

A POSSIBLE MODEL FOR DEVELOPING ROMANIA'S HORTICULTURE ON THE HORIZON OF 2040 CASE STUDY: VEGETABLE GROWING

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Abstract

In Romania, horticulture is an important economic branch through the production of vegetables, fruits, wine and table grapes, flowers and raw materials for the food industry. After 1990, in horticulture, like in other agricultural branches, there was a sharp decrease in production, as a result of the dissipation of areas, the ageing of fruit tree plantations and vines, etc. A certain revival of the horticultural sector begins in the last decade, but the average yields per hectare are, in many cases, much lower than in countries with advanced horticulture. Romania has imported horticultural products in recent years, mainly fruits and vegetables of around 1 billion euro. This paper done a SWOT analysis of Romanian horticulture (Strengths, Weaknesses, Opportunities, Risks), and is presented an updated situation of this sector. In the first part of the paper is presented target objectives of national horticulture for period 2021-2040: Development of new production capacities and/or modernization of existing ones and Quantitative and value increase in exports of horticultural products with a view to balancing the trade balance. In the second part of the paper is presented a case study for vegetable growing and some proposals for investments of this branch: New buildings solariums, warehouses, including conditioning and delivery facilities and modernization of vegetable farms in the field.

Keywords: Development model, Romanian horticulture SWOT analysis, vegetable growing.

1. INTRODUCTION

In Romania, horticulture is an important economic branch through the production of vegetables, fruits, wine and table grapes, flowers and raw materials for the food industry, alcoholic and non-alcoholic beverages, etc. At the level of the year 2017, in Romania there were registered 224.5 thousand ha cultivated with vegetables, 139 thousand ha cultivated with fruit trees, 177.2 thousand ha with vines for wine grapes and table grapes (<https://insse.ro/>). All these total areas place Romania on a leading position in European horticulture, which is also confirmed by the fact that before 1990, horticultural products had a significant export share.

After 1990, in horticulture, like in other agricultural branches, there was a sharp decrease in production, as a result of the dissipation of areas, the ageing of fruit tree plantations and vines, etc (Glăman, 2015). A certain revival of the horticultural sector begins after 2007, the year of Romania's accession to the European Union, but the average yields per hectare are, in many cases, much lower than in countries with advanced horticulture (Glăman, 2015; Scurtu, 2016). Romania

has imported horticultural products in recent years, mainly fruits and vegetables from solariums and greenhouses of around 1 billion euros (Glăman, 2015). In this paper we aim to develop a model of development of Romanian horticulture by increasing domestic production, so that at the level of 2040, imports of vegetables, fruits, grapes and wines will decrease in parallel with the increase in exports and the balance of payments. Our approach also aims to ensure the necessary products for the population of the country when, for different reasons, imported vegetable products are no longer available (pandemics, radioactive accidents, transport strikes, etc.).

2. SWOT ANALYSIS OF ROMANIAN HORTICULTURE

Strengths:

- Human and cultural potential that enables the development of the horticultural sector (Ștefan et al., 2008; Scurtu and Lăcătuș, 2013);
- Favourable climatic conditions for the production of quality horticultural products (Ștefan et al., 2008; Lăcătuș et al., 2013; Glăman, 2015);
- An internal market favourable to the consumption of domestic horticultural products (Ștefan et al., 2008; Lăcătuș et al., 2013; Scurtu and Lăcătuș, 2013);
- An external market favorable to Romanian horticultural products (Ștefan et al., 2008; Lăcătuș et al., 2013);
- Possibility of restoring the horticultural sector by accessing the amounts provided for by the National Strategic Plan (NSP), having a favourable experience and response of farmers through the Programme of Reconversion/Replanting of vines and the Submeasure Investments in fruit farms (Bogoescu et al., 2013; Glăman, 2015).

Weaknesses:

- Excessive shredding of horticultural surfaces in the private sector (Glăman, 2015);
- High costs for investment and production technologies (Scurtu and Lăcătuș, 2014);
- Lack of a high-performance consulting system to improve the poor training of farmers (Scurtu and Lăcătuș, 2013);
- Lack of a quantitative and especially qualitative census of horticultural areas on which feasible development programmes can be built (Scurtu and Lăcătuș, 2013; Glăman, 2015);
- Insufficient development of vegetable cultivation in protected areas for thermophile species to ensure the quality necessary to access retail and export chains (Scurtu and Lăcătuș, 2013; Scurtu and Lăcătuș, 2014; Glăman, 2015);
- Storage deficiency for vegetables (root, bulbous, cabbage), fruit (apples, pears, quince) and table grapes, to ensure off-season consumption (Glăman, 2015; Scurtu 2016);
- Lack of predictability in the production of seed and planting material, due to the lack of farmers orders to producers (Voican et al., 2002);
- Lack of associative forms that allow them to conclude long-term delivery contracts with retail networks (Voican et al., 2002);
- Large imports of horticultural products (Scurtu and Lăcătuș, 2013; Scurtu and Lăcătuș, 2014; Glăman, 2015);
- Banking system reluctant to lend to investment and/or production (Bogoescu et al., 2013).

Opportunities:

- Financial support through the NSP (2021-2027 and following), allowing to increase the number of horticultural farms and the modernisation of existing ones (Scurtu and Lăcătuș, 2013; Scurtu and Lăcătuș, 2014);
- Increase consumption of horticultural products/inhabitant by increasing domestic production (Ștefan et al., 2008; Scurtu and Lăcătuș, 2013; Glăman, 2015)

- Decrease of imports and increase exports of domestic horticultural products, leading to balancing the currency balance (export-import) (Scurtu and Lăcătuș, 2013);
- Providing concrete financial facilities and support to persuade producers to join in accessing commercial retail networks and exporting (Glăman, 2015).

Risks:

- Non-association of farmers and, as a result, reduced marketing opportunities through major retail and export networks (Glăman, 2015);
- Lack of horticultural education and consulting for farmers (Scurtu and Lăcătuș, 2013);
- Habit with import products (Scurtu and Lăcătuș, 2013);
- Lack of labour (Scurtu and Lăcătuș, 2013; Glăman, 2015);
- Depopulation of horticultural rural areas (Glăman, 2013).

3. UPDATED SITUATION OF ROMANIAN HORTICULTURE

In the period 1990-2017, the total horticultural area decreased by 163,100 ha respectively by 23.2% but total production increased by 847,300 tonnes i.e. 113 % as a result of investments made with distinction after 2007 (Table 1). However, the export-import balance is totally unfavourable, with the deficit at EUR 1 billion. The total imports of fresh fruit amounting to 475 mil. euro, of which exotic fruits 324.5 mil. representing 28% of total imports (Table 2).

Table 1. Evolution of areas, average yield and total productions in the period 1990-2017

Specification	UM	1990	2000	2017	Differences ±	
					2000/1990	2017/2000
TOTAL HORTICULTURAL SECTOR						
Total area	Th. ha	703.9	702.1	540.8	-1.8	-161.3
Total production	Th. to	5124.0	5339.8	5971.3	+226	+847.3
VEGETABLE GROWING						
Field area and solariums	Th. ha	249.5	234.0	224.6	-15.5	-9.4
Total production	Th. to	2739,0	2528,0	3638,0	-211	+1110
Average yield	kg/ha	10968	10803	16197	-165	+5229
FRUIT TREE GROWING						
Total area	Th. ha	230.8	220.5	139.0	-10.3	-81.5
Total production	Th. to	1431.0	1301.0	1209.0	-130	-92
Average yield	kg/ha	6200	5900	8698	-300	+2798
VITICULTURE						
Area vine for wine grapes	Th. ha	197.7	229.9	170.3	+32.2	-59.6
Total production	Th.to	791.2	1441	1067.1	649.8	-373.9
Average yield	kg/ha	4000	6268	6020	2268	-248
Wine production	mill. hl	3.2	5.4	4.0	2.2	-1.4
Area with table grapes	Th. ha	25.9	17.7	6.9	-8.2	-10.8
Total production	Th. to	162.8	129.8	57.3	-33.0	-72.5
Average yield	kg/ha	6286	7333	8304	+1047	+971

Table 2. Imports of vegetables, fruits, table grapes, wine, canned vegetables and fruit in 2017

Specificity	Import		Export		Diferența I-E (+/-)	
	Th. to	mill. €	Th. to	mill. €	Th.to	mill. €
TOTAL	x	1175.9	x	113.3	x	1062.6
Fruits	686.4	475.0	12.2	13.0	674.2	462
Of which: exotic	478.3	324.5	0.3	0.2	478.0	324.2
Vegetables	379.0	317.0	18.0	13.0	+361.0	+304
Table grapes	51.3	48.4	0.6	0.8	44.9	+47.6
Wine (mill. hl)	4.77	55.5	15.9	24.5	31.8	+31
Canned vegetables and fruits	287	280	52	62	235	+218

4. TARGET OBJECTIVES FOR PERIOD 2021-2040

In order to increase production in horticulture and to ensure a greater share of domestic consumption and availability for export, we propose the following objectives:

A. Development of new production capacities and/or modernisation of existing ones through the National Strategic Programme (NSP) (Table 3).

In our vision, for increase the total vegetable production we need to build every year, up to 2040, 100 ha solariums (plastic tunnels) where it is possible to obtain about 70-100 to vegetable/ha. In the same period, we must build warehouses, including conditioning installations – delivery, investments in upgrading vegetable farms in the field, new tree, wine grapes and table grapes plantation, new and upgraded wineries, upgrading new vines farms, etc.

Table 3. Investment proposals for increasing production in horticulture in order to ensure the largest share of domestic consumption and export availability

Specificity	Target 2027		Target 2034		Target 2040	
	Objective	Costs Mil. €	Objective	Costs Mil. €	Objective	Costs Mil. €
TOTAL	x	2070	x	2170	x	1901
New solarium surfaces- ha	3500	700	3500	700	3000	600
Warehouses and conditioning installations - delivery (No.)	80	160	80	160	30	60
Upgrading vegetable farms in the field (2600 €/ha)	35000	91	35000	91	20000	52
New tree plantations in commercial farms-ha	17685	459.3	24123	644.5	24233	654.8
Wine grape surfaces proposed to measure R/R -ha	10500	176.4	10500	176.4	10500	176.4
Investments in new and upgraded wineries (th. hl)	630	105	630	105	630	105
Investments in table grape areas -ha	3800	123	3700	119.7	3200	103.6

Specificity	Target 2027		Target 2034		Target 2040	
	Objective	Costs Mil. €	Objective	Costs Mil. €	Objective	Costs Mil. €
Upgrading new vines farms ha	3800	3.5	3700	3.4	3125	3.0
Installation irrigation drip ha	4000	16	4000	16	4000	16
Farm facilities new wine grapes	210	4.9	210	4.9	210	4.9
Investments in new/and upgraded nurseries	-	50.4	-	71.1	-	71.1
Of which: Viticulture -ha	110	7.1	110	7.1	110	7.1
Fruit tree growing-ha	1050	43.3	1543	64.0	1550	64.0
Investments in the modernisation of canning plants (thousand tonnes)	140	180	60	78	36	54

B. Quantitative and value increase in exports of horticultural products with a view to balancing the trade balance (table 4). The programme envisages reducing imports in 2027 by 522.2 mil. euro (49.1%) balance of payments in the year 2034, after which they are to become overdrafts.

Table 4. Possibilities for balancing the external balance of payments on horticultural products

Specificare	2017		2027		2034		2040	
	Th.to	Th. €	Th.to	Th. €	Th.to	Th.€	Th.to	Th. €
TOTAL horticulture	x	+1062.6	x	+540.4	x	+160.1	x	-145,4
Vegetable (I-E)	+361	+304	+200	+172	+50	+42	-50	-42
- Import	379	317	300	252	250	210	200	168
- Export	18	13	100	80	200	168	250	210
Fruit tree growing (I-E)	+686	+462	+440	+256	+265	+100	+180	-40
- Import	686	475	520	360	415	290	380	250
- Export	10	13	80	104	150	190	200	290
Viticulture-wine (I-E)	+31,8	+31	-7,0	-9,8	-25	-38,3	-38	-59
- Import	47.7	55.5	30	48.4	20	32.3	15	24.2
- Export	15.9	24.5	37	58.1	45	70.6	53	83.2
Table grapes (I-E)	+49.8	+47.6	+28.5	+27.1	+22.0	+21.4	+15.5	+15.6
- Import	51.3	48.4	30.0	28.2	25.0	23.5	20.0	18.8
- Export	0.5	0.8	1.5	1.1	3.0	2.1	4.5	3.2
Canned vegetables and fruits (I-E)	+235	+218	+110	+95	+50	+35	0	-20
- Import	287	280	200	205	150	160	100	110
- Export	52	62	90	110	100	125	100	130

5. CASE STUDY: VEGETABLE GROWING

Vegetables growing did not benefit in the National Plan for Rural Development (NPRD) for the development programme. Farmers, however, had two sub-measures at their disposal:

- Submeasure 6.1 – Support for the installation of young farmers (40-50.000 euro/farmer);
- Submeasure 6.3 – Support for the development of small farms (15,000 euro/farm)

Vegetable producers in solariums have benefited in the last three years from the de minimis aid scheme (3000 euro/farmer). In 2020, the minimis scheme provides for an amount of EUR 39,477,000 (<https://www.madr.ro/>).

For the next two decades, a moderate increase in annual consumption/capita is proposed, our country having among the highest consumptions in the EU. It also envisages diversifying the assortment and obtaining vegetables to the quality and packaging standards required by the major retail chains. A very important objective is to increase the areas of vegetables in protected areas (solars) for the cultivation of thermophile species (tomatoes, cucumbers, peppers, lettuce), to ensure the quality, sorting and packaging that allows access to the retail section (Scurtu, and Lăcătuș, 2013). Equally important remains the modernisation and specialisation of field farms for the production of roots, bulbous, cabbage and vegetable for canning plants, including thermophiles (Table 5).

Table 5. Production, consumption, import, export and balance of vegetables

Specificity	U.M.	2017	Proposals		
			2027	2034	2040
Population	No. inhabitants	19600000	18600000	17800000	16450000
Consum total	kg/capita.	205	212	220	230
Total domestic production (average 2012-2017)	Thousand to.	3660	3743	3866	3833
Import	Thousand to.	379	300	250	200
Value of imports	mill. €	317	252	210	168
Export	thausand to.	18	100	200	250
Value of exports	mil. €	13	80	168	210
Total production: domestic + import - export	Thausand to.	4021	3943	3915	3783
Balance (exp. – imp.)	Mill. €	-361	-200	-50	+50

By increasing protected areas by 500 ha annually, it is envisaged to achieve average yields comparable to those in EU countries. The increase protected areas will allow an increase exports and a decrease in imports, as well as a balancing of the trade balance on vegetables (Table 6).

In order to achieve these objectives, we propose the following:

- Building of 500 ha/year of protected area in the period 2021-2040, by introducing a measure in the SNP: Investment in new solariums. The costs per m² of a modern solarium, equipped with fertilization, amount to 20 €/ m². Costs for the period 2021-2027 amount to EUR 700 million for the area of 3500 ha, that means 100 million euro per year;

- Storage spaces for 200 thousand tons (root, bulbous, cabbage) by introducing a measure in the SNP: Investment in vegetable warehouses. Costs are EUR 2000/tonne. In the period 2021-2027 it is proposed to build warehouses for the amount of 80,000 tonnes, amounting to EUR 160 million (approximately EUR 29 million/year);
- Introducing a special measure in the SNP (2021-2027): Modernisation of vegetable farms in the field (irrigation and mechanisation to reduce labour costs and so deficient). An estimate of these costs is given in Table 7.

Table 6. Evolution of areas, average and total productions of vegetable

Specificity	UM	Media 2012-2017	2017	Proposals		
				2027	2034	2040
Area cultivated	Th.ha	241.4	224.6	174	160	154
of which: in solariums	ha	4600	5000	8500	12000	15000
Average yield	kg/ha	13910	16300	21500	24000	25800
of which: in solariums	kg/ha	55000	74000	76000	78000	80000
Total production	Th. to.	3358	3660	3743	3869	3982
of which: in solariums	Th. to.	248.0	372.0	646.0	936.0	1200

Table 7. Investments needed to support the vegetable development programme (2021-2040)

Specificity	UM	2017	Development proposals		
			2021-2027	2028-2034	2035-2040
New buildings solariums	ha	5000	3500	3500	3000
Costs / hectar	Th. €/ha	x	200	200	200
Total costs investment	mill. €	x	700	700	600
Warehouses, including conditioning and delivery facilities	Th.to.	12	80	80	30
Cost / 1000 to	mill. €	2	2	2	2
Costuri totale investiții	mill. €	x	160	160	60
Modernisation of vegetable farms in the field	ha	x	35000	35000	20000
Cost / ha	€/ha	x	2600	2600	2600
Total cost modernisation	mil. €	x	91	91	52

6. CONCLUSIONS

- In order to avoid chronicling imports of horticultural products, it is necessary to prioritise the allocation of funds through the SNP to restore the sector, to support domestic consumption and to make export availability, in order to balance the balance of payments;

- Identification of measures in the procedures for allocating funds through the SNP, naturally leading to the formation of farmers' associations, as well as the stabilisation of the population in rural-horticultural areas;
- In order to avoid problems with project co-financing, to attract more investors, especially from the small and medium-sized farm area, we propose that the SNP should constitute an eligible component, particularly for subsidizing interest on the loans needed to co-finance projects;
- Equipping horticultural farms with modern technological equipment is the only solution we have identified to compensate labour shortages and increase labour productivity;
- In order to achieve satisfactory profits for farmers, it is necessary to provide horticultural advice that responds promptly to farmers' request;
- For the preparation of young farmers, including for the continuous training of practicing farmers, we propose the re-establishment of horticultural technical middle schools, oriented towards horticultural practice;
- At Government level, actions are needed to promote Romanian horticultural products through embassies and commercial agencies.

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