

## SUMMARY

of the doctoral thesis entitled:

### CONTRIBUTIONS TO THE INFLUENCE OF SOIL RESOURCES ON PRODUCTION IN PRAHOVA COUNTY

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The theme taken in the study „Contributions on the influence of soil resources on production in Prahova” County is a work that spans a number of 148 pages, including, structured in 6 chapters comprising 51 tables and 41 figures and 125 bibliographic titles.

The study carried out within the doctoral thesis was aimed at conducting extensive research materialized in the performance of 21 soil profiles, made in Prahova County, in three localities, Drăgănești, Romania, Ceptura and Baba Ana, settlements totaling 21,322 ha of the total of 4,716 km<sup>2</sup> of the county, and includes all forms of relief (mountains, hills and plains), this led to the multitude of soil exploitation systems and a diversity of economic activities.

Pedological knowledge of land is required as a necessity, increasingly demanded by modern agriculture, which transforms soils (through fertilization and improvement according to well-defined methods and technologies) as well as plants.

The thesis is structured in two parts, Part I – The current state of knowledge, which includes a chapter, and Part II of its Personal research, which includes 4 chapters.

In **Chapter I „The current state of knowledge”**, information on the physico-geographical characterization of Prahova County, the characterization of soil resources in Prahova County, is presented, as well as the main yields obtained at county level and the main limiting factors of soils.

In **Chapter II „Material and the working method”** are briefly presented the research in the studied area, the methods of soil analysis in the field and in the laboratory, as well as working methodology on the classification of land in quality and favorable classes for different agricultural uses.

In **Chapter III „Characterization of soil resources and their influence on agricultural production in Drăgănești, Prahova County”** were described the physical-geographical conditions of the locality, the placement of soil profiles, location of soil profiles, description of soil units at type, subtype, variety, species, family and variant level and physical and chemical characterisation of each soil unit, classification of land in Drăgănești in quality and favorable classes, characterization of the main limiting factors of the commune, and, the yields obtained and the areas cultivated in the three years of research as well as the calamity agricultural areas at the level of 2020.

The total area of Drăgănești commune is 8756 ha, being the locality with the largest of the three communes taken into study. Due to the physical-geographic conditions, the studied territory presented advantages for the development of human communities and their activities. Following the transformations suffered by the natural landscape due to human intervention, the features of continentalization-aridization have increased. The need for agricultural land and housing construction led to the deforestation of forest areas of forest-steppe, followed by intensive crop of agricultural plants with direct repercussions on soils.

Chapter IV **“Characterization of soil resources and their influence on agricultural production in Ceptura, Prahova county”** also presents the physical-geographical conditions of the commune, soil profiles and territorial units of soil with description of each type of soil, its location within the county, spread, natural conditions of formation, soil, morphological description of each type of soil and physical (grain composition, structure) and chemical (soil reaction, humus content, carbonate content, nitrogen, potassium, calcium, magnesium, sodium, sulfates, sulphates, chlorides and total salts). It was also conducted

on the basis of the analysis analysis of the classification of the communal lands in quality and favorable classes for different agricultural uses. The main soil limiting factors in Ceptura have been identified and characterized and ameliorative measures have been developed to correct the causes that led to their occurrence.

The territory under study is conditional on the manifestation of certain limiting factors that are described for each land unit and for which certain ameliorative measures are imposed such as: for soil salting and alkalization, salt washing, gypsum fining or orisicole arrangement are applied, for soils with excess moisture, surface drainage or surface drainage measures are imposed, etc.

Chapter V entitled **"Characterization of soil resources and their influence on agricultural production in Baba Ana, Prahova county"** also presents the physical-geographical conditions of the locality, description of the soils in the commune, their classification into quality and pre-ability classes at different agricultural crops, as well as limiting factors that may affect agricultural yields.

The three years of research at the most important crops and cultivated areas have yielded the following productions.

Baba Ana has a total area of 7866 ha, being the second largest of the studied territories. The Baba Ana Communal Territory is located in the Romanian Plain, respectively in the Titu – Sarata subunit (Salted Plain). Genetically speaking, the Salty Plain is a subsidence plain the overall appearance is smooth, uniform and monotonous, with an unnoticeable slope betrayed only by the direction of the rivers and of the few streams that cross the region and which meander strongly through their beds.

The largest areas are grown with cereals, especially wheat and corn, followed by sunflowers and barley. An important area is used for fodder plants (eg 1235 ha in 2019).

The highest average yields were obtained in 2019 for all crops, and the lowest in 2020 mainly due to drought.

In addition to the most important crops (wheat, corn, barley, sunflower), soybean (377 ha in 2020), rapeseed (427 ha in 2021) are also cultivated in the commune, triticale, barley, peas, but also vegetables (54 ha in 2019).

The area calamited in 2020 at Baba Ana commune was 2235.6 ha, the most affected culture is wheat culture (1302 ha) followed by rape with 610 ha and barley with 280 ha calamity.

Chapter VI presents **„Measures to improve soil limiting factors in the cerebrate area”**.

Drăgănești municipality is mostly occupied by moderately and poorly acidic soils, representing 3211 ha (89%). On about 157 ha (4.0%) are found strongly acidic soils. Neutral soils occupy 26.0 ha (0.5%) and weak alkaline soils 208 ha (6%). On acid surfaces, calcareous fineing accompanied by organic fertilization is required. The use of chemical fertilizers with an acid physiological reaction such as nitrate and ammonium sulfate is not recommended. It is recommended to apply nitrocalcar and complex fertilizers 22:22:0, 16:48:0 which ensure nitrogen fertilization and correct soil acidity.

The supply of nitrogen soils is weak and moderate. In order to correct this state, organic fertilization is required in doses established according to the morphological situation of each soil type and the values resulting from the analysis. In addition, chemical fertilizers will be used in compliance with the appropriate agrotechnics and in accordance with the Code of good agricultural practice. A good nitrogen insurance situation is found on the surface of about 350 ha (10 %), following the values of the other agrochemical indices related to the pH value, as well, we conclude that here the correct fertilization of the soil was carried out.

Soil insurance with mobile phosphorus is generally moderate and well (2507 ha – 69%). On 364 ha (10.5) are very well secured soils with phosphorus. Isolated cases are the 757.0 ha (20.5% of the total agricultural area –) which are covered by very weak soils and poorly secured by mobile phosphorus, the explanation being that their owners did not respect the specific agrotechnics and fertilization technologies. On acidic soils, it is first necessary to fine limestone so that phosphate fertilization will give results. Phosphorus fertilizers are applied with the basic work and are incorporated into the soil with the plough, the, necessary because the mobility in the soil of this element is extremely small and so they can make contact with the roots of the plants.

Soils mapped within UAT Ceptura record values located in the moderately acidic – low alkaline domain, predominating soils with weak alkaline reaction. As regards nitrogen supply, 16.67% are nitrogen-poor soils, 70.83% medium nitrogen-supplied and 12.50% well-insured nitrogen. Ceptura soils are well insured with 40.72% mobile phosphorus and very well supplied with mobile phosphorus on 35.50%. A weak supply of mobile phosphorus is found on 23.79%. As for potassium, soils are well-stocked, respectively 70.03% while the rest have a weak supply of potassium.

In the mapped territory a problem is raised by the reaction of the soil that is located in the moderately acidic and weakly acidic domain. The acid reaction of soils is determined by the irrational use of fertilizers (it is mentioned that on these acidic soils it is forbidden to apply fertilizers based on nitrogen and ammonium sulfate, recommending the use of complexes or nitrocalcar.

Pollution occurs on the studied territory on the area of 109 hectares, that is, on 1.45 of the total area covered. The type of pollution is exclusively through animal manure, being a factor of wrong placement of sheepfolds, improper crawling and unreasonable grazing, without respecting the recommended duration and areas.

The effects lead to soil degradation by the destruction of valuable vegetation, the emergence of nitrophilic species and low fodder value, mounds of plant, animal, animal origin, shrubs or vegetation-free areas subject to subsidence or surface erosion. In these areas, preventive measures consisting in the practice of rational grazing and the observance of good agricultural practices are primarily required.

In the case of salinisation-sodization processes which represent the process of increasing the content of soluble salts in the soil and/or replacing the bivalent cations from the adsorbent complex of the soil with  $\text{Na}^+$  ions, the ameliorative measures are required to remove salts from the soil profile and to amend gypsum on alcalic soils.

UAT Baba Ana lands record values located in the moderately acidic – alkaline domain, predominating soils with weak alkaline reaction, 3761 ha, ha, soils c weakly acidic network occupy a spraface of 2275 ha. In the first soil horizons, the texture is clay-clay on most soils studied, at over 70 cm textur is clayey (the clay content reaching 50% pese on some soils. The soils of Baba Ana are mostly well secured with nitrogen, occupying 4275 ha and only 575 ha are poorly supplied soils. The charted soils record values located in the very weak field – very well insured with phosphorus, predominating soils with good insurance in mobile phosphorus, respectively an area of 2375 ha, and very well secured soils with phosphorus meet on an area of 1211 ha.

The charted soils record values located in the middle domain – very well insured with potassium, predominating soils with very good insurance in potassium, occupying an area of 6986 ha.

The main ameliorative measures required by UAT Baba Ana are for arable teren irrigation on 89.02% of the surface, Deep loosening on 85.67%, improvement of soils salted on 28.63% and radical fertilization on 10.32% of the surface. In the case of land used as pasture which occupies 354 ha, it is necessary to have a radical fertilization on 4.24%, desecration on 70.90%, and various ameliorative works (salty washing, deep loosening, calcic fining) on 55.36% from surface. For the fields occupied by fruit plantations of 48 ha are required drainage works on 84, 20% and removal of salts on 84,20%.