is sometimes causing flooding. Bratcov Creek is less than meets the water. Slowly that it looks dry summer of ponds that flow between them.
This creek bed is sinuous with many meanders. Bratcov stream water in irrigation is used in vegetable gardens with low content of chlorides and sulphates.

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Groundwater depth (varies depending on terrain), the plain is less than 20 m, the fountains are rare in this area.
The Vedea river floodplain is the depth at which ground water varies from 2.0 to 3.0 m.
Absolute maximum and minimum temperatures indicate the possibility of large frost, and very high temperatures during the summer, damaging crops. In floodplain river and stream Stejaru Bratcov, temperatures are generally lower than on the plain due to the cold currents running along the waterside and higher air humidity than in the plains. Here, hoarfrost earlier falling autumn and spring is maintained until mid-close.
These phenomena have great importance for the emergence vegetable cultivation and meadow as sensitive to low temperatures.

2. Materials and methods

From the official statistics of the Directorate registers Agricultural District, were taken the

dates to determine the proportion for each category of land use in the village Stejaru.
Labs for Soil and Agrochemical Studies Office Teleorman, determine the type of soil and arable land area appropriate for the village. Studies focused on determining the level of soil nutrenti supply (supply at high, medium or low). Determination of nitrogen supply was made by Kjeldahl method, determining the level of phosphorus supply was made by extracting it with a solution of ammonium acetate-lactate at pH 3.7, and determined by spectophotometric method as molybdenum blue. To determine the level of potassium supply, extract using the same solution was used to extract phosphorus, but potassium was dosed with flame photometry.

3. Results and discussion

In the areas mapped land use (%) is as follows (Fig. 1) arable land - 4304.44 ha grapes-wine - 17.88 ha, pastures - 156.20 ha; total agricultural area - 4478.52 ha; area unproductive - 2.48 - ha. The total area is 4481 ha.

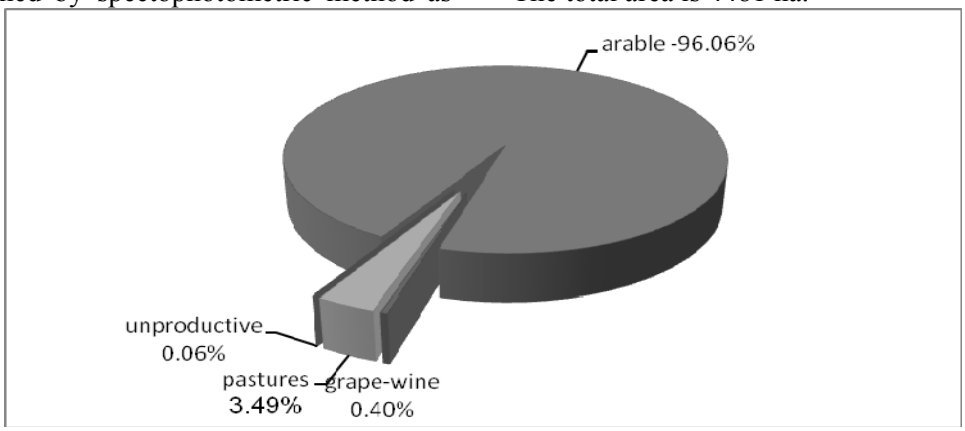

Figure. 1. Land use (%)

In figure 2 are presented the types of agricultural land soils. The faeozem and chernozem type have the more surface of agricultural land (1940.55 ha and 1464.11 ha, respectively).

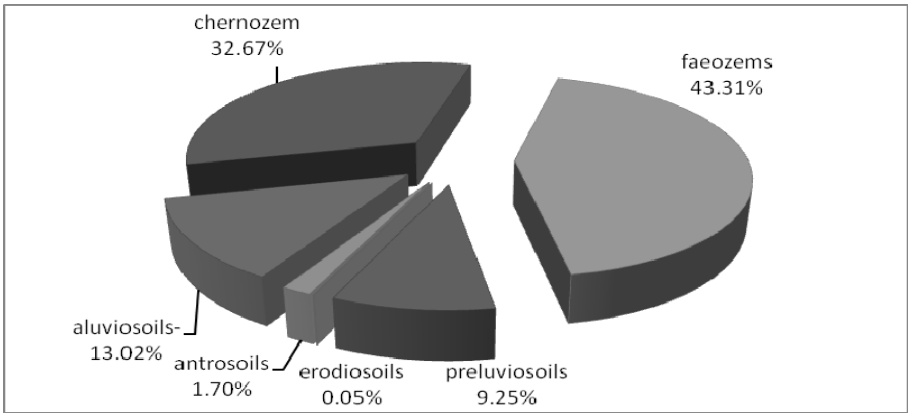

Figure 2. Types evidence of agricultural land soils (%)

Status of soil phosphorus supply digestible (P mobile) - is considered very weak and poorly supplied 24% of the area (1076 ha), medium 26% of the area (1165 ha) and well and very well stocked on 50% of area (2240 ha) (fig.3).

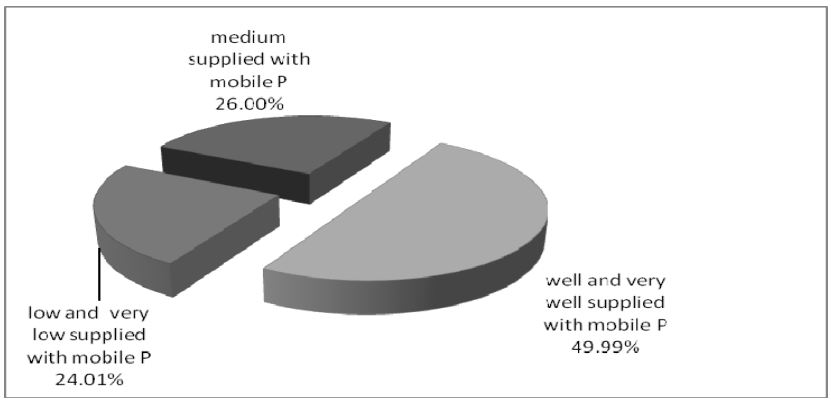

Figure. 3. Ground-state supply of assimilable phosphorus

Status of soil potassium supply digestible (K cell) - considered the middle of the area supplied by 2% (90 ha) and well and very well supplied with potassium on 98% of the area (4391 ha) (figure 4).

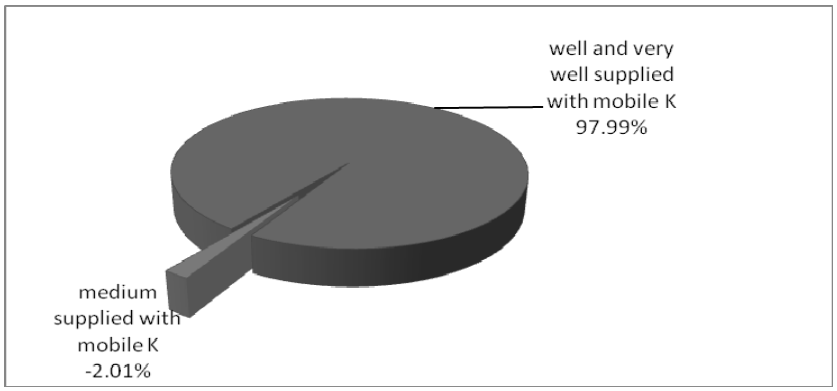

Figure.4. Ground-state supply of assimilable potassium

Nitric natural fertility status (fig. 4) - considered by the indices of nitrogen were obtained by correlating the degree of saturation in basis and the contents in humus is considered low of (44%) of the area (1972 ha) and average supplied (56%) of the surface (2509 ha) [1].

From the data presented in fig.4, we can see that the ground from Stejaru locality is very well suited fertilization with compost derived from animal manure, because the entire soil surface in Stejaru village is medium or low supplied with N and this fact claims fertilizing strategy, but carrefully monitorized to avoid a pollution with nitrites or nitrates of soil or surface water [2].

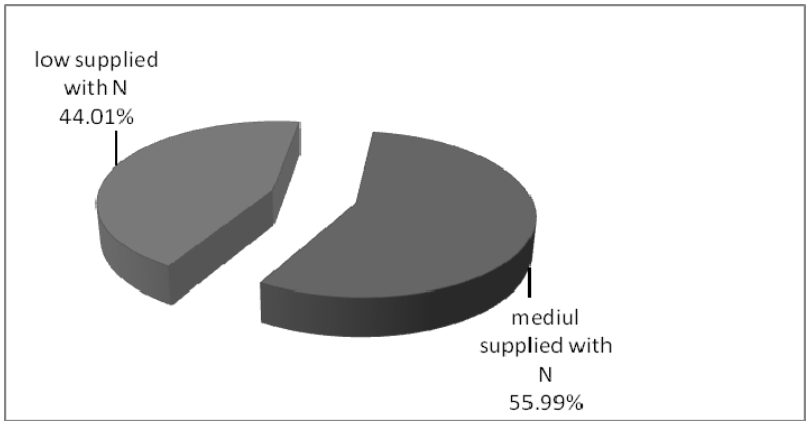

Figure 5. Nitric natural fertility status

In the table 1 are summarizes the categories of farm animals exploited and the amount of nutrients which they produce annually.

To obtain annual nutrient content were used the literature data's for daily average nutrient content [3].

Table 1. Annual nutrient content depending on the category of farm animals exploited [3]

Category of farm animal exploited	No. of farm animals	Weight (kg)	Annual nutrient content (kg/year/farm animal category)		
			N	P	K
Cows+heifers	286	250-400	10010	1430	7436
Calves 0-6 months	34	50-150	2754	510	1836
Donkeys	120	50-200	5400	960	3360
Horses	22	450	990	176	616
Sheep	686	45-70	4802	686	3430
Goats	970	45-50	5820	970	4850
Saws	24	120-170	624	192	384
Hens	7085	1-2	2550.6	495.95	708.5
Turkeys	285	3-5	102.6	19.95	51.3
Gees	320	4-6	115.2	22,4	32
Duks	270	2-3	97.2	18,9	48.6
TOTAL			**33265.6**	**5481.2**	**22752.4**

From the data presented in table 2, notice that for Stejaru village was obtained 33.265 tonnes of N/year, 5.481 tonnes P/year and 22,752 tonness K/year.

Knowing the total arable land that could be fertilized with manure from animals of economic interest, we conclude that these amounts of nutrients from livestock manure is not enough for fertilization. For example, in the case of nitrogen, if it is fertilized with 170 kg N/ha, the amount of nitrogen we would get to 195.68 ha, when the surface with low intake of nitrogen is 1972 ha.

On the other hand, the amounts of nutrients in table 2, are calculated for the fresh manure, which can not be applied as such in the field. We know that through composting, to lose a significant percentage of nitrogen, due to fermentative processes occurring in manure mass.

The main types of field crops and average production are presented in table 2.

Table 2 The main types of field crops and average production

Field crop	Average production (kg/ha)
Wheat	2933
Barley	2979
Maize	4166
Sun flower	1731

In the Stejaru village, field crops, by their nature, are consuming nutrients, so an additional fertilizer, composted manure outside is necessary.

4. Conclusions

From the analyzes about soil structure and quality, we can conclude the follow:

- Soil erosion affected area occupies 709.01 ha (15.82%), requiring erosion control works and radical fertilization.
- Soils affected by the phenomenon of gleyzation occupies an area of 609.51 ha (14.77%) requiring drainage works, drainage and fertilization radical.

-Frequently flooded land, once in three - four years, occupies the area of 505.24 hectares, or 11.28% of the area requiring drainage works, water impoundments + levee.

-Mobile phosphorus content is low - 651.84 ha (14.55%), middle 730.97 ha (16.31%) high 2523.29 ha (56.31%) and very high on 574.90 ha (12.83%).

-Mobile potassium content is medium to 595.5 ha (13.29%) high 2363.67 ha (52.75%) and very high on 1521.83 ha (33.96%).
-Nitrogen content is low and very low on 1940.25 ha (43.30%) and middle on 2540.75 ha (56.70%).
Due to medium texture - fine, fine and soils that were made during periods of high humidity have a strong sinking almost the entire surface.
To prevent and combat soil erosion, but also to minimize the risk of over-fertilization and thus a risk of surface water pollution by nitrates from agricultural and livestock activities, make some recommendations.
The territory belonging Stejaru village is generally occupied by soils with fine texture, tamped and compacted artificially (by executing the same deep plowing) requires scarification work, executed in complex with the application of ameliorative fertilization [4].
It also requires the application of agrophytotechnical measures, such as monoculture and the rigorous exclusion of culture technologies [5]. Moisture deficit in recent years, due to a reduced rainfall had a negative effect on land productivity directly influences pedogenesis processes occurring in soils, mainly by altering the sense of dryness soil moisture regime.
In soils without groundwater input as if mapped area, during the drought atmospheric place significant weight reduction in the liquid phase of soil mass, which leads to slowing or termination in most cases of physical, biological and biochemical soil [4]. Among the necessary measures applied to soils developed on the slopes of the valleys as:
farming performance parallel contour lines, protecting the soil against erosion; protection belt perpendicular to the prevailing wind direction; snow fences in winter; hoeing weeds in several crops.

Acknowledgements

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