# SOIL QUALITY IN THE PRUNDU FARM OF THE GREAT ISLAND OF BRAILA

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**Abstract**

*The paper aims to present a model of farm management, starting from the threats related to soil quality identified by the Joint Research Centre of the European Union (JRC). Soil samples were collected and analyzed from the Prundu farm on the Big Island of Brăila, after the soybean crop, a farm that is located on alluvial soils formed on river-lake deposits.*

*The effect of the minimum tillage system, carried out with the Joker, on the physical and chemical characteristics of the soil influencing soil quality was followed. Soil samples were collected and analyzed from three profiles every 10 cm at a depth of 50 cm.*

*When establishing the fertilizer doses, it was taken into account to obtain a soybean production of 4000 kg/ha. NPS complex fertilizer and UAN liquid fertilizer were applied, fractionated in two batches to avoid large nitrogen losses through leaching. A total of 94 kg/ha of nitrogen (N), 41 kg/ha of phosphorus (P), and 30.24 kg/ha of sulfur (S) were applied.*

***Key words**: **alluvial soil, conservative agriculture, fertilization***

## INTRODUCTION

Soil is one of the most important natural resources that provide vital goods and services for sustaining life. However, due to the enormous diversity of characteristics resulting during its formation from the interaction of the lithosphere, biosphere, atmosphere, hydrosphere and anthroposphere, under the action of time, the soil has been assessed as having local, at most regional characteristics, with a lower degree of generalization, and has not received due attention compared to other environmental factors, Although it is the main environmental factor, the main means of production, it provides us with food and water and imposes their quality, provides raw materials, regulates carbon and nutrient cycles, hosts more than 25% of biodiversity, and contributes to climate change mitigation.

Bouma (2006) considered that, due to various causes of complexity and diversity, we cannot define soil quality, although it is an essential element of environmental regulations, while water and air quality are well defined.

The European Union Joint Research Centre (JRC) has identified the following threats related to soil quality: water and wind erosion, decline of organic matter in peatlands and mineral soils, compaction, building cover, contamination, salinisation, desertification, floods, landslides and biodiversity loss. In addition, inadequate soil management on the farm can lead to acidification processes and imbalance in nutrients, with serious effects on production and production quality, biodiversity, nutrient valorisation, environmental quality.

Hartmann (2006) showed as a response to these threats, that soil science must: 1) increase soil productivity to maintain food production, 2) rehabilitate degraded ecosystems, 3) avoid "spillover effects" and 4) ensure economically acceptable sustainable soil management techniques.

In order to respond to these threats, Law no. 246/2020 on the use, conservation and protection of soil. In order to follow the evolution of soil quality and avoid negative impact on agricultural production, human health and soil protection, the Law provides for the issuance of a Soil Quality Certificate. The law provides that "the application for and obtaining the soil quality certificate are mandatory when changing the land owner/alienation of the land with any valid title, the land user, the mode of use, or when returning the land to the owner after use in lease, concession or any other form of exploitation, on which the following activities were carried out: a) agricultural, existing or new forestry and livestock farming; b) existing or new industrial or economic projects with a significant impact on the soil; c) military activities with a significant impact on the soil.

In addition, in the 2023 proposal for a Directive of the European Parliament and of the Council on Soil Monitoring and Resilience, it is shown that scientific works show that 60-70% of EU soils are in a state of unhealth. All Member States face the problem of soil degradation. The degradation processes are continuous and getting worse. The driving forces and the impact of this problem go beyond countries' borders, reducing the ability of soils to provide vital services in the EU and neighbouring countries. They create risks to soil health, the environment, climate, the economy, and society, including risks to food security, water quality, increased flood and drought impacts, biomass production, carbon emissions, and biodiversity loss (EC, 2023).

Abrahams (2002) considers that soils significantly influence a diversity of functions that support the human population. Through ingestion (whether deliberate or involuntary), inhalation and dermal absorption, the mineral, chemical and biological components of soils can be direct, beneficial or harmful to human health. All soil components, in conditions of deficiency, excess or imbalance between elements, can be more or less harmful. However, under normal conditions, the soil can only sometimes respond to the explanations required to identify the source, the transmission route and the receptor (human, animal, plant, water, atmosphere). For this reason, in this paper we refer only to the quality of the soil, especially as a factor of production, in conditions of environmental protection.

## MATERIALS AND METHODS

In order to see how we should issue this soil quality certificate, soil samples were collected and analyzed from the Prundu farm on the Big Island of Brăila, after the soybean crop. The samples were collected from three points, at depths of 10 every 10 cm, up to a depth of 50 cm. The information on the applied technology was made available by the Agrochemistry Laboratory of the IMB.

The following methods were used to perform the laboratory analyses:

- pH in aqueous suspension 1:2.5; SR 7184-13:2001;
- Humus: wet oxidation; STAS 7184/21-82;
- Nt: total nitrogen, Kjeldahl method; STAS 7184/2-85;
- $P_{AL}$: extractable phosphorus in - ammonium acetate-lactate; STAS 7184/19-82;
- $K_{AL}$: extractable potassium in ammonium acetate-lactate; STAS 7184/18-80;
- S-$SO_4$2-: soluble sulfates, turbidimetric method; ICPA Methodology (1981) vol. 1, part II, chap. 14;
- $P_{Total}$: total phosphorus, colorimetric method, ICPA Methodology (1986), chapter 8;
- $K_{total}$. Total potassium; ICPA Methodology (1981), vol 1, chap. 2 (2.1.4.3.), ICPA Methodology (1986), chap. 9;
- T-$NH_4$ : total cation exchange capacity; STAS 7184/12, chap. 2.6.2 - var.2, chap. 3.2.1;
- Structural hydrostability: Henin Feodoroff method developed by INRA France adapted in ICPA;
- Cu, Zn, Fe, Mn: -mobile forms, extracted in ammonium acetate solution - EDTA, Assay by atomic absorption spectrophotometry, SR ISO 11047:1998;
- Zn, Cu, Fe, Mn, Pb, Cr, Co, Ni: - total contents by atomic absorption spectrometry, ICPA Methodology (1981), vol. 1, part II, chap. 15, SR ISO 11047;

The interpretation of the results was carried out according to "Methodology of Elaboration of Pedological Studies", 1987,

N. Florea et al., ICPA – Bucharest and "Global Soil Chemistry, Processes, Determinations, Interpretations", 2017, R. Lăcătușu et al.

## RESULTS AND DISCUSSIONS

The soils from the Prundu farm are irrigated, and fall into four classes of suitability for irrigation. In class II, which occupies 43% of the farm area, and are represented by ethic alluviosols, poorly moist phreatic and soft, weakly glazed alluviosols. The third class of suitability for irrigation occupies 41.4 % of the area and is represented by gleic alluvial soils, sometimes saline, alkalized or salted, glyceal molic alluvial soils, saline molic alluvial soils sometimes in associations. Pretensibility class IV occupies 15,1 % of the area and is covered with typical gleiosols, soft, sometimes lightly salted gleiosols. The fifth class of pretability occupies 0.3% of the surface and is very unfavorable land, usually not being ameliorable in conditions of economic efficiency. They are molety, swampy gleiosols alone or in association (Dumitru et al., 2021).

Four main types of soil improvement requirements have been identified: preventing soil compaction, preventing water table rise, combating soil salinization and preventing excess stagnant moisture.

In order to prevent soil compaction, measures were taken that under the conditions of a fine texture (medium clay clay and clay clay), table 2 on the entire soil profile, in all three profiles, as can be seen in table 1, scarification works were applied at a depth of 40 cm after the corn harvest and the ploughing was replaced by conservative works carried out with the Joker at a depth of 8-10 cm. In order to avoid "nitrogen hunger" and stimulate decomposition 65 l/ha of UAN liquid fertilizer was applied to cellulosic plant residues (Table 1). Before sowing, it was fertilized with a complex fertilizer (204 kg/ha) containing 41 kg of nitrogen, 41 kg of phosphorus and 18 kg of sulfur. During the vegetation it was fertilized with 100 l/ha UAN.

Table 1. Tillage and fertilization in Prundu Farm – SOYBEAN cultivation

| Date | Works, fertilizers | Applied dose | Dose N (kg/ha) | Dose P (kg/ha) |
|---|---|---|---|---|
| 07.11 | scarified la 40 cm | - | - | - |
| 07.11 | fertilized with UAN liquid fertilizer | 65 l/ha | 20,8 | - |
| 27.11 | processed field with the Joker at 8 - 10 cm | - | - | - |
| 04.04 | fertilized with 20.20.0 9S with sowing | 204 kg/ha | 41 | 41 |
| 02.07 | fertilized with UAN liquid fertilizer | 100 l/ha | 32 | - |
| TOTAL | | | 94 | 41 |

Table 2. Texture and carbonate content of the soil from the Prundu farm, soybean crop

| Identification | | Particle size fractions (in mm) (% of the mass of the mineral part of the soil) | | | | | | | | | | | | Carbonates |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Coarse sand | | | | Fine sand | | | | Dust | Clay | | Simbol | |
| Try | h (cm) | 2.0-0.2 | 2-1 | 1-0.5 | 0.5-0.2 | 0.2-0.02 | 0.2-0.1 | 0.1-0.05 | 0.05-0.02 | 0.02 | <0,002 | <0.01 | class texturală | (%) |
| Pr1 | 0-10 | 0,7 | 0,1 | 0,1 | 0,5 | 20,1 | 0,5 | 1,6 | 18,0 | 27,7 | 51,5 | 69,6 | AL | - |
| Pr1 | 10-20 | 0,4 | 0,0 | 0,1 | 0,3 | 29,3 | 0,5 | 1,9 | 26,9 | 26,5 | 43,8 | 64,0 | TT | - |
| Pr1 | 20-30 | 0,7 | 0,0 | 0,1 | 0,6 | 24,4 | 0,6 | 2,0 | 21,8 | 26,7 | 48,2 | 66,8 | AL | 0,2 |
| Pr1 | 30-40 | 0,4 | 0,0 | 0,2 | 0,2 | 29,3 | 0,6 | 1,7 | 27,0 | 25,7 | 44,6 | 60,0 | TT | - |
| Pr1 | 40-50 | 0,7 | 0,2 | 0,0 | 0,5 | 28,8 | 0,6 | 2,7 | 25,5 | 29,9 | 40,6 | 56,6 | TT | 1,0 |
| Pr2 | 0-10 | 0,8 | 0,1 | 0,1 | 0,6 | 22,2 | 0,6 | 1,8 | 19,8 | 26,4 | 50,6 | 69,4 | AL | 0,2 |
| Pr2 | 10-20 | 0,7 | 0,0 | 0,1 | 0,6 | 21,9 | 0,4 | 1,9 | 19,6 | 26,4 | 51,0 | 68,8 | AL | 0,6 |
| Pr2 | 20-30 | 1,0 | 0,5 | 0,1 | 0,4 | 26,6 | 0,4 | 1,9 | 24,3 | 26,0 | 46,4 | 65,1 | AL | 0,4 |
| Pr2 | 30-40 | 0,4 | 0,0 | 0,1 | 0,3 | 28,1 | 0,5 | 1,8 | 25,8 | 26,5 | 45,0 | 63,9 | TT | 0,8 |
| Pr2 | 40-50 | 0,4 | 0,0 | 0,6 | 1,0 | 28,5 | 0,7 | 2,2 | 25,6 | 28,9 | 42,2 | 62,2 | TT | 1,3 |
| Pr3 | 0-10 | 1,1 | 0,0 | 0,0 | 1,1 | 25,3 | 0,4 | 2,1 | 22,8 | 26,4 | 47,2 | 66,4 | AL | - |
| Pr3 | 10-20 | 1,1 | 0,1 | 0,3 | 0,7 | 26,1 | 0,3 | 1,9 | 23,9 | 25,7 | 47,1 | 66,1 | AL | 0,4 |
| Pr3 | 20-30 | 0,4 | 0,2 | 0,1 | 0,1 | 27,2 | 0,5 | 1,9 | 24,8 | 27,3 | 45,1 | 64,1 | TT | - |
| Pr3 | 30-40 | 1,1 | 0,6 | 0,1 | 0,4 | 27,9 | 0,6 | 1,8 | 25,5 | 25,0 | 46,0 | 90,6 | AL | - |
| Pr3 | 40-50 | 0,6 | 0,1 | 0,1 | 0,4 | 31,3 | 0,5 | 2,7 | 28,1 | 26,5 | 41,6 | 60,1 | TT | 0,6 |

Working with the Joker leads to the shredding and semi-incorporation of plant debris into the soil, which creates conditions for a biological activation of the soil, improvement of the structure and hydrophysical characteristics of the soil.

Soybean plants possess two enzymatic nitrogen metabolism equipment: nitrate-reductase and nitrogenase. This allows soybeans to provide nitrogen in two alternative ways: soil nitrogen nutrition and biologically fixed nitrogen nutrition with the help of symbiosis formed with Bradyrhizobium japonicum bacteria. In the early stages of vegetation, the plant uses nitrogen from the soil, after which it uses symbiotically fixed nitrogen. Under these conditions, the application of a low dose of nitrogen, only 41 kg/ha at sowing, is necessary. In addition, for the metabolism of nitrogen in the soil, the plant consumes much less energy. Under favorable conditions, with the help of symbiosis, soybeans fix up to 220 kg of nitrogen/ha. But biologically fixed nitrogen is used by the plant later in the pre-flowering phase, which is a critical phase in the nitrogen nutrition of soybean plants (Roman et al., 2011).

Since, the insufficiency of nitrogen during the flowering-pod formation period leads to a reduction in the number of pods, the number and weight of berries per plant and the nitrogen content of the berries and vegetative organs, in the end registering harvest decreases of 25-50%, in this stage another 32 kg of nitrogen/ha were applied. This allowed to obtain a production of 4237 kg/ha compared to an expected production of 4000 kg/ha. Soybeans are a good precursor for most non-leguminous plants.

It is estimated that the application of the 41 kg phosphorus/ha is sufficient. Sala (2011) estimated that the phosphorus supplied in the first phases of vegetation ensures the needs of plants for a long period of time.

Although soybeans consume significant amounts of sulphur, due to the high values of sulphur in the soil, it was estimated that 18 kg of sulphur/ha is a sufficient dose.

The reaction of soybeans to sulfur fertilizers is weaker compared to alfalfa, clover and corn. It is strong on sandy and clayey soils (Davidescu et al., 1984).

Table 3. Some physical characteristics of the soil in Prundu Farm, soybean crop

| Identification | h (cm) | AH | D | IS |
|---|---|---|---|---|
| pr. 1 | 0-10 | 28 | 30 | 1 |
| pr. 1 | 10-20 | 25 | 21 | 1 |
| pr. 1 | 20-30 | 30 | 28 | 1 |
| pr. 1 | 30-40 | 37 | 32 | 1 |
| pr. 1 | 40-50 | 26 | 24 | 1 |
| pr. 2 | 0-10 | 21 | 36 | 2 |
| pr. 2 | 10-20 | 32 | 27 | 1 |
| pr. 2 | 20-30 | 31 | 21 | 1 |
| pr. 2 | 30-40 | 34 | 19 | 1 |
| pr. 2 | 40-50 | 21 | 25 | 1 |
| pr. 3 | 0-10 | 36 | 25 | 1 |
| pr. 3 | 10-20 | 40 | 23 | 1 |
| pr. 3 | 20-30 | 42 | 27 | 1 |
| pr. 3 | 30-40 | 40 | 24 | 1 |
| pr. 3 | 40-50 | 37 | 19 | 0 |

The data presented in Table 3 show that the structural hydrostability of the soil (HA), represented by the structural microformations stable to the action of water, has average values up to a depth of 50 cm; the dispersion (D) represented by the microformations with a diameter of <0.01 mm unstable to the action of water has extremely high values and leads to very high values of the structural instability index (SI). Water circulation in the soil at a depth of 50 cm is very good. The data are in agreement with the opinion expressed by Canarache (1990) who shows that the high structural hydrostability is ensured by the positive balance of humus, the presence of calcium carbonate on the entire soil profile, the maintenance of the soil reaction and the composition of changeable cations within optimal limits, the use of good quality water for irrigation, ensuring a low water intensity in sprinkler irrigation, favoring the activity of the mesofauna and the use of a varied structure of cultures.

The data presented in Table 4 show that the soil has a weak alkaline reaction, a medium humus content, a high total nitrogen content, a high total phosphorus content, a high mobile phosphorus content in the first 20 cm and a medium content at depths of 30-50 cm, a high total potassium and mobile potassium content in the first 10 cm and a deeper medium content, and a high sulfur content.

Due to the soil's weakly alkaline reaction and low carbonate content, calcium phosphates predominate in the soil. Organic matter contributes to increasing the solubility and bioavailability of phosphorus in soils by: a) the formation of organophosphorus complexes that are more accessible to plants; 2) the ability to retain and release phosphate anions; 3) the formation of compounds of organic ions with calcium, with the effect of reducing the fixation of phosphorus in the form of hardly soluble or insoluble compounds; 4) increasing the amount of organic phosphorus that will mineralize in inorganic form. Mycorrhizal plants benefit from a better supply of phosphorus as a result of the ability of fungi in the mycorrhizal relationship to increase the volume of explored soil and to solubilize phosphorus from more difficult to soluble compounds through hyphae (Sala, 2011).

Integrated crop management (practiced on the farm) is a working method that balances the requirements of running a profitable business with responsibility and environmental sensitivity. This type of management presents a realistic solution to many problems that agriculture has to face. It includes practices that can be used to avoid residues, improve energy efficiency and minimise pollution. Integrated crop management combines the best modern technologies with some basic principles of good agricultural practices and is a long-term strategy at the whole farm level (Rodriguess-Eugenio et al., 2018).

On the farm, based on agrochemical analyzes carried out every 2-3 years, a balanced fertilization is ensured, in accordance with the expected level of production, with the reserve of nutrients from the soil and crop residues that are incorporated into the whole soil, with the predecessor plant. Legume crops (alfalfa, soybeans, peas) were introduced in rotation on the farm, which are the best precursors for other crops (corn, wheat, barley, sunflower), constituting an important source of biological nitrogen, have an important role in soil structuring, and the ploughing was replaced with conservative works with Joker.

Table 5 shows the data on the total content of heavy metals in the soils of the Prundu farm. The values fall within the normal charging range in Zn, Mn, Pb and Co, poorly polluted for Cu and Cr and above the alert threshold for Ni. The agricultural technologies practiced on the farm did not change the total content of heavy metals in the soil. The metals come from the natural geological background and a small part may have been brought with the water before drying.

Table 4 Influence of agricultural technologies on some chemical characteristics of the soil cultivated with soybeans from the Prundu farm

| Identification | h (cm) | pH unități pH | Humus % | Nt % | $P_{AL}$[1)] mg/kg | $K_{AL}$ mg/kg | $S\text{-}SO_4$ mg/kg | Ptotal % | Ktotal % | $T\text{-}NH_4$ me/100g |
|---|---|---|---|---|---|---|---|---|---|---|
| Pr1 | 0-10 | 7,93 | 5,39 | 0,308 | 43 | 205 | 29 | 0,109 | 1,21 | 24,52 |
| Pr1 | 10-20 | 7,87 | 4,86 | 0,277 | 37 | 167 | 33 | 0,109 | 1,20 | 23,52 |
| Pr1 | 20-30 | 7,86 | 4,97 | 0,270 | 41 | 165 | 32 | 0,101 | 1,15 | 23,52 |
| Pr1 | 30-40 | 8,02 | 4,38 | 0,254 | 23 | 154 | 32 | 0,097 | 1,22 | 2,52 |
| Pr1 | 40-50 | 8,07 | 3,61 | 0,212 | 19 | 131 | 44 | 0,093 | 1,19 | 22,02 |
| Pr2 | 0-10 | 7,80 | 5,98 | 0,307 | 48 | 215 | 23 | 0,106 | 1,03 | 24,52 |
| Pr2 | 10-20 | 8,01 | 5,27 | 0,273 | 34 | 184 | 28 | 0,113 | 0,97 | 24,52 |
| Pr2 | 20-30 | 7,97 | 4,74 | 0,273 | 28 | 177 | 30 | 0,099 | 1,18 | 24,52 |
| Pr2 | 30-40 | 8,04 | 4,56 | 0,286 | 25 | 171 | 30 | 0,100 | 1,30 | 22,02 |
| Pr2 | 40-50 | 8,03 | 3,43 | 0,192 | 19 | 135 | 42 | 0,090 | 0,97 | 22,52 |
| Pr3 | 0-10 | 7,95 | 5,21 | 0,310 | 32 | 207 | 29 | 0,108 | 1,43 | 25,02 |
| Pr3 | 10-20 | 8,01 | 5,03 | 0,286 | 40 | 178 | 30 | 0,107 | 1,20 | 24,52 |
| Pr3 | 20-30 | 8,00 | 4,14 | 0,276 | 29 | 165 | 31 | 0,100 | 0,95 | 23,52 |
| Pr3 | 30-40 | 8,09 | 4,26 | 0,266 | 21 | 146 | 33 | 0,092 | 1,13 | 23,02 |
| Pr3 | 40-50 | 8,12 | 3,79 | 0,204 | 22 | 144 | 51 | 0,098 | 1,47 | 22,02 |

Table 5 Influence of agricultural technologies on the total heavy metal content of the soil on the Prundu farm

| Identification | H (cm) | Zn mg/kg | Cu mg/kg | Fe mg/kg | Mn mg/kg | Pb mg/kg | Cr mg/kg | Co mg/kg | Ni mg/kg |
|---|---|---|---|---|---|---|---|---|---|
| Pr1 | 0-10 | 77,2 | 37,8 | 36.435 | 447 | 21,9 | 46,1 | 13,5 | 58,6 |
| Pr1 | 10-20 | 88,9 | 38,4 | 37.216 | 448 | 17,8 | 46,7 | 13,8 | 60,6 |
| Pr1 | 20-30 | 82,5 | 37,5 | 36.932 | 433 | 14,6 | 46,1 | 14,1 | 57,9 |
| Pr1 | 30-40 | 90,3 | 31,5 | 17.221 | 168 | 23,8 | 14,8 | 9,4 | 36,5 |
| Pr1 | 40-50 | 86,7 | 32,0 | 32.796 | 480 | 19,3 | 39,4 | 11,0 | 46,4 |
| | | | | | | | | | |
| Pr2 | 0-10 | 88,6 | 39,2 | 36.955 | 450 | 20,5 | 47,0 | 13,9 | 60,1 |
| Pr2 | 10-20 | 86,7 | 38,8 | 37.547 | 458 | 16,4 | 47,7 | 14,4 | 59,8 |
| Pr2 | 20-30 | 83,6 | 37,2 | 36.921 | 434 | 9,7 | 45,0 | 13,8 | 58,9 |
| Pr2 | 30-40 | 94,6 | 35,7 | 33.905 | 426 | 21,8 | 43,6 | 12,2 | 53,3 |
| Pr2 | 40-50 | 88,7 | 32,9 | 33.479 | 483 | 19,7 | 40,2 | 11,8 | 48,1 |
| | | | | | | | | | |
| Pr3 | 0-10 | 85,4 | 38,1 | 36.853 | 438 | 19,1 | 47,9 | 13,8 | 58,8 |
| Pr3 | 10-20 | 92,1 | 38,6 | 38.100 | 451 | 12,4 | 47,8 | 14,7 | 59,3 |
| Pr3 | 20-30 | 79,5 | 37,2 | 36.890 | 434 | 7,6 | 46,1 | 13,2 | 57,8 |
| Pr3 | 30-40 | 96,3 | 37,1 | 35.407 | 460 | 22,5 | 43,9 | 12,0 | 55,0 |
| Pr3 | 40-50 | 87,9 | 32,7 | 33.635 | 479 | 21,0 | 40,8 | 10,7 | 47,2 |

Table 6 shows the microelement content of the soil from the Prundu farm. The data show medium and low values of soluble zinc in soil, high values of soluble copper, average values of manganese and iron.

The positive effect of microelements on soybean is manifested by increasing the leaf surface and photosynthesis intensity, as well as directly on the symbioses, they enter the constitution of enzymes with a role in nitrogen fixation (Roman et al., 2011).

Table 6 Influence of agricultural technologies on the microelement content of the soil on the Prundu farm

| Identification | h (cm) | Zn mg/kg | Cu mg/kg | Fe mg/kg | Mn mg/kg |
|---|---|---|---|---|---|
| Pr1 | 0-10 | 1,6 | 6,4 | 13,5 | 38,1 |
| Pr1 | 10-20 | 1,6 | 7,3 | 15,9 | 39,3 |
| Pr1 | 20-30 | 1,5 | 6,8 | 14,8 | 36,0 |
| Pr1 | 30-40 | 1,5 | 7,0 | 16,8 | 39,4 |
| Pr1 | 40-50 | 1,3 | 6,5 | 15,5 | 59,6 |
| | | | | | |
| Pr2 | 0-10 | 1,6 | 6,7 | 13,8 | 37,2 |
| Pr2 | 10-20 | 1,8 | 7,1 | 16,2 | 40,6 |
| Pr2 | 20-30 | 1,5 | 7,5 | 19,3 | 39,2 |
| Pr2 | 30-40 | 1,6 | 7,2 | 17,0 | 43,8 |
| Pr2 | 40-50 | 1,1 | 6,6 | 17,0 | 58,5 |
| | | | | | |
| Pr3 | 0-10 | 1,6 | 6,5 | 13,3 | 37,2 |
| Pr3 | 10-20 | 1,7 | 6,9 | 15,2 | 37,3 |
| Pr3 | 20-30 | 1,6 | 7,1 | 16,4 | 34,2 |
| Pr3 | 30-40 | 1,4 | 7,1 | 16,9 | 43,6 |
| Pr3 | 40-50 | 1,6 | 6,4 | 15,1 | 57,7 |

| | | | | | |
|---|---|---|---|---|---|
| Supply status | Low | <1,5 | <0,5 | <5 | <15 |
| | Medium | 1,6-3,0 | 0,6-1,5 | 5-25 | 16-30 |
| | High | >3,0 | >1,5 | >25 | >30 |

**CONCLUSIONS**

The integrated crop management practiced in the Prundu Farm on the Big Island of Brăila has led to high and quality productions, to the continuous improvement of the physical, chemical and biological characteristics of the soil, to the practice of works in harmony with the other environmental factors, in conditions of economic efficiency.

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