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AGRICULTURAL LAND UNDER STRESS FACTORS INFLUENCE

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Abstract

The aim of this paper is to emphasis the main trends on the Romanian vegetal products. Vegetal production has a particular importance because of its contribution to feed people and livestock, on the one hand, and, on the other hand, ensure the income for the farmers from export. The field crops placed under natural environment are constantly under the natural risk factors (weather, producing floods, droughts and so on), with unpredictable repercussions, especially under the current climate and climate conditions. The fertility ensures soil favorability for different uses, such as agricultural crops. Using quantitative statistical methods, the paper proposes an economic analysis in the period 2015-2017. These analysis shows that Romania cultivates large areas with vegetal products, ranking on the highest place to cereals. The role of management and technical methods remains a key element in Romanian agriculture in respect with good practices and sustainability.

Key words**:** *vegetal production, environment, agricultural land, stress factors*

INTRODUCTION

The life and human activity are food-conditioned and, alongside evolution, to be less dependent on hunting and gathered from wild fruits, people began to produce their own food. But food production leads to a high pressure on the natural balance, knowing that plants form the basis of any food pyramid, not just humans. The production of sufficient food for humans and animals goes hand in hand with keeping of other living organisms under control [17]. If these are removed from the environment (field), there is pressure on biodiversity, both directly and indirectly.

Maintaining life on earth, in its own right, has its origin in agricultural activity and others with natural resource exploitation character. By judicious management of natural resources and by resorting to the latest scientific results in the field, the vegetal products obtained in the field have diversified both by the number of species and by the cultivars, namely varieties and hybrids. It should be stressed that in the temperate climate characteristic of Romania, two productions can be obtained on the same area of land in one year [9].

The plant production is classified from many points of view and is spread under natural and artificial areas. As such, it is proposed to analyze the local Romanian natural environment exploited by field crops, ie, species with a weight in agriculture [10, 11].

As location, in Romania the forms of relief are structurally harmonious, most of the soil types are found on the continent, and the four seasons (Romania is crossed by the 45th Parallel) manage seasonally agricultural crops. The foundation of the agroecosystem, the soil (an indicator of the environmental evolution features), has received several classifications from the Romanian researchers, the latter dividing it into 12 classes. What is important is the mechanism of clay accumulation, an organic matter that, in relation to a multitude of other physic-chemical properties of the soil, promotes fertility. Ecological consequence, fertility ensures soil favorability for different uses, such as agricultural crops. Out of the total agricultural area, about 65% is occupied by field crops. From this area, considering the

qualification degree (the classification of the land in quality classes - 5 classes), about 74% belong to the first 3 classes. Therefore, the arable naturally favors plant production (organic fertilizer application is indicated). The plains and partly the hilly regions are the relief forms in which the field crops spread, predominantly on cernisoils, luvisoils, but also at their interference. The soil, constantly adapting to natural and/or artificial changes in the environment, has undergone changes (in the last negative period, according to various practitioners). Managed accordingly to sustainable use, the provision of goods and services is ongoing. Determining the relative value of a land (its cost-effective use) contributes to the foundation of technologies, investments, labor remuneration in agriculture and so on.

MATERIALS AND METHODS

The amount of crop yield per unit area, such as the productivity of crops, depends on the whole set of environmental conditions as well as on the manager's experience, which can alter the natural factors or the crop's qualities to the best of the conditions natural. The soil-plant system involves numerous processes influenced by soil work, herbicide action, crop rotation, and differentiated application, depending on pedoclimatic conditions [1, 2, 4, 5, 8]. The solutions for the rational exploitation of arable land are given by the practical methods and recommended scientific applications [7]. The agronomic technique is based on the notions specific to pedology, microbiology, physics, agro-chemistry, physiology, agricultural machinery, ecology [15]. At the same time, they represent the basis of other disciplines of agronomic specialty (plant, viticulture, vegetable growing, management, agricultural economy).
In order to ensure energy security, many countries have intensified the use of energy from renewable sources such as biofuels, whose production is still - under the current global economic context - an emerging industry [14]. It is active as long as there are enough resources, the technologies are reliable, the transformation yields are high for the whole chain (the final user farmer), and biofuel prices are competitive.
Romania has the higher agricultural potential compared to the world's agricultural potential, but there are some deficiencies (structure of agricultural crops, farming systems, unqualified professional labor force, insufficient endowment and technologically outdated with machinery and equipment) which sporadically, influence economic development [16].
In order to analyze the management of vegetal production it was started from the situation of Romanian agriculture. The analysis was made at the national level for evolution of cultivated areas, yields and weights/ha in main cross in the period 2015-2017. The statistical data used in this study were taken from the National Institute of Statistics and National Agricultural Research and Development Institute. To get an overview of the vegetal production in Romanian agriculture were consulted more specialized materials.

RESULTS AND DISCUSSIONS

The scientific approach of crop yield is based on research about the living conditions and productivity of ecosystems natural and cultivated communities [3]. Based on NIS (Romanian National Institute of Statistics) data, Figure 1 shows percentage differences in cultivated areas, outputs and yields in two consecutive years (2015 and 2016) [12, 13]. There are increases in the areas cultivated with legumes for grains (without soybean) and rapeseed, species where production increases are observed, but also on yield. Decreases in surface area were registered for industrial crops, vegetables and fodder plants, all of which recorded low yields. Quantitatively, variable yields are achieved both due to climatic variability/risk, as well as the contribution of knowledge in the field and the farmer's experience.
The land and the climate provide the *support*, but the profitability is given by the input allocation, the necessity of spending, the higher the intensity of the technological system.

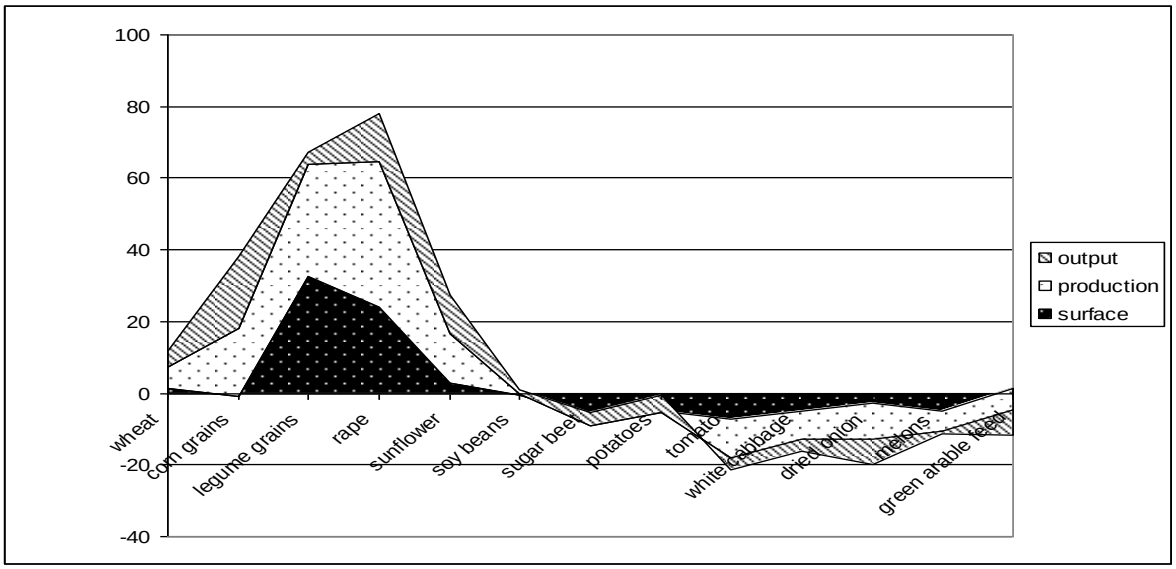

Fig.1. Evolution of cultivated areas, yields and weights/ha in main cross, 2016 as compared with 2015 (%)
Source: NIS, 2017; Author own processing based on data from http://www.insse.ro/, [13]

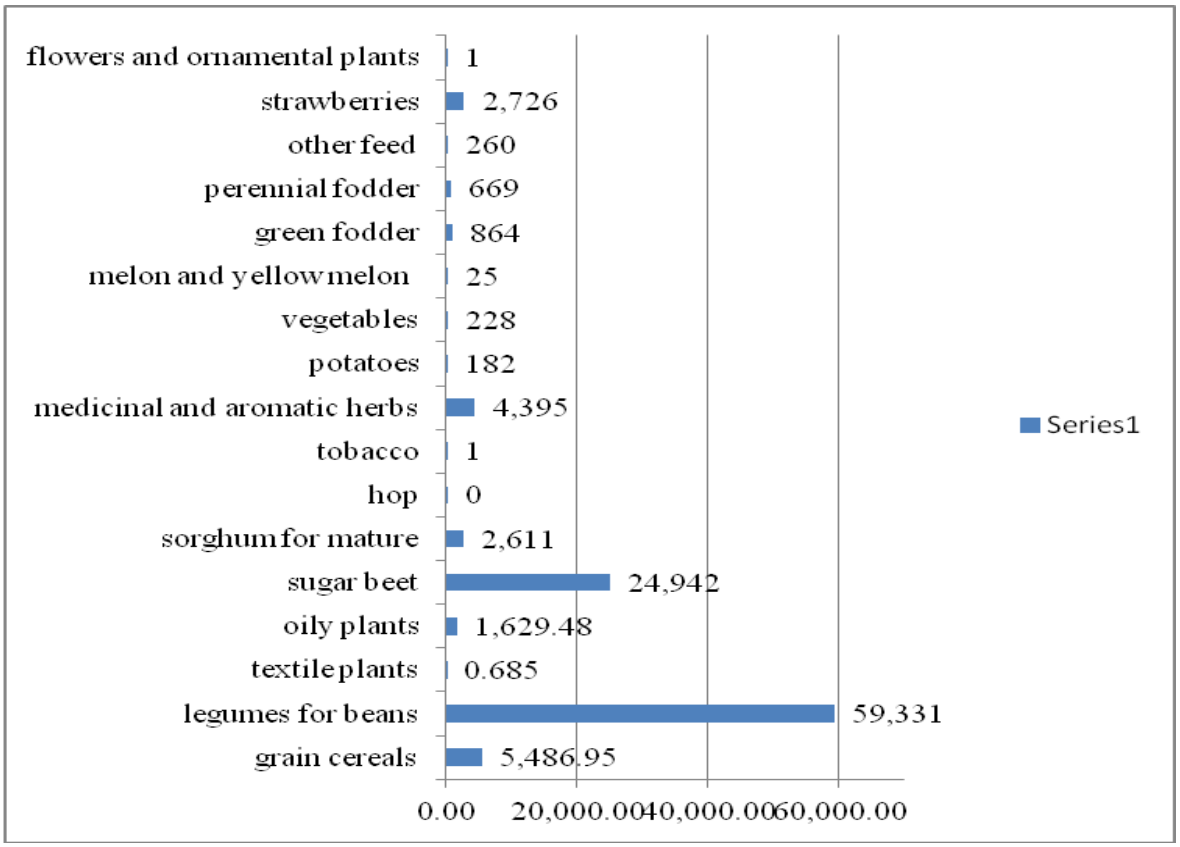

Fig. 2. Area cultivated with groups of species and
species cultivated in arable land in 2016 (thousands ha)
Source: NIS, 2017; Author own processing based on data from http://www.insse.ro/, [13]

The environmentally-friendly, eco-efficient systems also require health, investment, the unitary ones being even higher than in the previous case.

Under favorable environmental conditions, mankind is provided with both food and environmental demand [6]. In Romania, crop production in arable land includes small grains, legumes, oil plants, tuber crops, sugar beet, industrial crops, tobacco, medicinal and aromatic plants, fodder plants, vegetables, strawberries, ornamental plants; they have the

annual, biennial or perennial vegetation cycle. In 2016, the total area cultivated in arable land was 8,409,242 hectares, of which 4,982,912 ha in individual agricultural holdings (59.25%). The areas occupied by the crops and their structure are presented schematically in the Figure 2.

The weight of the crop species in the cultivated area of Romania in 2016 is presented in Fig.3.

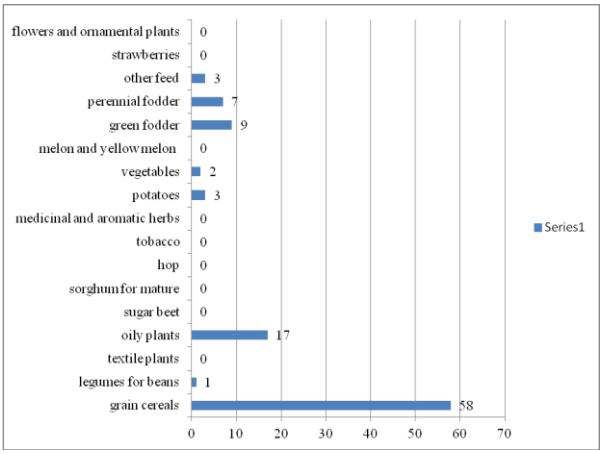

Fig.3. The share of share of crop species in the arable area in 2016 (%)

Source: NIS, 2017; Author own processing based on data from http://www.insse.ro/, [13]

Agricultural crops are important due to the existence of a main product (egg: grains/seeds, vegetative organisms, strains, green or dehydrated plants), which can be the raw matter for the food industry, light industry but also animal and poultry feed and byproduct, useful in animal husbandry or as a source of biodegradable organic matter.

From the Figure 4 it appears that the exploited arable provides large quantities of agricultural products to the population. There is a predominance of cereals, which provides bread and pasta, but also concentrated fodder and industrial raw materials (alcohol, oil, starch and so on).

In the genetic code of each plant species are written requirements for environmental conditions, which, if they are favorable, ensure adequate yields. Therefore, the ecological zoning of cultivated species is the ecological support of the agricultural production area. Thus, in relation to the ecological factors and the ecological optimum, the grouping of the natural areas was achieved by degrees of favorability.

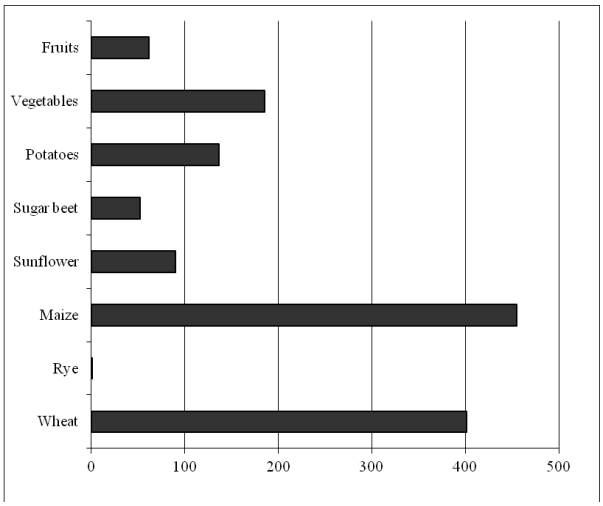

Fig. 4. Yield per capita in 2015, kg

Source: NIS , 2017; Author own processing based on data from http://www.insse.ro/, [12]

Areas are understood to mean several administrative territories that are characterized by the unity of environmental factors and which have more or less similar conditions for agricultural crops. For example, the Romanian Plain (delimited by the Danube River that drives the southern border on a distance of 840 km and north of the Hilly Regions, it is a broad strip of at least 20 km in Oltenia and a maximum of 140 km on the Zimnicea line - Piteşti) was originally dominated by steppe and forestry ecosystems, and nowadays is the area of agroecosystems, respectively fulfilling the most suitable conditions for the field crops, the production of fodder plants (grasses and leguminous plants), vegetables and so on.

However, there are crops which, although ecologically suitable for the area, do not yield yields in this area due to the lack of irrigation systems. The less favorable conditions have been amplified by the degree of land fragmentation and, implicitly, the dominance of semi-subsistence farms.

CONCLUSIONS

Romania's agricultural potential suffers because of the excessive fragmentation of property (the impossibility of intensive agro-cultivation) and the global climate changes,

with a reflection on Romania (excessive frequent drought, periodic excess of humidity, erosion). As a result of the emergence of various forms of degradation, arable land losses were reported, limiting the expansion of the performing agriculture. Consequently, there must be a major interest in innovative technologies, sustainable land use systems, preventing or minimizing soil degradation, restoring productive capacity and vital processes of degraded soils.

Taking into account the market requirement, small grains are the first in their preferences, providing light industry with raw matters, fodder concentrate and coarse fodder, and, more recently, the biofuel industry (fossil fuels alternative) with starch products and biomass. Some cereal species are established in the autumn (September - October), and they harness the local moisture and temperature conditions, and others spring (March - May) and are subject to summer moisture stress. Climate risk may exist under both situations, but the farmer must manage the situation through technical tricks. However, the grain harvesting campaign debuts early in the summer and ends at the end of October. Taking into account the sowing and harvesting campaigns, it is found that more than half of the year is working intensively for cereals. National Agricultural Research and Development Institute (NARDI) Fundulea, through the activity of the field researchers, recommends for grain cereals an impressive number of varieties and hybrids (over 250), both of Romanian origin and abroad (acclimatized, but with significantly reduced yields for wheat, for example).

Also worth mentioning are oilseeds, both for the yield of food fats and for the production of biodiesel. As a result, the field species can be successfully introduced into the energy crop group. After harvesting and processing any field crops, the biomass and the biofuel raw materials are generated. The collection of all bio-organic residues in the field (lignocellulosic) is important in order not to hamper soil tillage but to perpetuate diseases and pests of successive crops and, at the same time, to the biofuel industry. The paper shown that for the vegetal production of Romanian agriculture, the following assessments are made:- organic farming has a major contribution to sustainable development and increased interest in rural areas; technologically, at the same investment effort and under the same conditions as labor and on the same soil, economic results depend on natural factors; conventional technologies, although economically efficient, should be gradually replaced by durable, conservative technologies; from the economic point of view, assessments are made (total arable land, crops available - field crops, inputs on crops and the availability of these resources); the viable field holding must comply with some requirements: full cultivation of arable land; cultivating field species in a balanced structure, according to the natural conditions and the market; the possibility to achieve crop rotation and rotation according to scientific criteria; socially, agricultural yield in Romania meets the consumption needs of the local population.

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