Vegetable forcing program in Hungary, and its employment aspects

Gergely, Sándor

Keywords: vegetable forcing, vegetable export and import, employment of unemployed people, green energy, integration.

SUMMARY FINDINGS, CONCLUSIONS, RECOMMENDATIONS

Hungary is one of the countries best suited for agriculture in Europe and throughout the world. Over the last decades, however, the emphasis on putting such natural endowments to the benefit of the nation and of rural communities has dwindled. Most of the opportunities lost concern vegetable and fruit growing, as well as animal husbandry. This also means that these are the fields where we have the greatest reserves. No country may reach the level of prosperity to which it destined without using its natural and human resources in a sustainable manner. Our paper presents the main trends in vegetable growing in the world, the Community and in Hungary, as well as characteristics of the export and import of vegetables in the country. We present development scenarios in the field of vegetable forcing in greenhouse, covering program versions of 1000, 2000 or 3000 ha. We also present the investment and operational features of development scenarios, their budgetary effects, as well as how implementing such scenarios would/could improve employments rates, particularly in underdeveloped micro-regions characterised by high rates of unemployment. We present proposals on how producers could act together in the field of vegetable forcing and marketing.

VEGETABLE PRODUCTION OF THE WORLD AND EUROPEAN UNION

Vegetable production of the world and its expected development is characterised by the fact that it was increased by 93.5 % from 1990 to 2007. In accordance with the prognosis of *Kartali (2005)* the increase of world vegetable production will be 145.9% from 1990 to 2014 (Table 1).

The largest vegetable producer of the European Union is Italy with 15.2 million tons, it is followed by Spain with 12.1 million tons and by France with 8.6 million tons. Among the small countries the Netherlands is outstanding with 3.8 million tons. We can mention – characterising the Hungarian situation- that harvest changes of 30-50% are not rare between the given years due to lack of irrigation. Share of Hungarian production is between 2.4 and 3.6% in the European Union and this ratio can be increased to around 6-7% by realisation of the Vegetable Program.

VEGETABLE PRODUCTION OF HUNGARY

It is seen clearly in the Table 2 that how the cultivation divisions utilising the growing land with high revenue have been forced back from the beginnings of 1990s. It is not regular at all that this trend will have to be continued only causing disadvantages to the nation. However, turning this trend cannot be solved without program based on a wide-scale strategy. The Vegetable Program wishes to be this one.

Table 1

Vegetable production of the world and its expected development (1990-2014)

Vegetable production	1990	2000	2001	2002	2003	2004	2005	2006	2007	2014 prognosis	Change 2014/2007
	1000 t	1000 t	1000 t	1000 t	1000 t	1000 t	1000 t	1000 t	1000 t	1000 t	%
World	461 768	748 126	779 358	812 257	841 461	873 417	891 183	889 743	893 433	1 136222	127
Developed countries	153 765	168 373	162 437	162 453	164 466	172 553	164 879	157 926	157 658	173 332	110
Of which: EU-15	52 216	57 559	55 541	55 193	56 188	59 431	57 785	52 598	50 982	*71 148	140
EU-10	9 631	9 167	9 234	8 117	8 990	9 443	8 812	8 370	8 681	-	-
Hungary	1 976	1 500	1 888	1 851	2 001	2 103	1 637	1 779	1 754	2 200	125
North America	33 500	40 714	38 437	39 949	39 099	40 527	38 310	39 305	40 461	46 114	114
Developing countries	308 002	579 753	616 921	649 804	676 994	700 864	726 304	731 816	735 775	962 890	131
Of which: China	128 338	328 807	356 529	389 240	400 625	410 323	423 262	437 326	448 983	522 648	116
India	48 937	72 284	78 730	71 034	78 642	86 975	91 688	75 934	72 545	115 893	160
East-and SE- Asia	31 899	42 775	43 056	44 781	46 821	48 115	50 185	52 061	52 530	57 107	109
South America	23 133	19 191	19 081	21 131	21 883	21 619	21 775	22 016	22 013	54 184	246

*EU-25

Source: FAO, and Kartali' prognosis, 2005

Table 2

More important arable land plants and development of vegetable-, fruit- and grape production

(Unit: thousand tons)

Description	1931-1940	1951-1960	1961-1965	1966-1970	1971-1975	1976-1980	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005	2006-2007
	Annual average											
Com kinds total	6 006	6 166	6 755	8 248	11 403	12 633	14 422	14 282	11 455	11 969	13 703	12 060
	Of which:											
- wheat	2 196	1 899	2 020	3 008	4 299	5 186	6 066	6 261	4 394	4 079	4 629	4 182
- rye	712	507	271	224	171	135	146	222	167	109	103	90
- barley	628	785	970	845	813	772	1 011	1 108	1 476	1 100	1 152	1 047
- oat	286	190	108	80	81	90	141	135	130	132	153	138
- maize	2 185	2 723	3 350	4 049	5 934	6 374	6 977	6 449	5 127	6 218	7 179	6 155
- rice	-	63	36	42	64	31	41	40	15	9	10	9
Sugar beet	965	2 265	3 093	3 175	3 097	3 979	4 461	4 515	3 709	3 328	2 806	2 074
Sunflower seed	6	164	115	100	143	300	615	753	738	681	939	1 121
Potato	1 993	2 196	1 997	2 044	1 570	1 567	1 446	1 259	1 106	1 132	737	564
Vegetables	-	-	1 470	1 730	1 784	1 984	1 832	2 083	1 559	1 774	1 846	1 602
Fruits	310*	676	955	1 218	1 379	1 510	1 731	1 629	1 090	867	822	591
Grape	495	510	646	775	822	837	784	676	637	633	632	532
Vegetable, fruit, grape total	-	-	3 071	3 723	3 985	4 331	4 347	4 388	3 286	3 274	3 300	2 724

*1938. figure

Source: Orosz – Fűr – Romány, 1996 and KSH

Current volume and structure of our forced vegetable production are presented on the base of table elaborated by Hungarian Product Council of Vegetable and Fruit (Table 3).

Table 3

Volume and structure of Hungarian forced vegetable production (1999-2008)

(Unit: thousand tons)

Culture	Land (ha) year										Production (1000 t) year									
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Eating paprika	2300	2350	2400	2380	2300	2160	2040	2000	2100	1800	170	180	188	185	178	155	150	173	144	172.4
Tomato	1150	1100	1100	1090	1120	1050	880	910	610	610	100	98	100	100	104	101.5	93.3	101.6	132.2	130
Cucumber	600	520	510	480	435	390	350	340	180	150	95	84	80	74	59	55	50	51	29.5	20
Cabbage	400	420	260	300	400	110	90	95	100	98	22	23	15	17	18.3	11.2	9.8	10.1	10.5	10.2
Savoy	80	90	75	60	70	530	480	480	500	500	2.4	3.1	2.5	1.9	2.4	34	32	33	35	34
Chinese sprouts	90	100	60	80	90	129	110	130	300	330	2.8	3	1.7	2.5	2.8	4.5	3.9	4.5	12.1	13
Cauliflower	150	160	150	150	140	465	460	450	500	480	3	3.2	3	3	2.9	7.1	6.8	7.3	7.5	7.9
Carrot	350	380	390	410	400	560	450	480	500	490	10.5	12	13	14	12.9	18.4	16.2	16.5	17.5	17
Parsley	150	180	200	220	230	370	350	400	400	150	4.5	5.1	5.4	6	5.2	12	11	12.1	5.4	5
Mushroom	0	0	0	0	0	210	200	250	280	110	35	38	40	36	32	5	4.8	5.5	3.6	2.9

Source: Hungarian Product Council of Vegetable and Fruit, 2003

In the greenhouses and foiled facilities continuously operated all the year round the presence of eating paprika, tomato and cucumber is dominant in Hungary. From the 5 270–5 300 ha meaning the total forcing area the eating paprika, tomato and cucumber occupy together 4 000–4 200 ha.

Outstanding plant of the Hungarian vegetable forcing is eating paprika. In the area of about 2 300–2 400 ha the annually production is 160-180 thousand tons. It means 46% of the total domestic forcing area and about 42% of total production.

Paprika is followed by tomato in forcing – considering both the growing area and production volume. About 100 thousand tons are produced from it in the area of 1 100 ha. The presence of LSL species containing RIN gene and having long shelf time is dominant in the use of species.

Cucumber is third plant of the Hungarian vegetable forcing, but it is declining regarding both the growing area and production volume. Currently it is produced in the area of 5-600 ha and production volume is 80-90 thousand tons.

The Hungarian forced Vegetable Program has special significance because it means permanent earning opportunity to less educated population groups, while it contributes to rising of sub-regions of disadvantageous situation, which are dropping to the rear. The fewest foreign capital arrived in the most important regions in term of the Vegetable Program, these are South-Transdanubia, North- Plain and South-Plain.

Besides the above-mentioned regions also the North-Hungarian one can be said as the area of the Vegetable Program realisation, because there are vegetable growing areas with great traditions in its southern area, for example Hatvan-Boldog, Heves.

In a lifetime the ration of agricultural active earners declined from 51.5% to 10% and in parallel the total population falling

to one agricultural earner inclined from 4 to 33. It is a severe lesson that the active earning population of about 5.1 million in 1975 became fewer by more than one million to 2005, which reflects on the one hand the intolerable situation of employment and on the other hand it proves that the Country did not excel at all in the international competition of past 20 years.

Vegetable export of Hungary has increased from a low basis during the examined five years, but currency gaining effect of this increase was significantly reduced by vegetable import inclined to 3.1 times (Table 4).

Table 4

Role of vegetable export and vegetable import in the agrarian foreign trading of Hungary (2000-2007)

(Unit: million USD)

Description	2000	2001	2002	2003	2004	2005	2006	2007	2005 /2000 (%)	2007 /2000 (%)
Agrarian export	2 256	2 544	2 668	3 224	3 856	3 892	4 623	6 601	173	293
Vegetable export total	**289**	**321**	**353**	**419**	**460**	**435**	**469**	**574**	**151**	**199**
Of which: Fresh vegetable (HS07)	124	144	147	159	191	174	181	251	140	202
Ratio of vegetable export (%)	***13***	***13***	***13***	***13***	***12***	***11***	***10***	***9***	**-**	**-**
Vegetable import total	**43**	**54**	**67**	**100**	**136**	**135**	**190**	**239**	**314**	**556**
Of which: Fresh vegetable (HS07)	28	34	42	71	94	92	132	170	329	607
Balance total vegetable	**246**	**267**	**286**	**318**	**324**	**300**	**279**	**335**	**122**	**136**
Balance fresh vegetable (HS07)	96	110	105	88	97	82	49	81	85	84

Source: KSH foreign trading database

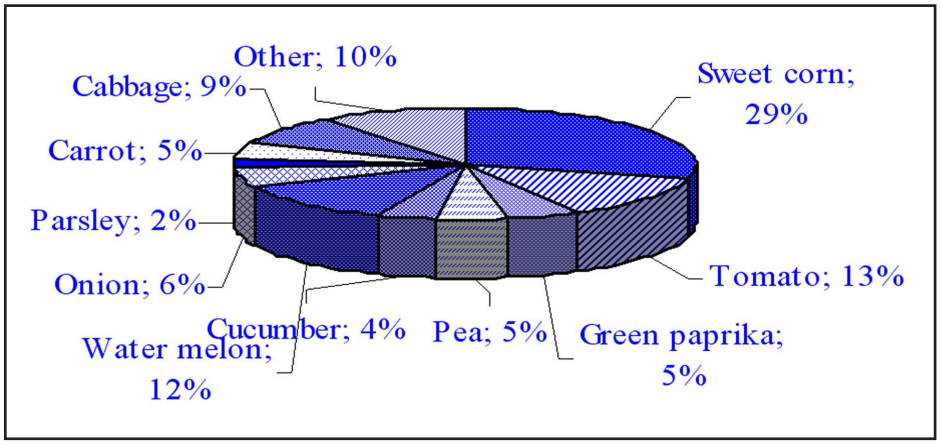
Considering the production of sweet corn, Hungary achieved the first place on the European list during the past 20 years, however this progress is shaded by the fact that we are not able to influence significantly the European price trend. Consequently, the price fluctuation between the years is hectic, cannot be treated and followed.

Producers of Hungarian onion - that was world famous earlier – are suffered by permanent market troubles, main reason of which is lack of organization and one of common marketing appearance.

There are still great unexploited spares in water-melon, pea, green paprika and tomato but also in root vegetable. Basic condition of the spare exploiting is co-operation, unit of force, to which exact recommendations will be provided in the Vegetable Program (Fig. 1).

Figure 1

Share of total vegetable production in Hungary by more important species, 2004



Source: KSH

Table 5

Delivery of vegetable industry (1995-2014)

Description	Unit	1995	2000	2004	2005	2006	2007	2010	2014
Harvesting area	thousand ha	119.4	95.6	104	85	91.1	90.5	85	90
Of which: tomato*	thousand ha	11.8	6	5.9	3.6	2.9	2.6	4	4.1
Production volume	thousand tons	1 644	1 540	2 033	1 547	1 779	1 760	2 000	2 200
Of which: tomato*	thousand t	231	203	269	188	205	228	200	230
Tomato* harvest average	t/ha	137	23.3	35.4	38.1	50.7	45.5	50	55

* Industrial and eating tomato together.
Source: KSH and AKI prognosis (2010-2014)

Delivery of the vegetable industry between 1995 and 2014 is shown in the Table 5, based on AKI prognosis.

We note that the predicted development can be meant very modest. Hungary will have to produce at least 1-1.5 million tons more till 2014.

FOILED HOUSE VEGETABLE FORCING – DEVELOPMENT PROGRAM SCENARIOS AND UNIFICATIONS OF PRODUCERS

As seen in the Fig. 2 the total forcing area has declined from 6300 ha to 5700 ha, while each factor would provide reasons that we

Figure 2

Vegetable production of Hungary 2004-2007

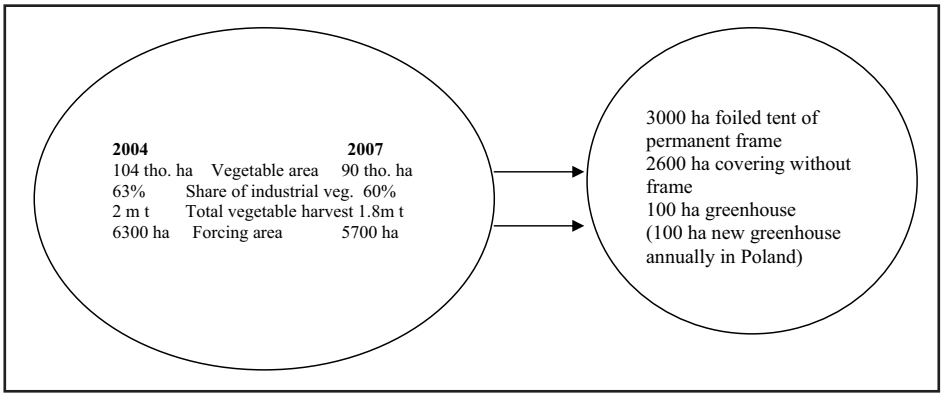


Figure 3

Vegetable Program

Features of automated hydro-culture vegetable forcing foiled house of 10 ha, manipulating packaging facility of 2000 m^2 and cooling house of 500 m^2

❖Heat volume demand/year: 187m MJ – 5.5m m^3 natural gas (34 MJ/ m^3)
- heating by wood (14 MJ/kg) – 13.4 thousand t/year wood chips - 1340 ha green energy plantation (-50% energy costs)
- heating by thermal water (-60-70% energy costs) dependent on water temperature and mineral content

❖employment 72 persons + 53 persons = 125 persons
❖ production value 793m HUF
production costs 653m HUF
revenue before taxes 140m HUF
❖investment
- 10 ha foiled house, manipulating packaging, cooling house, 1.61 bill
- planting of 1340 ha green energy wood plantation, tendering 0.94 billion HUF

Total: 2.55 billion HUF

Source: Tégla, 2008

significantly increase the vegetable growing area.

An automated hydro-culture vegetable forcing foiled house of 10 ha, a manipulating packaging facility of 2000 m2 and a cooling house of 500 m2 are shown in the Fig. 3. This is a significant program element requiring investment however the measurements make it possible to apply the up-to-date technique and technology efficiently and to produce vegetable in large volume and good quality.

In the Table 6, 3 foiled house vegetable forcing development program scenarios are shown.

Table 6

Foiled house vegetable forcing – development program scenarios

Scenario version	Investment		Harvest thousand tons	Product. value	Product. costs	Revenue before taxes	Perm. employed (persons)	Product. Value/ employed	Revenue before taxes/ employed
	Foiled forcing facilities, tempered manipulation, packaging cooling houses	Green energy wood plantation							
1. version: 1000 ha	Total: 161.0 bill HUF Self-contribution: 96.6 bill HUF Subsidy*: 64.4 bill. HUF	134.0 thousand ha Total: 93.8 bill. HUF Self-contribution: 56.3 bill. HUF Subsidy**: 37.5 bill HUF	397	79.3 bill HUF	65.3 bill HUF	14.0 bill HUF	12 500	6.35 bill HUF	1.12 bill HUF
2. version: 2000 ha	Total: 322.0 bill HUF Self-contribution: 193.2 bill HUF Subsidy: 128.8 bill. HUF	268.0 thousand ha Total: 187.6 bill HUF Self-contribution: 112.6 bill HUF Subsidy: 75.0 bill. HUF	794	158.6 bill HUF	130.6 bill HUF	28.0 bill HUF	25 000	6.35 bill HUF	1.12 bill HUF
3. version: 3000 ha	Total: 483 bill. HUF Self-contribution.: 289.8 bill. HUF Subsidy: 193.2 bill. HUF	402 thousand ha Total: 281.4 bill. HUF Self- contribution: 168.9 bill. HUF Subsidy: 112.5 bill HUF	1.191	237.9 bill HUF	195.9 bill HUF	42.0 bill HUF	37 500	6.35 bill HUF	1.12 bill HUF

Source: Own calculations and Tégla, 2008

Besides the green energy wood plantation the corn straws and thermal water can be mentioned as local energy source. However, optimum combination of these ones can mainly be realised in a certain place. Opportunities of thermal water utilisation are shown in the following figure since the purpose is to get more and more energy from water by consecutive utilisation methods as geothermal energy bearing media.

For third version, one-third domestic utilisation can increase the annual volume of vegetable produced in foiled forcing facility by 79.2 billion HUF. If vegetable produced in such a manner is exported in two-third ratio then it will mean an annual export surplus of 158.7 billion HUF, which is 0.9-1 billion USD annually. It means that our average vegetable export of 2003-2005 amounting 438 million USD can be three times higher during ten years. Besides the export increase the Vegetable Program has/can have serious importance permanently in the employment, because through training of unskilled workforce about 37 500 persons can take part in a permanently profitable activity. Similar like economic purposes the solutions of social stresses are also important which can be made by the program. It can only be achieved if selecting realisation locations of Vegetable Program that one of the major aspects will be to help efficient, long-term support of rising of settlements, micro-regions suffered by permanent, high ratio unemployment. The task –also in this field –is very complex and

requires serious planning, innovative and steady realisation. Obviously, taking the relatively unskilled workforce back in the world of labour means a lot of risks. Since such activity shall be taught to them which requires careful attention higher than average. Difficulty of the task is tried to show in the Fig. 4.

The full Vegetable Program contains such modernisation opportunities, for realisation of which the responsible, long-term activity of the state, municipalities and higher education is necessary.

We have made those calculations, which represent the budget influences of the program scenarios.

Figure 4

Taking workforce back in the word of labour

- System of workforce employment
- Training and motivation program of three years
- System of intensive supervision and management
- Motivation trainings
- Methods of fluctuation reduction
- Vocational training when working
- Semi-skilled workers training
- Delivery of complete training material to partners of Vegetable Program
- Local adaptation of complete training package at partners

Source: Own edition

We think that data of the Table 7 are clear evidence that it is worth to realise a program for development of forced vegetable production.

Multiple effects exerted by the Vegetable Program on the employment are shown in the Fig. 5.

Table 7

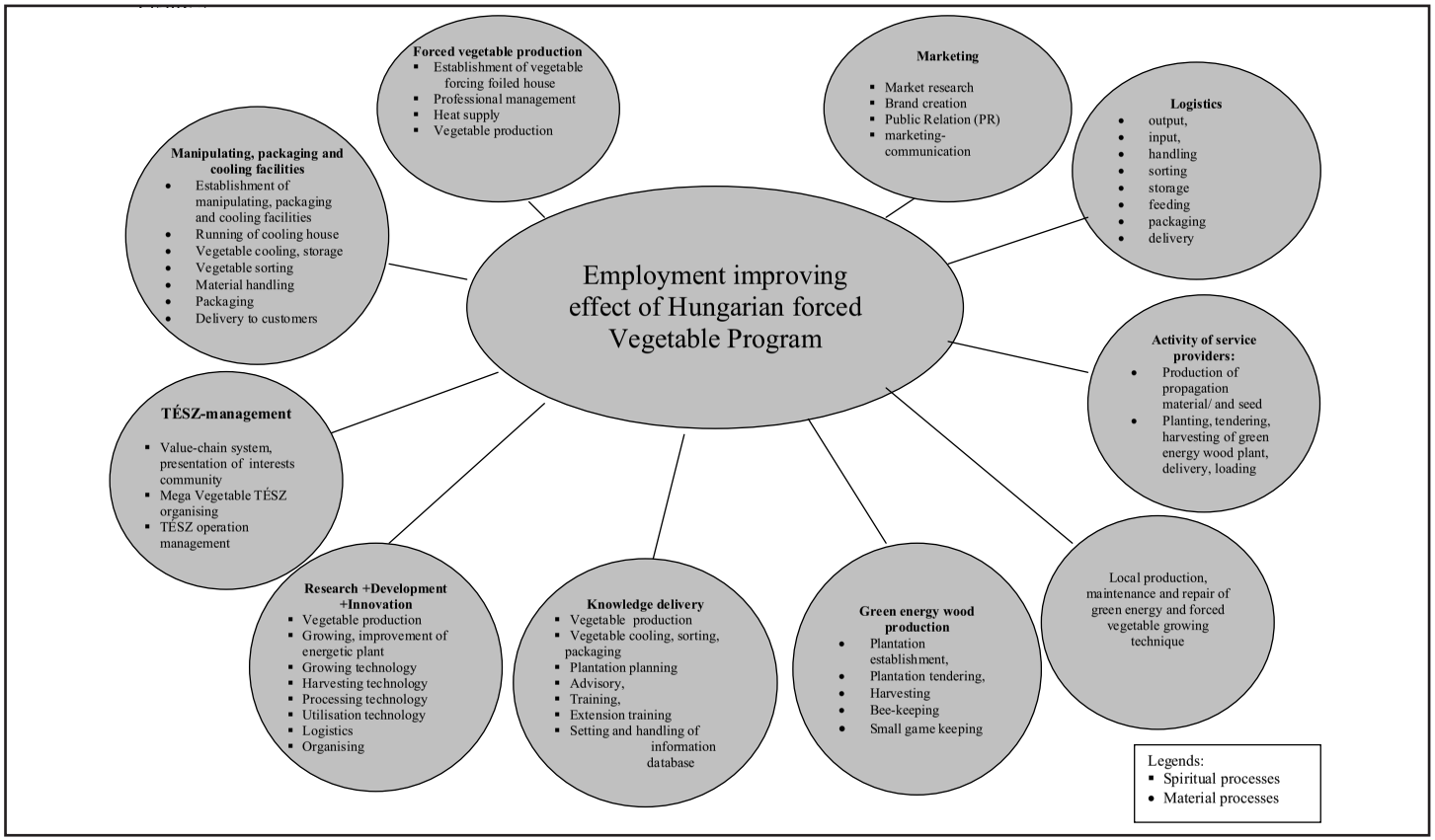
Economic characteristics and budgetary influences for three foiled vegetable forcing program variations (million HUF)

Description	1000 ha	2000 ha	3000 ha
Investment			
Foiled forcing facility and greenhouse	299 000	598 000	897 000
Green energy wood plantation	93 800	187 600	281 400
Investment total	**392 800**	**785 600**	**1 178 400**
Investment subsidy (70%)	274 960	549 920	824 880
Investment self-contribution (30%)	117 840	235 680	353 520
Revenue	**120 000**	**240 000**	**360 000**
Expenditure and amortisation	116 400	232 800	349 200
Profit before taxes	3 600	7 200	10 800
Tax paying responsibilities	600	1 200	1 800
Profit after taxes	**3 000**	**6 000**	**9 000**
Permanent employed people	**22 400**	**44 800**	**67 200**
Investment /employed people	60	120	180
Social expenditure savings (10 years)			
- employment of 70% unemployed people 0,6 mHUF/person/year	94 080	188 160	282 240
- employment of 100% unemployed people 0,6 mHUF/person/year	134 400	268 800	403 200
Corporate tax surplus (10 years)	6 000	12 000	18 000
HIPA surplus (1%) 10 years	6 667	13 334	20 001
Rates and taxes for person related expenditures (10 years) 289mHUF/year/ labour costs	124 270	248 540	372 810
Budgetary balance total (10 years)	**+ 365 417**	**+730 834**	**1 096 251**
Subsidy total (10 years)	- 275 000	-550 000	-825 000
Final budgetary balance (10 years)	+ 90 330	+180 330	+270 990

Source: Own calculations

Figure 5

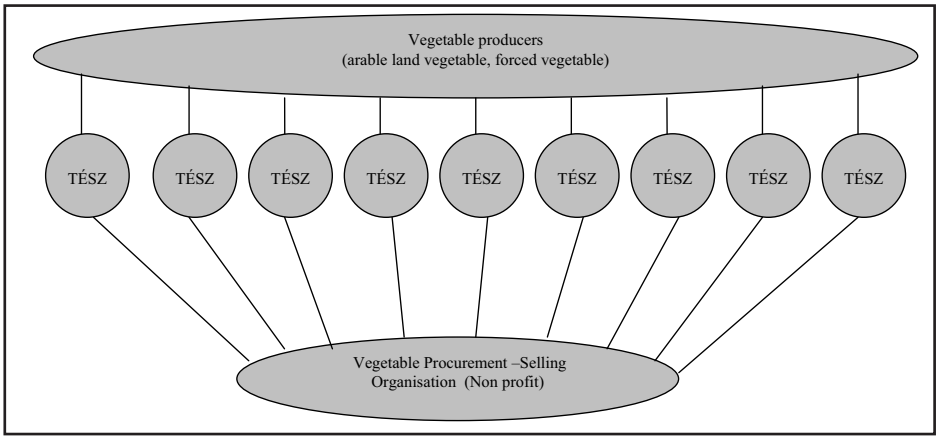
Employment improving effect of Hungarian forced Vegetable Program



Source: Own edition

Figure 6

Organisational background of Hungarian forced Vegetable Program



We mean it particularly important that integrative unit of power be created with such extent, which will be able – through its real market weight- to reach long-term attractive conditions on behalf of domestic vegetable producers at the giant store chains having superior force today, –using and often abusing it (Fig. 6).

REFERENCES

(1) Cselõtei, L. – Papp, J. – Z. Kiss L. (2005): Chances of closing up. HUNGARIAN AGRICULTURE - ISSN 0025-018X. - 2005. vol. 60, issue 43, p. 12-13. – (2) Csete, L. – Láng, I. (2005): Sustainable agrarian economy and rural development. Budapest, MTA Society Research Centre – (3) Gergely, S. (2005): NEKTÁR – National Small Business Supporting System. Szaktudás Edition House, Budapest – (4) Gergely, S. (2007): Green energy manual. Szaktudás Edition House, Budapest, 214. p. ISBN 978-963-9736-27-6 – (5) Gergely S. (2007): Regional Green Energy Cluster. Gyöngyös, 181p. ISBN 978-963-87229-6-6 – (6) Gergely, S. (2008): Green Energy and rural development. Szaktudás Edition House, Budapest – (7) Gergely, S. (2008): Successful country. Szaktudás Edition House, Budapest – (8) Gergely, S. – Tégla, Zs. (2008): MEGA Vegetable Program. Gyöngyös (draft) – (9) Magda, S. (ed.) (2003): Basis of management of agricultural businesses. Szaktudás Edition House, Budapest – (10) Magda, S. (2004): Situation of agricultural researches in the North-Hungarian Region. North-Eastern Hungary, Miskolc, 9–16 p – (11) Romány, P. (2002): Development and outlook of national agrarian policy. – (12) Tégla, Zs. (2003): Organisation and economy of vegetable forcing. In organisation and economy of horticultural industries. p. 59-72 ISBN 963 9422 88 6

ADDRESS:

Dr. Gergely Sándor, igazgató, Károly Róbert Főiskola, Kutató Fejlesztő Központ;
MTA Észak-magyarországi Ökoenergetikai és Környezetipari Társult Kutatócsoport
chief scientific associate, KRF Research Development Centre; MTA North-Hungarian Eco-Energetic and Environment Industrial Associated Research Team
3200 Gyöngyös, Mátrai út 36., Tel.: +36-37-309-070, Fax: +36-37-309-535, E-mail: sgergely@karolyrobert.hu