ABSTRACT

Keywords: Soil, fertility, economic efficiency, soil quality indices.

Sustainable agriculture is obviously due to the negative impact of intensive farming on the agricultural environment and agricultural products or their derivatives and the inability of the other conventional systems to achieve an efficient economic agriculture.

The concept of sustainable development means all forms and methods of socio-economic development whose foundation is to ensure a balance between socio-economic systems and natural potential.

Increasind the soil productivity and at the same time maintaining a healthy environment are two compatible concepts, despite the promoted perception until recently, claiming that they are in "conflicted". This dilemma was generated, at first, mainly, by the use of excessive amounts of chemical fertilizers in agriculture to ensure high yields and cheaper wich in the same time led to serious consequences for the balance of the various elements in the soil, causing the degradation of other resources of the environment, particularly the quality of surface water and groundwater.

Resilience capacity of the soil is one of the most important and complex characteristics of the soil, beeing actually an attribute of soil, which involve its ability to react as an "elastic body" when subjected to a force, pressure, or actions and to recover to its original shape. In this sense, the soil resilience is one of the most important factors that ensure its sustainability.

Our researches aimed to assessing the sustainability of vegetable production in Târgu Frumos microzone based on complex ecological indicators: study of the landscape conditions were the researches performed, to assess the sustainability of the vegetable soils based on the global index of agrochemical fertility potential (GIAF), the indicators of biological quality, the

ecopedological diagnose matrix of soil troficity effective resources (EDSTER) and economic efficiency indicators.

The thesis is structured into two parts and nine chapters.

Part I - The stage of the knowledge on sustainability regarding agricultural production. It includes two chapters:

- Chapter I. General considerations on the sustainable agriculture. content, importance and necessity of sustainable agriculture system practicing.
- Chapter II. Technological characteristics of sustainable cultivation of vegetables.

Second part - presenting the own research results. It includes seven chapters:

- Chapter III. The purpose, the objectives, the material and research methodology;
- Chapter IV. The environmental conditions where the researches were made;
- Chapter V. Results on sustainability assessment of vegetable soil based on the global index of agrochemical fertility potential (GIAF);
- Chapter VI. Results on sustainability assessment of vegetable soil based on the quality biological indicators;
- Chapter VII. Results on sustainability assessment of vegetable soil using the ecopedological diagnose matrix of soil troficity effective resources (EDSTER);
- Chapter VIII. The assessment of vegetable production sustainability from târgu frumos area based on the economic efficiency indicators;
- Chapter IX. Conclusions and recommendations

The bibliography includes a number of 147 specialty titles from our country and abroad.

The first chapter of the thesis contains useful and necessary information for sustainable vegetable production. Sustainable agriculture represents a long-term goal action which seeks to overcome the problems that facing the agriculture, society in general, to ensure economic viability, a healthy environment, the acceptance by the society of agricultural production systems. The main objective of sustainable development is to find a balance of interaction between four systems: economic, human, environmental and technological, in a dynamic and flexible operational process.

The sustainable management of soil resources should be based on the old urge "to leave to the future generations the agricultural land in better shape than we have received" relying on the

concept of "use, enhance, restore" the soil productive capacity.

In Chapter II are presented technological features of vegetables sustainable cultivation, and some basic principles of agricultural technologies regarding the ecologic, economic, social and environmental sustainability.

Chapter III is dedicated to the purpose, objectives, materials and research methodology of the thesis.

The purpose of this thesis is to highlight by the complex analysis how is performed the sustainability of the vegetable production from Târgu Frumos microzone, respectively, which are the factors that ensure this sustainability.

For achieving this purpose, we propose the following major objectives:

1. The assesing of the natural resources from Târgu Frumos microzone as factors of practicing a sustainable vegetable production;

2. The sustainability assessing of the vegetable fields from Târgu Frumos using complex analysis indicators:

a global index of agrochemical fertility potential (GIAF);

b the indicators of biological quality;

c the ecopedological diagnose matrix of soil troficity effective resources (EDSTES),

3. The assessing of vegetable production sustainability from Târgu Frumos microzone based on economic efficiency indicators.

In Chapter IV are presented the landscape conditions in which investigations were conducted. From the soil researches, made of morphologically and systematically point of view, it was established that in Târgu Frumos microzone the soil type is chernozem (CZ) cambic (cb), typical loess and silty clays formed with the following sequence of morphological, Am-A/B-Bv-Cca.

As regards the temperature of 11.3˚ C, recorded during the years of experimentation, surpassing the annual average, the conditions for growing vegetable plants are suitable in the area of Târgu Frumos in both, field and in protected areas, in a sustainable vegetable production system. Rainfall average recorded was 462.4 mm, which is below the multiaannual normal.

Chapter V had as main objective the analysis of the main quality characteristics of Târgu Frumos microzone and the determination of the global agrochemical fertility potential in two

locations from this area. The material that was used for these determinations represented the soil samples collected from the plant rows and between rows of the plant.

The results that were obtained showed that in both cases the soil has a fine texture. Soil reaction had values of the weak acid-neutral domain, and humus content is within normal limits, those characteristics demonstrate a better suitability of the soil for sustainable cultivation of vegetables.

The recorded values by the global agrochemical soil fertility potential index in the three years of experimentation both samples, the row of plants as well as those taken from the interval between rows of plants, has been classified in global potential high fertility class between 26 and 100 points, reflecting a higher fertility potential.

Chapter VI aimed to assessing the sustainability of soil and hence of the production by the analysis of the main vegetable production indicators that expressing the soil quality. To achieve its purpose, we have take account of the following objectives: the analysis of soil biotic potential, the assessment of soil enzyme potential and the study of synthetic biological indicators of soil.

The soil enzyme potential for the two stationary investigated is highlighted by the three synthetic indicators of fertility and quality VAPI% EAPI% and BSI%, and during the three years of research are influenced by the technological conditions being recorded average values of this indicator, thereby practicing the vegetable cultivation in a sustainable agriculture system.

In chapter VII are presented results regarding the assessment of the land sustainability using the ecopedological diagnosis effective of soil trophicity resources matrix (EDSTES). The research purpose of this chapter was to highlight the correlation and interaction of ecological factors (climatatical, pedological, pedobiological) of the biotopes, analyzing the potential and actual soil trophicity level in a regional, ecological and local context.

The results of the analysis and evaluation of the effective trophicty using the ecopedological diagnosis matrix, of soil resources of the two studied stationary for three years of research demonstrates a high potential land fertility from Târgu Frumos microzone and the higher values of ecopedological diagnosis indicators underline a much closer aproached trophicity to what can potentially provide natural resources of soil.

Chapter VIII aimed at theoretical and practical examination of the relationship between the activity of the production of vegetables and their economic efficiency at the two stationary

investigated level. To achieve our goal were considered that objective such as economic efficiency analysis of A.F. Maxim microfarm and economic efficiency analysis of AF Vavilov microfarm.

Annual profit rate in case of A.F. Maxim microfarm was in the range of 27.7% for the culture of pepper Maradona F1 cultivar and 42.8% at tomato Caliope F1cultivar, for the A.F. Vavilov microfarm the rate of profit was in the range of 19.6% for cucumber culture, Amour F1 cultivar and 44.7% at tomato Belle F1 cultivar, which will allow for the administrators to amortize the expenditure effected and to repay any loans taken.

Analyzing those calculated indicators in terms of vegetable species productivity as inputs in the framework, we find that annual production of vegetable obtained was above national averages, thus increasing the economic efficiency of the two vegetable farms.

In the last chapter there are presents the conclusions and recommendations of the thesis, showing that the objectives have been entirely fullfil.

Based on the results a conclusion can be drawn that the purpose and objectives of the thesis have been fully achieved, thus, so far as possible to enrich the fund of knowledge in sustainable vegetable production and to develop a model for assessing the sustainability of vegetable production.