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WAYS TO INCREASE THE VEGETABLE PRODUCTION IN ROMANIA

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Abstract: Vegetable growing, as sector of horticulture, has a strategic role within the national economy, whereas vegetables is a component of great importance for the nutrition of the population. This work aims to identify ways to increase national production of vegetables in order to increase the average annual national consumption. Currently, the average consumption of fresh vegetables in the equivalent, in our country, is around 150 kg/capita. Ways to increase production of vegetables consist both in surface growth of vegetables in protected spaces and in the field and also the average yields per hectare, by improving technologies. We emphasize that these measures may result in the development of our country vegetable growing, increase employment of rural population and reducing imports of vegetables.

Keywords: growing vegetables, production, consumption

INTRODUCTION

Vegetables are a component of great importance for the population alimentation and therefore the vegetable growing, as sector of horticulture, has a strategic role. It can be noted that in Romania, the vegetables are consumed in amounts that are about 50% higher compared to the total consumption of fruits and grapes.

Vegetables means products mandatory the food strategy, primarily through the acid-base balance, high in carbohydrates, as well as through the presence of vitamins from the vast majority of known classes. To these are added the content rich in mineral elements, the reaction in general basic of most vegetables and the rich in fiber content.

Until 1990 the country had developed a growing vegetables sector, with significant amounts of vegetables for export (in 1986 were exported approx. 600,000 tons/vegetables).

MATERIAL AND METHOD

In the paper were used the following indicators: arithmetic mean, standard deviation, coefficient of variation.

Formulas used to calculate these indicators are presented below^{5; 6}:

For arithmetic mean $\bar{x} = \frac{\sum xi}{n}$; where: \bar{x} = the arithmetical mean of furniture; $\sum xi$ = average production values on a number of years (i); n = number of years taken into account.

For the annual rate of growth⁷ =;

$$r_{2010-2014} = \sqrt[n]{\prod (p1/p0)} - 1$$

r 2003-2014 = annual rate; $\prod p1/p0$ = chained indicators of growth.

For the standard deviation $\sigma = \sqrt{\frac{\sum (\bar{x} - xi)^2}{n-1}}$; where: σ = standard deviation; $\sum xi$ = average production values on a number of years; n = number of years taken into account

Coefficient of variation $C = \frac{\sigma}{\bar{x}} \times 100$

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where: C = coefficient of variation (expressed in percentages)

Coefficient of variation can be: 0-10% small variation; between 10-20% middle variation ; more than 20%-high variation

The data used had as source: Statistical Yearbook of Romania, INS, data in the literature.

RESULTS AND DISCUSSION

From the data presented in table no. 1 it can be highlighted the fact that the total area occupied with vegetables in the period 2010-2014, showed a tendency to decrease at an annual rate of -2.29%, so that in the year 2014 it decreased by 8.2% compared with 2010.

The most important share was owned by tomatoes, which have been cultivated on the 18.3-19.6% of the total surface area, in 2014 is more reduced by 11.9 % towards the first year of the period, registering a decrease at an annual rate of -3.11%.

White cabbage was cultivated on the 17.9-21.2% of the total vegetable area. The trend has been of increase until the year 2013, and in the following year the surface fall with 12.9%.

Along with onion garlic held within the total surface of vegetables, a share of 16.5-17.7% with a decreasing trend, so that in the year 2014, the area was reduced by 12.1 % compared with 2010.

Table No. 1

The area occupied by vegetables cultivated in the field and in protected areas
in the period 2010-2014

Main crops	2010	2011	2012	2013	2014	Average	Annual rhythm	Standard deviation	Var. Coef.
	HA						%	HA	%
Vegetables-total	262,69 ₂	263,359	258,910	259,029	239,474	256692.80	-2.29	9371.49	3.65
Tomato	49767	51754	49655	48369	43857	48680.40	-3.11	2905.13	5.97
Eggplant	10315	10020	9577	9359	9209	9696.00	-2.80	342.74	3.53
Dry onion	33842	33125	33050	32245	30305	32513.40	-2.72	1184.38	3.64
Dry garlic	12803	12128	11367	10616	10703	11523.40	-4.38	686.74	5.96
White cabbage	47043	47016	49089	54907	47837	49178.40	0.42	3134.49	6.37
Peppers	21005	20002	19947	19491	18241	19737.20	-3.47	776.75	3.94
Edible roots	18227	18678	16846	18014	17683	17889.60	-0.75	664.99	3.72
Vegetables grown in the field	159,36 ₄	161,355	157,622	153,799	136,815	153791.00	-3.74	9487.83	6.17
Vegetables in greenhouses and solariums	2545	3506	3275	3422	3997	3349.00	11.95	337.40	10.07
Vegetables fresh from the domestic gardens	92384	89688	88385	93181	90017	90731.00	-0.65	1809.96	1.99

Source: National Statistic Institute, Vegetal production for the main agricultural crops Years 2011-2015 ;

Crops of eggplants and peppers together have been cultivated on 11.1-11.9% of the total vegetable area. The same trend of decreasing surface, so that in the year 2014, they represent 87.6% compared to 2010.

Vegetables grown in the field have seen a continuous reduction of areas with an annual rate of -3.74%, occupying in 2014, with 14.2 percent less land, compared to the first year of the period. The main cause of this was represented by the character increasingly fluctuating and unstable of the climatic conditions which have determined many producers to forego growing vegetables in the field and to turn its attention to producing them in protected areas, particularly in the solarium. As a result, the surface of vegetables in protected areas has reached a figure of 57% higher at the end of the period compared to the year 2010, registering an annual growth rate of 11.95 %.

Average yields obtained from the main vegetable species in the field, are presented in table no. 2, where it is noted that all recorded an annual rate of increase.

Table No. 2

Average production reached the main vegetable species in the field
in the period 2010-2014

Main crops	2010	2011	2012	2013	2014	Average	Annual rhythm	Standard deviation	Var. Coef.
	kg/ha						%	kg/ha	%
Tomato	15443	17602	13761	15488	16102	15679.2	1.05	1377.68	8.79
Dry onion	10908	11904	10449	12152	12770	11636.6	4.02	870.65	7.48
Dry garlic	5250	5492	5223	5855	5865	5537	2.81	278.09	5.02
White cabbage	20858	21807	20125	21062	23478	21466	3.00	1237.53	5.77
Peppers	11592	12674	10381	11682	12531	11772	1.97	912.78	7.75

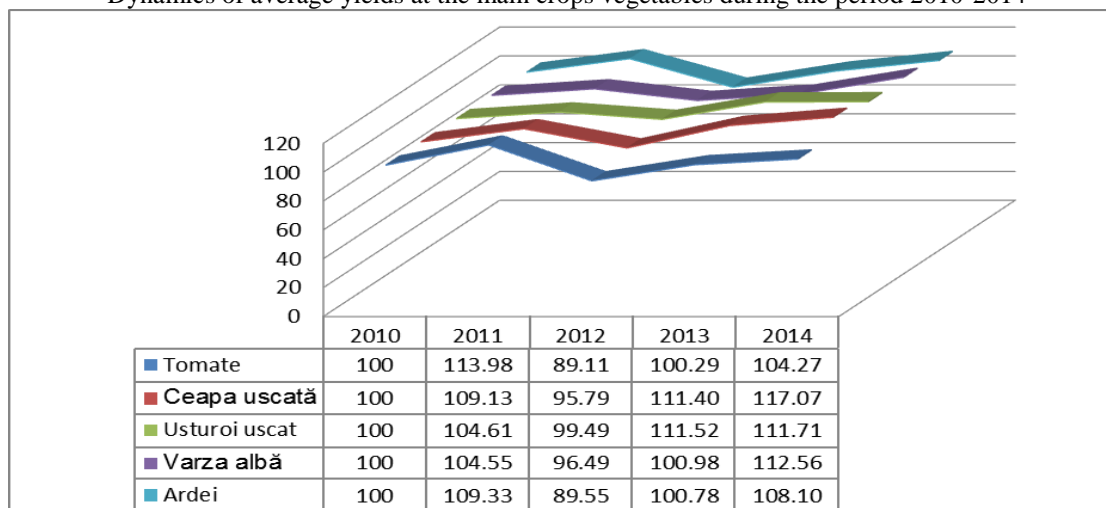
Source: National Statistic Institute, Vegetal production for the main agricultural crops Years 2011-2015 ;

With regard to the production of tomatoes and peppers, they wavered between 13,700-17,600 kg/ha and 10,400-12,700 kg/ha, depending on the climatic conditions that have characterized those years and the decrease in cultivated areas, during the analyzed period, registering an annual growth rate of 1.05 percent, 1.97 percent, respectively.

Onions and garlic, the largest yields were obtained in the year 2011, and reduced production from next year was followed by increases in the other two years of the period.

Figure No. 1

Dynamics of average yields at the main crops vegetables during the period 2010-2014



The culture of white cabbage manifested the same phenomenon presented at tomatoes and peppers, and in 2014 the average production has exceeded with 12.6 percent the one in 2010.

As a general remark, it can be said that the average yields of vegetables grown in the field were not at the level of the production potential of soils, both because of climatic conditions, and because of the failure to meet the technological links established by scientific research.

Table 3

Agricultural production of vegetables produced in the period 2010-2014 (to)

Cultures	2010	2011	2012	2013	2014	Average	Annual rate	Standard deviation	Var. Coef.
	to						%	to	%
Vegetables-total	3,863,617	4,176,302	3,535,316	3,960,990	3,802,494	3,867,744	-0.40	233810.18	6.05
Tomato	768,532	910,978	683,282	749,128	706,200	763,624	-2.09	88988.33	11.65
Eggplant	144,391	160,010	126,005	123,278	127,578	136252.4	-3.05	15108.05	11.09
Dry onion	369,142	394,305	345,340	391,837	386,989	377522.6	1.19	20074.13	5.32
Dry garlic	67215	66602	59368	62156	62773	63622.8	-1.69	2731.88	4.29
White cabbage	981,219	1,025,293	987,900	1,156,436	1,123,132	1,054,796	3.43	71319.70	6.76
Peppers	243,493	253,505	207,072	227,690	228,576	232067.2	-1.57	16700.96	7.20
Cultivated mushrooms	9973	7661	9311	8785	9758	9097.6	-0.54	812.90	8.94
Edible roots	241,578	275,145	212,438	242,265	251,589	244,603	1.02	22481.50	9.19
Of the total vegetables: vegetable field and under	2,479,315	2,877,686	2,472,115	2,706,616	2,631,752	2,633,497	1.50	150849.19	cleaner V5.73

Vegetables grown in the field	2,388,781	2,753,054	2,373,957	2,594,394	2,479,134	2,517,864	0.93	144378.34	cleaner V5.73
Vegetables in solariums	90534	124,632	98158	112,222	152,618	115632.8	13.95	21011.26	18.17
Vegetables fresh from the kitchen gardens	1,384,389	1,298,616	1,063,201	1,254,374	1,170,742	1,234,264	-4.10	97266.78	7.88

Source: National Statistic Institute, Vegetal production for the main agricultural crops Years 2011-2015 ;

In table 3 we can see that the largest production of vegetables was achieved in 2011, surpassing with 8% the year 2010, followed by a less favorable year, but still recorded a slight growth trend until 2014, where production was set at the level of the first year of the period.

Vegetables grown in the field realized fluctuating productions, but except for the year 2012, in all other years have exceeded the year 2010 with a percentage ranging between 3.8-15.1%.

A favorable situation was that of the productions obtained from vegetables grown in solariums, where yields were higher than in 2010 with values between 8.4%-37.7% peaking in 2014 at a rate of 68.6% higher in relation to the first year of the period, registering an annual growth rate of 13.95%. This is also the explanation for the fact that in recent years, producers are turning more and more towards vegetable production in protected areas, being eliminated the risk of crop losses due to climatic phenomena.

In addition to the production obtained from the areas of vegetables grown in the field and solarium, a high share between 30.1-35.8% is owned by the vegetables produced in domestic gardens. In the period under review, was manifested a decreasing trend, so that in the year 2014, production of vegetables was lower with 15.4% compared to that obtained in the first year of the period.

To determine population demand for vegetables, to the year 2014 (11.9 million inhabitants), with an average annual consumption per capita. 150 kg/capita and to arrive at a consumption of 170 kg/capita, it was made the following calculation:

Table 3

The annual requirement of vegetables

Average-consumption per capita	150 kg	170 kg
The vegetables necessary for 19.1 Mil Inh.	2,865,000 t	3,247,000 t
Exports, approximately	100,000 t	100,000 t
Total requirement of vegetables	2,965,000 t	3,347,000 t
Provided domestically	2,632,000 t	2,632,000 t
Assured from import	333,000 t	715,000 t

Own calculations

Taking into account an average production of 38.2 t/ha on an area of greenhouses and solariums in 2014, it appears that demand for vegetables, without resorting to imports, it is necessary to increase the surface of solariums with 8717 ha , having a total required of 12714 ha greenhouses and solariums (table 3).

To ensure an average consumption of 170 kg/capita vegetable, it is considered a possible average production of 45 t/ha, from which it follows that in order to waive the imports, it is necessary to increase the surface of solariums with 15890 ha in total being required of 19890 greenhouses and solariums ha. In this case, it is necessary to increase annually with 3180 hectares the protected vegetable surface by 2020.

Constructions, as well as the application of new technologies in the field of protected vegetable crops have a number of advantages, namely: providing fresh vegetables and of good quality all the year , the reduction of losses of water and nutrients from the soil, reducing the attack of pests and diseases, reduction of specific energy consumption over 30%.

CONCLUSIONS

Ensuring sustainable agriculture involves the use of varieties and hybrids with high genetic potential, adapted to local conditions; limiting the use of chemical substances using preventive crop protection; exploitation of rational agricultural land and conservation of soil fertility status. This proves to be a viable alternative to intensive farming with a role in the economy, and by practicing the "friendly" technologies with environmental protection and ensure the existence of future generations.

Also, for the application of appropriate technologies concerning conditions of different areas, it must be developed a complex system concerning the biological stability of plants, conserving and protecting natural resources, in parallel with the introduction and expansion of technologies economically viable on a long time, to achieve high yields with lower costs.

Vegetables are a basic component in the diet of the population, so the vegetable may be regarded as an area of strategic interest. Noted that typically, in Romania consumes annually 50% vegetables more than fruit and grapes together.

On the average of the past five years, Romania has cultivated a. 257 thousand hectares of vegetables, meaning 0.013 ha/inhabitant.

In the EU-28, the average area cultivated with vegetables in the period 2010-2014 was of 2350 thousand hectares, which reported to the population meant 0.047 ha/inh. If we refer to the average yields achieved in this period, in Romania there were only 15.1 to/ha, representing 54.3% of 27.8 to/ha production at the level of EU-28 countries. This was due to both the application of weak technologies and also unfavorable weather conditions.

In the last 2-3 years has increased the area of vegetable crops, which is the best insurance against climatic risks.

Worthy to be mentioned are qualitative aspects, knowing that from this point of view of Romanian vegetables are superior to those produced in the European Union. It is necessary to pay more attention to the domestic use of valuable biological material existing in research establishments, which is adapted to the conditions concerning Romania, gradually dropping the imported varieties and hybrids, even if the present acquisition prices are more advantageous for producers.

In terms of food consumption in Romania was about 150 kg/inhabitant, assuring an average daily consumption of over 400gr/day/capita, higher relative to UE-28.

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