

## VEGETAL AGROBIODIVERSITY IN THE ECONOMIC DYNAMICS OF BULGARIA

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### Abstract

In the context of the current world crisis and the global climatic changes, Bulgarian agricultural and rural food economy is based on the sustainable preservation and management of natural resources and biodiversity in compliance with the European research field. Biodiversity as a complex interaction on Terra comprises living organisms and social and economic systems to which such is connected. In economic point of view are of significance cultivated species liable for the assurance of the necessary food to the population. The agricultural production is performed both traditionally and conventionally, in agricultural units of varied types. Such removed sugar-beet from the list of cultivated species due to the high level of production expenses for setting up and maintenance, the non-stimulating prices offered by processors, the dropping of the price on the world market and the cheap imports of unrefined raw sugar. The structure of cultures is dominated by cereals due to the economic interest manifested not only by small-size exploitations. Their technical outfit and high costs to assure the inputs influence the yields per hectare.

**Key-words:** biodiversity, vegetal species, production, economy, agriculture

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## INTRODUCTION

The adhesion of Bulgaria to the EU is the decisive factor for a reform in agriculture and rural economy, as European agriculture is based on a market-oriented sector, concurrently with the integration of agriculture in the environment and forestry. With this background, vegetal biological diversity represents the variety and variability of numerous species and the ecologic ambient in which such are found. Vegetal organisms are organized on varied levels in Bulgaria, within the period 1992-2002 and 3,572 species (5,714 species worldwide) are known: among these, indigenous forestry species 128. There were no endangered species on the specified date.

Concurrently the increase of the anthropic impact and global weather changes impose the quantitative and qualitative valuation of biodiversity from natural and anthropized ecosystems and social-ecological complexes in view of environment protection and sustainable development. As agriculture uses external energy as inputs, it is necessary that such should be allotted in a balanced way and administered only within optimal periods.

The deficit of indigenous products deriving from inaccurate management impairs the supply of the Bulgarian market with vegetable products and the acceptance of import.

## MATERIALS AND WORK METHOD

Bulgaria benefits in the largest part of the territory of a continental climate with cold winters and hot summers. Precipitations are in average of approximately 630 mm per year. Within this area, vegetal biodiversity is represented by agricultural (field cultures, vegetables, fruit-trees, vine, pastureland and hay-fields) and forestry species.

The agricultural area of Bulgaria is of 5,174 mil. ha, out of which 2% in irrigation conditions (in the year 2008); arable land (3,031 mil ha) is serviced by obsolete mechanization, to one tractor being assigned 57.65 ha arable land. The fertilization of cultures is executed with chemical NPK products in the quantity of 77.1 kg active substance/ha (with approximately 33kg active substance/ha more than in Romania).

Within the period 1990-2009, Bulgaria recorded high values of the agricultural weighting in GDP, in the conditions of the lasting decline of agricultural production (image 1). Thus, in 1990, agriculture participates with 17.03% in the forming of GDP; in 1993 it dropped to 11.3% due to the structural changes generated by the land reform and then on the background of the powerful crisis manifested in economy, in 1997 agriculture reached the maximum level of the period, i.e. 26.72%. Since 1998 and until 2009 the weighting of agriculture in GDP showed evident descending trends, reaching thus 5.63%. The labor force in agriculture is old, similar to Romania; in 1991 it represented 19.5% from the total working places and in 2009 it dropped to 7.5%.

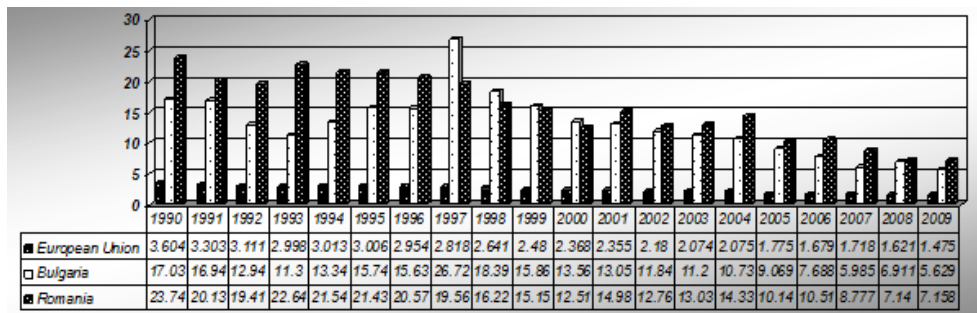


Fig. 1 - Agriculture (cultivation of plants, livestock production, forestry, hunting, fishing), %GDP

The determination of productive limits of vegetal species on Bulgarian farms was possible by a thorough documentation regarding the ecological conditions and the statistical regional and local data, but studying also the know-how of certain cultures.

### RESULTS AND DISCUSSIONS

*Cultivated area.* Due to the favorable relief, soil and weather conditions, but also the experience and tradition in production, *cereals* are the dominant agricultural cultures. Thus, their weighting in arable cultivated area was at the level of the year 1990 of 53%; after two transition decades, the areas assigned to cereal cultures extended to 60.15%.

In the structure of areas cultivated with cereals, wheat and corn occupy significant places: in 1990, 30% and 11% respectively; in 2009, 40.16% and 9.73% respectively.

The growing trend of the cereal domination in the structure of cultures is the direct result of the economic interest manifested by small-size exploitations that resulted concurrently with commencing the land reform at the beginning of the 90's.

From among plants destined to industrialization, *sugar-beet* records the deepest decline in view of the cultivated areas. The causes of this phenomenon were generated by the high level of production expenses for the setting up and maintenance of the culture, the non-stimulating prices offered by processors to agricultural producers, the dropping of the price for sugar-beet on the world market and the cheap imports of unrefined raw sugar. The weightings of sugar-beet cultures in the total arable area was at the level of the year 1990 of 1%; during the last decades, areas destined to this culture have been considerably reduced<sup>5</sup> and as of 2008 this species was given up.

*Sunflower* experienced during the analyzed period an extension of the cultivated areas; it recorded an ascending evolution within the period 1990-2009 (from 7.3% to 22%). This positive evolution was influenced both by the suitability of the culture to the natural conditions, but especially the competitiveness and the comparative advantage

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of such culture versus others (sugar-beet) in the new conditions of the domestic market and the maintaining of a high price on the international market.

Areas cultivated with *potatoes* have had negative dynamics. In the year 2009 versus 1990, the weighting of the areas cultivated with potatoes within the arable area has been reduced to 0.45%.

In regard to *vegetables*, within the period 2005-2009<sup>6</sup> general decreases have been recorded (ha), as follows:

Year	Species						
	tomato	cucumber	g r e e n pepper	o n i o n dry	cabbage	potatoes	melons
2005	5394	777	5129	1527	3304	23999	7069
2006	7022	991	8516	2217	2818	24471	10069
2007	4828	850	5497	1262	2246	22427	4572
2008	3474	371	3751	1281	2093	21711	4749
2009	3007	876	5013	1179	1596	14002	5593

Areas occupied with *fruit-trees* recorded descending dynamics, as follows:

Year	Surface-owned orchards, ha	
	total	in which production
2005	71457	26343
2006	71084	25978
2007	64800	28361
2008	65100	21978
2009	63102	24269

In Bulgaria, the restitution of areas occupied with orchards has been accompanied by the payment to the State of taxes that should cover the value of the plantations and this led to the decrease of the interest for tree-growing and the increase of the number of abandoned orchards. In order to stop such degradation were taken a series of measures that compelled owners to keep the orchards and to set up production cooperatives for the exploitation thereof<sup>7</sup>.

The area held by vineyards within the period 2002 – 2009 was reduced to approximately one half.

*Productions.* As presented in table 1, one could say that neither extraordinary productions have been obtained, but in comparison to the records of the Romanian agricultural sector, they are larger in their majority.

6 Statistical Yearbook of Bulgaria 2010, pg. 298

7 Constantin Florentina, *Privatizarea agriculturii in unele tari est-europene*, Teza de doctorat, ASE, 2005

**Table 1: Average productions obtained at agricultural cultures from Bulgaria<sup>8</sup>**

Specification	2005	2006	2007	2008	2009
<i>Field crops, kg/ha</i>					
Wheat	3157	3403	2197	4167	3187
Barley	2487	2942	2247	3943	3322
Maize	5308	4533	1459	4155	4707
Beans	1160	1318	1394	1169	1003
Sunflower seeds	1472	1594	937	1802	1928
Seed cotton	1148	1044	988	983	983
Tobacco	1427	1533	1374	1678	1842
Sugar beets	19112	19749	12684	-	-
<i>Vegetable species in the field, kg/ha</i>					
Tomato	16811	24283	19709	28345	24182
Cucumbers	13504	22224	16216	28394	23764
Green pepper	13418	17993	14395	15124	13648
Onions dry	9364	9143	8396	12485	6973
Cabbage	20939	25727	22055	30957	24636
Potatoes	15641	15771	13317	16258	16539
Melons	13759	18453	20894	19641	19757
<i>Forage species, kg/ha</i>					
Maize for silage and green fodder	12605	12823	3909	12804	13070
Alfalfa hay	4701	5251	3424	4671	4727
Meadows hay	3324	3276	2283	2804	2557
<i>Fruit species, media, kg fruits/ha</i>					
Apples, pears, plums, cherries, apricots, peaches	4663	5535	4558	4912	4978
<i>Grape vine, kg/ha</i>					
Wine grapes	3067	4494	4855	4390	4944
Table grapes	2640	4383	5460	7305	5315

It can be noticed that cotton cultures are maintained and areas cultivated with tobacco have increased; cotton may be a profitable variant in terms of global warming, as the resistance is rendered by the deep pivoting root of the plant; tobacco, by its tropical origin, may be cultivated on significant areas in Bulgaria, as the trend of the species is already increasing.

If the distribution on the market is considered, costs with the vegetal production are high. Thus, for one hectare of wheat, Bulgarians invest Euro 970 (table 2) and the result is 0.2425 euro/kg grains; further to making the conversion into RON and capitalizing the product in Romania, if it is produced with RON 1.05 and the market price is RON 0.8 – 1.0, the loss is obvious.

<sup>8</sup> Surse: Ministry of Agriculture and Food, Agrostatics Department

**Table 2: Technological expenses for the wheat culture (4t grains/ha + 1.5 t hay/ha)**

No.	Activities	Mechanized work	Material expenses / fuel, fertilizer, seeds, pesticides, water	Manual labor	Total costs
1	Basic fertilization / $\text{NH}_4\text{NO}_3$ ; $\text{P}_2\text{SO}_4$ ; $\text{K}_2\text{O}$	50	275	5	330
2	Fall show + discussion	25	60	10	95
3	Sowing	20	60	15	95
4	Spring fertilized with N	40	20	10	70
5	Plant-protection spray	40	85	10	135
	fungicides	10	25	5	40
	herbicides	15	30	5	50
	insecticides	5	20	5	30
6	Harvesting	40	40	30	110
7	Closely straw	10	5	-	15
	<b>Total costs</b>	<b>255</b>	<b>620</b>	<b>95</b>	<b>970</b>
	<b>Costs, %</b>	26,30	63,91	9,79	100

Field cultures are obtained in exploitations of the type of such presented in table 3. The structure of the species is generally adequate; an exception is individual exploitation, in which the rotation of sunflower cannot be accomplished at the necessary interval.

**Table 3: Types of exploitations (households)**

No.	Types of exploitations/ households	Surface household, ha		Structure	
		min.	max.	species	%
1	Individuals	1.5	250	wheat	65
				sunflower	35
2	Unique traders	250	800	wheat	64
				maize	10
				sunflower	26
3	Household rent / lessor	800	6500	wheat	40
				maize	10
				sunflower	30
				rape	20
4	Agricultural cooperatives	500	2500	wheat	40
				maize	10
				sunflower	30
				rape	20

**Vegetable production.** Vegetables are demanded at local level and on export both in fresh condition and industrially processed.

On the territory of Bulgaria have been identified approximately 46 vegetable species that are reproduced in their majority by seeds and a couple of them by vegetative

organs (garlic, onion, horseradish etc.). The tradition of Bulgaria in vegetables is renowned. And in order to strengthen this, Professor Kolev<sup>9</sup> specified a number of 64 commercial enterprises and firms out of 28 countries that as early as 1970 were supplying themselves with seed material from the Bulgarian vegetable genome.

During the last years, the vegetable production was impaired and difficulties were visible. In regard to the area held by vegetables, we found its decrease by approximately 31% in 2009 versus 2005. From the cultivated area, 90% represent vegetable cultures in the field.

The area occupied by vegetable species is held by varied types of households (table 4), with a general average of 5.0016 ha/household. Individual producers predominate, who although not even cultivating 2000 m<sup>2</sup>/producer, exploit a significant area. Nevertheless, 67% from the production is performed in agricultural cooperatives.

**Table 4: Types of exploitations (households) and the related average area**

Types of households	Suprafata medie/gospodarie, ha
Individuals	0,19
Unique traders	0,49
Agricultural cooperatives	13,83
Societies, registered under the law come	13,45
Civil associations	0,35
Other status	1,7

Further to comparatively analyzing the vegetable activity, a significant discrepancy is recorded between the Southern and the Northern part of Bulgaria: in the Southern part, the vegetable production is higher (within the period after 1989) by 5-6 times than the one from the Northern part.

In Southern Bulgaria, the predominant species are: onion (70%), cabbage (82%), carrot (94%), leek (96%), radishes (98%), savory (95.8%) etc.

Seed assigned to the setting up of vegetable cultures is produced in qualitative proven spaces that satisfy the requirements of each species and even variety, but the know-how is obsolete (works are manually performed in their majority). In the current conditions, State policies are liable to keep local sorts by stimulating the selection activity. The situation is so much more sensitive, as the seed material from the import is not suitable to the Bulgarian vegetable zones. In Northern Bulgaria are assigned 95 ha to seed cultures for vegetable species and in Southern Bulgaria 475 ha. Profitable productions are obtained by placing species (varieties) in favorable ecological conditions and using competitive and innovating know-how both in the production of the seed material and in the market vegetable products.

“Bulgaria should use more effort to develop its potential in the agricultural sector that has been neglected in previous years”, admitted the Minister of Agriculture from Bulgaria at the International Agriculture Show 2011.

<sup>9</sup> EE&AE’2004 – International Scientific Conference, Rousse, Bulgaria

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## CONCLUSIONS

Further to the analysis and interpretation of the data on the average productions per hectare for the main vegetable cultures, it results that: due to the low degree of the technical outfit and the assignment of chemical fertilizers, very high oscillations can be noticed from one year to the other, at the level of yields per hectare and furthermore descending trends. It should be specified that oscillations of average productions occurred also according to the weather conditions; in all agricultural cultures, save small exceptions, in certain favorable years, large discrepancies versus the average of yields per hectare recorded within the European Union are experienced.

The reduction of the area cultivated with vegetables experienced in Bulgaria occurred due to the transition of the areas to other cultures, such as wheat and sunflower.

Although reputable by the vegetable production, the productive deficit is also generated due to the week preoccupation regarding the preservation of biodiversity of vegetal species (genetic material).

The impact of biodiversity researches influences decisions at the level of the economic and social environment, concurrently with taking measures regarding environment protection and nature preservation.

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